Technical Report on Preliminary Economic Assessment for the Caribou Massive Sulphide Zinc-Lead-Silver Project, Bathurst, New Brunswick, Canada

Report Prepared for

Trevali Mining Corporation

Report Prepared by

SRK Consulting (Canada) Inc.
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Cover: Caribou mining and milling complex site, Bathurst, New Brunswick. Photo courtesy of Trevali Mining Corporation

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Executive Summary

Introduction

The Caribou project is a past producing polymetallic deposit, located 50 kilometres (km) west of Bathurst, New Brunswick, Canada. Trevali Mining Corporation (Trevali) wholly owns the Caribou mine and mill complex, consisting of a historically developed underground mine and a fully permitted 3,000 tonne per day (tpd) processing mill, flotation recovery plant, metallurgical and geochemical laboratories, and a tailings management facility. Trevali is a Canadian public company domiciled in Vancouver, British Columbia with shares listed on the TSX under the symbol TV.

The Caribou underground mine has significant underground development workings and mineral resources. It is a massive sulphide zinc-copper-lead-silver+/- gold deposit. SRK Consulting (Canada) Inc. (SRK) completed a resource estimate for the Caribou project, outlining seven high grade mineralized lenses, documented in "Independent Technical Report for the Caribou Massive Sulphide Project, Bathurst, New Brunswick, Canada", dated February 25, 2013, amended November 21, 2013. In January 2014, SRK was commissioned by Trevali to prepare a preliminary economic assessment (PEA) for the Caribou project by working with independent consultants Holland and Holland Consultants (Holland and Holland), Stantec Consulting Ltd. (Stantec), and Trevali.

This technical report summarizes the technical information that is relevant to support the disclosure of the preliminary economic assessment results for the Caribou project pursuant to Canadian Securities Administrators' National Instrument 43-101. It provides a summary of the work completed by the independent consultants. The opinions contained herein and effective May 13, 2014, are based on information collected by the various consultants throughout the course of their investigations.

Property Description and Ownership

The Caribou project is located in Restigouche County in the province of New Brunswick. The property lies within National Topographical System (NTS) map sheet 21O/09. The Caribou deposit is located on an existing mine site with extensive pre-existing infrastructure. The property is approximately 7 km long in the east-west direction and 5 km wide in the north-south direction. The north-eastern and northern limits of the property are intersected by Highway 180.

The Caribou property consists of a single Mining Lease, ML-246 covering 3,105.7 hectares (ha). The lease has a 20 year term and is set to expire on October 27, 2028. It is owned 100% by Trevali.

Geology and Mineralization

The Bathurst Mining Camp (BMC) occupies a roughly circular area of approximately 70 km diameter in the Miramichi Highlands of northern New Brunswick. The area boasts some 46 mineral deposits with defined tonnage and another hundred mineral occurrences, all hosted by Cambro-Ordovician rocks that were deposited in an ensialic back-arc basin.

The rocks in the BMC are divided into five groups: the Miramichi, Tetagouche, California Lake, Sheephouse Brook, and Fournier groups, which are largely in tectonic contact with one another. The lower part of each group is dominated by felsic volcanic rocks and the upper part by mafic volcanic rocks, which are overlain by carbonaceous shale and pelagic chert. The basalts are both tholeiitic and alkalic and show a progression from enriched, fractionated continental tholeiites to alkali basalts to more primitive, mantle-derived midocean ridge, tholeiitic pillow basalts. Most massive sulfide deposits of the Bathurst mining camp are associated with felsic volcanic rocks in each group.

Exploration Status

Trevali conducted a drilling program between February and April 2014 and completed four drill holes to test different property-wide geophysical anomalies (Titan 24 IP) for a total of 2,179 metres (m), and a fifth borehole successfully tested deep mineralization down plunge of the Caribou deposit, approximately 450 meters down-dip of the currently defined resource. The previous drilling program on the property was carried out by Blue Note Mining Inc. in early 2009.

Mineral Resource and Mineral Reserve Estimates

Block model quantities and grade estimates for the Caribou project were classified according to the CIM *Definition Standards for Mineral Resources and Mineral Reserves* (November 2010) by Guy Dishaw, PGeo, of SRK, under the supervision of Dr. Gilles Arseneau, PGeo. Both are independent Qualified Persons as this term is defined in National Instrument 43-101.

Mineral resources were considered for the Measured category for blocks generally above the lowest mined levels, developed within the mineralized domains. Within this volume, most blocks were estimated by at least three composite samples from a minimum of two drill holes from the first and second interpolation passes, which searched out to 35 metres. Mineral resources were considered for the Indicated category where blocks were estimated by at least three composite samples from a minimum of two drill holes from the first and second interpolation passes which searched out to 35 metres (exclusive of the volume considered for Measured). Measured and Indicated candidate blocks were reviewed in three dimensions to assess how they related to each other and the borehole data. The Measured and Indicated candidate blocks were used to design wireframe models of the final Measured and Indicated category volumes. All remaining estimated blocks within the estimation domains were classified as Inferred. Mineral resources are summarized in Table i below. There are no mineral reserves at the Caribou project.

Table i: Mineral Resource Statement*, Caribou Project, Bathurst, New Brunswick, SRK Consulting, May 13, 2014.

Category	Quantity	Grade					Metal				
		Au	Ag	Pb	Zn	Cu	Au	Ag	Pb	Zn	Cu
	(Mt)	(g/t)	(g/t)	(%)	(%)	(%)	(M oz)	(M oz)	(M lbs)	(M lbs)	(M lbs)
Underground**											
Measured	5.61	0.84	84.64	2.93	6.91	0.46	0.15	15.28	362.69	855.36	56.94
Indicated	1.62	1.06	83.68	2.94	7.28	0.34	0.06	4.36	104.95	259.87	12.14
Measured and Indicated	7.23	0.89	84.43	2.93	6.99	0.43	0.21	19.64	467.64	1,115.23	69.08
Inferred	3.66	1.23	78.31	2.81	6.95	0.32	0.14	9.21	226.60	560.44	25.80

* Mineral resources are not mineral reserves and do not have demonstrated economic viability. All figures are rounded to reflect the relative accuracy of the estimate. All composites have been capped where appropriate.

** Underground mineral resources are reported at a cut-off grade of 5% Zn equivalent. Cut-off grades are based on price for Au of US$1470 per ounce, Ag is US$26 per ounce, Cu is US$3.39 per pound, Pb is US$1.18 per pound, and Zn is US$1.14 per pound, and exchange rate US$1.00 per Canadian dollar. A recovery of 83% was applied to Zn, 71% was applied to Pb, 57% was applied to Cu, 45% was applied to Ag, and 40% was applied to Au.

Mine Hydrogeology and Geotechnical

There is no specific hydrogeological study to support the design of a mine dewatering system for the PEA. The PEA mine dewatering system design is based on a review of historical records from previous mining which indicated peak dewatering rates in the range of 12.6 litres per second (L/s) or 200 US gallons per minute (GPM). Considering the increased depth of planned mining, a worst case scenario was estimated at 42.9 L/s for the PEA.

There is no current, comprehensive geotechnical study. SRK reviewed historical geotechnical information, past mine design practices and stope production records, and concluded that the rock mass conditions are suitable for an AVOCA type open stoping method. Similar to previous Caribou operations, stope dimensions were set at 20 m long by 20 m high by lens width.

An SRK sill pillar recovery assessment suggests partial recovery that varies with depth, averaging 27% overall.

Underground Mining

Modified AVOCA is the main mining method planned, supplemented by up hole retreat for partial sill pillar recovery. Modified AVOCA stopes will employ unconsolidated waste rock as backfill. The mine plan includes 87% of tonnes from modified AVOCA stoping with down holes on 20 m sublevels and waste rock fill, and 13% of tonnes from longhole retreat using up holes with no backfill for sill areas between mining fronts. Crown pillar recovery is not considered in the PEA due to lack of geotechnical information.

Access to the underground mine will be by a connected dual ramp system from existing portals in the upper 100 m of the mine and a single ramp system below. New ramps required at depth are designed at an average gradient of -15% with dimensions of 5.0 m width by 5.0 m height. Existing ramps in the upper mine will be slashed to the same size to accommodate planned air flows. A planned connection between the two ramps is 390 m long between elevations 2473 and 2415 m.

Stope sequencing will generally be a retreat along strike from lens extremities or strategic starting points to access crosscuts. Plant feed will be hauled to surface by 45-tonne capacity trucks loaded by Load-Laul-Dump vehicles (LHDs). Waste rock broken underground will be hauled by 45-tonne capacity ejector type trucks to empty stopes as backfill, or to surface (mainly during pre-production). Plant feed will be stored in remuck bays along the ramps prior to truck haulage. In addition to the ejector type trucks, LHDs will fill empty stopes with waste rock from development, supplemented with waste rock back hauled from existing surface waste rock stockpiles.

During sill pillar mining late in the mine life, up holes will be drilled only to a designed length to preserve a non-recoverable portion of the sill pillar. Mining will be on retreat with remote mucking by LHDs.

Ventilation is planned at 425 cubic metres per second (cms) or 900,000 cubic feet per minute (cfm) for a production rate of 3,000 tonnes per day (tpd), providing an estimated 29% contingency. Intake will be through two existing fresh air raises (FAR), to be slashed out to 4.7 m by 4.7 m cross section. Exhaust will be through the main ramp and a planned return air raise (RAR) in the lower mine, and through the main ramp, the shaft, the old conveyor ramp, and the main services raise in the upper mine.

An existing main sump located on the 2360 Level will pump clear water to surface through the main services raise. Planned secondary pump stations located on all main levels will direct water to the main sump for pumping to surface.

Plant Feed Estimate

There are no mineral reserves declared for the Caribou project. In the PEA, all mineral resources categories, including Measured, Indicated, and Inferred resources, were considered for inclusion into the mine plan. The resource block model was used for the design of mining shapes targeting all mineral resources above an in situ net smelter return (NSR) cut-off value (CoV) of $100/t based on a zinc price of US$1.00/pound (lb), lead price US$1.00/lb, copper price US$3.00/lb, silver price US$21.00/ounce (oz), gold price US$1200.00/oz, exchange rate of US$0.95 per Canadian dollar, an initial estimated total site cost of $84.43 per tonne processed (comprising of site operating cost of $74.93/t and royalties of $9.50/t), and initial metallurgical zinc recovery of 83.6%, lead recovery of 64.7%, copper recovery of 42.2%, silver recovery of 35.3%, and gold recovery of 7.6%. Mining recovery and dilution parameters were applied based on the selected mining method and geotechnical considerations. External dilution averages 16% with an averaging $43.15/t NSR. Mining recoveries vary from 27% to 94% dependent on stope category, with an average of 77%.

The estimated life-of-mine (LoM) plant feed is summarized in Table ii below. There is no Mineral Reserve at the Caribou Project.

Table ii: Plant Feed Estimate

Category	Plant Feed						
	Tonnes (kt)	Zn (%)	Pb (%)	Cu (%)	Ag (gpt)	Au (gpt)	NSR ($/t)
Measured	2,461	6.18	2.45	0.32	68.20	0.89	131
Indicated	554	6.19	2.48	0.35	67.70	0.88	132
Subtotal of Measured and Indicated	**3,014**	**6.18**	**2.46**	**0.33**	**68.11**	**0.89**	**131**
Inferred	3,138	6.04	2.52	0.35	67.70	0.83	130
Subtotal of Inferred	**3,138**	**6.04**	**2.52**	**0.35**	**67.70**	**0.83**	**130**

* Figures have been rounded.
** The estimated plant feed is partly based on Inferred Mineral Resources that are considered too speculative geologically to have the economic considerations applied to them that would enable them to be categorized as Mineral Reserves, and there is no certainty that the preliminary economic assessment based on these Mineral Resources will be realized.
*** The reader is cautioned that the mineralized material should not be misconstrued as a mineral resource or a mineral reserve. The quantities and grade estimates are derived from the block model and include mining dilution and losses.

Production Schedule

The underground mine will be contractor operated from start-up to the end of the first year of production (2015), and owner operated from Q1 2016 to the end of mine life (~Q1 2021). Monthly LoM development and production schedules were prepared and consolidated into an annual schedule for reporting. The underground mine pre-production period is defined as a 9-month period from April 1, 2014 (re-start of mine dewatering and rehabilitation) to December 31, 2014. In H1 2015, the average production rate will be 2,040 tpd, which is 68% of the designed underground mine capacity. The mining production period extends from January 1, 2015 to March 2021 for 6.3 years. At full production the planned mining rate is 3,000 tpd or 1,095,000 tonnes per annum (tpa). The LoM total plant feed is 6,152,000 t.

LoM lateral development is estimated at 31,200 m, including 3,200 m capitalized and 28,000 m expensed. LoM vertical development is estimated at 1,300 m, all capitalized. The lateral development advance rate was scheduled to a maximum of 360 m/month, or 120 m/month/jumbo. LoM waste rock broken is approximately 926,000 t. Definition drilling costs are budgeted but no detailed definition drilling plan has been prepared.

Total required backfill of 2,325 kt will be sourced from underground development waste (889 kt) and surface waste stockpile (1,336 kt). The surface waste stockpile has been reviewed by Trevali and deemed to be sufficient make up for the LoM.

Metallurgy and Processing

Based on the metallurgical results available from previous operations and laboratory testwork, future metallurgical performance (top section of Table iii) has been estimated for the rehabilitated Caribou processing plant that will include a new copper separation circuit.

Based upon in-depth discussions with previous operations technical staff, it is anticipated that the primary grind of 30 microns can be achieved with the existing equipment, with the possibility of improving on previous operations through the use of the replacement SAG mill.

The future forecast metallurgy is based on additional capital expenditure aimed at optimizing the primary grind in conjunction with improvements to regrinding of the lead and zinc ahead of cleaning. It is based on testwork results obtained from finer grinding. It represents possible upside only, and is not incorporated into the capital budget or the financial model.

Table iii: Predictive Metallurgy

	Grades						Recoveries (%)				
	Wt (%)	Pb (%)	Cu (%)	Zn (%)	Ag (g/t)	Au (g/t)	Pb	Cu	Zn	Ag	Au
Anticipated Metallurgy at 30 micron primary grind											
Feed	100.0	2.44	0.40	6.05	71	0.93	100.0	100.0	100.0	100.0	100.0
Pb Conc	3.52	45.00	0.40	6.05	655	2.00	65.00	3.52	3.52	32.5	7.58
Cu Conc	0.90	8.00	20.00	5.50	394	3.10	2.62	45.00	0.73	5.00	3.00
Zn Conc	10.16	1.22	0.70	50.00	126	0.91	5.08	17.79	84.00	18.11	10.00
Tailing	85.41	0.78	0.16	0.83	37	0.86	27.30	33.69	11.75	44.50	79.42
Anticipated Future Metallurgy with fully refitted grinding circuit											
Feed	100.0	2.44	0.40	6.05	71	0.93	100.0	100.0	100.0	100.0	100.0
Pb Conc	3.80	45.00	0.40	6.05	655	2.00	70.00	3.66	3.66	35.00	8.16
Cu Conc	1.00	8.00	20.00	5.50	391	2.79	2.79	50.00	0.77	5.50	3.00
Zn Conc	10.20	1.22	0.70	51.00	125	0.91	5.14	18.00	86.00	18.00	10.00
Tailing	85.00	0.63	0.13	0.68	35	0.86	22.07	28.34	9.57	41.5	78.84

The planned 3,000 tpd process flowsheet is identical to the flowsheet used during previous operations with the addition of a copper circuit to recover the copper values evident in the Caribou plant feed.

Project Infrastructure

The basic infrastructure required for the project is in place, and has been kept in a serviceable state since the 2008 mine closure. Power has been maintained and heat has been supplied to buildings that could not otherwise be protected against freezing.

With minor repair or rehabilitation, the surface infrastructure supporting the underground mine can be restored to an operating state for the mine re-opening. With underground mine dewatering in progress, underground rehabilitation and development slashing work will be started to prepare for production start-up. No new major underground infrastructure is needed in the early years of production.

The process plant is a multi-level structure occupying an area of approximately 4,000 m^2. Primary plant feed crushing will be contracted out. Grinding, a lead flotation circuit, and a zinc flotation circuit are in place. By undertaking repair work and replacing the SAG mill, the 3,000 tpd capacity process plant will be brought to a functional condition. A new copper flotation circuit will be added to the existing lead and zinc circuits in the existing plant building in order to maximize the revenue from the plant feed.

Market Studies and Contracts

Zinc, lead and copper concentrate offtake agreements are in place with Glencore Xstrata plc, a large, diversified resource conglomerate and commodity trader, for LoM feed at International Benchmark terms, as defined by average respective commodity price on the London Metal Exchange for the relative shipping period.

The following contracts will be part of the construction and/or operation of the Caribou mine:

- Dewatering of the underground mine;
- Underground rehabilitation and development slashing work will be conducted by a mining contractor during pre-production, and during year one of production all mining will be done by contractor;
- Production drilling and blasting;
- Primary crushing on surface of the plant feed.

SRK has not reviewed any of these contracts or documents related to tendering.

Social and Environmental Aspects

The Caribou mine falls within the BMC, an area with a long history of mining. With the recent closure of the Brunswick-12 Mine (B-12 Mine), the area is in need of employment opportunities in mining, and has a large pool of experienced mining personnel, contractors, and service providers available to service the project.

The re-opening of the Caribou mine will make use of the existing infrastructure on an already disturbed site. The site is fully permitted and consists of a water treatment plant and sludge ponds, and a tailings management facility. The Caribou site has been previously operated by various companies and the proposed start-up does not represent a significant variance to previous operations.

On January 31, 2013 Trevali entered into a Limited Environmental Liability Agreement with the province of New Brunswick, where the province would accept the environmental liability associated with historic operations.

At present, the monies being held in securities for the Caribou mine site are included in the assets that were acquired by Trevali Mining New Brunswick Ltd. (TMNBL). The current reclamation assets on file with the province total $4,733,000. Based on the current reclamation plan, a total of $6,250,000 reclamation security bond is required to be on file with the New Brunswick Department of Natural Resources (NBDNR). TMNBL will post an additional $1,517,000 to top up the current reclamation security. Additionally, as per Trevali's

Approval to Operate I-8310 (C*ond.15b*), an additional $1,500,000 environmental protection bond will also be posted with the New Brunswick Department of Environment and Local Government (DELG or NBDELG).

Capital and Operating Cost Estimates

Capital and operating costs are presented in Canadian dollars as at the second quarter of 2014 (2Q14).

Caribou project total capital cost estimate is $125.1 million, comprised of $36.3 million in pre-production capital and $88.8 million in sustaining capital over LoM. Many costs within the PEA are based on direct supplier/contractor quotations including the following:

- Major mine mobile equipment quotations;
- Mining contractor quotations as cost base for development and production;
- Material supply quotations;
- Building rehabilitation quotations;
- Consumables - fuel, power and explosives.

The remaining capital cost estimates were prepared to an accuracy level of +/- 40%. The capital cost estimates include a $6 million contingency for the mine and $0.7 million for the process plant. Cost estimates for the underground mine are based on contractor operation from start-up to Q4 2015, and owner operation from Q1 2016 to the end of mine life.

Site operating costs averaging $74.77 per tonne processed are estimated for the period from January 1, 2015 through to March 2021, which consists of $37.06/t-milled mine operating cost, $30.14/t-milled mill operating cost, $1.59/t-milled environmental operating cost, and $5.99/t-milled general and administration (G&A) operating cost.

Indicative Economic Results

The Caribou project has been evaluated on a discounted cash flow basis. The cash flow analysis was prepared on a constant 2014 Canadian dollar basis. No inflation or escalation of revenue or costs has been incorporated. The base case assumed metal prices are zinc price of US$1.00/lb, lead price of US$1.00/lb, copper price of US$3.00/lb, silver price of US$21.00/oz, gold price of US$1200.00/oz, and exchange rate of US$0.95 per Canadian dollar.

The financial analysis performed as part of this PEA used the following base case assumptions. The pre-tax present value of the net cash flow with a 5% discount rate (NPV5%) is $150 million using the base case metal prices. Project post-tax NPV5% at the base case metal prices is $106 million. The internal rates of return (IRR) are respectively 69% pre-tax and 57% post-tax.

The payback period is expected to be approximately two years at the base case metal prices. The payback period is defined as the time after production start that is required to recover the initial expenditures incurred.

The key economic indicators of NPV5% and IRR are most sensitive to changes in metal prices and then plant feed head grades. This is attributed to the fact that metal prices and head grades affect directly the entire revenue stream. The project is slightly more sensitive to changes in operating costs than to capital costs. Of the parameters examined the project is least sensitive to changes in the external dilution.

This preliminary economic assessment is preliminary in nature. The results of the economic analysis performed as a part of this PEA are based in part on Inferred mineral resources. Inferred mineral resources are considered too speculative geologically to have the economic considerations applied to them that would enable them to be categorized as mineral reserves, and there is no certainty that the preliminary economic assessment will be realized.

Conclusion and Recommendations

This PEA was prepared by a group of independent consultants to demonstrate the economic viability of an underground mine and mill complex targeting all mineral resources defined in the Caribou project. This technical report provides a summary of the results and findings from each major area of investigation to a level that is considered to be consistent with that normally expected for a PEA of a resource development project.

The results of the PEA indicate that the re-opening of the proposed Caribou project has financial merit at the base case assumptions considered. The results are considered sufficiently reliable to guide Trevali's management in a decision to advance the project to a prefeasibility study or a feasibility study.

Analysis of the results of the investigations has identified a series of risks and opportunities associated with each of the technical aspects considered for the development of the proposed project.

The key risks include:

- There is uncertainty in the actual required quantities of mine rehabilitation and drift slashing due to restricted underground access during dewatering. An increased or decreased quantity of rehabilitation/slashing work and/or schedule delays or ahead schedule could affect the PEA economic results;
- There is a risk of increased external dilution beyond the planned amount. This would reduce the mill head grade and have a negative impact on revenue;
- The project risk associated with the concentrator operation and metallurgical performance is minimal. However there is a risk that the predictive metallurgy will not be consistently achieved with a negative impact on the revenue;
- A process related risk at present is the ability to recruit suitably trained staff for a relatively difficult plant feed to process; however as noted a skilled labour pool from the recently closed B-12 Mine is locally available;
- The Caribou mine site is a fully permitted facility that allows for mining and milling under the existing certificate of approval (CofA). The addition of a copper circuit to produce a copper concentrate will need to be permitted.

The key opportunities include:

- Exploration potential to increase the mineral resources of the Caribou project with additional drilling targeting the deep extension below the currently defined mineralization zones;
- Maximize sill pillar recovery by replacing waste backfill with paste backfill. A trade-off study would be needed;
- Further stope design optimization will lead to reduced internal dilution and increased plant feed head grades, potentially head grades increase by 3% to 4.5%;
- Further detailed mine planning work could possibly bring more mineralized material into the mine plan;
- Further definition drilling should convert some of the existing Inferred mineral resources to Indicated or Measured category. This will be a benefit for future higher level technical studies;
- Owing to the historical operations being based upon a mixture of Caribou and Restigouche plant feed with the Restigouche plant feed known to be the more difficult to process, the potential to improve the predicted metallurgical forecast for Caribou plant feed only, is most likely.

Analysis of the results and findings from each major area of investigation suggests several recommendations to be considered during the next study stage of the project, including:

- Drill three HQ diamond drill holes to collect samples of the mineralization for metallurgical testing;
- Evaluation of backfilling alternatives, such as paste backfill, that may be more cost efficient than the planned use of unconsolidated rock fill and has potential to increase sill pillar recovery rate;

- Optimize stope design and re-evaluate minimum mining width and the smallest mobile equipment size in order to reduce internal dilution and improve total mining recovery of the Caribou mineral resources;
- Perform a comprehensive geotechnical study to support future mine design including generation of a three-dimensional lithological model, a three-dimensional structural model, development of three-dimensional geotechnical design domains and establishment of representative geotechnical parameters for each domain; and development of excavation support requirement guidelines for both in waste and in mineralization;
- Review hydrogeological information and assess the requirement for development of a hydrogeological model;
- Draw on experience from the detailed operational logs of past producers at Caribou to focus efforts on the critical areas to improve plant efficiency and increase metallurgical performance moving forward;
- Engineering and planning studies should commence in mid-2014 for the environmental infrastructure upgrades;
- Continue discussion with provincial department on permitting the addition of a copper circuit;
- Review CofA permit conditions regularly to ensure compliance is achieved and condition deadlines are met.

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1 Introduction and Terms of Reference

1.1 Introduction

The Caribou project is a past producing polymetallic deposit, located 50 kilometres (km) west of Bathurst, New Brunswick, Canada. Trevali Mining Corporation (Trevali) wholly owns the Caribou mine and mill complex, consisting of a historically developed underground mine and a fully permitted 3,000 tonne per day (tpd) processing mill, flotation recovery plant, metallurgical and geochemical laboratories, a water treatment plant, and tailings management facility.

Considerable infrastructure is already in place as a result of several periods of historical mining in the project areas and Trevali's other properties in the vicinity. The project is located in the Bathurst mining camp of northern New Brunswick, and along provincial Highway 180. Local resources are sufficient to meet the project requirements.

The Caribou underground mine has significant underground development workings and mineral resources. It is a massive sulphide deposit. SRK Consulting (Canada) Inc. (SRK) completed a resource estimate for the Caribou project, outlining seven high grade mineralized lenses, documented in "Independent Technical Report for the Caribou Massive Sulphide Project, Bathurst, New Brunswick, Canada", dated February 25, 2013 and amended November 21, 2013.

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The purpose of this technical report is to document the results of the preliminary economic assessment (PEA) for the Caribou project prepared by SRK with contributions from Trevali and other independent consultants. It was prepared following the guidelines of the Canadian Securities Administrators' National Instrument 43-101 and Form 43-101F1.

This report has been compiled by Mr. Benny Zhang, PEng, MEng, of SRK in SRK's Toronto office during the months of May and June, 2014.

1.2 Scope of Work

SRK's scope of work included:

- Management of SRK's own work;
- Review of Trevali updated resource block model, containing all sulphide mineralized materials, solely used for external dilution assessment in the mine planning;
- Review and update underground mine planning and related cost estimation as prepared by Trevali;
- Review and update the project financial model as prepared by Trevali;
- Review third party consultants' corresponding work compiled in the technical report (processing and metallurgical testing, environmental, permitting, tailings and waste rock management, infrastructure, etc.);

- Compile a National Instrument 43-101 compliant technical report describing the preliminary economic assessment for the Caribou project by incorporating the work of Trevali and the work of other independent consultants separately commissioned by Trevali.

1.3 Contributing Authors

1.3.1 Management of the PEA

The preliminary economic assessment reported herein is a collaborative effort between Trevali, SRK, and other independent consultants. Mr. Benny Zhang, PEng, MEng, managed the SRK team. Mr. Paul Keller, of Trevali Chief Operating Officer (COO), PEng, with assistance from Mr. Jeremy Ouellette, PEng, of Trevali, was responsible for the management of the PEA.

Mr. Paul Keller, PEng, is the COO of Trevali and has extensive mine operations experience in Canada with 27 years of experience most recently as Manager of Technical Services for a major Canadian mining contractor where he led a team of engineers and designers on various mining contracts for major mining companies. Mr. Keller began his career with Rio Algom Limited and has also worked in various management roles with Barrick Gold's Hemlo mine in operations, engineering and maintenance.

Mr. Benny Zhang, PEng, **MEng**, is a Principal Mining Engineer employed by SRK since 2011 and has more than 28 years of experience in mining studies, planning and design, mine operations, and teaching and research in North America, South America, Europe, Africa, and Asia. Prior to joining SRK, he worked with AMEC Americas where he was involved in scoping, prefeasibility, feasibility, geomechanical studies, ground control, technical review, technical due diligence audit, and natural resource valuation projects. He has held research assistant and teaching assistant posts at McGill University where he was involved in applied rock mechanics for mine planning research projects and courses in mine development and services as well as materials handling.

Mr. Jeremy Ouellette, PEng, is a Senior Mining Engineer with Trevali and under the supervision of Mr. Zhang, PEng, managed the design of all mine layouts and scheduling as well as equipment specifications, ventilation modeling, etc. In addition, Jeremy developed the PEA initial cost and scheduling models with input from multiple sources.

1.3.2 Qualified Persons

The following consultants, designated as Independent Qualified Persons (QP) for the purpose of this technical report, have provided contributions as authors for specific sections of this report related to their areas of expertise. Only general areas of responsibility are listed here, with detailed lists of responsibility provided in the Qualified Persons Certificates included with this report.

Dr. Gilles Arseneau, PGeo (APEGBC # 23474) is an Associate Consultant with SRK, specialized in the area of geology and mineral resource estimation. Dr. Arseneau is the QP for the "Independent Technical Report for the Caribou Massive Sulphide Project, Bathurst New Brunswick, Canada", dated February 25, 2013 with amended November 21, 2013. The current technical report regarding geology and mineral resources generally restated the previous technical report.

Dr. Arseneau is the qualified person taking responsibility for the geology and Mineral Resource Statement.

Mr. Benny Zhang, MEng, **PEng** (PEO # 100115459) is a Principal Mining Engineer employed by SRK, specialized in the area of mine planning and mining project economics.

Mr. Zhang Benny is the qualified person taking responsibility for mine planning, economic analysis, and project infrastructure (excluding processing and environmental related).

Mr. Leonard Holland, CEng (IMMM # 41918) is an independent consultant with Holland and Holland, specialized in the area of metallurgy and mineral processing. Since graduation from University of Wales in the UK in 1968, Len has worked continuously in the mineral processing industry covering all aspects of concentrator processing plants from preliminary metallurgical testwork through the design of the process plant to commissioning and operation, in addition to consulting on process plant optimization.

Mr. Holland is the qualified person taking responsibility in metallurgy and processing, and project infrastructure (processing related).

Mr. Jeffery Barrett, PEng (APEGNB # M6890) is an Associate, Geotechnical Engineering, with the consulting firm Stantec Consulting Ltd.

Mr. Barrett is the qualified person taking responsibility for environmental, permitting, social impact, and project infrastructure (environmental related).

1.3.3 Others Contributing to the PEA

Other contributors to the preliminary economic assessment include:

Mr. Ken Reipas, PEng (PEO # 100015286) is a Principal Mine Engineer employed by SRK since 2001 and has over 30 years of experience in mine engineering, mine production and consulting. Prior to joining SRK, he worked at several open pit and underground mining operations in Canada involved in the bulk mining of iron, coal, gold and base metals. Since 1997, his consulting projects have included technical studies, mine planning and reserves, mine operations assistance, and due diligence reviews. Mr. Reipas is the mine planning and project economics technical reviewer, and as per SRK internal quality management procedures acts as a senior reviewer of this technical report.

Mr. Guy Dishaw, PGeo (APEGBC # 36183), is a Senior Consultant (resource geology) with SRK. Mr. Dishaw performed the resource evaluation work, and validation of the Trevali updated block model.

Mr. Bruce Murphy, MSc. Eng, (FSAIMM # 56806) is a Principal Consultant with more than 20 years of experience in operational and consulting environment in both open pit and underground rock engineering. He has operational experience in deep level gold, open pit and underground iron ore and copper in South Africa and Zambia. He specializes in establishing the geotechnical and mining context of existing and potential open pit and underground deposits through the integration of structural geology, rock mass characterization, and other influences such as hydrogeology, permafrost, and existing excavation performance. He has project experience in North and South America, Africa, and Asia. Mr. Murphy undertook a high level assessment of sill pillar recovery for the proposed mining plan.

Mr. Cam Scott, PEng, MEng is a Principal Geotechnical Engineer employed by SRK with more than 35 years of professional experience, most of which has focused on the geotechnical and hydrogeological aspects of mining, including site selection, design, permitting, operation and closure of mine waste facilities. He has assumed various roles, from project manager to technical specialist, on multidisciplinary teams responsible for the development, operation and/or closure of mines in Canada, the Americas, Europe, Africa, and Asia. Mr. Scott undertook a high level review of third party contributions to the PEA in the areas of environmental, permitting, tailings and waste management.

Mr. Eric Arseneau, MES, is a Senior Environmental Scientist with Stantec, a former Environmental Manager at Blue Note Caribou Mines Ltd., and provided major support to the environmental aspects of the PEA.

Mr. Shaun Woods, PEng, is the former senior metallurgist at Xstrata's B-12 Mine and is Senior Metallurgist with Trevali and under the supervision of Mr. Holland, CEng, managed the copper circuit design with input from milling and metallurgical consultants (Holland, RPC, and DRA Americas) and was involved in mill cost estimates and assessing metallurgical recoveries.

Ms. Vanessa Williams, EIT, is an Engineer in Training with Trevali and under the guide of Mr. Ouellette generated most of the secondary models used to support the PEA. These models include the mobile equipment analysis, ventilation diagrams and model, rehabilitation backup, etc. In addition to this, Ms. Williams provided major support to the mine designs and scheduling.

Mr. Daniel Williams, EIT, is an Engineer in Training with Trevali and provided major support to the mine designs and scheduling.

Ms. Dayle Rusk, PGeo, is the Director Geology for Trevali and helped with reconciliations and verifying block models. In addition, Ms. Rusk supplied the wireframes which were checked by SRK.

1.3.4 PEA Technical Report Responsibilities

Responsibilities for each report section are listed in Table 1.

Table 1: Responsibility of PEA Report Sections

Section	Title	Responsible
-	Executive Summary	SRK / Holland and Holland / Stantec / Trevali
1	Introduction	SRK
2	Reliance on Other Experts	SRK
3	Property Description and Location	SRK / Stantec
4	Accessibility, Climate, Local Resources, Infrastructure and Physiography	SRK
5	History	SRK
6	Geological Setting and Mineralization	SRK
7	Deposit Types	SRK
8	Exploration	SRK / Trevali
9	Drilling	SRK
10	Sample Preparation, Analysis and Security	SRK
11	Data Verification	SRK
12	Mineral Processing and Metallurgical Testing	Holland and Holland
13	Mineral Resource Estimates	SRK
14	Mineral Reserve Estimates	SRK
15	Mining Methods	SRK / Trevali
16	Recovery Methods	Holland and Holland / Trevali
17	Project Infrastructure	SRK / Holland and Holland / Stantec / Trevali
18	Market Studies and Contracts	SRK / Trevali
19	Environmental Studies, Permitting and Social or Community Impact	Stantec
20	Capital Cost and Operating Costs	SRK / Holland and Holland / Stantec / Trevali
21	Economic Analysis	SRK / Trevali
22	Adjacent Properties	SRK
23	Other Relevant Data and Information	Stantec
24	Interpretation and Conclusions	SRK / Holland and Holland / Stantec / Trevali
25	Recommendations	SRK / Holland and Holland / Stantec / Trevali
26	References	SRK / Holland and Holland / Stantec / Trevali

1.4 Basis of Technical Report

SRK compiled this technical report based on the following sources of information:

- Previous technical report, "Independent Technical Report for the Caribou Massive Sulphide Project, Bathurst New Brunswick, Canada", SRK Consulting (Canada) Inc., February 25, 2013 and amended November 21, 2013;
- Previous technical studies and technical memorandums (not publicly disclosed by consultants commissioned by Trevali and the former owners of the Caribou project);
- Contributions from the independent consultants listed in Section 1.2;
- Observations and data collected during site visits to the project area;
- Discussions with Trevali management and technical personnel;
- A resource block model (described in this report) prepared by SRK under a separate commission with Trevali (SRK 2013 High Grade Model), used for stope design;
- An updated resource block model prepared by Trevali and reviewed by SRK (Trevali 2014 Update), used solely for external dilution assessment;
- Data, maps, drawings, and other project information provided by Trevali;
- Cost information provided by Trevali and its solicited contractors and equipment suppliers;
- A project financial model prepared by Trevali and reviewed by SRK;
- SRK's mine productivity and cost reference data;
- Holland's and Stantec's cost reference data;
- Mining industry cost reference guides.

1.5 Qualifications of SRK

The SRK Group comprises of more than 1,600 professionals, offering expertise in a wide range of resource engineering disciplines. The independence of the SRK Group is ensured by the fact that it holds no equity in any project it investigates and that its ownership rests solely with its staff. These facts permit SRK to provide its clients with conflict-free and objective recommendations. SRK has a proven track record in undertaking independent assessments of mineral resources and mineral reserves, project evaluations and audits, technical reports and independent feasibility evaluations to bankable standards on behalf of exploration and mining companies, and financial institutions worldwide. Through its work with a large number of major international mining companies, the SRK Group has established a reputation for providing valuable consultancy services to the global mining industry.

1.6 Site Visit

In accordance with National Instrument 43-101 guidelines, the following independent consultants commissioned by Trevali and acting as Qualified Persons visited the Caribou project in support of their contributions to the Caribou Preliminary Economic Analysis.

- Dr. Gilles Arseneau, PGeo (APEGBC # 23474), visited the project site on November 21 to 23, 2012 to review and audit exploration work completed by Trevali, and to collect all relevant information for the preparation of a revised mineral resource model, accompanied by Dayle Rusk, PGeo, Director Geology of Trevali;
- Mr. Benny Zhang, MEng, PEng (PEO # 100115459), visited the project site on February 10 to 12, 2014 to ascertain the overall project site, accompanied by Paul Keller, PEng, COO of Trevali, Jeremy Ouellette, PEng, Senior Mining Engineer of Trevali, and Shaun Woods, PEng, Senior Mill Metallurgist of Trevali;
- Mr. Leonard Holland, CEng (IMMM # 41918), visited the project site on two occasions during April and June 2012 to review the plant and assess the plant suitability for rehabilitation and review process historical information;
- Mr. Jeffrey Barrett, MScE, PEng (APEGNB # M6890), inspected the Caribou project on numerous occasions since 2007, and most recently on October 2, 2013 to carry out inspections of the dams and ponds on the site.

All independent consultants were given full access to relevant data and conducted interviews with Trevali personnel to obtain relevant project information.

1.7 Acknowledgement

SRK would like to acknowledge the support and collaboration provided by Trevali personnel for this assignment.

1.8 Declaration

SRK’s opinion contained herein and effective in May 13, 2014 is based on information collected by SRK throughout the course of SRK’s investigations. The information in turn reflects various technical and economic conditions at the time of writing this report. Given the nature of the mining business, these conditions can change significantly over relatively short periods of time. Consequently, actual results may be significantly more or less favourable.

This report may include technical information that requires subsequent calculations to derive subtotals, totals, and weighted averages. Such calculations inherently involve a degree of rounding and consequently introduce a margin of error. Where these occur, SRK does not consider them to be material.

SRK is not an insider, associate or an affiliate of Trevali, and neither SRK nor any affiliate has acted as advisor to Trevali, its subsidiaries or its affiliates in connection with this project. The results of the technical review by SRK are not dependent on any prior agreements concerning the conclusions to be reached, nor are there any undisclosed understandings concerning any future business dealings.

1.9 Terminology

Metric units of measure and Canadian dollars are used in this report unless otherwise stated.

Mine grid elevations quoted are metres above sea level plus 2,000 metres. The terms levels, sublevels, and elevation are used interchangeably to describe underground mining levels.

2 Reliance on Other Experts

SRK relied on the expertise of Ms. Anna Ladd, Certified Management Accountant, CFO, of Trevali, in setting up the correct application of the taxes and royalties section of the preliminary economic assessment financial model.

Financial results are reported in Section 21 “Economic Analysis” of this technical report.

SRK has not performed an independent verification of land title and tenure information as summarized in Section 3 of this report. SRK did not verify the legality of any underlying agreement(s) that may exist concerning the permits or other agreement(s) between third parties, but has relied on the law firm Cox & Palmer as expressed in a report provided to Trevali Mining (New Brunswick) Ltd. on June 16, 2014. A copy of the report concerning matters of title is provided in Appendix A.

The reliance applies solely to the legal status of the rights disclosed in Sections 3.1 and 3.2 below.

3 Property Description and Location

The Caribou project is located about 50 km west of Bathurst in Restigouche County in the province of New Brunswick (Figure 1). The property is accessible via Highway 180 then by a gravel road south of the Highway 180. The property lies within National Topographical System (NTS) map sheet 21O/09. The Caribou deposit is located on an existing mine site with infrastructure. The property is approximately 7 kilometres long in the east-west direction and 5 kilometres wide in the north-south direction. The north-eastern and northern limits of the property are intersected by Highway 180.

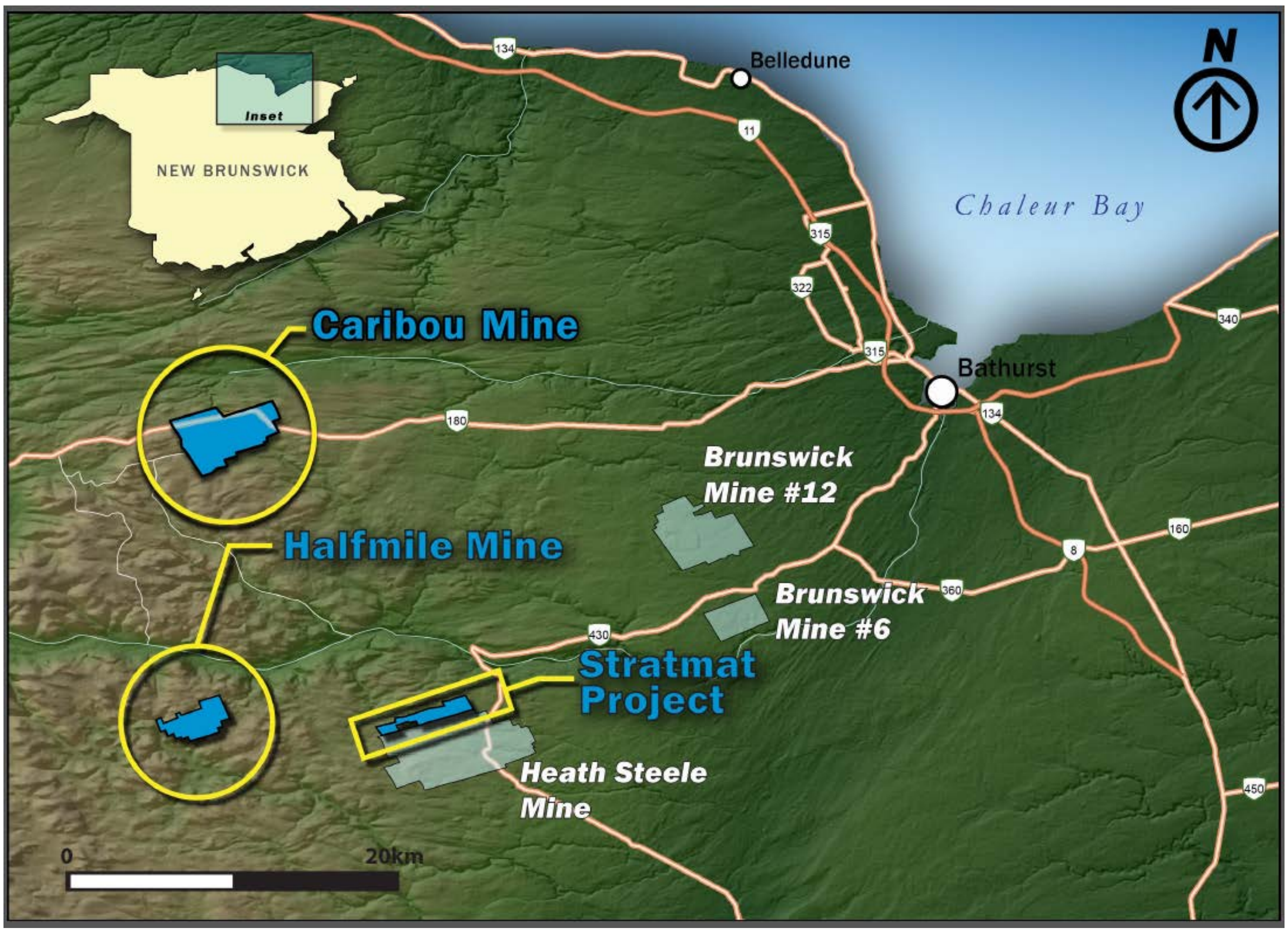


Figure 1: Property Location Map
(Trevali 2014)

3.1 Mineral Tenure

The Caribou property consists of a single Mining Lease, ML-246 covering 3,105.7 hectares (ha) (Figure 2). The lease has a 20 year term and is set to expire on October 27, 2028. The lease is subject to a rental fee amounting to $6.00 per hectare per year.

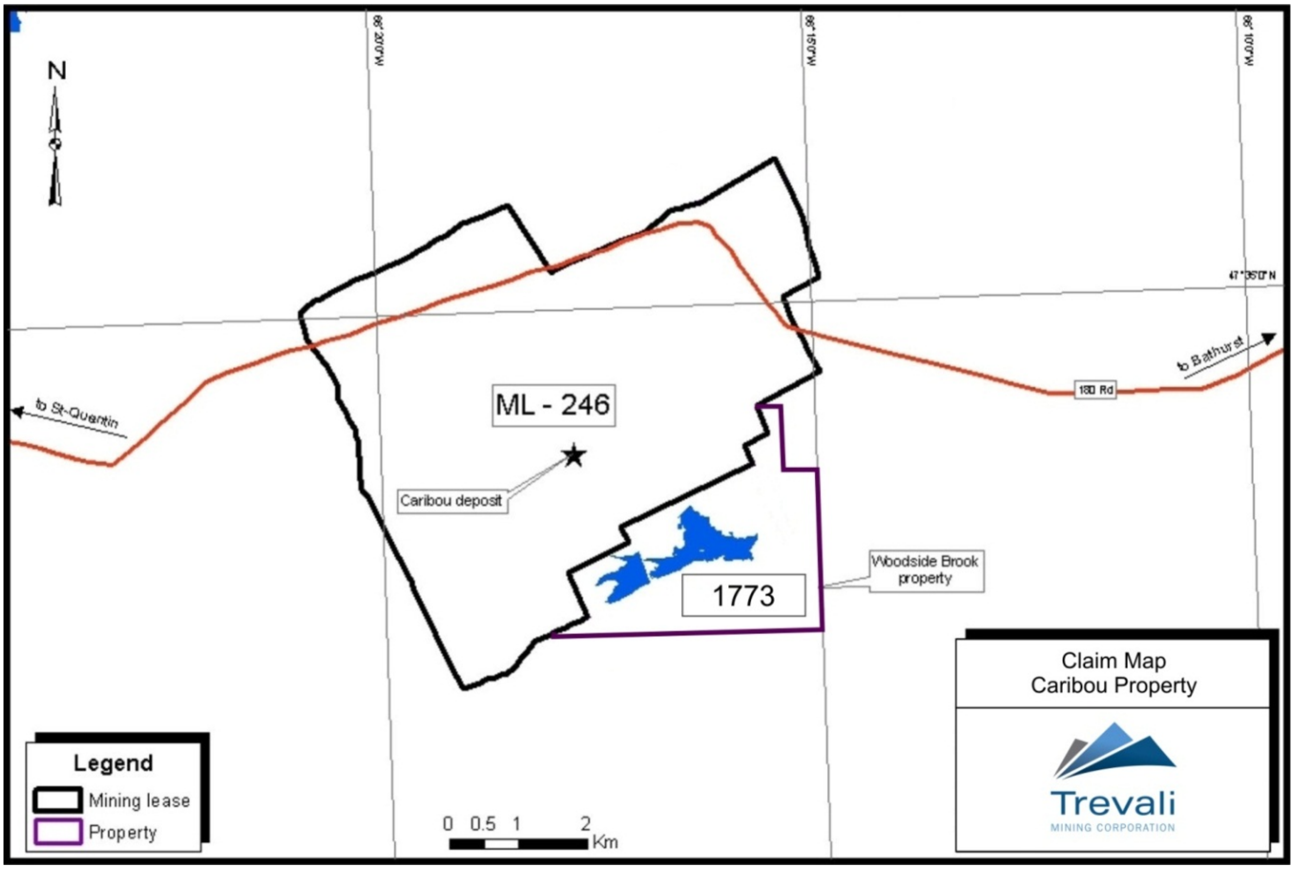


Figure 2: Land Tenure Map
(Peltier and Beausoleil, 2006 with modifications)

3.2 Underlying Agreements

Pursuant to the terms of a combination agreement dated May 14, 2012, a wholly-owned subsidiary of Trevali, Trevali Mining (New Brunswick) Ltd., and Maple Minerals Ltd. (Maple) amalgamated in a three cornered amalgamation with Trevali, and Trevali issued to the former shareholders of Maple, 20,000,010 common shares of Trevali and 3,999,986 common share purchase warrants (which were exercisable at $2.00 but have since expired unexercised). The Maple transaction closed on November 2, 2012. Based on the closing price of Trevali on the Toronto Stock Exchange (TSX) on November 2, 2012, the transaction implied an acquisition price of approximately $22 million for Maple.

The majority shareholder of Maple, MMC Holding - a private limited company incorporated under the laws of the Grand Duchy of Luxembourg (MMC), entered into a voting support and standstill agreement ("Lock-Up Agreement") pursuant to which, among other things, MMC agreed to support, for a period of one year from closing of the transaction on November 2, 2012, the Company's Board nominees and further agreed to restrictions on the disposition of certain of the Trevali common shares issuable to MMC at Closing. Furthermore, pursuant to the Lock-Up Agreement, MMC agreed not to acquire any additional Trevali common shares (other than through the exercise of the (now expired) warrants issued to MMC at Closing) for a period of 2 years from Closing, without the consent of Trevali. In addition, under the Lock-Up Agreement, MMC agreed not to (and to cause any transferee of its shares not to) dispose more than 10% of its shareholdings through the facilities of any stock exchange on which Trevali's common shares were listed for a period of one year from Closing. MMC has also agreed to guarantee the representations and warranties given by Maple under the Combination Agreement and, to this end, has escrowed 20% of its Trevali shares (namely 3,967,399 common shares) received at Closing in support of its guarantee. The escrow period is a two year period ending November 2, 2014.

The Caribou Deposit is subject to a 10% Net Profits Interest held by a third party.

3.3 Permits and Authorization

Trevali currently holds an Approval to Operate for the Caribou project (I-8310) which authorizes Trevali to:

a. To operate the LDS minewater treatment plant, and to release the treated minewater to the STTP via the hydroxide sludge pond or the STTP hydroxide sludge cell subject to the Discharge Limits listed in Conditions 27 and 28;
b. To carry out any activities necessary to maintain the mine in Care & Maintenance;
c. To construct new structures within the currently disturbed area of the mine site;
d. To dewater the underground mine;
e. To carry out equipment inspections, maintenance and/or replacement of the underground and/or concentrator plant equipment;
f. To carry out all aspects of rehabilitation and stabilization of the underground mine, including establishing safe access by mucking out the ramp, shotcreting and scaling, etc.;
g. To conduct exploratory drilling on the property and/or in the underground mine, subject to any further Terms and Conditions deemed necessary by the Department of Energy & Mines;
h. To carry out any other activity that may be subsequently approved by the Industrial Processes Section, subject to any further Terms and Conditions deemed necessary by the Industrial Processes Section for the activity identified;
i. To operate the underground mine and mill.

The existing Approval to Operate also includes a clause to allow for the operation of a copper circuit if subsequently approved by the department. The current Approval to Operate is valid until March 31, 2018.

3.4 Environmental Considerations

The Caribou site has been previously operated by various companies and the proposed start-up does not represent a significant variance to previous operations. Trevali will continue to operate the property in accordance with all applicable provincial and federal regulations and permits (described in Section 19).

On January 31, 2013 Trevali entered into a Limited Environmental Liability Agreement with the province of New Brunswick, where the province would accept the environmental liability associated with historic liabilities, defined as:

"Anaconda Tailings Area", the "Open Pit", the "Waste Rock Storage Area" (as those terms are described in Section 5.6 of the Reclamation Plan and for those amounts estimated in Table 8.1 of the Reclamation Plan). Such environmental liability obligations of the Minister are hereinafter referred to as the "Historic Liabilities".

Further details of the Limited Environmental Liability Agreement are described in Section 19.4.

3.5 Mining Rights in New Brunswick

As defined under the *Mining Act*, most minerals are owned by the Crown; however, some land grants reserved only specific minerals to the Crown and therefore other minerals were, in fact, transferred to the grantee. Prior to 1810, it was common for gold and silver and a few other minerals to be reserved to the Crown. The *Mining Act* defines a mineral as any natural, solid, inorganic or fossilized organic substance and such other substances as are prescribed by regulation to be minerals, but does not include:

- Sand, gravel, ordinary stone, clay or soil unless it is to be used for its chemical or special physical properties, or both, or where it is taken for contained minerals;
- Ordinary stone used for building or construction;
- Peat or peat moss;
- Bituminous shale, oil shale, albertite or intimately associated substances or products derived there from;
- Oil or natural gas; or
- Such other substances as are prescribed by regulation not to be minerals.

Crown-owned minerals are property separate from the soil; that is, a landowner owns the surface rights but does not own minerals unless some minerals were granted with the land and each conveyance since the granting has preserved the ownership of those minerals. By means of the *Mining Act*, the province makes Crown-owned minerals available for exploration and development. Prospectors (persons or companies who hold prospecting licences), holders of claims and holders of mining leases have the right to prospect, explore, mine and produce those minerals, whether they are on Crown-owned or privately-owned lands. They also have the right of access to the minerals; however, they are liable for any damage they cause.

Trevali currently owns 100% of Mining Lease ML-246 that covers 3,105.7 ha on the Caribou property. The lease expires on October 27, 2028.

4 Accessibility, Climate, Local Resources, Infrastructure, and Physiography

4.1 Accessibility

The property is accessible via Highway 180 that links Bathurst to Saint-Quentin in northern New Brunswick. Highway 180 intersects the northern part of the mining property. Approximately 55 km west of Bathurst on Highway 180, a 4-km long gravel road leads to the main infrastructure at the Caribou mine site.

4.2 Local Resources and Infrastructure

The city of Bathurst has a population of 12,000 people and 45,000 people live in the immediate Bathurst area. It is an important centre for mining, forestry, fishing and tourism in northern New Brunswick. The property has sufficient water, power and surface rights to support mining.

The Caribou site is comprised of two former open pit lead-zinc-silver mines, namely the West and East pits, and an underground lead-zinc-silver mine. A mill and processing complex formerly used to concentrate the ore are also located at the Caribou site. The Caribou site also has a large permitted tailing impoundment area. Other buildings on the site include:

- Large staff office;
- Dry facility;
- Core shack;
- Assay laboratory;
- Warehouse;
- Maintenance shop;
- Hoist room;
- Head frame;
- Mine water treatment plant.

Two portals for the underground ramps are still accessible. A power line connected to the New Brunswick power grid supplies the site with electricity (Figure 3).

4.3 Climate

The average annual temperature is approximately 10˚C, with a summer maximum of 30˚C and winter minimum of -30˚C. Frost depth is at 2.0 m. The total annual precipitation is approximately 880 mm, of which 60% is rainfall.

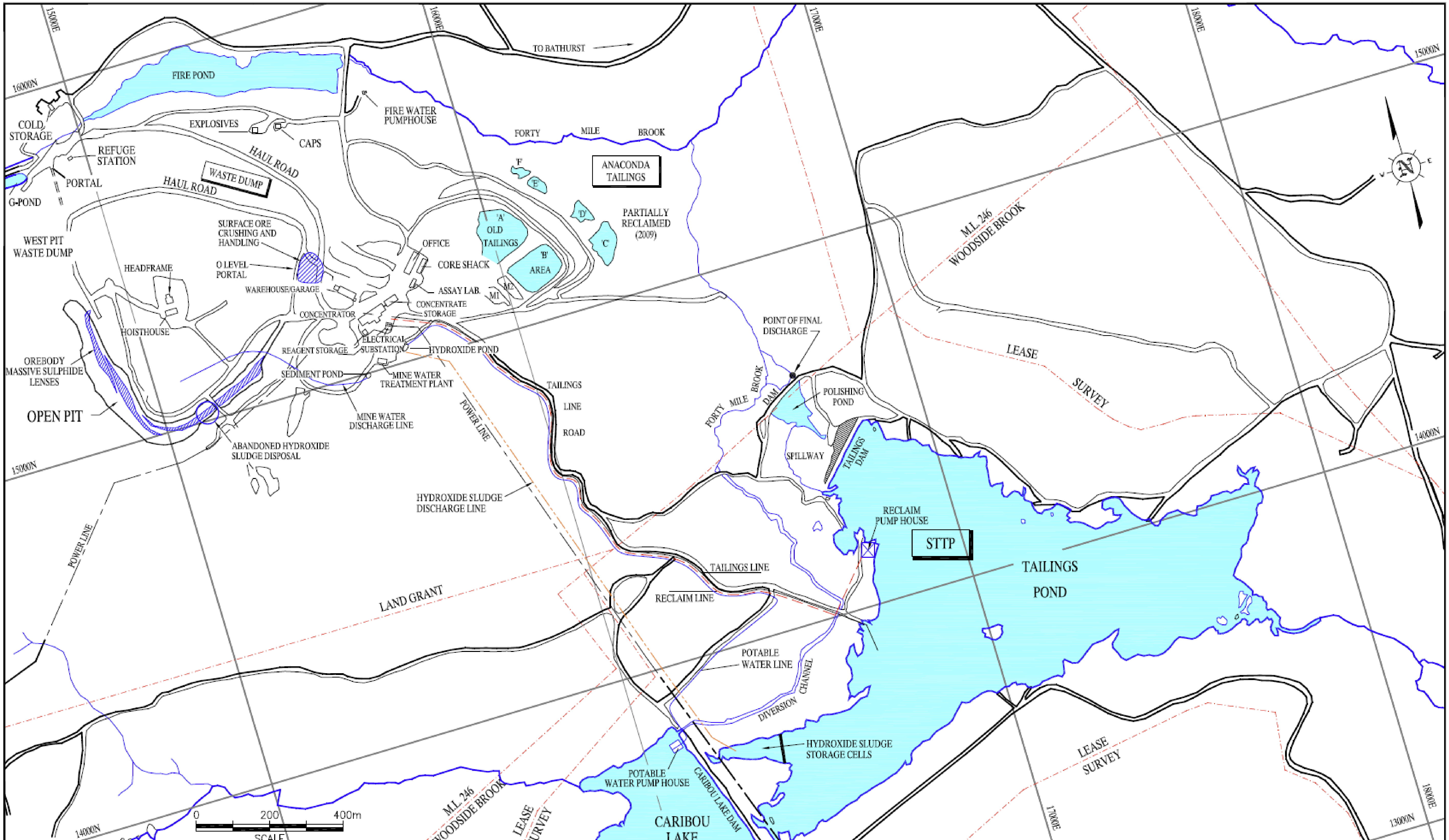


Figure 3: Infrastructure and Site Layout
(Stantec 2011)

4.4 Physiography

The Caribou project is located within the northern part of the New Brunswick Highlands of the Appalachian Physiographic Region of Canada. The highlands are characterized by deep valleys and variable relief. Elevation on the property varies from 40 metres (m) to 540 m above sea level. In general, the topography of the land decreases in elevation from west to east, ending in gently undulating farm country on the east coast (Figure 4).

Figure 4: Site Layout of the Caribou Project Area

5 History

The Caribou mine has been previously developed and mined by different owners, employing a variety of mining methods.

Table 2 summarises the previous ownership of the project:

Table 2: Property Ownership History

Company	Years of Ownership
Anaconda Minerals Company	1954 to 1987
East West Caribou Mining Ltd.	1987 to1989
Breakwater Resources Ltd.	1990 to 2005
Blue Note Metals Inc.	2005 to 2009
Maple Minerals Inc.	2009 to 2012
Trevali Mining Corporation	2012

Early exploration work on the Caribou property in 1954 by Anaconda Minerals Company (Anaconda) included an airborne electromagnetic (EM) survey over the property. Anaconda carried out preliminary surface mapping and exploration work in 1955 and began drilling the deposit in 1956. In 1959, Anaconda excavated a 380 m long 2.4 m by 2.7 m adit to obtain a bulk sample of the mineralization. In 1965, Anaconda extended the adit to cover the entire deposit and discovered the supergene copper gossan by excavating a ventilation raise through the oxidized zone.

The mine began production from an open pit on the oxidized zone in 1970; in 1971 mining continued in the sulphide body accessed from a ramp. Production ended in December of 1971.

Anaconda initiated a second phase of production in 1973-74. Production ceased in November of 1974 and the project was placed on care and maintenance.

In 1980, Anaconda re-initiated exploration on the property and carried out a deep drilling program to test the continuity of the Caribou zone at depth. Anaconda also carried out limited test mining and processing that concluded with 25,400 t of plant feed being milled at the Brunswick mine plant. In 1983, Anaconda built a gold-silver heap leach plant and processed 61,500 t of gossan, extracting 106,000 ounces of silver and 8,100 ounces of gold.

The project was transferred to the East West Caribou Mining Company Ltd. (East West) in 1987. Between 1987 and 1988, East West initiated pre-production construction which included underground development and the construction of a concentrator on the property. East West re-initiated production at Caribou in 1989 and shortly after, the mine was shut down due to various operating problems.

Breakwater Resources Ltd. (Breakwater) acquired East West in 1989 and briefly re-opened the mine producing 728,400 t but it closed it in 1990 due to poor metallurgical recoveries. Metallurgical test work performed by Lakefield Research in 1994 demonstrated that lead and zinc concentrates could be produced with significantly higher recoveries than had been achieved in the past. Table 3 summarises the past production from the Caribou deposit.

Table 3: Past Production Records for the Caribou Mine

Years	Tonnes	(Pb+Zn) (%)	Zn (%)	Pb (%)	Cu (%)	Ag (g/t)	Au (g/t)
to 1989	728,400	10.71	7.17	3.54			
1989-1990	421,000	11.24	7.7	3.54			
1990-1998	586,598	9.27	6.34	2.93		90	
2007-2008	567,449	7.63	5.19	2.44	0.26	62.72	
Total	**2,303,447**	**9.68**	**6.57**	**3.11**			

In 1996-97, Breakwater began construction of a new mill at Caribou and carried out surface exploration work on the property including the re-estimation of the mineral resources. Breakwater carried out soil and stream sediment sampling and magnetic and induced polarization geophysical surveys. Breakwater also drilled eight diamond drill boreholes totalling 2,659 m. The drilling program was successful in identifying massive sulphide lenses at depth and production was re-initiated in July of 1997.

In 1998, Breakwater drilled an additional five boreholes for 1,664 m. Production was stopped again in August 1998 after having produced 586,598 t grading 6.32% zinc and 2.93% lead.

The Caribou and Restigouche mines have remained on care and maintenance since August 1998.

From 1999 to 2000, Breakwater undertook several engineering studies to determine the feasibility of re-opening the Caribou mine. Mineralogical and metallurgical studies were carried out at Lakefield research; preliminary engineering review of the modifications required to the concentrator as well as detailed engineering reviews of critical environmental projects were also carried out.

In 2005, the property was acquired by Blue Note Metals Inc. (Blue Note) who re-opened the mine based on the Breakwater plan prepared in 2000. Blue Note commissioned Ross-Finlay Engineering, Leslie Engineering and Jacques Whitford Ltd. to evaluate and prepare a plan to re-open the mine. In 2009, Blue Note declared bankruptcy after mining about 517,000 t. Maple Minerals Inc. acquired the Caribou property from bankruptcy and in November of 2012, Trevali acquired Maple Minerals and now controls the Caribou deposit.

Several historical mineral resource estimates have been prepared for the Caribou deposit. These estimates are no longer considered relevant as they are being replaced by the estimate presented in this report; they are only listed here for historical completeness and to demonstrate the relative consistency of the estimates over time. Some of these historical estimates were prepared before the implementation of National Instrument 43-101 (NI 43-101) and as such do not follow categories of mineral resources as stipulated by NI 43-101. SRK has not done the work necessary to validate these historical estimates and Trevali is not treating these historical estimates as current NI 43-101 mineral resource estimates. Table 4 summarises the historical mineral resource and mineral reserve estimates for the Caribou deposit.

Table 4: Historical Mineral Resource Estimates for the Caribou Project

Author	Year	Tonnes	Class	Cu (%)	Pb (%)	Zn (%)	Au (g/t)	Ag (g/t)
Anaconda	1980	39,346,700	Not assigned	0.33	2.06	4.86	0.97	53
Breakwater	1991	2,989,100	Proven	ND	3.68	8.31	ND	ND
Breakwater	1991	777,200	Probable	ND	3.29	8.17	ND	ND
Breakwater	1991	945,300	Possible	ND	3.63	7.48	ND	ND
Breakwater	1991	8,302,500	Inferred	ND	3.47	8.21	ND	ND
Breakwater	1995	2,995,900	Proven	0.36	3.68	8.3	1.3	104
Breakwater	1995	772,200	Probable	0.41	3.29	8.17	1.6	97
Breakwater	1995	945,300	Possible	0.3	3.63	7.48	0.8	105
Breakwater	1995	8,302,500	Inferred	0.39	3.47	8.21	1.5	101
Breakwater	1996	2,770,000	Measured	ND	3.74	8.34	ND	ND
Breakwater	1996	1,962,000	Indicated	ND	3.83	8.12	ND	ND
Breakwater	1996	4,573,000	Inferred	ND	3.65	8.2	ND	ND
Breakwater	1998	1,935,000	Measured	ND	3.8	8.02	ND	101
Breakwater	1998	551,947	Indicated	ND	3.48	8.38	ND	99
Breakwater	1998	737,000	Inferred	ND	3.78	7.79	ND	107
Breakwater (external)	1999	1,461,000	Measured	0.33	4	8.1	ND	100
Breakwater (external)	1999	1,170,000	Indicated	0.31	4.1	7.7	ND	98
Breakwater (external)	1999	2,591,000	Inferred	0.31	4.1	7.8	ND	100
Breakwater (Internal)	1999	2,295,000	Measured	ND	3.71	8.06	ND	ND
Breakwater (Internal)	1999	521,778	Indicated	ND	3.45	7.92	ND	ND
Breakwater (Internal)	1999	4,102,000	Inferred	ND	3.21	6.66	ND	ND
Blue Note	2006	2,800,300	Measured	ND	3.45	7.64	ND	95
Blue Note	2006	1,009,700	Indicated	ND	2.76	7.12	ND	85
Blue Note	2006	3,944,300	Inferred	ND	3.59	7.36	ND	107

6 Geological Setting and Mineralization

The following description is taken from Peltier and Beausoleil (2006).

6.1 Regional Geology

The Bathurst Mining Camp (BMC) occupies a roughly circular area of approximately 70 km diameter in the Miramichi Highlands of northern New Brunswick. The area boasts some 46 mineral deposits with defined tonnage and another hundred mineral occurrences, all hosted by Cambro-Ordovician rocks that were deposited in an ensialic back-arc basin (Figure 5).

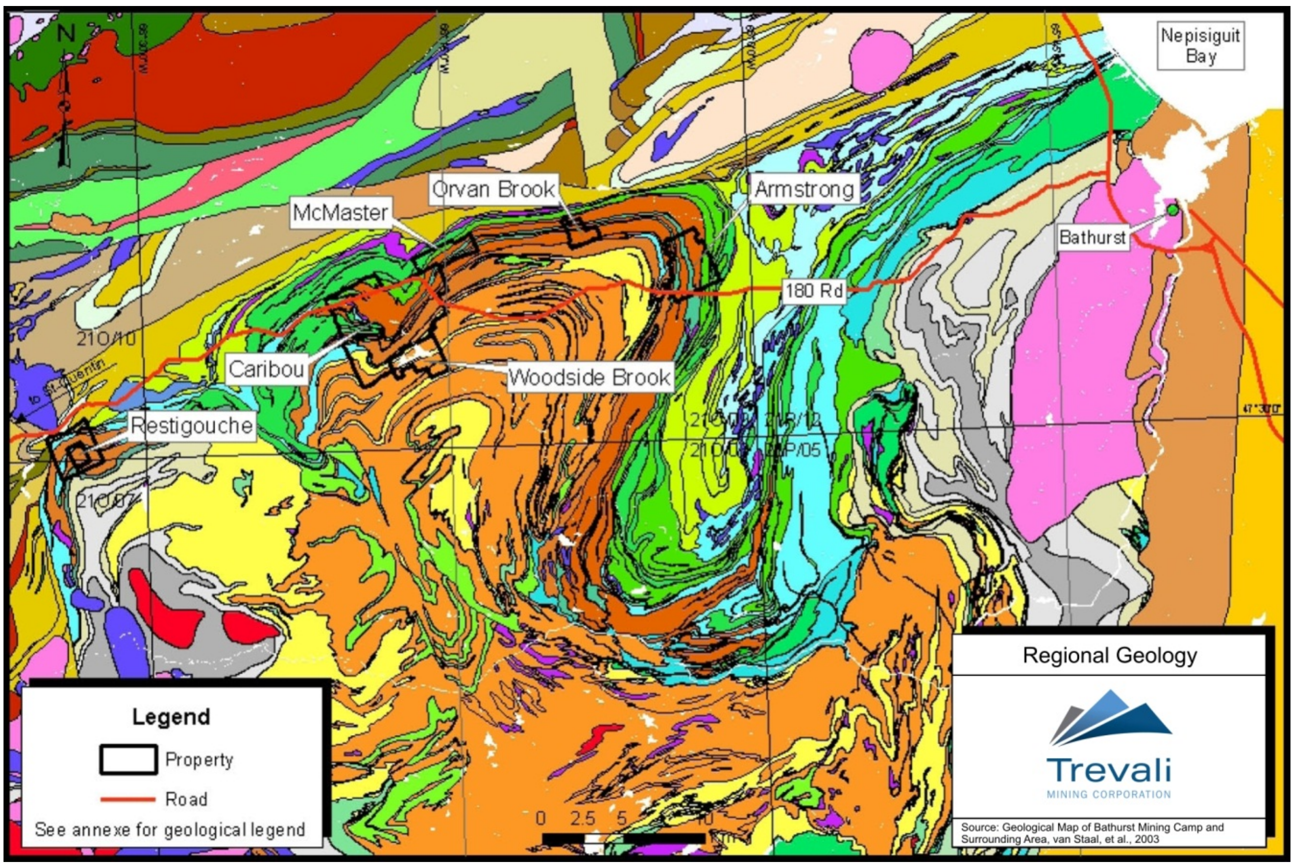


Figure 5: Regional Geology Setting
(Peltier and Beausoleil, 2006 with modifications)

The rocks in the BMC are divided into five groups: the Miramichi, Tetagouche, California Lake, Sheephouse Brook, and Fournier Groups that are largely in tectonic contact with one another (Van Staal et al., 2003). The Cambro-Ordovician Miramichi Group represents a passive margin sequence that was deposited on the Avalonian platform. This passive margin became an active, Andean-type margin in the middle to late Arenig with the subduction of oceanic crust beneath the margin and the development of the ensialic Popelogan volcanic arc (Van Staal et al., 2003).

The Middle Ordovician California Lake, Tetagouche, and Sheephouse Brook groups represent the initial stages of back-arc rifting of ensialic crust. Radiometric dating shows that the California Lake, Tetagouche, and Sheephouse Brook groups are approximately coeval and there are similarities in the internal stratigraphy of each group (Van Staal et al., 2003). The lower part of each group is dominated by felsic volcanic rocks and the upper part by mafic volcanic rocks, which are overlain by carbonaceous shale and pelagic chert. This bimodal suite of rhyolites and basalts and cogenetic granites and gabbros formed by partial melting of lower crustal rocks and the mantle, respectively, during progressive back-arc rifting of the Avalonian basement (van Staal et al., 1991). The basalts are both tholeiitic and alkalic and show a progression from enriched, fractionated continental tholeiites to alkali basalts to more primitive, mantle-derived midocean ridge, tholeiitic pillow basalts (Van Staal et al., 1991). Most massive sulfide deposits of the BMC are associated with felsic volcanic rocks in each group.

The accretion of the Popelogan arc to the Laurentian margin in the Caradoc was followed by the closure of the back-arc basin by northwest-directed subduction beneath both the arc and Laurentia. All groups of the BMC were intensely deformed and tectonically assembled in the Brunswick subduction complex (Van Staal, 1994).

Rocks of the BMC have been subjected to complex polyphase deformation and associated greenschist and blueschist metamorphism (Helmstaedt, 1973; Van Staal et al., 1990). Five episodes of folding have been recognized in the BMC, but only the first two folding events account for the complex structural geometry (Van Staal and Williams, 1984).

The earliest deformation event (D1) is characterized by strong layering-parallel foliation (S1), asymmetrical intrafolial folds (F1), and a well-defined stretching lineation (L1). The D1 structures are concentrated in zones of high strain, are commonly associated with stratigraphic repetition, and are interpreted to have resulted from progressive deformation during imbrication in the northwest-dipping Brunswick subduction zone (Van Staal, 1994). The first phase of deformation has been interpreted by Van Staal et al. (1992) to have taken place in the Late Ordovician to Early Silurian.

The second deformational event (D2) is represented by tight, near-vertical isoclinal folds that are probably Early Silurian or older (McCutcheon et al., 1993) and occurred during continental collision. The plunges of the F2 folds are generally shallow except near F1 fold closures. The cleavage associated with F2 folds is well developed, steeply dipping, and subparallel to S1 along the limbs of F2 folds. This deformation event is partly associated with the obduction of the accretionary wedge onto the basin margin.

Structures associated with D1 and D2 have been refolded by open to tight recumbent F3 folds (Van Staal and Fyffe, 1991). The S1 and S2 fabrics were reoriented to shallow-dipping attitudes where D3 was intense. Earlier structures have been refolded by large- and small-scale F4 and F5 folds, although the overprinting relationships are rarely preserved. Examples of later folds include the Nine Mile synform and the Tetagouche antiform (Van Staal and Williams, 1984). These F4 and F5 structures probably correspond to kink and parasitic folds documented by Davis (1972) in the area of the Caribou deposit.

6.2 Property Geology

The Caribou massive sulfide deposit is located in the northern part of the BMC and occurs in the core of a synformal structure that plunges steeply (80°-85°) to the north (Figure 6). The host felsic volcanic and sedimentary rocks are assigned to the Spruce Lake Formation that forms part of the California Lake Group. In the Caribou area, the Spruce Lake Formation is confined to one of three nappes that are named after the predominant volcanic unit in each nappe. All three nappes contain rocks that belong to the California Lake Group (Van Staal et al., 2003).

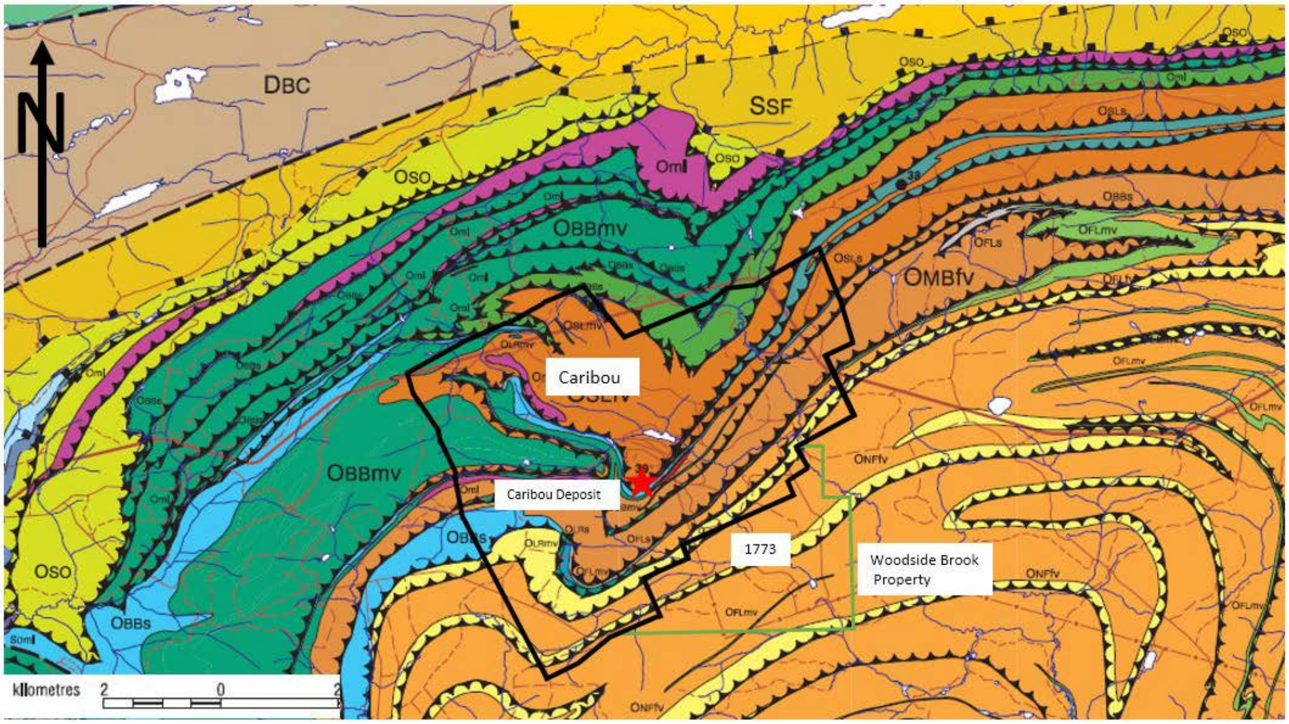


Figure 6: Local Geology Setting
(Peltier and Beausoleil, 2006 with modifications)

The Caribou deposit consists of the following units from the base upward: (1) dark gray to black carbonaceous shale, pale gray phyllite, graywacke, and chloritic schist interbedded with hydrothermally altered pale green felsic volcanic rocks (footwall of the deposit); (2) stringer sulfides cutting hydrothermally altered sedimentary and felsic volcanic rocks; (3) massive sulfides comprising a vent complex and bedded sulfides; (4) chloritic schist at the contact between massive sulfides and overlying felsic volcanic rocks; and (5) interbedded felsic volcanic and sedimentary rocks.

Mineralization within the Caribou deposit is composed of seven lenses that are zoned mineralogically and chemically from a copper-rich vent-proximal facies (vent complex) near the bottom and western part of each lens, to a lead-zinc-rich vent-distal facies (bedded sulphides) near the top and eastern part of each lens. Although it is impossible to rule out one large sulphide lens that was dismembered during deformation, the common clustering of modern and ancient deposits in vent fields is consistent with multiple vent sites at Caribou.

The vent complex consists predominantly of pyrite + pyrrhotite + chalcopyrite + magnetite, whereas the bedded sulphides are composed of pyrite + sphalerite + galena + arsenopyrite + tetrahedrite. The massive sulphides are zoned such that copper, bismuth, cobalt, europium/europium*, and copper/(copper + lead+ zinc) decrease, and zinc, lead, silver, tin, indium, arsenic, antimony, molybdenum, cadmium, mercury, and gallium increase, from the vent complex to the bedded sulphide facies. Compared to bedded sulphides, sphalerite, galena, and pyrite in the vent complex are also iron-, silver-, and arsenic-rich, respectively.

The western sulphide lenses at Caribou are underlain by a sulphide stringer zone that is composed mostly of pyrite + quartz + siderite impregnations and veins with iron chlorite selvages cutting hydrothermally altered felsic volcanic and sedimentary rocks. Because the rocks are highly strained, the sulfide stringer zone appears strata bound and individual sulphide veins occurs sub-parallel to bedding.

The massive sulphides consist of seven *en échelon* lenses, numbered 10 to 80 around the Caribou fold. The zones consist of 90% sulphides, mainly pyrite, sphalerite, galena and chalcopyrite. The main gangue minerals are magnetite, siderite, stilpnomelane, quartz and chlorite. Lenses 10, 20, 30, 70, and 80 occur on the north limb of the Caribou fold while lenses 40 and 60 are mostly on the eastern limb of the fold (Figure 7).

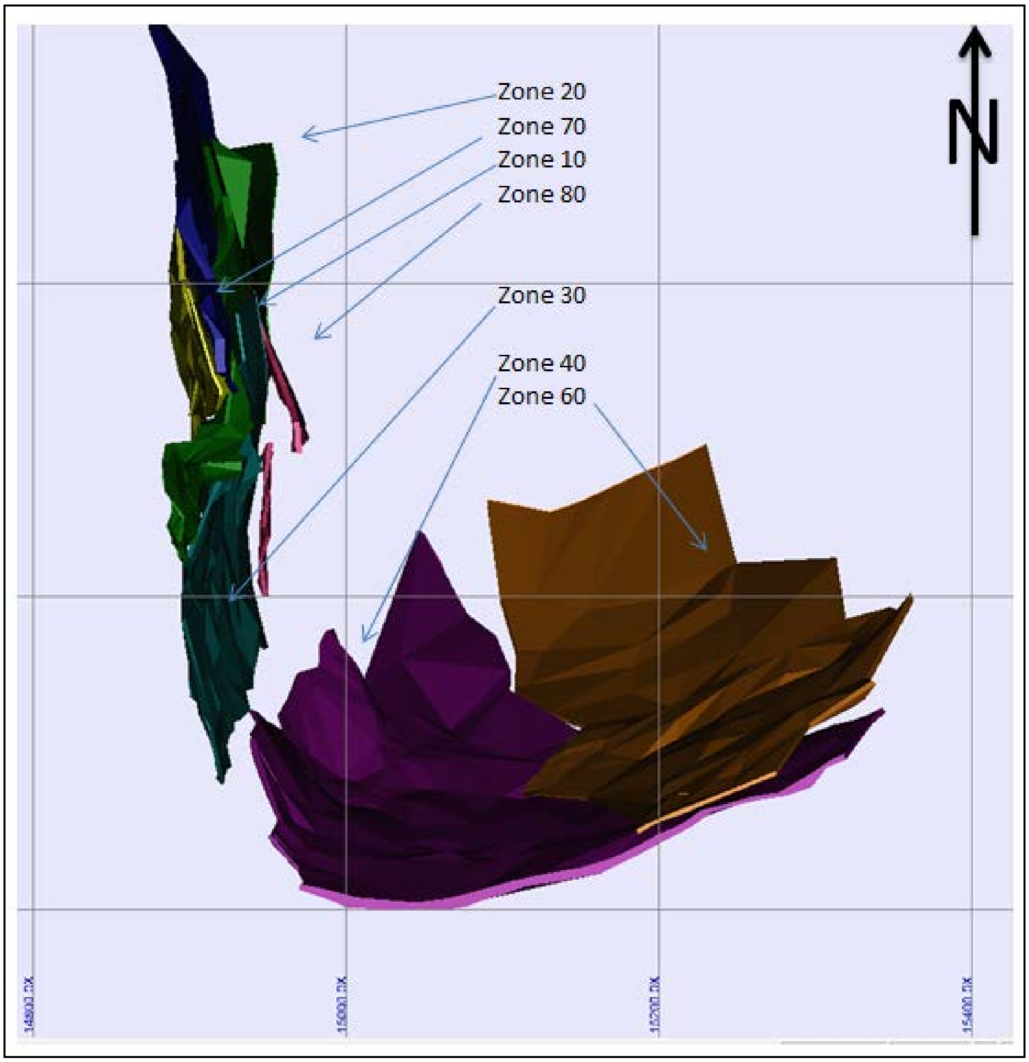


Figure 7: Plan View of Mineralized Lenses
Note: Grid is 200 by 200 m

7 Deposit Types

The Caribou deposit is a volcanic hosted massive sulphide deposit (VMS) typical of the BMC. The BMC hosts 46 volcanic-sediment hosted massive sulphide deposits and another hundred mineral occurrences, including the Brunswick No. 12 deposit. The BMC deposits formed in a sediment-covered back-arc continental rift during periods when the basin was stratified with a lower anoxic water-column. The basin was subsequently intensely deformed and metamorphosed during multiple collisional events related to east-dipping subduction of the basin.

VMS deposits typically form lenses of polymetallic massive sulphide. Most deposits are zoned vertically and laterally from a high-temperature, vent-proximal, copper-cobalt-bismuth-rich veined and brecciated core to vent-distal zinc-lead-silver-rich hydrothermal sediments. The vent complex is commonly underlain by a highly deformed sulphide stringer zone that extends hundreds of metres beneath deposits and consists of veins and impregnations of sulphides, silicates, and carbonates that cut chloritized and sericitized volcanic and sedimentary rocks.

The Caribou massive sulfide deposit is sufficiently distinct from the Brunswick type to warrant a subtype designation (Caribou type) within the BMC. This deposit is second only in size to the Brunswick 12 deposit in the BMC (Cavalero, 1993). Unlike the Brunswick-12 deposit, which is hosted by the Tetagouche Group, the Caribou deposit occurs in the California Lake Group near the base of a felsic volcanic rock sequence that comprises part of the Spruce Lake Formation (Figure 8).

The Spruce Lake Formation volcanic rocks are petrologically and geochemically distinct from those of the Tetagouche Group (Goodfellow, 2007). Furthermore, the Caribou deposit is not associated with the Algoma-type carbonate-oxide-silicate iron formation that overlies and is lateral to the Brunswick-12 and Heath Steele deposits (Peter and Goodfellow, 2003).

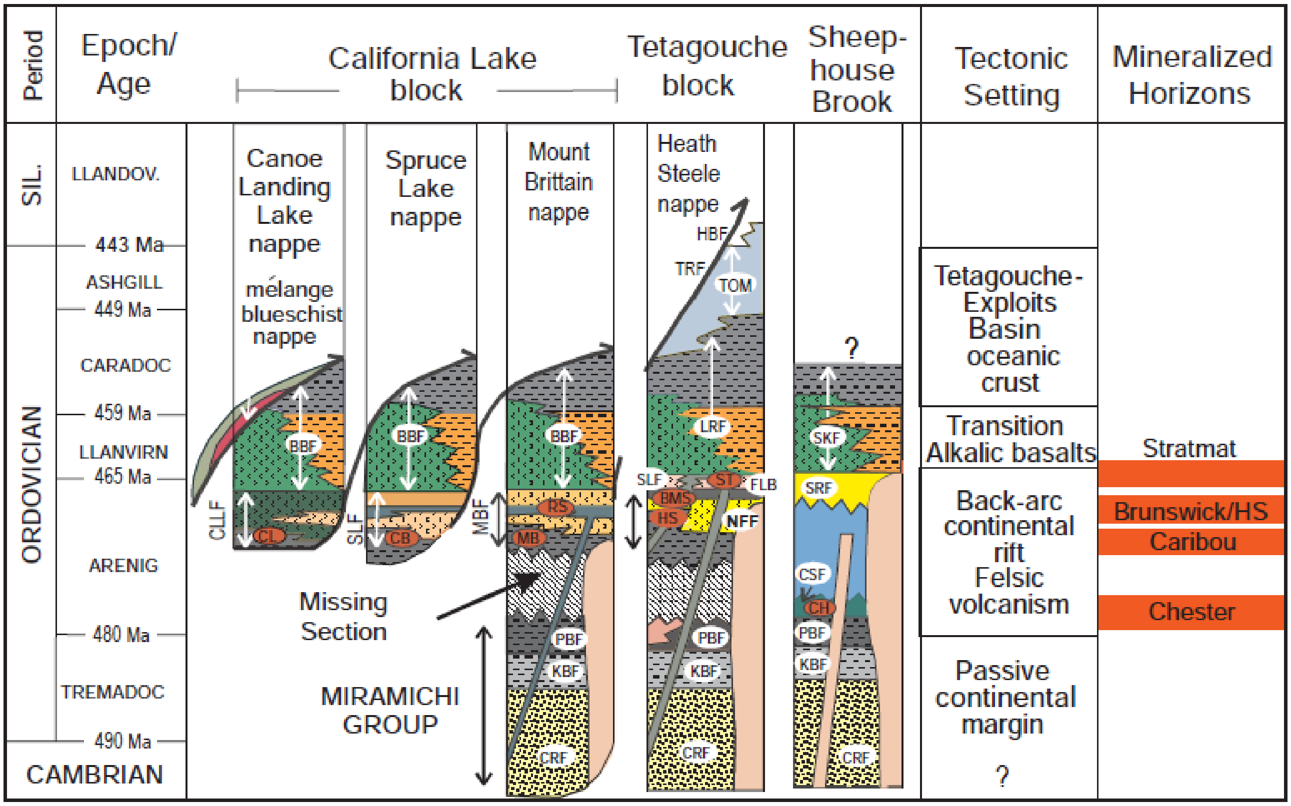


Figure 8: Stratigraphic Location of Caribou Deposit
(Goodfellow, 2007)

8 Exploration

Between February and April 2014, four boreholes (BR-1001 – BR-1004), were completed to test four different Titan 24 IP anomalies for a total of 2,179 m (Figure 9). One of these drill holes also served as condemnation for the planned tailings expansion. Borehole BR-1005 (1,095 m) was completed testing deep mineralization down plunge, below and to the west-northwest of the defined Caribou resource. BR-1005 successfully intersected massive sulphide mineralization approximately 450 m below the currently defined resource. A subsequent wedge borehole attempt encountered technical difficulties and the hole had to be abandoned.

All available 2014 drill holes and several historic exploration drill holes will receive down hole EM surveys in June 2014. Compilation of historic exploration data over the Caribou property is currently underway and this data will be integrated with the 2008 Titan 24 IP data, 2014 BHEM results, and 2014 summer mapping and sampling to generate additional exploration drill targets. A second exploration drill program is scheduled to begin as early as September 2014.

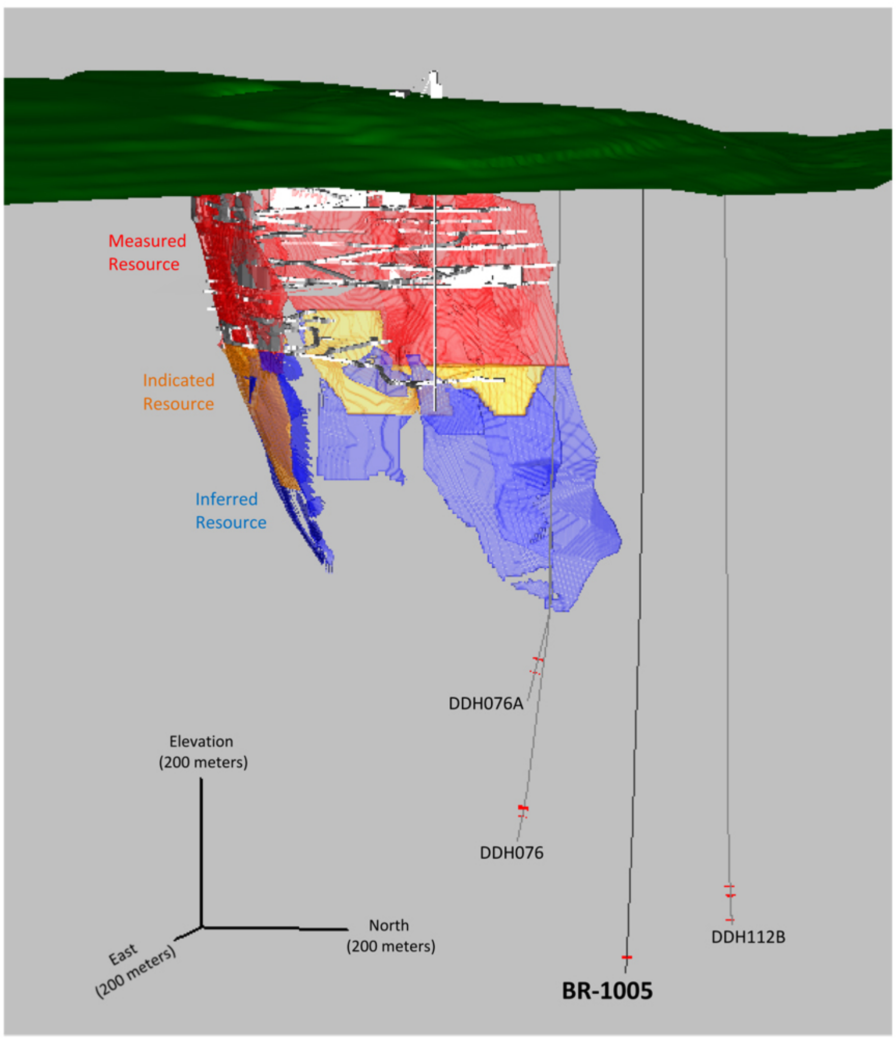


Figure 9: Trevali Caribou 2014 Exploration Drill Holes

9 Drilling

9.1 Drilling

There has been no recent drilling, other than the four boreholes discussed in Section 8 above, on the Caribou property. The last significant drilling campaign was carried out by Blue Note Mining.

All drilling discussed in this section was carried out by previous owners of the property. Trevali has not carried out any significant drilling on the Caribou deposit.

The Caribou deposit has been tested with a total of 708 diamond drill holes totalling 65,674 m. Most of the drilling, 630 drill holes, have been drilled from underground while 78 drill holes were collared from surface. Figure 10 is a plan view showing the location of the surface and underground drill holes. The location of the Caribou syncline is evident from the drill hole collar locations.

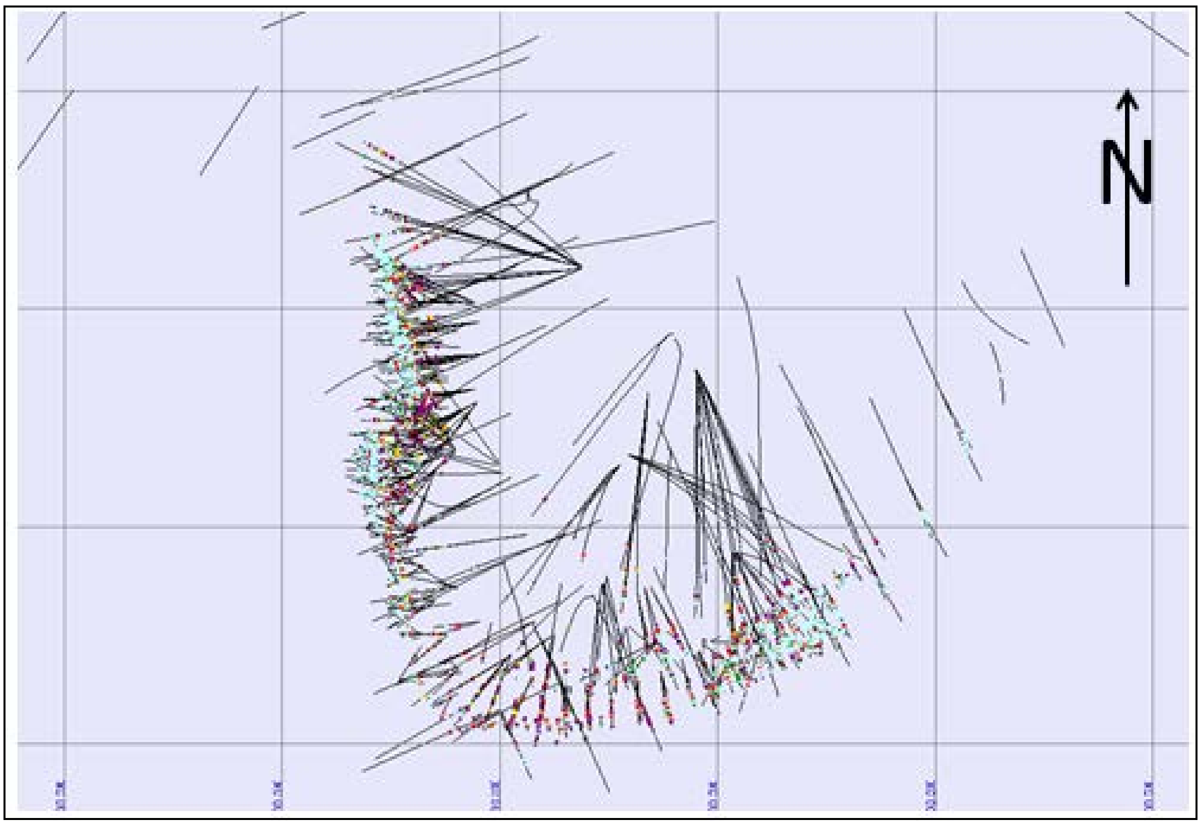


Figure 10: Distribution of Drilling on the Caribou Property
Note: Grid is 200 by 200 m

9.2 SRK Comments

SRK is of the opinion that the drilling density for the Caribou deposit is sufficient for the estimation of mineral resources and is of appropriate density for a volcanogenic massive sulphide deposit.

10 Sample Preparation, Analyses, and Security

No information is currently available on the sample preparation and security for the historical data collected by previous owners of the property. Some descriptions of sample preparation, analyses and security are available in historical reports (Luff, 1998; Gow 1999). SRK has reviewed these reports and summarized the methodologies used during past drilling campaigns. For diamond drill holes, the sampling was typically carried out in lengths varying from 0.3 m to 1.5 m with the bulk of the samples being less than 1 m long. While some of the earlier boreholes were sampled with a core splitter, most of the drill cores were sampled with a saw. The remaining cores were stored in core racks inside the core shack on the Caribou property and remained in good condition for further examination. Most of the surface drilling utilized N-sized core. Earlier underground diamond drilling was typically AX- sized, though some BX-sized core drilling was completed. Underground drilling completed since 1987 is BQ core size.

Underground chip sampling of faces in stopes and drifts was carried out on a regular basis, sampling methodologies are not described. SRK used the chip sample data to guide the wireframe construction but not the grade interpolation.

10.1 Sample Preparation and Analyses

The assays used for the resource estimate are from historical information prior to NI 43-101 standards. All the samples at the mine were assayed by atomic absorption spectroscopy (AAS). Prior to 1987, this work was generally completed at a contract laboratory located in Bathurst, with assay checks completed at Lakefield Research and at an in-house Anaconda laboratory located in Butte, Montana. After 1987, assays were done on site, with check assays being carried out in Bathurst by either a commercial laboratory or by Noranda. SRK is unaware of the certification that the historical laboratories may have had at the time that the assays were carried out but has no reason to believe that the laboratories were biased in any way.

10.2 Bulk Density Data

There are no bulk density (BD) data available in the database supplied by Trevali. SRK used a fixed bulk density for both the massive sulphide (4.27 t/m^3) and for the surrounding country rock (2.7 t/m^3). The numbers were derived from past reports and production data. The mineralized intervals at 4.27 t/m^3 seemed to agree well with historical mining campaigns and past reconciliation.

SRK recommends that Trevali should initiate a program of measuring bulk density during the next exploration program at the Caribou project.

10.3 Quality Assurance and Quality Control Programs

There are no quality assurance and quality control data (QA/QC) in the Caribou database but from historical records, it is evident that QA/QC samples were collected in the past and that protocols for collecting such samples were in place.

10.4 SRK Comments

Based on the review of historical reports and examination of drill core at the Caribou site, SRK concluded that the sampling approaches used by previous owners of the Caribou project were consistent with industry practices at the time and consistent for this type of mineralization. While SRK was not able to confirm the security procedures utilized during sampling, SRK has no reason to doubt the reliability of the assay data. The assay data, based on sampling carried out by several past owners, seem to be in the appropriate range when compared with the historical production record for the deposit.

The lack of documentation on QA/QC data is of some concern but given that the property has changed ownership several times in the past, it is possible that the information was collected but has simply been lost over the years. SRK recommends that a QA/QC program including the insertion of blanks and reference material be initiated and put in place for the next drilling program on the project.

11 Data Verification

Historical data has been verified several times in the past by various Qualified Persons that have been involved with the project and nothing of concern has been reported (Luff, 1998; Gow, 1999; Peltier and Beausoleil, 2006).

11.1 Verifications by SRK

11.1.1 Site Visit

During the field visit of November 2012, Gilles Arseneau reviewed all the available data stored on the Caribou mine site. This information consisted of level plans, cross-sections, longitudinal sections, maps, reports and diamond drill core and logs. Most of the data have been removed from filing cabinets as the site was being prepared for sale by the previous owners and as such the data were not organized in any logical manner but copies of historical drill logs and a digital database of all the drilling information was found and reviewed.

It was not possible to visit the underground infrastructure at the time of the visit as the property was on care and maintenance and the underground workings were flooded. Trevali was in the process of dewatering the mine workings during the site visit but the water level in the mine was still above all the underground levels.

11.1.2 Verifications of Analytical Quality Control Data

SRK checked the digital database provided by Trevali against historical drill logs found at the mine site during the site visit. A total of 140 historical drill holes were checked for coordinate and down hole survey records. Several small non material rounding errors were noted in drill hole collar locations. Two drill holes, TH212-16 and UGX-07-02 were found to have their easting and northing coordinates reversed. These errors were corrected in the database prior to modelling. An additional 13 boreholes were found to have different coordinates on the paper logs than those entered in the database. Investigating further, with visual inspections, SRK decided that the log coordinates had been incorrectly entered.

Only minor errors were noted in the survey table; none were deemed material.

A check of the assay table indicated that one drill hole had silver ounces entered in the grams per ton field; this was corrected prior to modelling. SRK also noted that some assays that were entered as being less than the detection limit on the paper logs (DDH TH4E3-17) had been entered as 0.33% copper and lead in the database. These assays were not from the mineralized intervals; therefore they were not used in the estimate, but were still corrected prior to modelling.

12 Mineral Processing and Metallurgical Testing

There are various sources of information available showing the metallurgical characteristics of the Caribou plant feed as detailed in the following sections.

Various laboratories have carried out testwork into the lead-zinc metallurgy while others have also studied the potential for copper recovery from the lead circuit tailing. In addition a campaign of Caribou plant feed processing was carried out at the Caribou plant during August 2008.

It should be emphasised that all of the results should be interpreted metallurgically and a balanced opinion of the overall metallurgy established, within the confines of the existing plant flowsheet.

12.1 Caribou Plant Feed Processed in Caribou Concentrator

The Caribou plant feed was processed for two days in August 2008, with a third day dedicated to processing a mixture of the Caribou and Restigouche plant feed. The results for the two days of processing Caribou plant feed only are presented in Table 5.

Table 5: Historical Caribou Metallurgy

		Grades				Recoveries (%)			
	Tonnes	Pb (%)	Zn (%)	Cu (%)	Ag (g/t)	Pb	Zn	Cu	Ag
August 13, 2008									
Flotation Feed	3552.1	2.72	6.25	0.22	79	100.0	100.0	100.0	100.0
Lead Concentrate	143.9	**41.88**	5.40	0.39	**531**	**62.4**	3.5	7.2	**27.2**
Zinc Concentrate	380.8	2.15	**48.78**	0.50	127	8.5	**83.7**	24.4	17.2
Copper Concentrate						0.0	0.0	**0.0**	0.0
Final Tailings	3027.4	0.93	0.94	0.18	45	29.1	12.8	68.4	55.6
August 14, 2008									
Flotation Feed	3062.1	2.61	6.08	0.22	56	100.0	100.0	100.0	100.0
Lead Concentrate	112.7	**46.44**	5.15	0.37	**522**	**65.5**	3.1	6.2	**34.3**
Zinc Concentrate	313.9	2.32	**49.65**	0.52	104	9.1	**83.7**	24.2	19.0
Copper Concentrate						0.0	0.0	**0.0**	0.0
Final Tailings	2635.5	0.77	0.93	0.20	27	25.4	13.2	69.6	46.7

12.1.1 Zinc

The zinc metallurgy is consistent both in grade and recovery and would suggest that the plant feed is marmatitic. Regarding the recovery of zinc, most losses are to tailing which would indicate either that the plant feed requires finer grinding to improve recovery, or that the zinc was lost to the lead circuit and reported to tailing through the lead cleaner tailing. Both of these scenarios would suggest that there is minimal opportunity to improve significantly on the daily results provided.

12.1.2 Lead

The first day shows a lower grade at a lower recovery, followed the next day by a higher grade concentrate at higher recovery. This would suggest that the plant was improving – albeit not reflected in the zinc metallurgy. Of concern is the level of silver in the two concentrates which appears almost constant for a wide variation in lead grade, which is not usual. The silver recovery to concentrate at the almost identical grade does however reflect a difference of almost 7%. This may be attributed to the feed and tailing assays which are lower grade on day two, but which also carries concentrate from the previous day generated from the higher feed.

The improvements in lead metallurgy are therefore valid, but the silver recoveries to the lead concentrate are regarded as an anomaly, and mainly attributed to the lower feed and tails grade.

It is recommended therefore that the grade of silver in the lead concentrate is established (typically 525+/-5 g/t) and the recovery calculated from the concentrate weights, and the feed grade.

The high loss of lead to tailing can only be attributed to the lead cleaner tailing which passes direct to tailing. Otherwise the lead recovery would be reflected in the zinc concentrate.

Improving the lead recovery would therefore mean a lowering of the concentrate grade by including the cleaner tailing (copper feed) back into the concentrate.

Based upon the above, the expected metallurgical balance for the plant is shown in Table 6.

Table 6: Expected Caribou Metallurgy Based on Historical Results

	Grades			Recoveries (%)		
	Pb (%)	Zn (%)	Ag (g/t)	Pb	Zn	Ag
Feed	2.66	6.17	68	100.0	100.0	100.0
Lead Concentrate	46.50	5.25	525	66.0	3.2	29.1
Zinc Concentrate	2.25	50.00	115	8.8	84.0	17.5

12.1.3 Copper

The recovery of copper to tailing is consistent at nominally 70%. This accounts for the copper lost to zinc circuit tailing and the copper lost to the lead tailing. The split between the two is not known and no predictions can be made other than that a separate copper concentrate must have a recovery of less than 70%.

12.2 Lakefield SGS

Testwork was carried out in Lakefield Laboratories in Canada, as reported in “5621-001 Breakwater Feb 23-06 – final.” Lakefield tested the Caribou plant feed in an extensive investigation into the flotation characteristics. The mineralogy analysis determined:

> *The liberation analysis of Caribou Comp – 1 showed that at a grind K80 of 18 microns, 55% of the galena and 66% of the sphalerite were liberated, while at a K80 of 50 microns, only 28% of the galena and 3% of the sphalerite were liberated.*

This highlights the importance of the primary grind in the plant.

A similar result is reported by ALS Metallurgy Kamloops laboratory whose results were plotted as grade recovery curves and show a 4% drop in lead recovery between 19 and 28 microns grind.

12.2.1 Lead and Copper Metallurgy

The Lakefield testwork was carried out at a K80 of ~20 and 30 microns and the following comments and Figure 11 demonstrates the variation in lead metallurgy between the two levels of K80 grind.

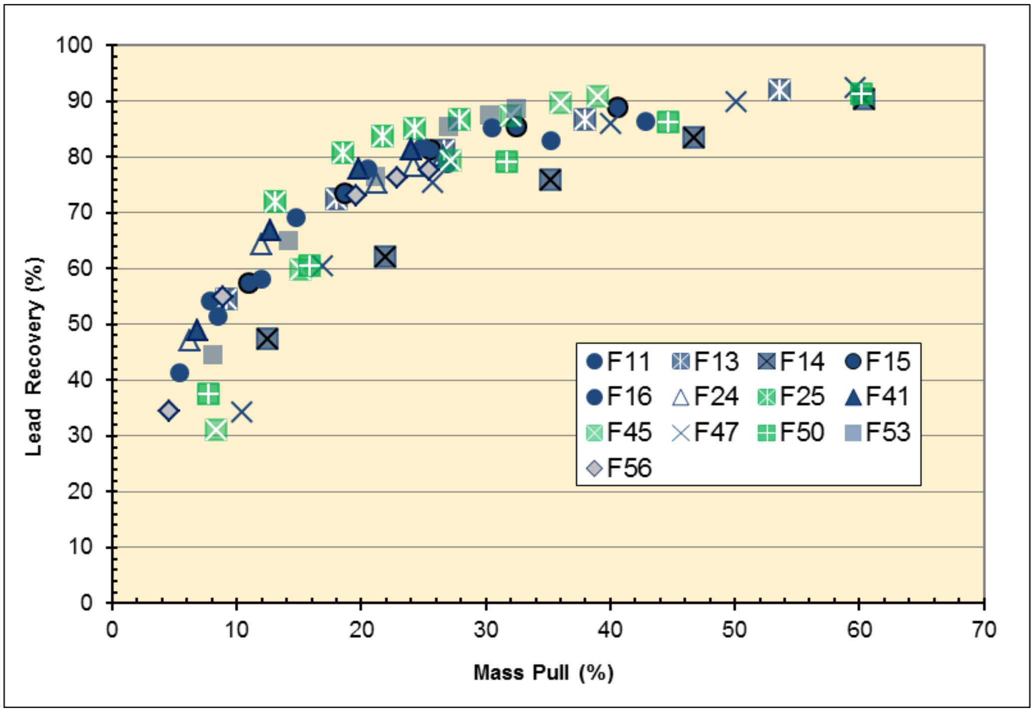


Figure 11: Effect of Grind on Lead Flotation Selectivity

(Green: K80 = 20 µm; Blue: K80 = 30 µm; Brown: K80 = 100µm)

> *Finer grinding, to 20 microns, tended to yield a slightly more selective lead float. The selectivity between lead and zinc was also somewhat enhanced by the finer primary grind, although the benefit did not fully reflect that predicted by mineralogy. This is possibly due to over-grinding of the galena (which will preferentially slime). Therefore, any grind to 20 microns should be a sequential grind-float-grind-float, so maximizing the liberation benefits.*

The selectivity between the lead and the zinc is also affected by the primary grind size as shown in Figure 12.

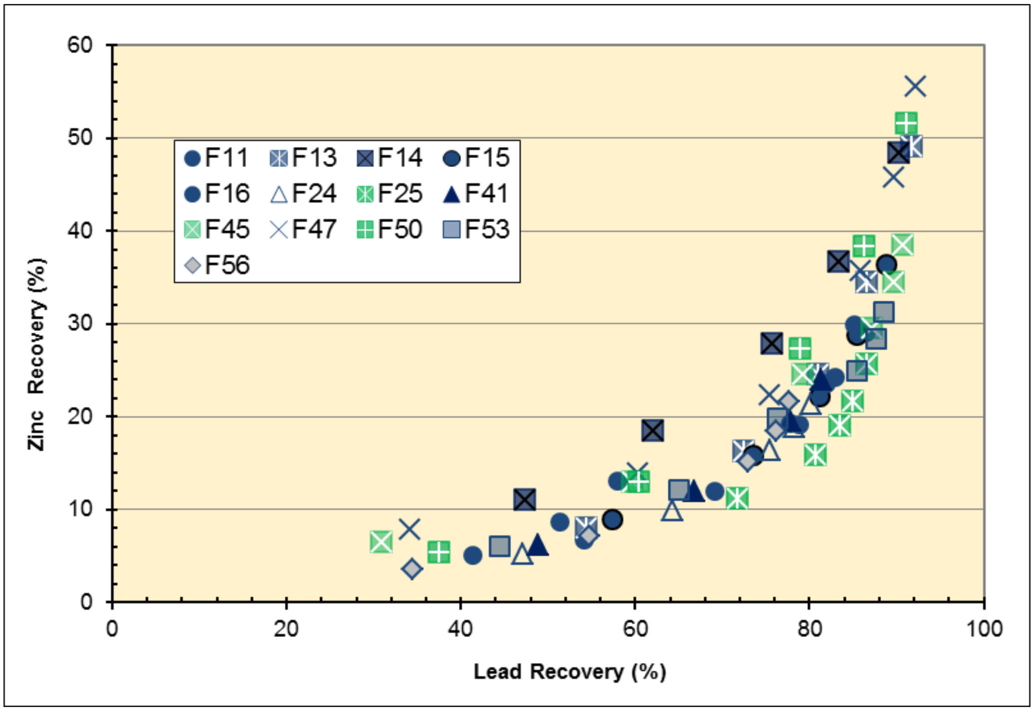


Figure 12: Effect of Grind Size on Lead/Zinc Selectivity in Lead Rougher Flotation

Green: K_{80} =20 micron; Blue: K_{80} = 30 micros; brown: K_{80} = 100 micros

Variation in lead metallurgy throughout the remaining rougher testwork is attributed mainly to the variation in reagent additions.

The regrind sizing was investigated as shown in Figure 13.

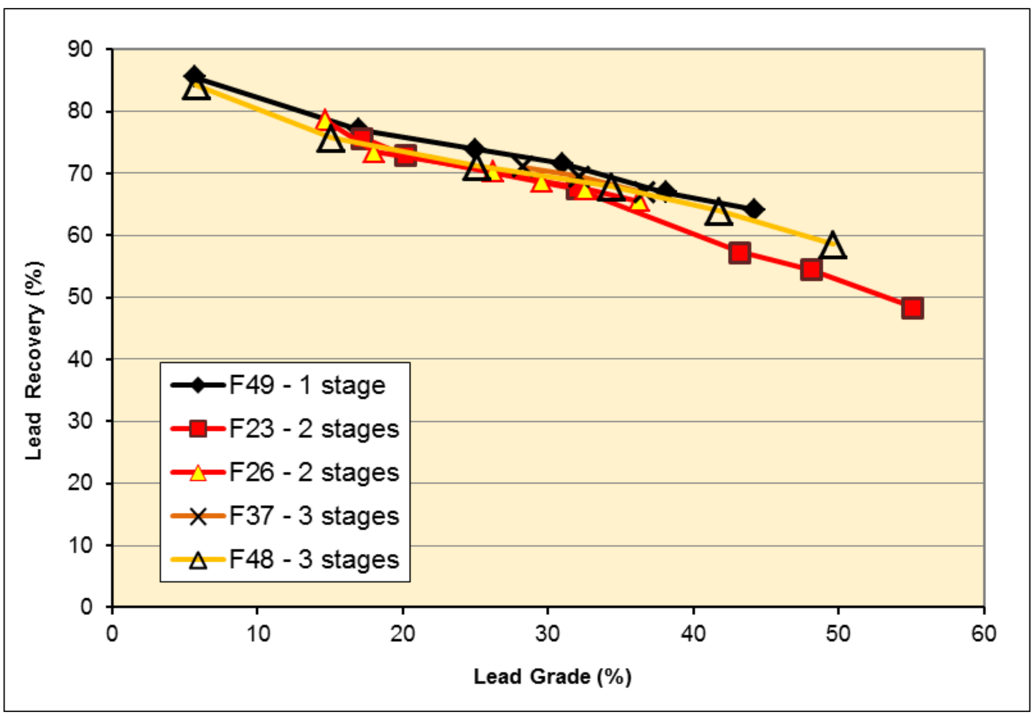


Figure 13: Effects of Number of Regrinds on the Grade/Recovery of Lead in Lead Cleaning

The above was developed from a single stage regrind and a two stage intermediate regrind. All other variants were based upon reagent additions.

The number of stages of regrind (2 exist in Caribou) also affect the selectivity between the lead and the copper as shown in Figure 14 and Figure 15.

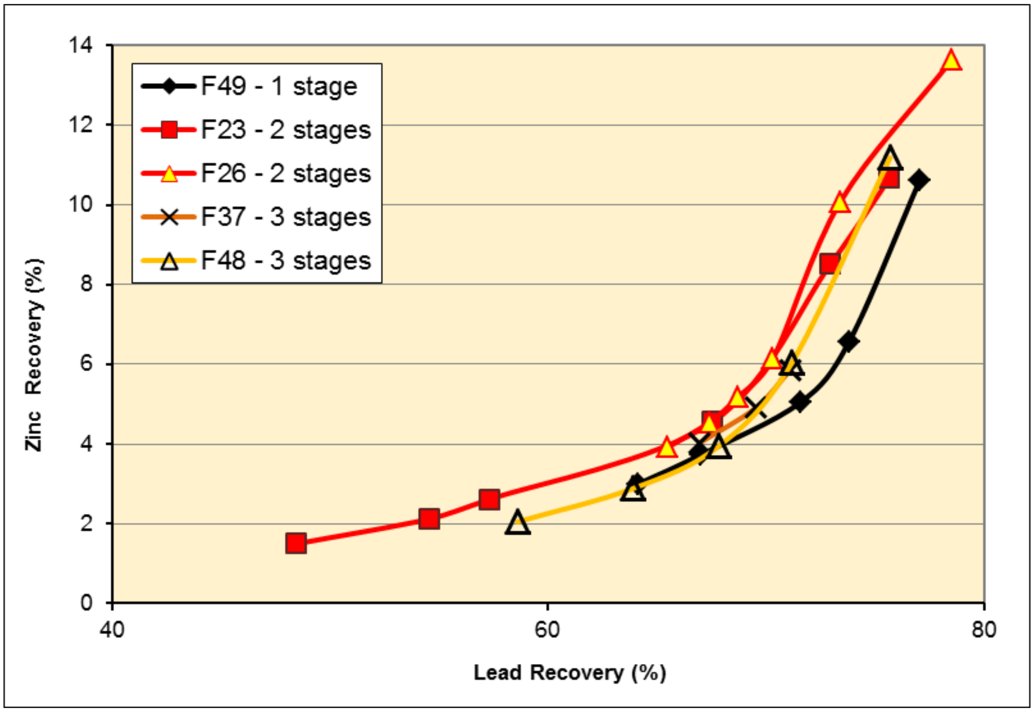


Figure 14: Effects of Number of Regrinds on Selectivity of Lead and Zinc in Lead Cleaning

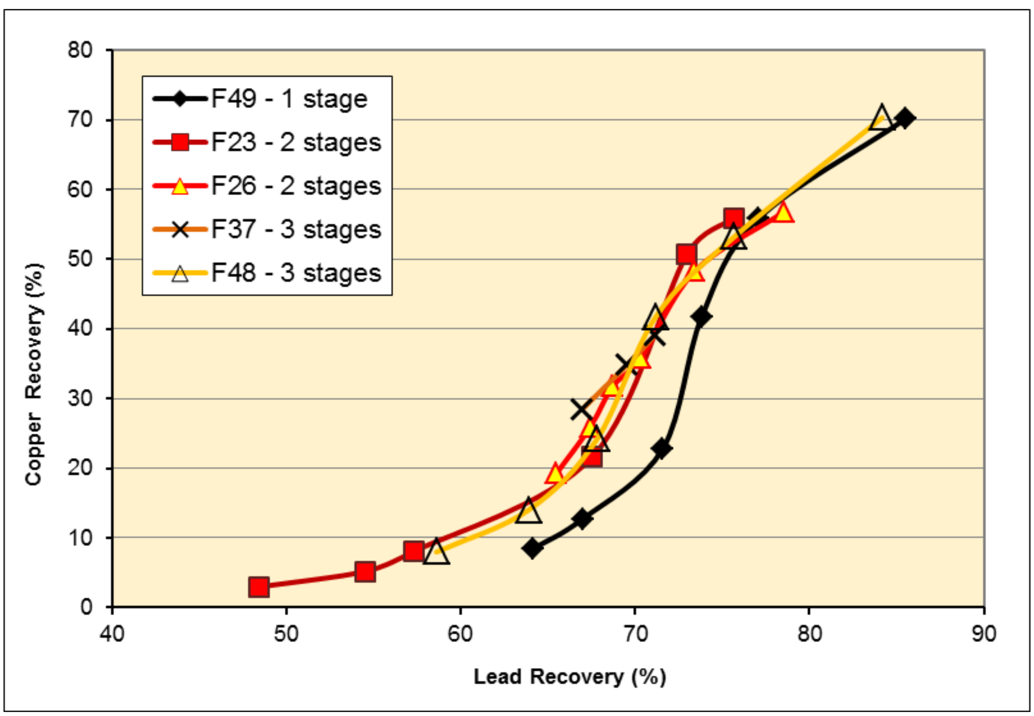


Figure 15: Effects of Number of Regrinds on Selectivity of Lead and Copper in Lead Cleaning

> *Liberation analyses of samples from various test showed that the galena in the final concentrate was roughly 70-80% free (relatively poor for a final concentrate).*

The separation of the lead and copper was investigated using different metallurgical techniques. The differential flotation of the lead from the copper with the copper floated from the lead cleaner tailing provided the superior results. However it is stated that:

> *Therefore, the overall recovery of copper from the feed is critically affected by the rougher and cleaner flotation of lead.*

Additionally the copper metallurgy in the rougher would appear to be a function of the lead recovery albeit marginally lower as shown in the following plot of all testwork results available (Figure 16).

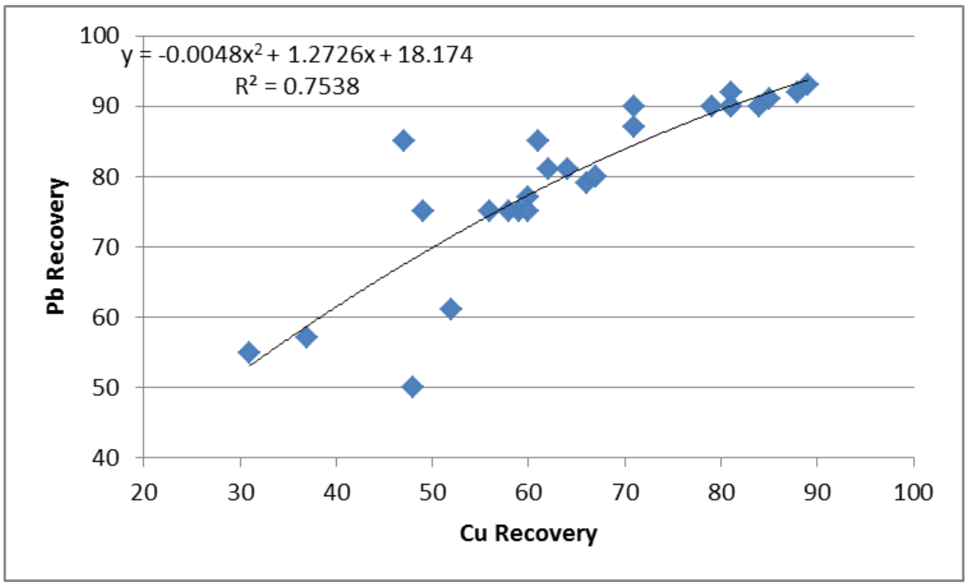


Figure 16: Lead vs. Copper Recovery for All Tests

Obviously the correlation coefficient is not high; however this is due to the nature of investigative testwork and the testing of reagent schemes which were not successful.

12.2.2 Zinc Metallurgy

An extensive investigation into the zinc metallurgy was carried out and indicated that the primary grind was extremely important in overall selectivity and recovery (Figure 17).

The regrind size metallurgy was investigated (Figure 18) and it was concluded that the overall grind size may not affect the results significantly but that the regrind sizing may restrict the limitations of the overall final concentrate grade as detailed below:

> *Partial regrinding yields a tighter grade/recovery relationship, with recoveries being higher at a concentrate grade of 50% zinc.*

> *For those tests employing a partial regrind employed three different regrind times, ranging from 10 minutes (K_{80}=16µm) to 20 minutes (K_{80}=11µm). There is no clear-cut advantage to*

fine regrinding and selection of grind time may depend on the target grade/recovery relationship, in that higher grades appear to be achieved with the finer regrind.

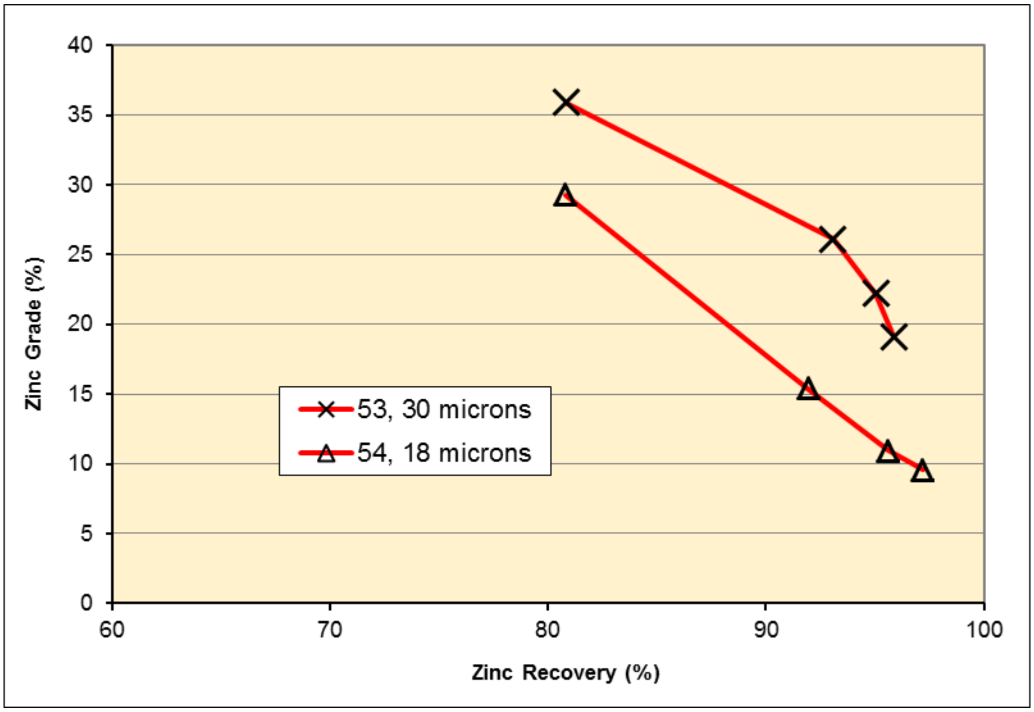


Figure 17: Effect of Primary Grind on Zinc Rougher Flotation
(all other conditions essentially the same)

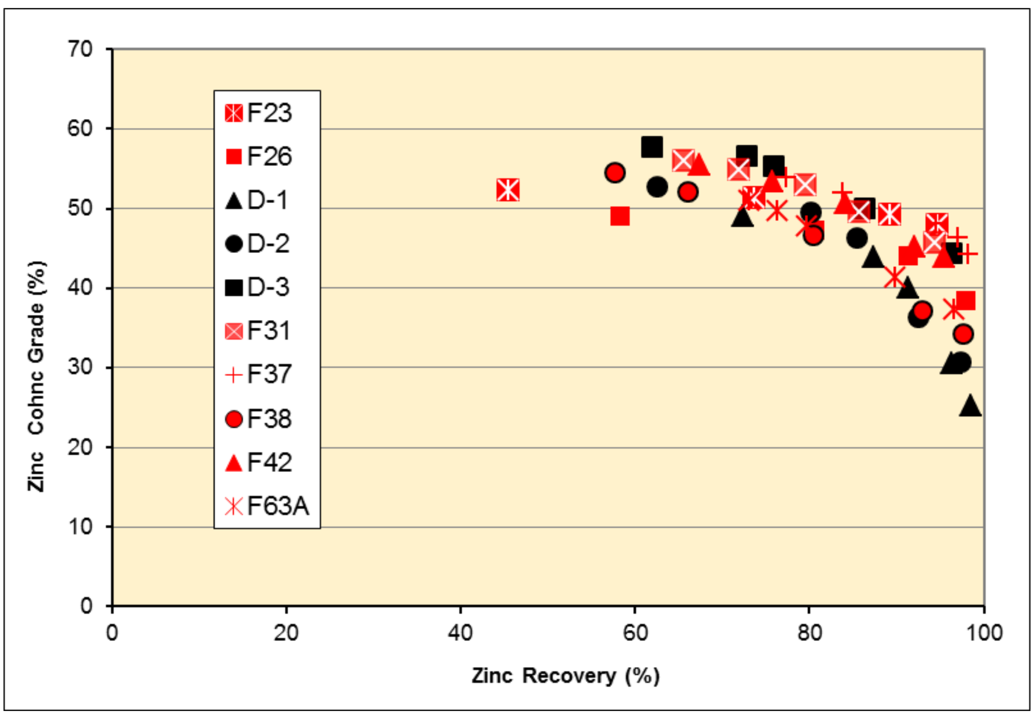


Figure 18: Partial vs Full Regrinding of Zinc Rougher Concentrate

12.2.3 Lock-Cycle Testwork

A total of nine lock-cycle tests were carried out on the Caribou plant feed at two differing primary grinds (Table 7). The test F67 was selected as being a true representation of the Caribou flowsheet with a primary grind of 30 microns which was regarded as conservative based upon the stated intention of the operation (Blue Note) to use a finer product sizing.

Discussions with the ex-mill superintendent confirmed that the two primary mills available in the Caribou mill are more than adequate to generate a 30 micron float feed, with the lead regrind mills (3 off Isa mills) dictating the overall metallurgical efficiency of the plant.

Table 7: Projected Metallurgy Calculated from the Locked Cycle Tests

Test #	Product	Wt (%)	Assays				Distribution (%)			
			Pb (%)	Zn (%)	Cu (%)	Ag (g/t)	Pb	Zn	Cu	Ag
F58	Pb Conc	3.5	49.80	5.09	0.41	590.0	63.5	2.6	3.2	34.5
	Zn Conc	7.4	1.00	54.60	1.98	68.0	2.7	58.9	33.3	8.5
	Zn Tail	89.1	1.00	2.98	0.32	38.0	33.7	38.5	63.5	57.0
	Head		2.70	6.88	0.44	60.0				
F60	Pb Conc	3.8	46.20	4.76	2.81	581.0	65.3	2.6	23.3	36.3
	Cu Conc	0.9	6.20	8.56	5.59	293.0	2.0	1.1	10.4	4.1
	Zn Conc	13.2	1.30	43.50	0.72	82.0	6.5	82.4	20.6	17.6
	Zn Tail	82.1	0.90	1.18	0.26	31.0	26.3	13.9	45.7	41.9
	Head		2.70	6.97	0.46	61.5				
F61	Pb conc	2.8	50.70	4.16	3.20	590.0	53.0	1.7	19.0	26.2
	Cu Conc	1.5	11.20	8.19	4.42	298.0	6.1	1.8	13.8	7.0
	Zn Conc	12.9	1.60	43.90	0.71	96.0	7.8	81.8	19.2	19.6
	Zn Tail	82.8	1.10	1.23	0.28	36.0	33.0	14.8	48.1	47.2
	Head		2.70	6.92	0.48	63.0				
F67	Pb Conc	3.8	44.40	3.88	1.23	594.0	59.7	2.1	8.8	31.7
	Cu Conc	1.1	12.90	5.48	17.40	321.0	5.2	0.9	37.2	5.1
	Cu Ro Tail	1.6	4.00	6.94	1.17	92.1	2.2	1.6	3.5	2.1
	Zn Conc	10.9	1.34	50.20	0.69	104.0	5.2	80.0	14.3	16.0
	Zn Tail	82.7	0.93	1.26	0.23	38.4	27.6	15.3	36.3	45.1
	Head		2.79	6.81	0.53	70.4				
F68	Pb Conc	4.3	39.40	4.02	2.28	538.0	61.2	2.6	19.1	32.9
	Cu Conc	1.4	15.10	5.80	14.10	335.0	7.7	1.2	38.7	6.7
	Cu Ro Tail	1.7	3.63	7.20	0.47	72.8	2.3	1.8	1.6	1.8
	Zn Conc	12.2	1.33	46.90	0.66	92.1	5.8	84.8	15.6	16.0
	Zn Tail	80.3	0.80	0.81	0.16	37.3	23.0	9.6	25.1	42.6
	Head		2.77	6.76	0.51	70.3				
F69	Pb Conc	3.9	45.00	4.05	1.34	490.0	62.6	2.4	10.1	30.2
	Cu Conc	0.4	22.80	4.60	18.90	411.0	3.1	0.3	13.9	2.5
	Cu Ro Tail	2.8	5.38	6.82	5.66	146.0	5.4	2.9	30.5	6.4
	Zn Conc	9.9	0.88	51.80	0.71	87.0	3.1	77.4	13.7	13.7
	Zn Tail	83.0	0.87	1.37	0.20	36.0	25.9	17.1	31.8	47.2
	Head		2.80	6.64	0.52	63.2				
F70	Pb Conc	3.3	45.90	3.86	1.38	535.0	56.5	1.9	9.2	20.9
	Cu Conc	0.8	11.00	2.82	25.90	316.0	3.2	0.3	40.4	2.9
	Cu Ro Tail	1.6	6.19	8.35	0.98	124.0	3.6	2.0	3.1	2.3
	Zn Conc	9.0	1.31	53.50	0.73	126.0	4.4	73.1	13.2	13.5
	Zn Tail	85.3	1.02	1.75	0.20	60.0	32.3	22.6	34.1	60.4
	Head		2.69	6.60	0.50	84.7				
F72	Pb Conc	3.5	42.90	4.26	1.13	552.0	54.8	2.2	7.7	32.6
	Cu Conc	0.6	17.90	4.40	15.40	477.0	3.9	0.4	17.8	4.8
	Cu Ro Tail	2.6	4.15	6.07	0.60	102.0	3.9	2.3	3.0	4.4
	Zn Conc	10.1	1.59	50.30	0.89	95.0	5.8	75.7	17.4	16.0
	Zn Tail	83.2	1.40	1.56	0.33	30.2	31.6	19.3	54.1	42.2
	Head		2.75	6.70	0.51	59.8				
D-6	Pb Conc	4.1	41.30	3.42	5.18	542.0	62.7	2.1	39.5	36.3
	Zn Conc	8.9	1.20	54.50	0.84	92.3	3.9	72.2	13.8	13.3
	Zn Tail	87.0	1.02	1.97	0.29	35.6	33.4	25.7	46.7	50.4
	Head		2.71	6.68	0.54	61.6				

Based upon the above results test F67 was selected as the most suitable duplicate of the Caribou circuit at a primary grind of 31 microns; a lead regrind to 8 microns; and a zinc regrind to 14 microns, with the predicted metallurgy shown in Table 8 and Table 9.

Table 8: Metallurgical Projection Test F67, Cycles D-F

			Assay				Distribution (%)			
	Wt (g)	Wt (%)	Pb (%)	Zn (%)	Cu (%)	Ag (g/t)	Pb	Zn	Cu	Ag
Lead Conc	223	3.8	44.40	3.88	1.23	594.0	59.7	2.1	8.8	31.7
Copper Conc	66.7	1.1	12.90	5.48	17.4	321.0	5.2	0.9	37.2	5.1
Copper Tail	93.1	1.6	4.00	6.94	1.17	92.0	2.2	1.6	3.5	2.1
Zinc Conc	643.9	10.9	1.34	50.20	0.69	104.0	5.2	80.0	14.3	16.0
Zinc Tail	4907	82.7	0.93	1.26	0.23	38.4	27.6	15.3	36.3	45.1
Feed	5933	100	2.79	6.81	0.53	70.4	100.0	100.0	100.0	100.0

Table 9: Forecast LoM Metallurgical Performance - Caribou Plant Feed

		Assay				Distribution (%)			
	Wt (%)	Pb (%)	Zn (%)	Cu (%)	Ag (g/t)	Pb	Zn	Cu	Ag
Feed	100.00	2.81	6.47	0.34	81.2	100.00	100.00	100.0	100.0
Copper Conc.	0.51	8.05	3.07	20.00	481.0	1.45	0.24	30.0	3.0
Lead Conc.	3.74	44.89	3.63	0.54	759.5	59.79	2.10	6.0	35.0
Zinc Conc.	10.3	1.42	50.18	0.47	118.3	5.20	79.89	14.3	15.0
Tails	85.45	1.10	1.35	0.26	44.7	33.56	17.77	49.7	47.0

The metallurgical projection for Test 67 is a direct calculation of the results from the lock-cycle test and provides a true reflection of the metallurgy of the Caribou feed material tested.

12.2.4 Comparative Results Lock Cycle vs. Plant

Lead-Zinc Metallurgy

The metallurgy achieved during the Caribou plant operation over the two day period in 2008 shows improved lead and zinc performance with respect to recoveries. The lead recovery was nominally 5 % higher while the zinc was nominally 4% higher. Grades to final concentrates are extremely close for the predicted grade and the actual grades achieved.

The improvements in recovery obtained during the plant run can only be attributed to either the plant feed being mined was easier to process, or the superior performance of the operating staff as the grind achieved on the Caribou plant was stated to be as follows for the two day operation (Table 10).

Table 10: Caribou Plant Feed Trial Grinding (Comparison)

Parameter	August 13, 2008	August 14, 2008
Tonnes Throughput (tonnes)	3552	3062
Primary Grind P80 (µm)	37	31
Lead Regrind P80 (µm)	13	8
Zinc Regrind P80 (µm)	14	14

Calculations considering the power available for the existing SAG mill, and the existing ball mill, in conjunction with discussions with previous metallurgical staff would indicate that a 30 micron primary grind can be achieved.

Discussions with the Plant Manager indicated that with a fully operational SAG mill and the secondary ball mill operating with suitable grinding media then the power available would be adequate to process 3,000 tpd at nominal 30 microns to float feed.

Based on a 3000 tpd throughput and a plant utilisation of 92.5%, the equipment available in the present Caribou mill will be adequate to generate a P_{80} of 30 microns which will be suitable to duplicate the existing metallurgy.

Silver Metallurgy

For Test F67, the silver grade in the lead concentrate of 594 g/t at a recovery of 32% from a feed of 70 g/t is in total agreement with the metallurgy achieved during the plant run. An additional 4-5% silver will be recovered into the copper concentrate.

The LoM silver metallurgy appears to be distorted by the increased silver grade in the feed with fixed concentrate weights from the base metals.

Copper Metallurgy

For Test F67, a copper grade of 17.4% at a recovery of 37.2% appears to be in line with values achieved by recent testwork in the RPC laboratory (Section 12.4).

12.3 ALS Metallurgy Kamloops

Testwork was carried out in the ALS Metallurgy Kamloops laboratory on a single composite of Caribou plant feed as reported under report number KM3541 dated February 12, 2013. The feed grade of the composite was determined as shown in Table 11.

Table 11: Chemical Composition of the Composite

Sample	Assay - (%) or (g/t for Au and Ag)													
	Cu	Pb	Zn	Fe	S	C	TOC	Ag	Au	Mg	CuOx	PbOx	ZnOx	As
Master Composite 1	0.27	3.47	8.65	30.7	42.3	1.31	0.03	87	2.15	0.8	0.001	0.78	0.11	0.35

The head assay reflects a high grade feed sample relative to the plant data and Lakefield testwork.

A QEMSCAN analysis indicated that the base metals were 49 – 49 – 46% liberated for lead – zinc – copper respectively at the primary grind size of 28 microns. The report concludes that a 60% liberation would be typical for good metallurgy and that a primary grind of closer to 20 microns would be required to achieve good separation in the rougher stages.

The major aspects taken from the report are shown below:

> *At a primary grind sizing of 28µm K80, lead recovery recorded less than 70 percent for both tests. When the primary grind size was decreased to 19µm K80, this could be increased to over 80 percent. Silver recovery was directly related to lead recovery, so this also equated to an increase in silver recovery to this product. Although the finer primary grind size showed improved performance, an economic analysis would be required to determine if the*

additional costs associated with finer primary grind size would be justified by this improvement.

The higher grade lead concentrates were generally associated with lower lead recoveries. The lead concentrate grading 40 percent was associated with a lead recovery of 62 percent. Silver and gold in the feed were 36 and 12 percent recovered, respectively, in this test.

Zinc concentrates grading more than 50 percent zinc were consistently obtained, with zinc recoveries of up to 70 percent. Copper responded poorly to flotation in all tests.

Table 12: ALS Metallurgy Kamloops Results

Product	Weight	Assay (%) or (g/t for Au and Ag)						Distribution (%)					
	(%)	Cu	Pb	Zn	Fe	Ag	Au	Cu	Pb	Zn	Fe	Ag	Au
T5 Lead Conc	8.1	1.20	30.60	6.80	23.4	428	4.26	32.7	70.9	6.2	6.0	41.1	16.7
T5 Zinc Conc	7.8	0.54	0.67	55.20	8.3	86	0.88	14.2	1.5	48.6	2.1	7.9	3.3
T6 Lead Conc	10.1	1.32	25.60	6.20	27.0	388	4.09	39.8	73.6	7.3	8.1	48.6	20.1
T6 Zinc Conc	8.7	0.61	0.37	54.70	7.8	97	1.02	15.8	0.9	55.0	2.0	10.5	4.3
T8 Lead Conc	5.2	1.71	40.40	5.47	18.3	564	4.41	29.0	61.9	3.3	3.0	35.6	12.1
T8 Zinc Conc	5.7	0.53	0.51	58.30	6.3	80	0.63	9.8	0.9	38.4	1.1	5.5	1.9
T9 Lead Conc	5.3	0.41	36.80	5.24	21.1	392	3.22	6.8	56.0	3.2	3.4	25.1	9.5
T9 Zinc Conc	9.6	0.60	0.63	53.20	9.3	88	0.90	18.1	1.7	58.5	2.8	10.2	4.8
T10 Lead Conc	7.2	1.02	31.30	5.57	22.7	424	3.88	22.8	68.3	4.7	5.0	34.9	15.0
T10 Zinc Conc	11.5	0.66	1.14	52.40	9.6	102	0.87	23.6	4.0	70.4	3.4	13.4	5.4

The sample provided graded about 3.5 percent lead, 8.7 percent zinc, 87 g/tonne silver and 2.2 g/tonnes gold. Copper graded 0.3 percent, but poor recoveries for coper were observed from all tests. As Caribou is massive sulphide, pyrite dominated the mineralization, making up 64 percent of the sample mass. Galena and sphalerite composed an additional 4 and 14 percent of the sample mass, respectively. With the ratio of galena and sphalerite to pyrite, conditions selective against pyrite would certainly be required to produce high grade concentrates.

Similar to other samples of Caribou mineralization analyzed at ALS Metallurgy Kamloops in previous programs, galena and sphalerite liberation was very poor. As a primary grind sizing of 28µm K_{80}, galena and sphalerite were both about half liberated. The remainder was mostly interlocked with pyrite in either binary composites, or in particles containing more that two mineral phases.

This intense interlocking between the valuable minerals and pyrite makes flotation separation difficult since conditions selective against pyrite are required to produce clean concentrates. Thus, low recoveries would be anticipated.

The above results would indicate that even though the sample provided was a high grade mineralization, the size of the interlocking of the various minerals was sufficiently fine to prevent separation into high grade concentrates at comparable recoveries to those achieved either at Lakefield or in the plant.

These lower recoveries are attributed to locking which required finer grinding as opposed to the correct development of a suitable reagent scheme. This would suggest that parts of the Caribou mineralized material contains extremely fine mineralization.

The lead metallurgy is summarised as:

> *The higher grade lead concentrates were generally associated with lower lead recoveries. The lead concentrate grading 40 percent was associated with a lead recovery of 62 percent. Silver and gold in the feed were 36 and 12 percent recovered, respectively, in this test.*

12.3.1 Lead Metallurgy

The best result achieved is reported as Test 8 (Table 12) which was run with a primary grind of 19 microns, and a bulk regrind to 8 microns. The test results gave a final lead concentrate of 40% lead at 62% recovery in open circuit.The tailing content would be recirculating within an operating plant, and contained approximately 12.6% additional lead which would be available for additional recovery. A maximum of 50% recovery of the tailing content would be typical industry practice thus improving the best result for the lead metallurgy to 40% grade at nominally 68% recovery.

12.3.2 Silver Metallurgy

Based upon the best lead metallurgy the silver grade was 564 g/t at 35.5% recovery from a head grade calculated as 82 g/t. The tailing from the open circuit contained nominally 12% recovery suggesting that the silver is tracking the lead metallurgy. In an operating plant it is anticipated that the silver recovery would improve to approximately 40 - 42.5% based upon the high feed grade of 82 g/t.

12.3.3 Copper Metallurgy

The tailing from the lead circuit contains only 16% copper recovery at a grade of approximately 0.24% copper which would not provide a feed to an economic circuit.

12.3.4 Zinc Metallurgy

A significant amount of zinc was lost to the lead circuit, which resulted in a lower amount of zinc entering the zinc circuit. A zinc concentrate of 48.4% zinc at 68.2% recovery was achieved. A higher grade concentrate at lower recovery was also achieved indicating that the mineralization is high grade sphalerite. A concentrate of 58.3% at 38.4% recovery supports the fact that the higher grade composite appears to contain a high grade sphalerite mineral which differs from the sphalerite encountered in the previous laboratory testwork.

12.3.5 Gold Recovery

Based on the higher grade composite at 1.89 g/t gold in the feed (Table 13) a recovery of 13.4% was achieved at a grade of 4.41 g/t gold in the lead concentrate. The tailing gold recovery would appear to track the weight of tailing suggesting that the gold is most probably associated with the pyrite in the tailing. The potential improvement in gold by recirculation of the tailing would therefore only be associated with the improvement in lead recovery. Based upon a lead metallurgy improvement of 6% additional to an open circuit recovery of 62%, an improvement of 1.0 - 1.5% gold recovery to the lead concentrate would be anticipated.

Based upon the Kamloops testwork with a high grade feed the anticipated metallurgy would be as shown in Table 13.

Table 13: Anticipated Metallurgy based on ALS Kamloops Work

Product	Grades					Recoveries (%)				
	Cu (%)	Pb (%)	Zn (%)	Ag (g/t)	Au (g/t)	Cu	Pb	Zn	Ag	Au
Feed	0.31	3.40	8.64	82	1.89	100.0	100.0	100.0	100.0	100.0
Cu Conc	0.45	5.00	7.00	125	2.00	16.0	16.2	8.9	16.8	11.7
Pb Conc	1.70	40.00	5.50	565	4.40	31.5	68.0	3.7	39.5	13.4
Zn Conc	0.55	0.84	50.00	86	1.00	19.9	2.8	65.0	11.8	5.9

From the above it is evident that the only comparable metallurgy achieved by Kamloops is the lead concentrate, which appears to have been achieved at the expense of the copper and zinc metallurgy. While the poor copper metallurgy is understandable owing to a low copper to lead ratio in the feed (high grade lead), the poor zinc metallurgy would appear to be due to a combination of finer disseminations in the mineralization, and the maximisation of the lead metallurgy.

12.4 DRA Testwork at RPC

The testwork carried out at the Research and Productivity Council (RPC), a metallurgical lab in Fredericton, under the supervision of DRA Americas, an international metallurgical consulting group, was aimed at developing a copper-lead separation circuit for the Caribou plant feed.

Testwork has been carried out to investigate the occurrence of the copper in the lead cleaner circuit, and the requirements for reagent stripping ahead of floating the copper from the lead circuit tailing. The more pertinent results are provided as a guide to the flowsheet development.

12.4.1 Early Separation Results

The head grade of 0.52% copper and 1.72% lead would suggest that this sample has the potential for production of a lead and copper concentrate. However, owing to the initial complicated flowsheet and low weights involved in the cleaner circuits the initial testwork proved difficult to control and resulted in extremely poor metallurgy as summarized in Table 14.

Although a separation of the lead and copper could be achieved as evident from the individual recoveries, the up-grading of the copper mineralization was poor, as shown in Table 15.

The lead concentrate at 16.7% lead and 53.2% recovery would suggest that the operator sacrificed the lead metallurgy to increase copper recovery. However the low concentrate grade of 5.3% copper at 58.8% recovery indicated that problems existed with the copper metallurgy during the test run.

The lead cleaner testwork is very similar throughout the testwork, and shows that the lead can be cleaned to high grades (at the expense of recovery). The rapid fall off in recovery as shown by the grade-recovery curve would suggest that a considerable amount of mineralization is contained within a middling material.

Table 14: RPC Test Results

Stream Number	1	2	3	4	5	6	7	8	9	10	11	Total	Total	Total
Stream Name	Trevali Ore Feed	Pb Rougher Conc.	Pb Rougher Tails	Pb Cleaner 1 Conc.	Pb Cleaner 1 Tails	Pb Cleaner 2 Conc.	Pb Cleaner 2 Tails	Pb Cleaner 3 Conc.	Pb Cleaner 3 Tails	Pb Cleaner 4 Conc.	Pb Cleaner 4 Tails	Pb Cleaner Tails 2,3&4	Pb Cleaner Tails 1 & 2	Pb Cleaner Tails
Mass (%)	100.00	20.60	79.40	6.40	14.20	3.30	3.10	2.30	1.00	1.80	0.50	4.6	17.3	18.8
Cu Grade (%)	0.45	1.30	0.22	2.25	0.87	1.70	2.84	1.26	2.72	1.04	2.06	2.7	1.2	1.3
Cu Distribution (%)	100.00	59.90	40.10	32.10	27.80	12.60	19.60	6.50	6.00	4.20	2.30	27.9	47.4	55.7
Pb Grade (%)	1.86	6.23	0.73	15.65	1.99	27.74	2.67	37.86	4.16	44.25	14.89	4.3	2.1	2.6
Pb Distribution (%)	100.00	68.90	31.10	53.70	15.20	49.30	4.40	47.10	2.20	43.00	4.00	10.7	19.6	25.8

Table 15: RPC Test Results

Stream Number	1	2	3	4	5	6	7	8	9	10	11
Stream Name	Trevali Ore Feed	Pb Rougher Conc.	Pb Rougher Tails	Pb Cleaner 1 Conc.	Pb Cleaner 1 Tails	Pb Cleaner 2 Conc.	Pb Cleaner 2 Tails	Pb Cleaner 3 Conc.	Pb Cleaner 3 Tails	Cu Rougher Conc.	Cu Rougher Tails
Mass (%)	100.00	34.50	65.50	13.40	21.10	7.60	5.70	5.60	2.10	4.10	1.50
Cu Grade (%)	0.37	0.88	0.10	2.15	0.07	3.48	0.39	4.57	0.52	5.32	2.54
Cu Distribution (%)	100.00	82.20	17.80	78.10	4.00	72.10	6.10	69.10	2.90	58.80	10.30
Pb Grade (%)	1.75	3.62	0.76	7.84	0.95	12.67	1.43	16.73	1.77	18.56	11.74
Pb Distribution (%)	100.00	71.50	28.50	60.00	11.50	55.30	4.70	53.20	2.10	43.20	10.00

12.4.2 Tailing Regrind October 2013

As shown in Table 16 and Table 17, both tests were carried out with a steam strip, with Test 2 excluding the first cleaner tailing regrind.

A lead concentrate of 37.6% lead at 54.9% recovery, and a copper concentrate of 17.2% copper at 19.2% recovery would suggest that Test 1 did not operate under ideal conditions. Test 2 gave a 38.3% lead grade at 54.4% recovery in combination with 22.6% copper grade at 37.1% recovery.

12.4.3 Steam Stripping January 2014

The flowsheet used in October 2013 was duplicated with minor changes in reagents for improved metallurgical control. The initial test (Test 1), see Table 18, included the steam stripping of reagents ahead of copper flotation.

The lead concentrate at 33.5% lead and 50.5% recovery was similar to previous lead metallurgy, while the copper concentrate at 6.2% copper and 9.3% recovery suggested that fundamental problems were being experienced with the flowsheet and-or the reagent schedule.

Test 2 removed the steam strip ahead of the copper circuit with the results as shown in Table 19.

The lead concentrate of 30.8% lead at 51.8 % recovery is comparable with previous testwork, while the copper concentrate at 19.1% copper at 45.7% recovery would indicate that removing the steam stripping had had a positive effect on the copper circuit metallurgy which was subsequently adopted for further Cu circuit design.

12.4.4 Lead Metallurgy

The lead metallurgy throughout the testwork is inferior to both the plant production results and the Lakefield results. It may be assumed therefore that increasing the lead concentrate grade would be associated with a loss in lead recovery. The additional rejection of copper to copper circuit would however be marginal as the present lead concentrate contains only 1.1% copper at a recovery of 6.3%.

12.4.5 Copper Metallurgy

The copper metallurgy shows a vastly improved result with a grade of 19.1% copper at 45.7% recovery. This result requires confirmation through duplicate testwork. However the result does indicate the amenability of the copper to up-grading given the correct flowsheet and reagent additions.

The copper metallurgy is comparable with the Lakefield testwork (Table 8: 17.4% copper at 37.2% recovery) and as such is accepted as a reflection of the copper metallurgy.

Table 16: Final Copper Flotation Results (Test 1)

Stream Number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Stream Name	Trevali Ore Feed	Pb Rougher Conc.	Pb Rougher Tails	Pb Cleaner 1 Conc.	Pb Cleaner 1 Tails	Pb Cleaner 2 Conc.	Pb Cleaner 2 Tails	Pb Cleaner 3 Conc.	Pb Cleaner 3 Tails	Cu Flotation Feed	Cu Rougher Tails	Cu Rougher Conc.	Cu Cleaner 1 Tails	Cu Cleaner 1 Conc.	Cu Cleaner 2 Tails	Cu Cleaner 2 Conc.
Mass (%)	100.00	23.00	77.00	8.30	14.80	4.00	4.30	2.50	1.40	20.500	16.90	3.60	2.70	1.00	0.50	0.50
Cu Grade (%)	0.45	1.21	0.22	1.58	1.01	1.46	1.69	0.93	2.41	1.25	0.61	4.20	1.27	12.35	7.04	17.21
Cu Distribution (%)	100.00	62.30	37.70	29.10	33.20	12.90	16.20	5.20	7.70	57.0	23.00	34.00	7.60	26.40	7.20	19.20
Pb Grade (%)	1.73	5.27	0.67	12.90	0.99	25.50	1.29	37.60	4.16	1.28	1.04	2.37	1.27	5.43	3.35	7.34
Pb Distribution (%)	100.00	70.10	29.90	61.60	8.50	58.40	3.20	54.90	3.40	15.10	10.10	5.00	2.00	3.00	0.90	2.10
Ag Grade (g/t)	74.00	175.00	44.00	338.00	84.00	616.00	81.00	782.00	322.00	100.00	79.00	200.00	119.00	424.00	342.00	498.00
Ag Distribution (%)	100.00	54.30	45.70	37.60	16.70	32.90	4.70	26.70	6.20	27.70	17.90	9.80	4.30	5.50	2.10	3.40
Au Grade (g/t)	1.42	2.17	1.20	3.32	1.53	4.36	2.36	5.28	2.74	1.79	1.77	1.86	1.67	2.40	2.33	2.44
Au Distribution (%)	100.00	35.20	64.80	19.30	15.90	12.20	7.20	9.40	2.80	25.80	21.00	4.80	3.10	1.60	0.80	0.90

Table 17: Final Copper Flotation Results (Test 2)

Stream Number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Stream Name	Trevali Ore Feed	Pb Rougher Conc.	Pb Rougher Tails	Pb Cleaner 1 Conc.	Pb Cleaner 1 Tails	Pb Cleaner 2 Conc.	Pb Cleaner 2 Tails	Pb Cleaner 3 Conc.	Pb Cleaner 3 Tails	Cu Flotation Feed	Cu Rougher Tails	Cu Rougher Conc.	Cu Cleaner 1 Tails	Cu Cleaner 1 Conc.	Cu Cleaner 2 Tails	Cu Cleaner 2 Conc.
Mass (%)	100.00	21.20	78.80	7.60	13.60	3.70	3.90	2.40	1.30	18.70	16.40	2.40	1.40	1.00	0.20	0.70
Cu Grade (%)	0.45	1.35	0.21	1.58	1.22	1.47	1.69	0.97	2.41	1.40	0.36	8.57	1.26	19.09	7.62	22.63
Cu Distribution (%)	100.00	63.10	36.90	26.50	36.60	12.10	14.40	5.20	6.90	57.90	13.10	44.80	3.90	40.90	3.80	37.10
Pb Grade (%)	1.72	5.60	0.68	13.85	0.99	26.53	1.61	38.33	4.16	1.34	1.08	3.13	1.61	5.30	4.11	5.67
Pb Distribution (%)	100.00	68.90	31.10	61.10	7.80	57.50	3.60	54.40	3.10	14.50	10.30	4.30	1.30	3.00	0.50	2.40
Ag Grade (g/t)	73.00	182.00	44.00	358.00	84.00	632.00	94.00	795.00	322.00	102.00	66.00	351.00	164.00	620.00	581.00	633.00
Ag Distribution (%)	100.00	52.90	47.10	37.20	15.60	32.30	5.00	26.60	5.70	26.30	14.90	11.40	3.10	8.20	1.80	6.40
Au Grade (g/t)	1.41	2.11	1.22	3.33	1.44	4.33	2.36	5.17	2.74	1.72	1.61	2.44	2.00	3.08	3.57	2.93
Au Distribution (%)	100.00	31.90	68.10	18.00	13.90	11.50	6.50	9.00	2.50	22.90	18.80	4.10	2.00	2.10	0.60	1.50

Table 18: Copper Float with Steam - CN Leach Flotation Results (Test 1)

Stream Number	1	2	3	4	5	6	7	8	9	10	11
Stream Name	Trevali Ore Feed	Pb Rougher Conc.	Pb Rougher Tails	Pb Cleaner 3 Conc.	Cu Flotation Feed	Cu Rougher Tails	Cu Rougher Conc.	Cu Cleaner 1 Tails	Cu Cleaner 1 Conc.	Cu Cleaner 2 Tails	Cu Cleaner 2 Conc.
Mass (%)	100.00	22.40	77.60	2.20	20.20	15.30	4.90	3.30	1.60	0.90	0.60
Cu Grade (%)	0.42	1.09	0.23	0.99	1.10	0.83	1.95	1.16	3.64	1.94	6.16
Cu Distribution (%)	100.00	58.30	41.70	5.20	53.10	30.20	22.80	9.20	13.60	4.30	9.30
Pb Grade (%)	1.47	4.19	0.68	33.50	0.98	0.82	1.48	0.98	2.53	1.44	4.14
Pb Distribution (%)	100.00	63.90	36.10	50.50	13.40	8.50	4.90	2.20	2.70	0.90	1.80
Ag Grade (g/t)	57.00	135.00	35.00	714.00	71.00	57.00	115.00	74.00	202.00	113.00	334.00
Ag Distribution (%)	100.00	52.80	47.20	27.60	25.20	15.30	9.90	4.30	5.50	1.90	3.70
Au Grade (g/t)	1.23	1.74	1.08	4.95	1.38	1.32	1.57	1.40	1.94	1.62	2.40
Au Distribution (%)	100.00	31.70	68.30	8.90	22.80	16.50	6.30	3.80	2.50	1.20	1.20

Table 19: Copper Float w/o Steam - CN Leach Flotation Results (Test 2)

Stream Number	1	2	3	4	5	6	7	8	9	10	11
Stream Name	Trevali Ore Feed	Pb Rougher Conc.	Pb Rougher Tails	Pb Cleaner 3 Conc.	Cu Flotation Feed	Cu Rougher Tails	Cu Rougher Conc.	Cu Cleaner 1 Tails	Cu Cleaner 1 Conc.	Cu Cleaner 2 Tails	Cu Cleaner 2 Conc.
Mass (%)	100.00	23.00	77.00	2.50	20.50	15.00	5.50	3.70	1.80	0.80	1.00
Cu Grade (%)	0.40	1.15	0.18	1.06	1.16	0.18	3.83	0.40	11.08	1.46	19.07
Cu Distribution (%)	100.00	65.70	34.30	6.50	59.20	6.90	52.30	3.70	48.60	2.90	45.70
Pb Grade (%)	1.47	4.14	0.67	30.75	0.94	0.76	1.42	1.03	2.24	1.53	2.83
Pb Distribution (%)	100.00	64.90	35.10	51.80	13.10	7.80	5.30	2.60	2.70	0.80	1.90
Ag Grade (g/t)	57.00	126.00	36.00	605.00	69.00	35.00	159.00	60.00	369.00	122.00	574.00
Ag Distribution (%)	100.00	51.10	48.90	26.40	24.80	9.40	15.40	3.90	11.50	1.70	9.80
Au Grade (g/t)	1.20	1.27	1.18	3.60	0.96	0.94	1.12	1.06	1.25	1.23	1.27
Au Distribution (%)	100.00	24.30	75.70	7.40	16.90	11.70	5.20	3.30	1.90	0.80	1.00

12.4.6 Silver and Gold Metallurgy

The gold grade of the copper concentrate is 1.27 g/t. The silver content of the copper concentrate is 574 g/t at 9.8% recovery, which is an improvement on the Lakefield results.

12.5 Predictive Metallurgy

Based on all of the metallurgical results available a metallurgical prediction may be made for the anticipated metallurgical balance for the Caribou operations based on rehabilitation of the plant including a copper separation circuit from the lead circuit cleaner tailing.

A prediction for the plant operating at the required 30 micron float feed is shown in the top section of Table 20 below, based on the Caribou plant results with minor adjustments for recent testwork.

The future forecast metallurgy is based on additional capital expenditure aimed at optimizing the primary grind in conjunction with improvements to regrinding of the lead and zinc ahead of cleaning. It is based on testwork results obtained from finer grinding. It represents possible upside only, and is not incorporated into the PEA capital budget or financial model.

Table 20: Predictive Metallurgy

	Grades						Recoveries (%)				
	Wt (%)	Pb (%)	Cu (%)	Zn (%)	Ag (g/t)	Au (g/t)	Pb	Cu	Zn	Ag	Au
Anticipated Metallurgy at 30 micron primary grind											
Feed	100.00	2.44	0.40	6.05	71.00	0.93	100.00	100.00	100.00	100.00	100.00
Pb Conc	3.52	45.00	0.40	6.05	655.00	2.00	65.00	3.52	3.52	32.50	7.58
Cu Conc	0.90	8.00	20.00	5.50	394.00	3.10	2.62	45.00	0.73	5.00	3.00
Zn Conc	10.16	1.22	0.70	50.00	126.00	0.91	5.08	17.79	84.00	18.00	10.00
Tailing	85.41	0.78	0.16	0.83	36.99	0.86	27.30	33.69	11.75	44.50	79.42
Anticipated Future Metallurgy with fully refitted grinding circuit											
Feed	100.00	2.44	0.40	6.05	71.00	0.93	100.00	100.00	100.00	100.00	100.00
Pb Conc	3.80	45.00	0.40	6.05	655.00	2.00	70.00	3.66	3.66	35.00	8.16
Cu Conc	1.00	8.00	20.00	5.50	391.00	2.79	2.79	50.00	0.77	5.50	3.00
Zn Conc	10.20	1.22	0.70	51.00	125.00	0.91	5.14	18.00	86.00	18.00	10.00
Tailing	85.00	0.63	0.13	0.68	34.66	0.86	22.07	28.34	9.57	41.50	78.84

13 Mineral Resource Estimates

13.1 Introduction

The Mineral Resource Statement presented herein represents the first mineral resource evaluation prepared for Trevali for the Caribou project in accordance with the Canadian Securities Administrators' National Instrument 43-101. Several historical mineral resource estimates have been prepared for the Caribou deposit (Refer to Section 5). These estimates are no longer considered relevant as they are being replaced by the estimate presented in this report.

The mineral resource model prepared by SRK considers 708 core boreholes drilled by various owner/operators during the period of 1956 to 2009. The resource estimation work was completed by Guy Dishaw, PGeo, of SRK, under the supervision of Dr. Gilles Arseneau, PGeo. Both are independent Qualified Persons as this term is defined in National Instrument 43-101. The effective date of the Mineral Resource Statement is May 13, 2014.

This section describes the resource estimation methodology and summarizes the key assumptions considered by SRK. In the opinion of SRK, the resource evaluation reported herein is a reasonable representation of the global zinc/lead/copper/gold/silver mineral resources found in the Caribou deposit at the current level of sampling. The mineral resources are estimated in conformity with generally accepted CIM *Estimation of Mineral Resource and Mineral Reserves Best Practices Guidelines* and are reported in accordance with the Canadian Securities Administrators' National Instrument 43-101. Mineral resources are not mineral reserves and have not demonstrated economic viability. There is no certainty that all or any part of the mineral resource will be converted into a mineral reserve.

The database used to estimate the Caribou project mineral resources was audited by SRK. SRK is of the opinion that the current drilling information is sufficiently reliable to interpret with confidence the boundaries of poly-metallic VMS mineralization and that the assay data are sufficiently reliable to support mineral resource estimation.

Vulcan version 8 was used to review and verify the resource estimation domains designed by Trevali, prepare assay data for geostatistical analysis, construct the block model, estimate metal grades, and tabulate mineral resources. Sage2001 was used for geostatistical analysis and variography.

13.2 Resource Estimation Procedures

The resource evaluation methodology involved the following procedures:

- Database compilation and verification;
- Review of wireframe models for the zinc/lead/copper/gold/silver boundaries of the mineralization;
- Definition of resource domains;
- Data conditioning (compositing and capping) for geostatistical analysis and variography;
- Block modelling and grade interpolation;
- Resource classification and validation;

- Assessment of “reasonable prospects for economic extraction” and selection of appropriate cut-off grades;
- Preparation of the Mineral Resource Statement.

13.3 Resource Database

The Caribou project database was provided to SRK as an Excel file. The current drill hole database within the resource area consists of 11,819 samples from 708 drill holes. Table 21 provides a summary of the database used for the Caribou Project resource estimation.

Table 21: Exploration Data within the Resource Area

Number of Boreholes	Number of Samples	Total Sample Length (m)
708	11,819	13,310

There are no specific gravity data available in the database supplied by Trevali. SRK used a fixed specific gravity for both the massive sulphide (4.27) and the surrounding country rock (2.7). The numbers were derived from past reports and production data. The mineralized intervals were set to 4.27 which seemed to agree well with historical mining campaigns and past reconciliation.

13.4 Solid Body Modelling

Solid body modelling focused on the design of grade-shell models outlining mineralization greater than 7% (lead+zinc). SRK reviewed the final estimation domain models prior to implementation into the estimation. SRK separated domain 40 into two sub-domains (40 and 50) due to the folding of this domain at its western extent. This allowed for proper rotation of the search ellipse in each subdomain.

13.5 Compositing

Most of the samples inside the mineralized estimation domains were collected at about 1m intervals (Figure 19). For resource estimation, all assays were composited to 1 m lengths within the estimation domains. Composites less than 0.5 m were merged with the adjacent composite of the same domain.

13.6 Evaluation of Outliers

Block grade estimates may be unduly affected by very high grade assays. SRK reviewed log-normal probability plots of the composites from each metal in each estimation domain to evaluate outliers. Capping levels were determined by this evaluation and are summarized in Table 22. The resulting ‘metal loss’ was calculated by comparing the block estimates between capped and uncapped interpolation runs.

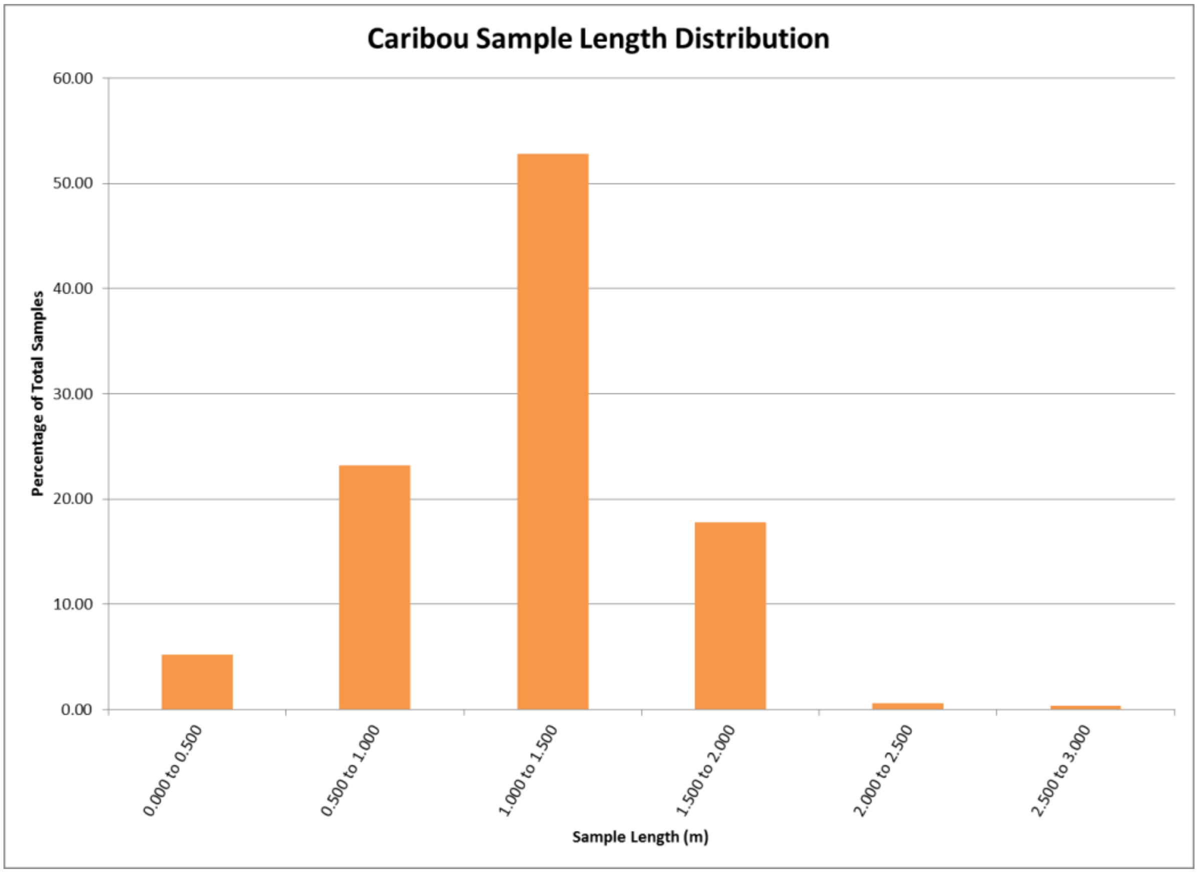


Figure 19: Histogram of Sample Lengths in the Mineralized Domains

Table 22: Capping Levels by Estimation Domain and Metal

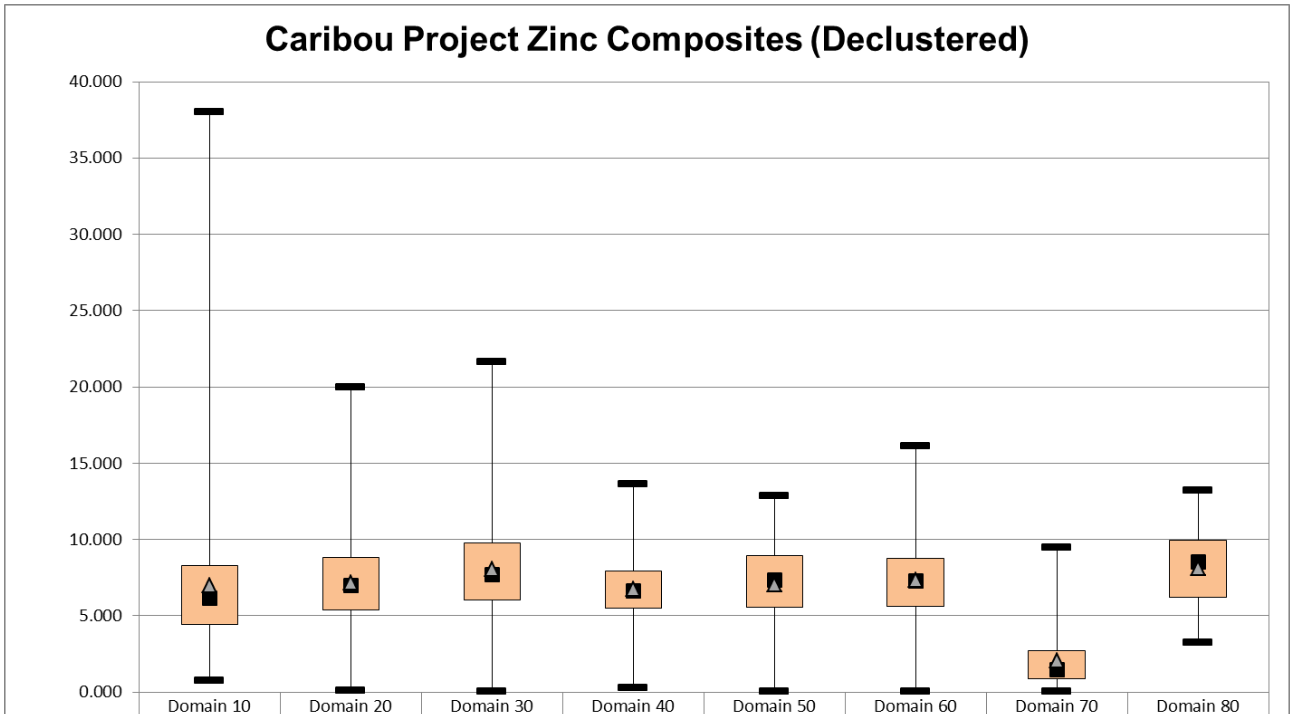
Domain	Au			Ag			Pb		
	Max Composite	Capping Level	Metal Loss (%)	Max Composite	Capping Level	Metal Loss (%)	Max Composite	Capping Level	Metal Loss (%)
10	11.1	5.0	1	180	170.0	0.05	8.8	7.0	0.48
20	4.9	5.0	0	246.8	170.0	0.04	14.3	7.0	0.51
30	6.9	5.0	4	260.3	180.0	0.41	10.2	7.0	1.10
40	10.3	5.0	5	264	210.0	0.07	8.1	7.0	0.00
50	3.2	2.0	0	359.4	210.0	1.30	12.1	8.0	0.89
60	2.9	2.0	3	310	210.0	1.49	9.5	8.0	0.32
70	5.5	5.0	0	154	90.0	2.53	4.8	3.0	5.13
80	3.6	5.0	0	254.7	210.0	0.21	8.9	7.0	1.30

Domain	Zn			Cu		
	Max Composite	Capping Level	Metal Loss (%)	Max Composite	Capping Level	Metal Loss (%)
10	38.0	16.0	0.16	8.3	1.50	2.50
20	20.0	16.0	0.19	3.1	1.50	0.00
30	21.6	16.0	0.57	5.8	1.50	3.03
40	13.6	13.0	0.00	8.9	1.00	0.00
50	12.9	13.0	0.00	0.6	1.00	0.00
60	16.1	13.0	0.47	1.3	1.00	0.00
70	9.5	7.0	2.77	11.1	6.00	2.78
80	13.2	13.0	0.00	1.2	1.00	0.00

13.7 Statistical Analysis and Variography

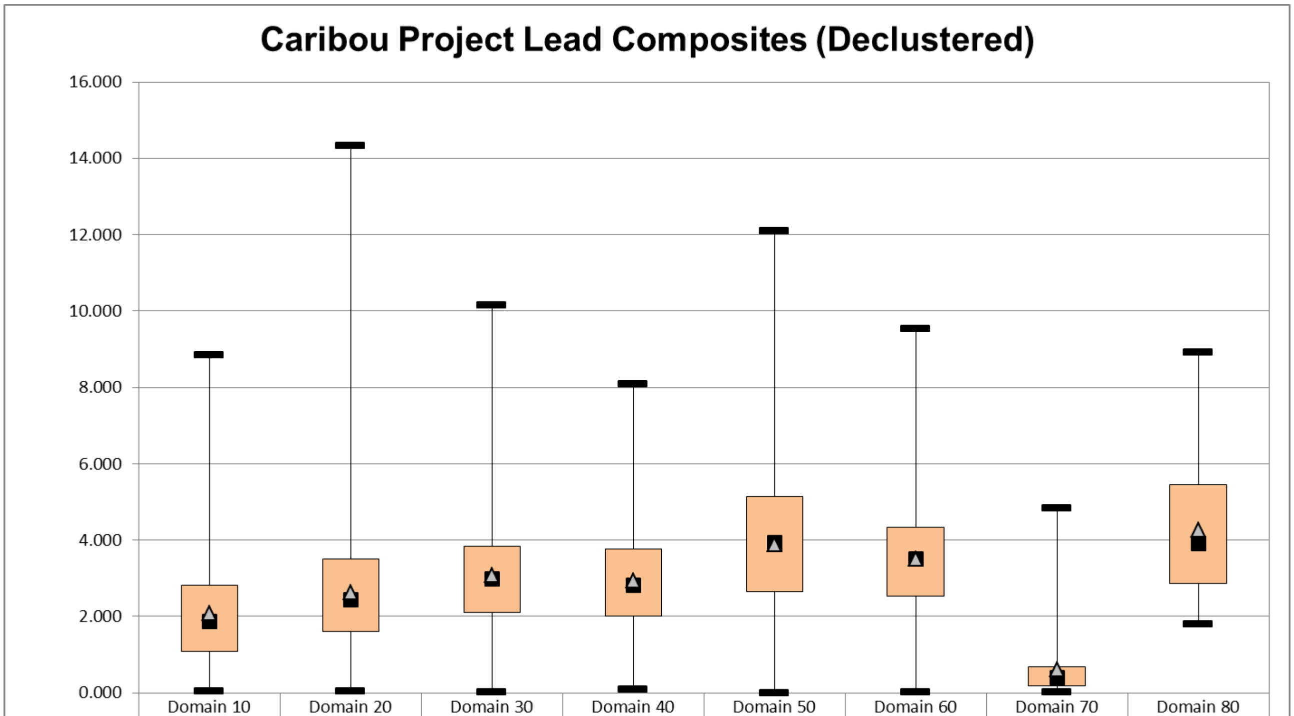
To be able to assess the global, unbiased characteristics of the composites within the estimation domains, the data were declustered by a cell declustering method. Each composite was assigned a weight proportional to the volume it represents.

Basic declustered statistics of assays composited to 1 m lengths for zinc and lead are presented in Figure 20 and Figure 21.



	Domain 10	Domain 20	Domain 30	Domain 40	Domain 50	Domain 60	Domain 70	Domain 80
Q1	4.459	5.401	6.027	5.495	5.572	5.620	0.881	6.211
Min	0.777	0.100	0.047	0.290	0.034	0.040	0.030	3.240
Median	6.184	7.007	7.707	6.625	7.322	7.304	1.482	8.553
Mean	7.006	7.190	8.061	6.758	7.044	7.316	2.055	8.107
Max	38.000	20.000	21.610	13.640	12.876	16.100	9.450	13.197
Q3	8.314	8.834	9.791	7.963	8.966	8.792	2.734	9.937
NSamples	750	1160	684	655	503	453	294	69

Figure 20: Basic Statistics of Declustered Zinc Composite Grades by Domain



	Domain 10	Domain 20	Domain 30	Domain 40	Domain 50	Domain 60	Domain 70	Domain 80
Q1	1.091	1.597	2.101	2.017	2.648	2.530	0.195	2.856
– Min	0.035	0.040	0.010	0.080	0.005	0.010	0.010	1.800
■ Median	1.860	2.443	2.980	2.810	3.935	3.504	0.400	3.909
△ Mean	2.077	2.620	3.084	2.945	3.876	3.508	0.615	4.275
– Max	8.840	14.339	10.150	8.092	12.100	9.530	4.846	8.920
Q3	2.815	3.502	3.847	3.760	5.139	4.347	0.679	5.444
NSamples	747	1160	684	655	503	453	292	69

Figure 21: Basic Statistics of Declustered Lead Composite Grades by Domain

Variography

Correlogram models of all metals were designed from 1 m composites for the mineralized domains. Down-hole correlograms were used to model nugget effects, i.e., assay variability at very close distance. Directional correlograms, supported by correlogram maps, were used to model grade continuities for larger distances for all metals in all domains. Similarities were realized between the experimental variograms of domains 10, 20, 30, 70, and 80. These domains were grouped and final variogram models for each of the metals were designed. The experimental variograms of domains 40, 50, and 60 were also similar and these domains were grouped and final variogram models for each of the metals were designed.

The correlogram models were designed for all metals with the exclusion of gold where fewer assays were available. To estimate gold grades correlogram models designed for silver were used.

Examples of experimental and modelled correlograms along best directions of continuity for zinc and lead in the 10, 20, 30, 70, and 80 domains are presented in Figure 22 and Figure 23.

All final correlogram models for each metal are detailed in Table 23.

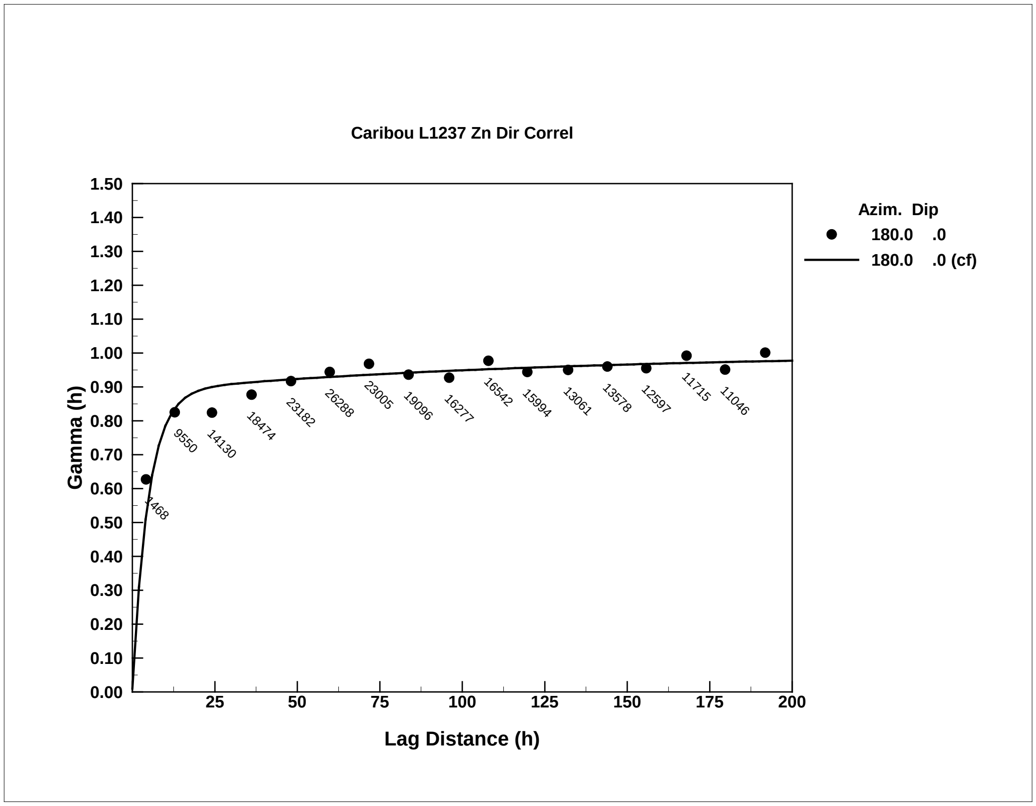


Figure 22: Modelled Correlogram Used for Zinc Estimation on Domains 10, 20, 30, 70, 80

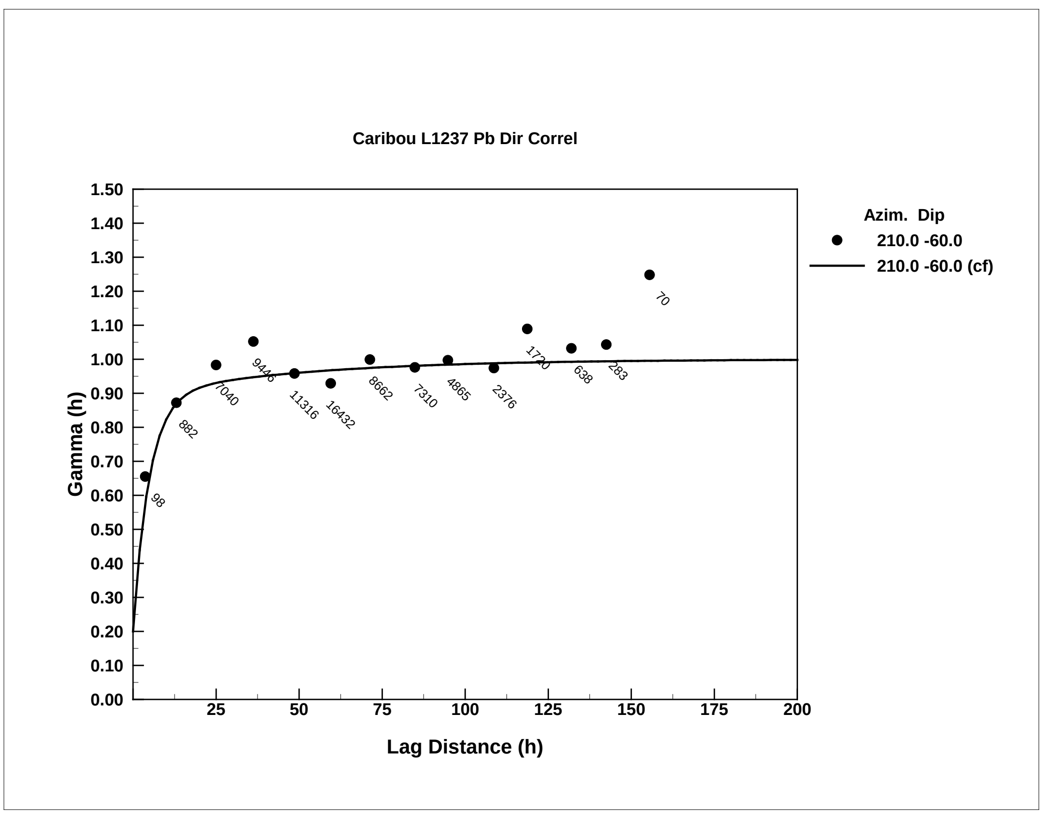


Figure 23: Modelled Correlogram Used for Lead Estimation on Domains 10, 20, 30, 70, 80

Table 23: Modelled Grade Continuity for All Metals in All Domains

Domains	Metal	Model Type	Nugget (C_0)	C_1 & C_2	Rotation			Range		
					Bearing(Z)	Plunge(Y)	Dip(X)	Rot X	Rot Y	Rot Z
10, 20, 30, 70, and 80	Ag	Exponential	0.20	0.679	9	-14	-35	19.3	9.3	22.2
				0.033	9	-14	-35	11.9	10.8	26.9
	Au	Exponential	0.20	0.679	9	-14	-35	19.3	9.3	22.2
				0.033	9	-14	-35	11.9	10.8	26.9
	Cu	Exponential	0.20	0.473	-4	14	-10	24.1	14.4	58.5
				0.188	-4	14	-10	25.0	13.8	69.8
	Pb	Exponential	0.20	0.674	84	-24	3	7.5	12.1	17.9
				0.034	84	-24	3	10.9	5.7	23.5
	Zn	Exponential	0.01	0.596	-13	-22	-18	6.6	8.1	16.2
				0.307	-13	-22	-18	127.8	5.1	15.9
40, 50, and 60	Ag	Exponential	0.15	0.368	-97	21	31	2.7	5.5	2.3
				0.343	-97	21	31	127.5	11.7	38.1
	Au	Exponential	0.01	0.441	50	14	1	26.9	18.0	16.6
				0.549	50	14	1	184.6	22.3	77.7
	Cu	Exponential	0.15	0.518	-7	-71	109	126.1	13.5	6.9
				0.204	-7	-71	109	46.4	6.9	45.4
	Pb	Exponential	0.01	0.509	-8	19	70	1.4	12.9	5.3
				0.368	-8	19	70	15.8	20.7	83.9
	Zn	Exponential	0.01	0.632	8	2	81	1.2	28.6	17.7
				0.306	8	2	81	14.6	10.7	51.3

13.8 Block Model and Grade Estimation

Resource estimation was completed within all of the mineralized domains with block model geometry and extents as presented in Table 24. The resource estimation methodology was further based on the following:

- Assay data were composited to 1 m and were capped for outliers;
- Estimation domains were treated as hard boundaries, preventing sharing the composites across the boundaries;
- Gold, silver, copper, lead and zinc were estimated by ordinary kriging.

Table 24: Block Model Extents and Dimensions

Description	Easting (X)	Northing (Y)	Elevation (Z)
Block Model Origin (Lower left corner)	14,600	14,600	1700
Parent Block Dimension	6	6	6
Sub Block Dimension	2	2	2
Number of Blocks	600	600	501
Rotation	0	0	0

The selection of the search radii and rotations of search ellipsoids were guided by the geometry of the estimation domains and the modelled ranges of continuity from correlograms (Table 25). In addition, the search radii were established to estimate a large portion of the blocks within the modelled area with limited extrapolation. The parameters were refined by conducting repeated test resource estimates and reviewing the results as a series of plan views and sections.

Each block was interpolated with at least three composites representing at least two drill holes. A maximum of 12 composites were used to estimate any given block.

Table 25: Search Ellipse Parameters by Domain and Estimation Pass

Domain	Ellipse Orientation			Pass 1 Dimensions		
	Bearing	Plunge	Dip	Major	Semi-Major	Minor
10	80	-85	0	25	25	10
20	80	-85	0	25	25	10
30	80	-85	0	25	25	10
40	160	80	0	25	25	10
50	30	-80	0	25	25	10
60	160	80	0	25	25	10
70	80	-85	0	25	25	10
80	90	-90	0	25	25	10
Domain	**Pass 2 Dimensions**			**Pass 3 Dimensions**		
	Major	**Semi-Major**	**Minor**	**Major**	**Semi-Major**	**Minor**
10	35	35	20	100	100	50
20	35	35	20	100	100	50
30	35	35	20	100	100	50
40	35	35	20	100	100	50
50	35	35	20	100	100	50
60	35	35	20	100	100	50
70	35	35	20	100	100	50
80	35	35	20	100	100	50

* A bulk density of 4.27 was assigned to all blocks within the estimation domains.

13.9 Model Validation and Sensitivity

The deposits were validated by completing a series of visual inspections and by:

- Comparison of local “well-informed” block grades with composites contained within those blocks;
- Comparison of average assay grades with average block estimates along different directions – swath plots.

The results for zinc and lead are presented below. Visual inspection was conducted by locally comparing composite grades versus block estimates.

13.9.1 Well Informed Block Grades versus Estimates

Figure 24 shows a comparison of estimated zinc (left) and lead (right) block grades with drill hole composite assay data contained within those blocks. On average, the estimated block grades are similar to the composite data, with good correlation between the estimates and the assays.

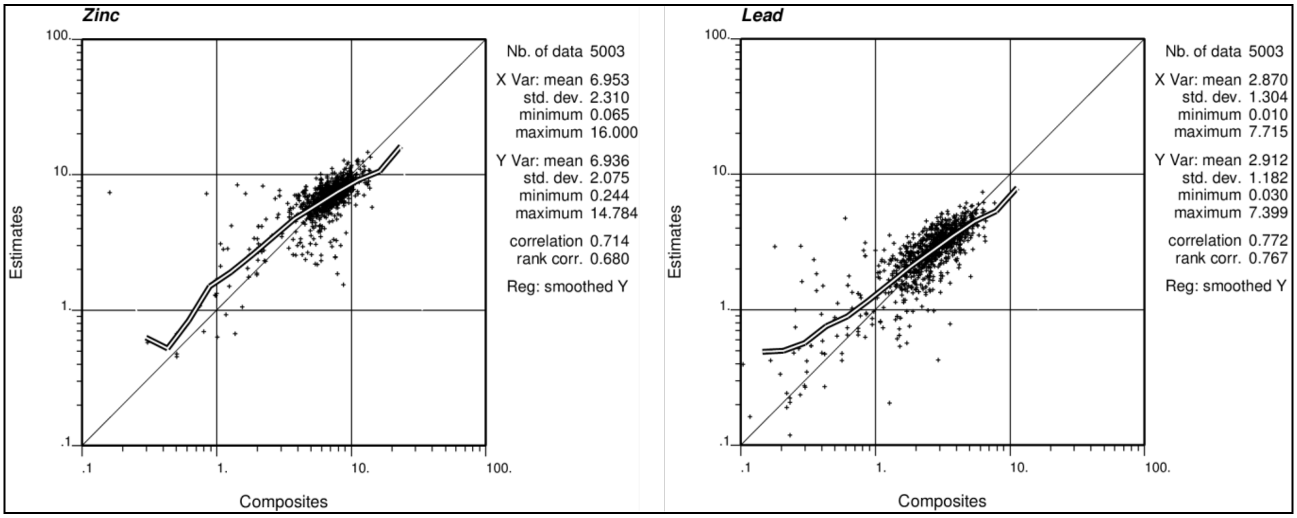


Figure 24: Comparison of Zinc (left) and Lead (right) Estimates with Composite Assay Data Contained within the Blocks in All Domains

13.9.2 Swath Plots

Average composite grades and average block estimates were compared along different directions. This involved calculating de-clustered average composite grades and comparing them with average block estimates along east-west (for domains 40, 50, and 60), north-south (for domains 10, 20, 30,70, and 80) and horizontal (by elevation) swaths.

Figure 25, Figure 26, and Figure 27 show the swath plots for zinc along the three directions. Block estimates generally agree well with the composite averages. Similar results were achieved for lead.

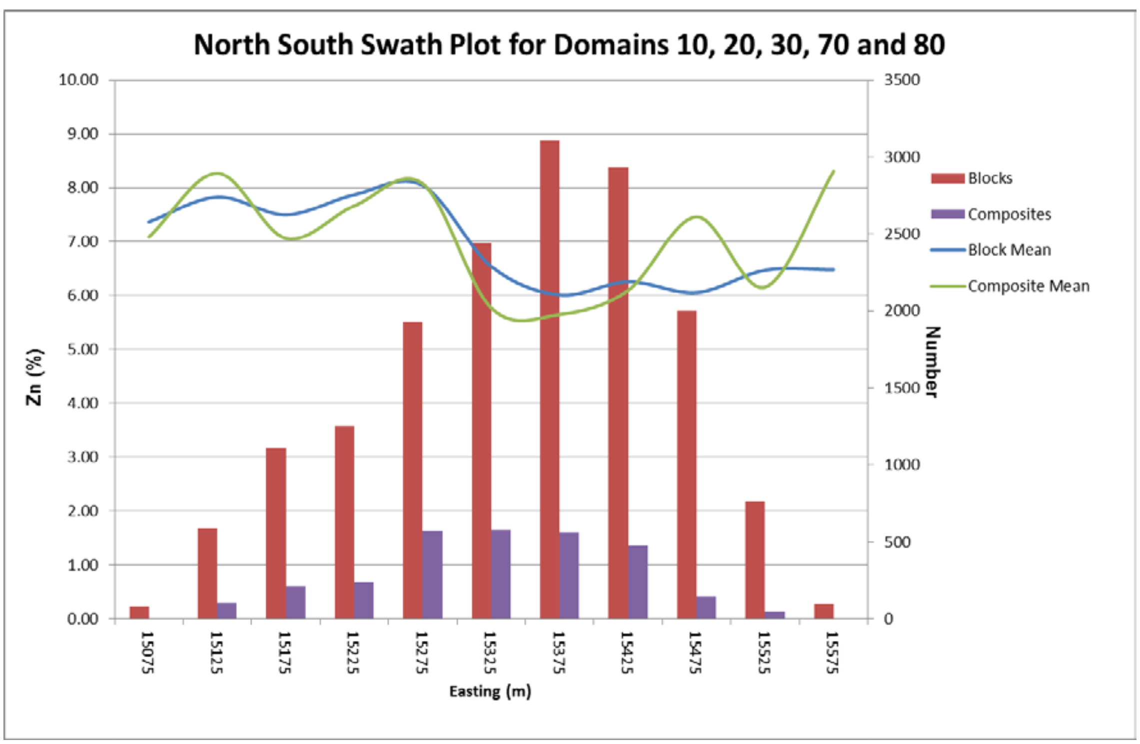


Figure 25: North-South Swath Plot for Zinc in Domains 10, 20, 30, 70, and 80

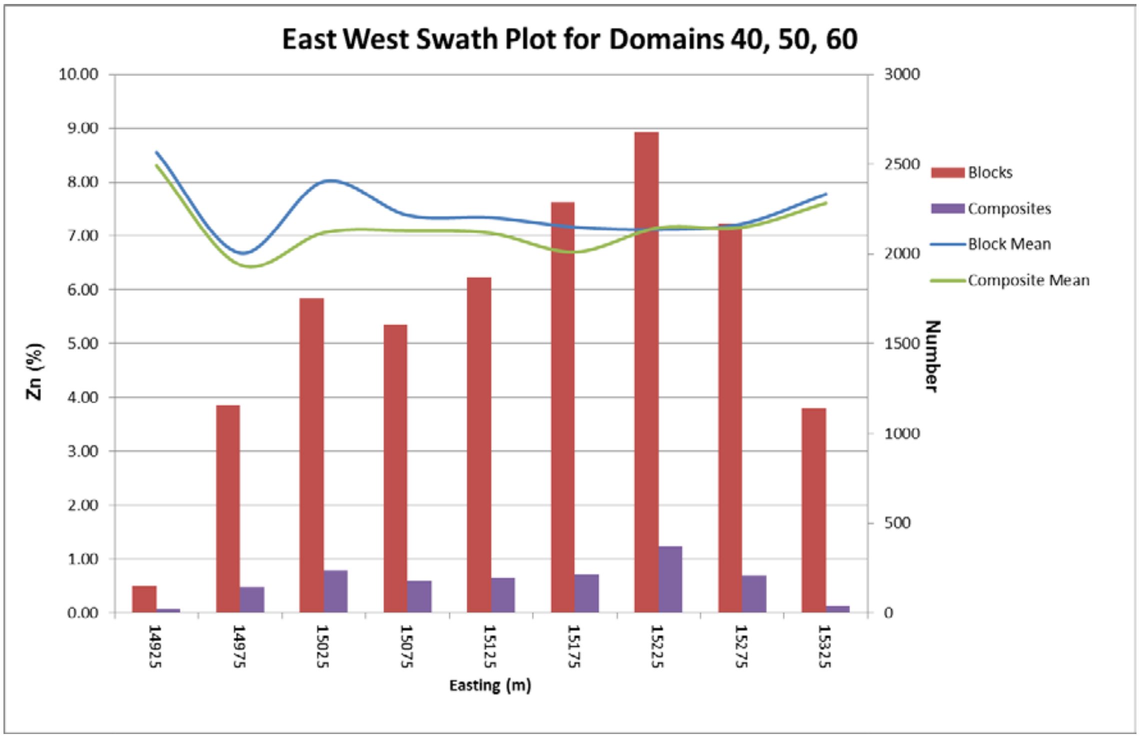


Figure 26: North-South Swath Plot for Zinc in Domains 40, 50, and 60

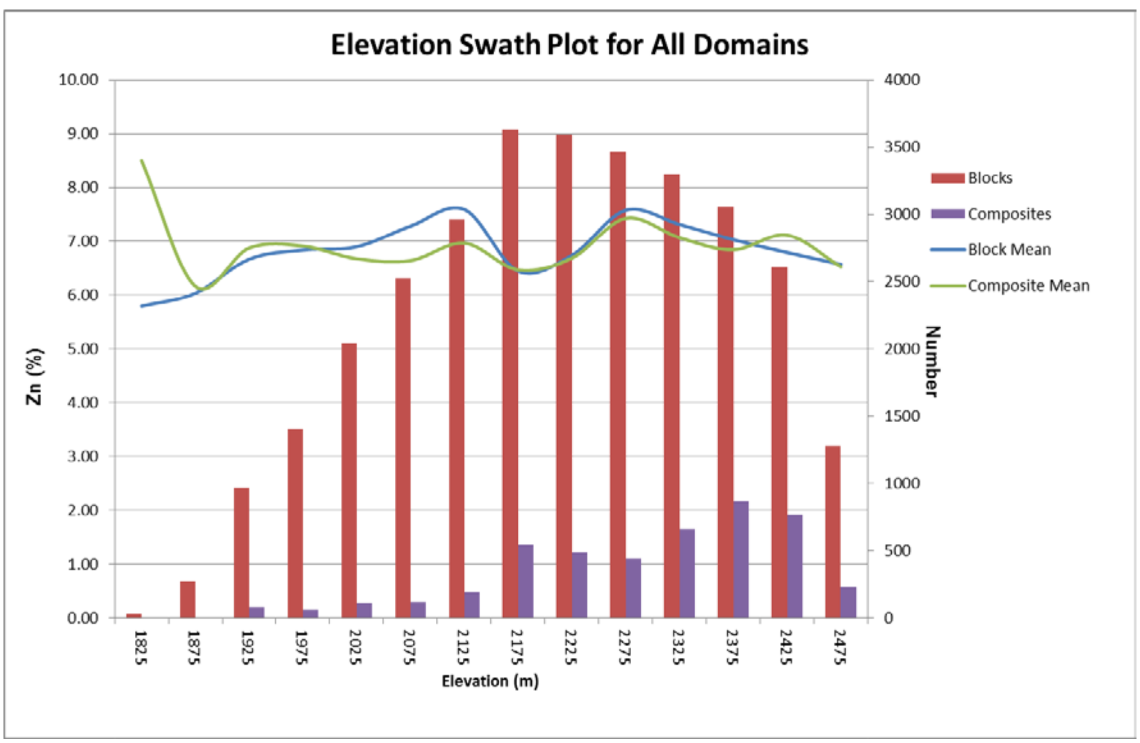


Figure 27: Elevation Swath Plot for Zinc in All Domains

13.10 Mineral Resource Classification

Block model quantities and grade estimates for the Caribou Project were classified according to the CIM *Definition Standards for Mineral Resources and Mineral Reserves* November 2010 by Guy Dishaw, PGeo (APEGBC # 36183) of SRK Consulting (Canada) Inc., under the supervision of Dr. Gilles Arseneau, PGeo (APEGBC # 23474). Both are independent Qualified Persons for the purpose of National Instrument 43-101.

Mineral resource classification is typically a subjective concept. Industry best practices suggest that resource classification should consider the confidence in the geological continuity of the mineralized structures, the quality and quantity of exploration data supporting the estimates, and the geostatistical confidence in the tonnage and grade estimates. Appropriate classification criteria should aim at integrating these concepts to delineate regular areas at similar resource classification.

SRK is satisfied that the geological modelling honours the current geological information and knowledge. The location of the samples and the assay data are sufficiently reliable to support resource evaluation. The sampling information was acquired primarily by diamond drilling on sections spaced at 15 m.

Mineral resources were considered for the Measured category for blocks generally above the lowest mined levels, developed within the mineralized domains. Within this volume, most blocks are estimated by at least three composite samples from a minimum of two drill holes from the first and second interpolation pass, which searched out to 35 m. Mineral resources were considered for the Indicated category where blocks are estimated by at least three composite samples from a minimum of two drill holes from the first and second interpolation pass which searched out to 35 m (exclusive of the volume considered for Measured). Measured and Indicated candidate blocks were reviewed in three dimensions to assess how they related to each other and the drill hole data. The Measured and Indicated candidate blocks were used to design wireframe models of the final Measured and Indicated category volumes.

All remaining estimated blocks within the estimation domains are classified as Inferred.

13.11 Mineral Resource Statement

CIM *Definition Standards for Mineral Resources and Mineral Reserves* (November 2010) defines a mineral resource as:

> *[A] concentration or occurrence of diamonds, natural solid inorganic material, or natural solid fossilized organic material including base and precious metals, coal, and industrial minerals in or on the Earth's crust in such form and quantity and of such a grade or quality that it has reasonable prospects for economic extraction. The location, quantity, grade, geological characteristics and continuity of a Mineral Resource are known, estimated or interpreted from specific geological evidence and knowledge.*

The "reasonable prospects for economic extraction" requirement generally implies that the quantity and grade estimates meet certain economic thresholds and that the mineral resources are reported at an appropriate cut-off grade that takes into account extraction scenarios and processing recoveries. In order to meet this requirement, SRK considers that major portions of the Caribou project are amenable for underground extraction.

In order to determine the quantities of material offering “reasonable prospects for economic extraction” underground, SRK used reasonable mining assumptions to evaluate the proportions of the block model that could be “reasonably expected” to be mined from an underground operation at an appropriate cut-off grade.

The reasonable mining assumptions were selected based on experience and benchmarking against similar projects (Table 26). Based on the assumptions, zinc equivalent estimated block grades were calculated from the following formula:

Zn_Eq = (((1.14 * (zn_lbs * 0.83)) + (1.18 * (pb_lbs * 0.71)) + (3.39 *(cu_lbs * 0.57)) + (1470 * (au_ozs * 0.40)) + (26 * (ag_ozs * 0.45)))/1.14)/(block_volume*BD*22.04623)

The reader is cautioned that the results from this evaluation are used solely for the purpose of testing the “reasonable prospects for economic extraction” from underground and do not represent an attempt to estimate mineral reserves. There are no mineral reserves on the Caribou project. The results are used as a guide to assist in the preparation of a Mineral Resource Statement and to select an appropriate resource reporting cut-off grade. Mineral resources are presented in Table 27.

SRK considers that the blocks located within 650 m of surface show “reasonable prospects for economic extraction” and can be reported as a mineral resource.

Table 26: Conceptual Assumptions Considered for Underground Resource Reporting

Parameter	Value	Unit
Zinc Price	1.14	US$ per lb
Lead Price	1.18	US$ per lb
Copper Price	3.39	US$ per lb
Gold Price	1470	US$ per oz
Silver Price	26	US$ per oz
Exchange rate	1	$US/$CND
Mining and Processing Costs	100	US$ per tonne of feed
Zinc Recovery	83	percent
Lead Recovery	71	percent
Copper Recovery	57	percent
Gold Recovery	40	percent
Silver Recovery	45	percent

Table 27: Mineral Resource Statement*, Caribou Project, Bathurst, New Brunswick, SRK Consulting, May 13, 2014

Category	Quantity	Grade					Metal				
		Au	Ag	Pb	Zn	Cu	Au	Ag	Pb	Zn	Cu
	(Mt)	(g/t)	(g/t)	(%)	(%)	(%)	(M oz)	(M oz)	(M lbs)	(M lbs)	(M lbs)
Underground**											
Measured	5.61	0.84	84.64	2.93	6.91	0.46	0.15	15.28	362.69	855.36	56.94
Indicated	1.62	1.06	83.68	2.94	7.28	0.34	0.06	4.36	104.95	259.87	12.14
Measured and Indicated	7.23	0.89	84.43	2.93	6.99	0.43	0.21	19.64	467.64	1,115.23	69.08
Inferred	3.66	1.23	78.31	2.81	6.95	0.32	0.14	9.21	226.60	560.44	25.80

* Mineral resources are not mineral reserves and do not have demonstrated economic viability. All figures are rounded to reflect the relative accuracy of the estimate. All composites have been capped where appropriate.

** Underground mineral resources are reported at a cut-off grade of 5% Zn equivalent. Cut-off grades are based on price for Au of US$1470 per ounce, Ag is US$26 per ounce, Cu is US$3.39 per pound, Pb is US$1.18 per pound, and Zn is US$1.14 per pound, and exchange rate US$1.00 per Canadian dollar. A recovery of 83% was applied to Zn, 71% was applied to Pb, 57% was applied to Cu, 45% was applied to Ag, and 40% was applied to Au.

13.12 Grade Sensitivity Analysis

The mineral resources of the Caribou project are sensitive to the selection of the reporting cut-off grade. To illustrate this sensitivity, the global model quantities and grade estimates are presented in Table 28 and Table 29 at different cut-off grades.

Table 28: Measured and Indicated Block Model Quantities and Grade Estimates*, Caribou Project at Various Zinc Equivalent Cut-off Grades

		Grade					Metal				
Cutoff % ZnEq	**Quantity Mt**	**Au g/t**	**Ag g/t**	**Pb %**	**Zn %**	**Cu %**	**Au M oz**	**Ag M oz**	**Pb M lbs**	**Zn M lbs**	**Cu M lbs**
3	7.31	0.88	83.92	2.91	6.95	0.45	0.21	19.73	469.23	1,120.68	72.56
4	7.31	0.88	83.99	2.91	6.96	0.45	0.21	19.73	468.71	1,121.05	72.48
5	7.23	0.89	84.43	2.93	6.99	0.43	0.21	19.64	467.64	1,115.23	69.08
7	6.96	0.90	86.10	3.02	7.17	0.41	0.20	19.26	462.59	1,098.86	62.43
8	6.43	0.92	88.59	3.11	7.36	0.39	0.19	18.32	441.73	1,044.05	55.49
10	4.27	1.01	99.13	3.49	7.99	0.38	0.14	13.61	328.60	751.79	35.31

* The reader is cautioned that the figures in this table should not be misconstrued as a Mineral Resource Statement. The figures are only presented to show the sensitivity of the block model estimates to the selection of a cut-off grade.

Table 29: Inferred Block Model Quantities and Grade Estimates*, Caribou Project at Various Zinc Equivalent Cut-off Grades

		Grade					Metal				
Cutoff % ZnEq	**Quantity Mt**	**Au g/t**	**Ag g/t**	**Pb %**	**Zn %**	**Cu %**	**Au M oz**	**Ag M oz**	**Pb M lbs**	**Zn M lbs**	**Cu M lbs**
3	3.69	1.23	77.51	2.78	6.9	0.32	0.15	9.20	226.31	561.71	26.05
4	3.69	1.23	77.54	2.79	6.91	0.32	0.15	9.20	226.98	562.16	26.03
5	3.66	1.23	78.31	2.81	6.95	0.32	0.14	9.21	226.60	560.44	25.80
7	3.56	1.24	79.4	2.85	7.02	0.32	0.14	9.10	223.87	551.43	25.14
8	3.28	1.23	82.1	2.95	7.21	0.31	0.13	8.66	213.26	521.21	22.41
10	1.99	1.13	98.49	3.42	7.98	0.31	0.07	6.31	150.14	350.32	13.61

* The reader is cautioned that the figures in this table should not be misconstrued as a Mineral Resource Statement. The figures are only presented to show the sensitivity of the block model estimates to the selection of a cut-off grade.

The reader is cautioned that the figures presented in this table should not be misconstrued as a Mineral Resource Statement. The figures are only presented to show the sensitivity of the block model estimates to the selection of cut-off grade. Figure 28 and Figure 29 present this sensitivity as grade tonnage curves.

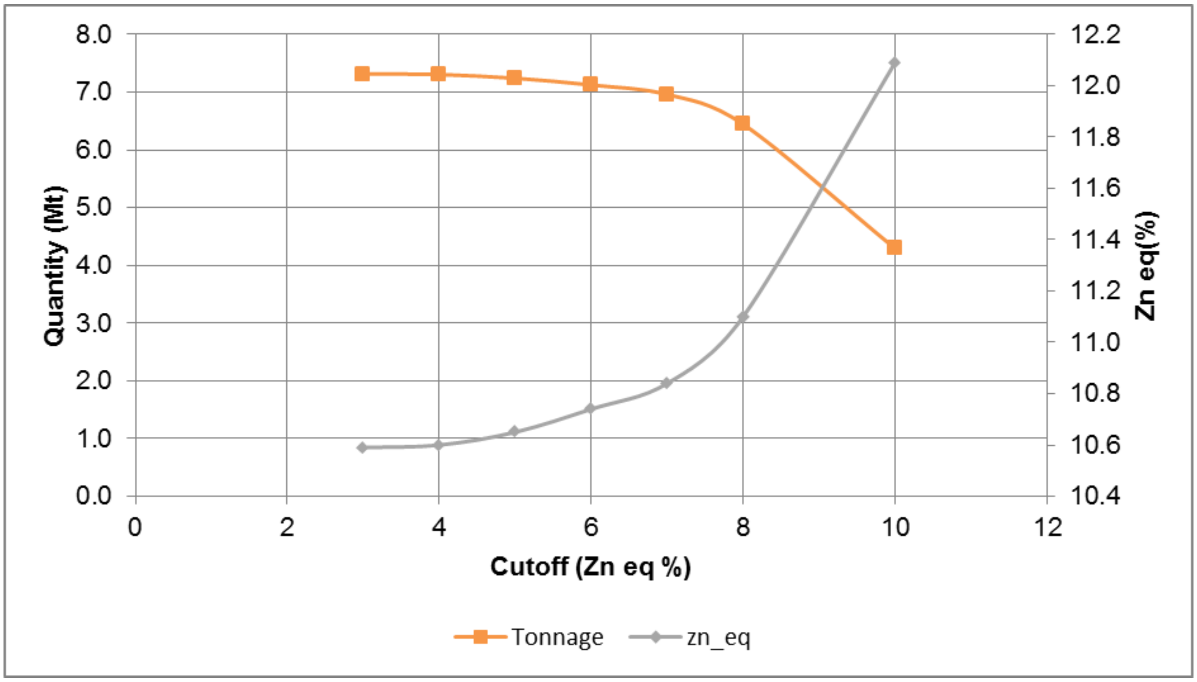


Figure 28: Measured and Indicated Resource Grade Tonnage Curves for the Caribou Project

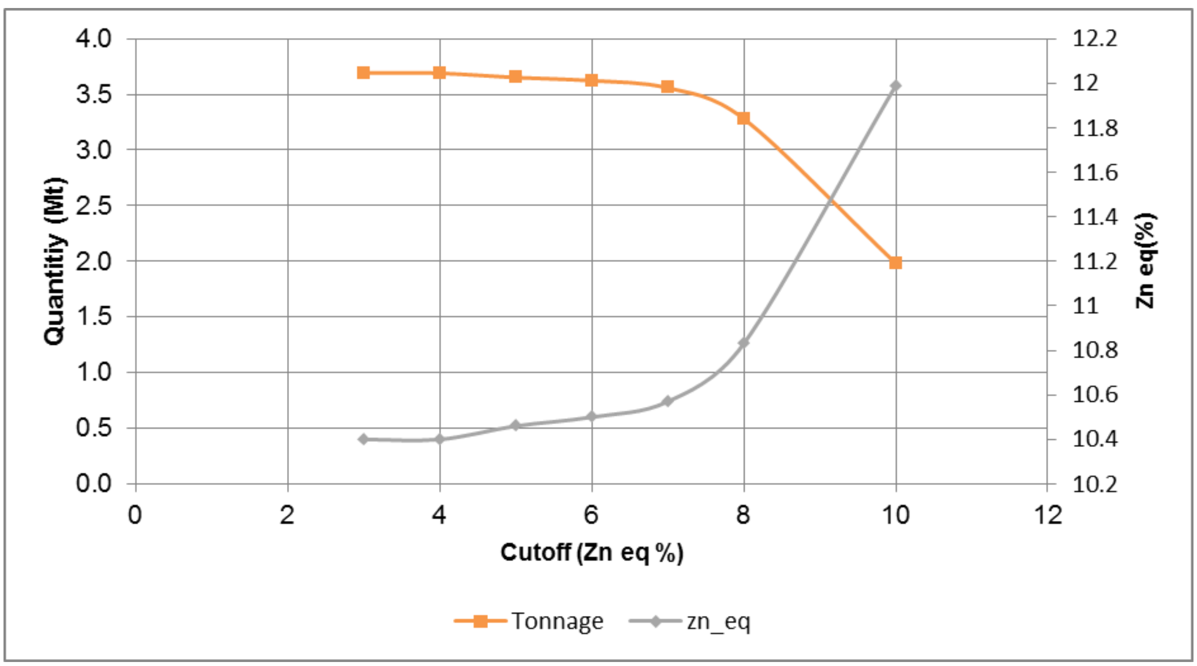


Figure 29: Inferred Resource Grade Tonnage Curves for the Caribou Project

14 Mineral Reserve Estimates

At the current stage, there are no mineral reserves declared for the Caribou project. To support a mineral reserve estimate, a prefeasibility study or a feasibility study is required.

15 Mining Methods

This section summarizes the mine design and planning work completed to support the PEA including the plant feed schedule. The underground mine planning was a collaboration work between Trevali and SRK. This work was supervised by Mr. Benny Zhang, MEng, PEng (PEO#100115459) of SRK, the Qualified Person taking professional responsibility, and prepared by Mr. Jeremy Ouellette, PEng (APEGNB # M7352), Ms. Vanessa Williams, EIT, and Mr. Daniel Williams, EIT, of Trevali. The sill pillar recovery assessment for the proposed underground mine was undertaken by Bruce Murphy, FSAIMM, of SRK.

The objective of this preliminary economic assessment is to determine the potential economic viability of the Caribou project at a scoping level.

The Caribou project consists of an underground mine with a mine life of 6.3 years and a processing plant. The maximum mill feed rate is set at 1.095 million tonnes per annual (Mtpa), or 3,000 tonnes per day (tpd).

15.1 Pre-development Mine Dewatering

The Caribou mine has been on care and maintenance since the end of last operations in December 2008. In November 2013, Trevali contracted a local contractor (Chaleur Shotcrete Inc.) to start dewatering the mine workings. During SRK's site visit in mid-February 2014, the water level in the mine was at about Level 2 or mine grid elevation 2340 metre (mEL) (mine grid elevation = sea level elevation + 2000). It was not possible to visit the underground infrastructure at the time of the visit due to safety concerns. In early May 2014, Trevali informed SRK that approximately 40% of the dewatering work had been completed (also referred to in Section 15.9.4).

15.2 Mine Rehabilitation

During the late stages of mine dewatering, extensive underground mine rehabilitation will be started, including slashing/widening of existing openings and ground support. It is estimated that approximately 3,000 line metres will need to be rehabilitated as per Trevali's ground support standards. It is unknown at this time how much of this area will need to be slashed to accommodate new equipment. The amount of material to be slashed will vary by heading to achieve a maximum 5.0 m wide x 5.0 m high, and a preliminary estimate amounts to 27,000 cubic metres, or 1,080 metres of 5 m x 5 m drift equivalent.

The estimated mine rehabilitation time needed and cost required have been scheduled in the mine plan.

15.3 Mine Geotechnical

There is no formal geotechnical study for the underground deposit to support this PEA. Based on a review of historical information, the following summary from Golder Associate Ltd. (Golder) Technical Memorandum titled "Caribou – General Assessment of Ground Conditions" dated April 20, 2007 (Golder, 2007a) represents the best information available describing the Caribou deposit rock mass quality:

Summary of the Geology

The Caribou deposit is composed of seven high grade massive sulfide lenses within a pyrite rich envelope, all folded about a steep north-east plunging fold axis with a limb striking north-south and the other striking east-west. Both limbs plunge towards the north/north-east with a dip angle of 80° to 90°. Three lenses are located in the north limb (Lenses 10, 20, 30, 70, and 80) and have a higher Pb and Zn content. Lenses 40, 40E, 50 and 60 form the east limb. Lens 50 is mostly composed of massive pyrite and is not considered for mining.

Main Lithological Units

- Massive Sulfides: mostly pyrite, sphalerite, galena and chalcopyrite with minor amount of magnetite, *pyrrhotite,* and siderite;
- *Graphitic schist: dark schist with various amounts of quartz, muscovite and graphite. It is a relatively weak crumbling material;*
- *Chlorite schist: various amount of quartz, muscovite and chlorite. It is more competent than the graphitic schist;*
- *Phyllite (also referred to in some documents as sericitic schist): a thin bedded metapelite with variable amount of quartz, muscovite, graphite and minor chlorite;*
- *Hanging wall volcanic units: these units are mainly composed of a schist of volcanic origin. The shaft, main access drifts and ramps are mainly located within these units.*

Footwall Contact

The footwall contact is composed of phyllite for all ore lenses with the exception of the southern part of Lens 2 where chloritic schist is dominant. The thickness of the contact zone ranges from 5 to 20m. Beyond the footwall contact, the rock is composed of a mixture of graphitic and chlorite schist.

Hangingwall Contact

For all massive sulphide lenses, a sharp hangingwall contact exists and is composed of an approximately 3 to 20 m thick sedimentary phyllite band. The rest of the hangingwall is mostly composed of volcanic units.

Major Faults

Two major fault systems intersect the lenses and consist of a north-south trending fault and an east-west trending fault. The north-south fault dips approximately 55° to the east. The east-west fault dips approximately 60° to the south. The north-south fault appears to be a single fault whereas the east-west fault is accompanied by a system of subparallel secondary faults. The north-south fault intersects the main ramp and levels in several areas as well as the north ventilation raise.

Rock Mass Classification

A limited amount of information on rock mass quality was found in an internal memorandum dated from 1998. The rock mass parameters available to date are summarized in the following *Table.*

Rock Mass Parameters for the Main Lithological Units

	RQD (%)	Q'	RMR	UCS (MPa)
Ore (massive sulfides)	75 [1]	18.3 [1]	67-70 [1]	100 [1]
Sericite Schist (phyllite)	25 [1]	2.7 [1]	48-53 [1]	35 [1]
Contact zone (2-5m)			18 [1]	
Estimated from site visit in Feb. 2007. (in volcanics, away from faults)	70-90 [2]	1.4 [2] min 10 max 4 average	47-65 [2]	70 [2]

[1] MacRory, 1998. 2 Estimated from visual observations

The rock mass quality expressed in the Table is based on two universally recognized classification systems: the Rock Mass Rating (RMR) and the Modified Rock Tunneling Quality Index (Q'). According to both classification systems, the data provided by the mine indicated that the massive sulphide ore zones can be classified as fair to good quality.

The phyllite that composes both footwall and the hangingwall close to the mineralization can be estimated to be of poor quality. No direct observations of these units has been made however the information provided in the historical records is in line with reports of rock mass behavior and dilution reports during mining in 1998.

For stope design and dilution control, Golder's Technical Memorandum titled "Caribou – Additional Comments Regarding A General Assessment of Ground Conditions" dated June 7, 2007 (Golder, 2007b) stated that:

Stope Design and Dilution Control

Waste rock dilution represents an additional cost and production delays. Efforts are typically made to minimize dilution while ensuring maximum recovery of the lenses. The mining method selected by Caribou mine (Avoca method) was introduced in the mining industry in the 1970's and has been adopted by several mining operations since. The operation parameters and stope dimensions were refined by the previous owner of Caribou mine in order to suit the characteristics of the rock mass. The stope height varies between 20 m and 27 m from floor to floor. The stope width is controlled by the thickness of the lens and it rarely exceeds 10 m. The stope length is controlled by the operators and it is adjusted to maintain stable conditions in the stope at all times. The stope dimensions selected by Caribou mine are very reasonable considering the rock mass as it is known today. Furthermore, the mine has the capability to add additional support to the roof and walls of the stopes, in the form of cable bolts. Between this additional support and controlling the stope length and backfilling at will, the mine operators can control dilution and maintain stable and safe excavations.

For ground support, Golder Technical Memorandum titled "Site Visit Caribou and Restigouche – July 10-11 2007" (Golder, 2007c) made the following recommendations for Caribou mine:

Ground Support

- *Permanent accesses with spans above 4.5 m should be systematically bolted and screened. Current practice is to screen the back only leaving the haunches of the drifts exposed. Wall support is particularly important in schistose ground where the schistosity is vertical, as failure of the walls leads to destabilization of the back;*
- *In light of the experience on 323 Sub, it is recommended to avoid increasing the wall height in schistose ground. Slashing down the back should be avoided in other circumstances, unless the walls are secured and bolted before increasing their height;*
- *Screen should therefore extend down to 1.8 m from the floor in fair ground conditions, (hanging wall volcanics in ramp and waste sulphides). In poor ground conditions (Phyllite, sericitic, graphitic and chlorite schist), the screen should be lowered to 1.5 m from the floor. A metallic band installed with split sets can be used to maintain the lower part of the wall to avoid ripping of the screen with mobile equipment;*
- *Longer support should be installed in the back of intersections for spans exceeding 6 m, using inscribed circle as a measure of span. Damaged or narrow pillar noses should be excluded from the measurement, as they do not provide adequate support to intersections. Longer support for temporary drifts and intersections with spans between 6 m and 10 m may consist of 3.6 m long Mn 24 Swellex bolts;*
- *In permanent accesses and for spans above 10 m, cable bolts are preferable. In temporary accesses or highly fractured ground requiring immediate support, Connectable Mn24 Swellex bolts are a good alternative as they are quick to install and provide immediate support;*
- *Quality control for all Swellex bolts include hole diameter (must not be smaller than specified by manufacturer) and good maintenance of the pump to ensure specified water pressure. It is recommended to conduct tests to evaluate the life span of rock bolts, Split sets and Swellex bolts under the Caribou mine conditions;*
- *Ground support recommendations for fault areas, presented in the June 7, 2007 Technical Memorandum (Golder, 2007b), are still applicable.*

During this PEA study, SRK performed a high level sill pillar extraction and surrounding rock review, and analyzed seven (7) available cavity monitoring system (CMS) sections (all in east lenses system). SRK concluded that:

- RMR range of 48 – 53 of phyllite from Golder memo (Golder 2007a) fits well to what CMS dilution monitoring data shows – sloughing depth from less than 1 m up to more than 2 m locally, dilution (W/O) by weight ranging from 8% to 40%;
- The thickness of the contact zone (phyllite), contact zone rock mass conditions or the drill-and-blast practices seem to be the controlling factor for dilution, as no clear correlation between stope dimension and dilution is found from the CMS sections;
- Instability of walls could affect the stability of stope back, and walls at top drift should be supported;
- Stope back should be supported;
- Substantial mining will be undertaken and it is expected that the sills will likely be at elevated stress levels or at least strain damage as mine plan takes the sills out with uppers;
- Stope and sill pillar stability will be more at risk in the areas of parallel stopes (parallel lenses), and higher dilution and lower sill recovery could be expected in the second stope;
- Where fault structures cross the lens, pillars will likely need to be retained;

- With increased depth and high level extraction, stope and sill pillar extraction will be negatively impacted, especially in the weaker lenses and contact phyllite conditions by elevated stress levels;
- Crown pillar stability could range from Class A to Class E because occurrence and characteristics of the contact zone is unclear and uncemented rock fill is on top of the crown pillars.

SRK recommends sill pillar extraction guidelines show in Table 30.

Table 30: Sill Pillar Extraction Guidelines

Stope Width (m)	Remaining Pillar Requirements (m)	
	Above 2200 mEL	Below 2200 mEL
4	6	8
6	8	12
8	Mined 6m wide, Pillar as above	Mined 6m wide, Pillar as above
10	Mined 6m wide, Pillar as above	Mined 6m wide, Pillar as above

Notes: 1. Pillars retained at fault area having a height/width ratio of 2:1;
2. Pillars retained at parallel veins/stopes areas having a height/width ratio of 2:1.

Based on discussions, Trevali stated that during 2007-2008 the former owner operations period, the stope size generally was 20 m long x 20 m high x lens width, and the stope stability and dilution were maintained successful.

15.4 Mine Hydrogeology

There is no specific mine hydrogeological study to support this PEA. Based on a review of historical information, Golder (Golder, 2007a) described:

Ground Water Inflow

> *Based on current observations and past experience at the mine, ground water inflow is not expected to be a significant issue during the mining stage at Caribou. Although the mine was flooded for many years before its re-opening, adequate measures were taken to dewater the entire underground mine as well as the two open pits, and verifications have been made of the water levels in old stoping areas. A continuous pumping system has been installed to collect and evacuate all mine water, including infiltration from the two open pits and the fill raises used for conveying rockfill materials from the surface to several locations underground.*

Based on discussions with Trevali and Stantec, during historical mining periods, the peak underground dewatering flow rates were approximately 12.6 litres per second (L/s) or 200 US gallons per minute (GPM). Stantec estimates that approximately 42.9 L/s or 680 GPM dewatering capacity will be required for mine operations.

15.5 Proposed Mining Methods

15.5.1 Mining Context

The relevant characteristics of the Caribou deposit from a mining method selection perspective are provided below.

- It is a steeply dipping (85° – 90°) volcanic massive sulphide polymetallic deposit;
- The massive sulphides consist of seven lenses striking parallel to the Caribou fold, forming a horseshoe shape in plan view;
- Lenses 10, 20, 30, 70, and 80 occur on the north limb of the Caribou fold, while lenses 40 and 60 are mostly on the east limb of the fold, see Figure 7;
- The rocks are highly strained, the sulphide stringer zone appears strata bound and individual sulphide lens occurs sub-parallel to bedding;
- The lenses have an average in situ thickness of 4.6 m, ranging from 2 m to 20 m (splay junction);
- The continuity of each lens is relatively good at a target of $100/t NSR value;
- All resources above 2240 mEL are Measured resources with the highest confidence level in the Caribou project; all resources below 2000 mEL are Inferred resources with the lowest confidence level; between 2240 – 2000 mEL, all resource categories occur (Measured, Indicated, and Inferred);
- Above 2150 mEL, extensive historical (major) development in place (shaft, ramps, levels, etc.);
- Waste rocks at Caribou site are potential acid generating (PAG) rocks;
- Waste rock as backfill material was deemed unsuitable for cemented fill without expensive screening and mixing equipment.

15.5.2 Mining Method(s)

The proposed mining method will be modified AVOCA, the same as used in the previous operating periods. This method uses development waste and surface stockpiled waste (historical open pit and underground development waste) as backfill, see Figure 30. The stopes will be excavated 20 m along strike and to a nominal height of 20 m floor to floor. Stope width is normally the same as the lens width. Parallel blast holes with 64 millimetres (mm) or 2.5 inch diameter parallel blast holes will be drilled on 1.8 m x 2.0 m burden by spacing pattern and loaded with emulsion explosive or ANFO if conditions are dry. When stope mucking is completed, the mined-out will be tightly filled with waste rock; no cement is planned for the backfill material. When the backfilling cycle is completed, the first ring in the next section/stope will be blasted against the waste fill (Step #1). This action compacts the waste fill that remains near vertical when the blasted economical material is mucked. After the first ring is blasted economic material will be mucked out (Step #2), the reminder of the stope will be blasted as needed, two rings at a time (Steps #2 – 7).

Back hauling surface stockpiled waste rock as supplemental backfill will be beneficial from two points of view: using nearby unconsolidated material for fill is cheap and effective; moving PAG surface waste to underground will improve the surface environment and will accelerate surface environmental mitigation activities. The practice of using unconsolidated fill has been demonstrated successfully at the Caribou mine during operating periods by both Breakwater (1997 – 1998) and Blue Note (2007 – 2008).

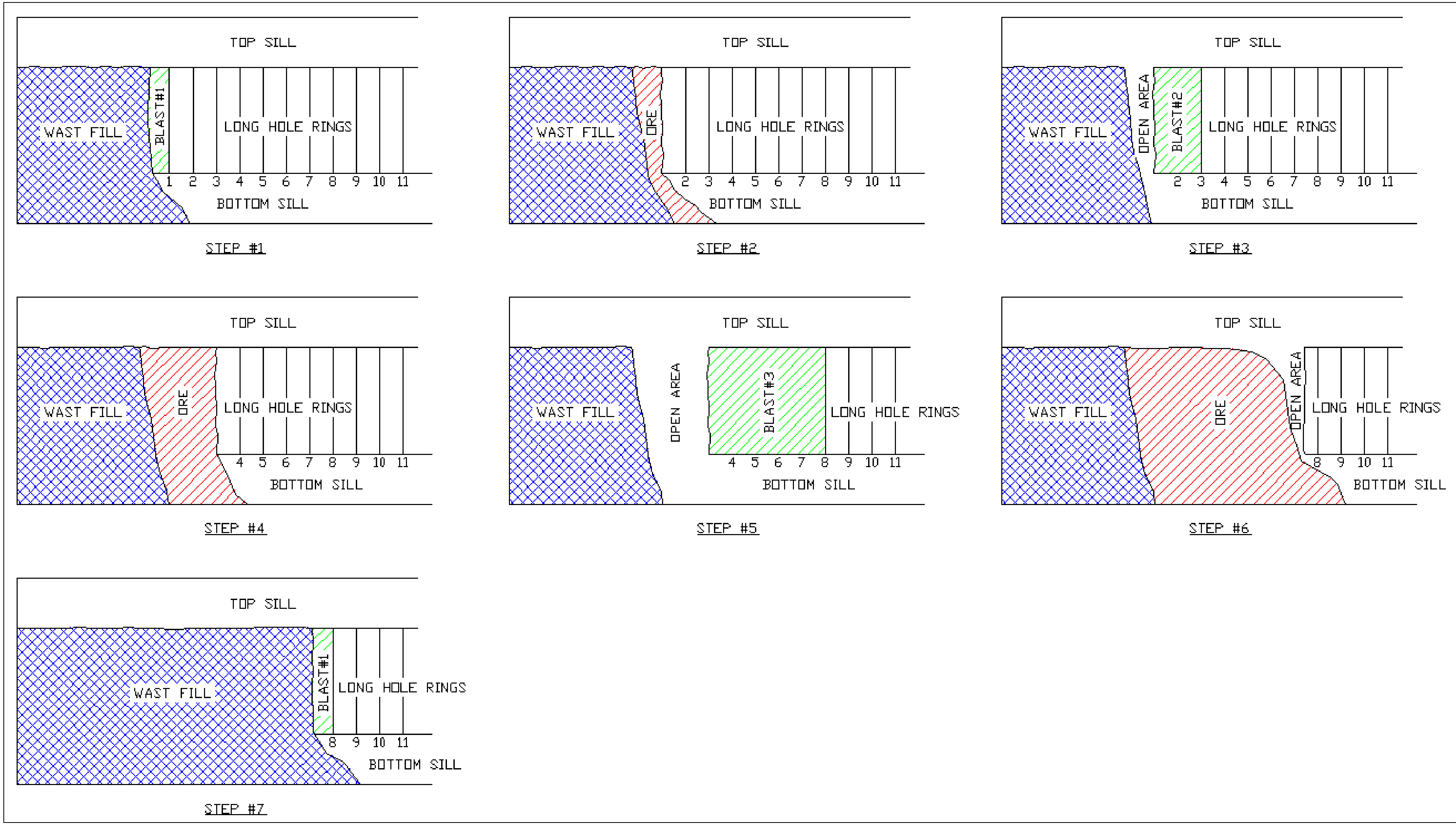


Figure 30: Modified Tight-Fill AVOCA Mining Method and Blasting Sequence
(Trevali 2014)

Modified AVOCA is a longitudinal retreating mining method. It starts from lens extremities or strategic points, and retreats to ramp access points (Figure 31). The mine layout includes two separate access points to the north limb of the lens system and another two to the east limb of the lens system. In cases where a lens system has a strike length of more than 250 m – 300 m, the access points are arranged to break up the lens system into sections approximately 80 m – 120 m strike length for each retreating mining front. This helps to minimize mucking distances and to provide additional independent mining fronts. Based on local ground conditions and stability of the stope hangingwall and footwall, stope strike length can be easily adjusted to facilitate dilution control by varying total number of rings blasted in stope. With modified AVOCA, no rib pillars are required since wall support for the mined out areas is provided by the backfill.

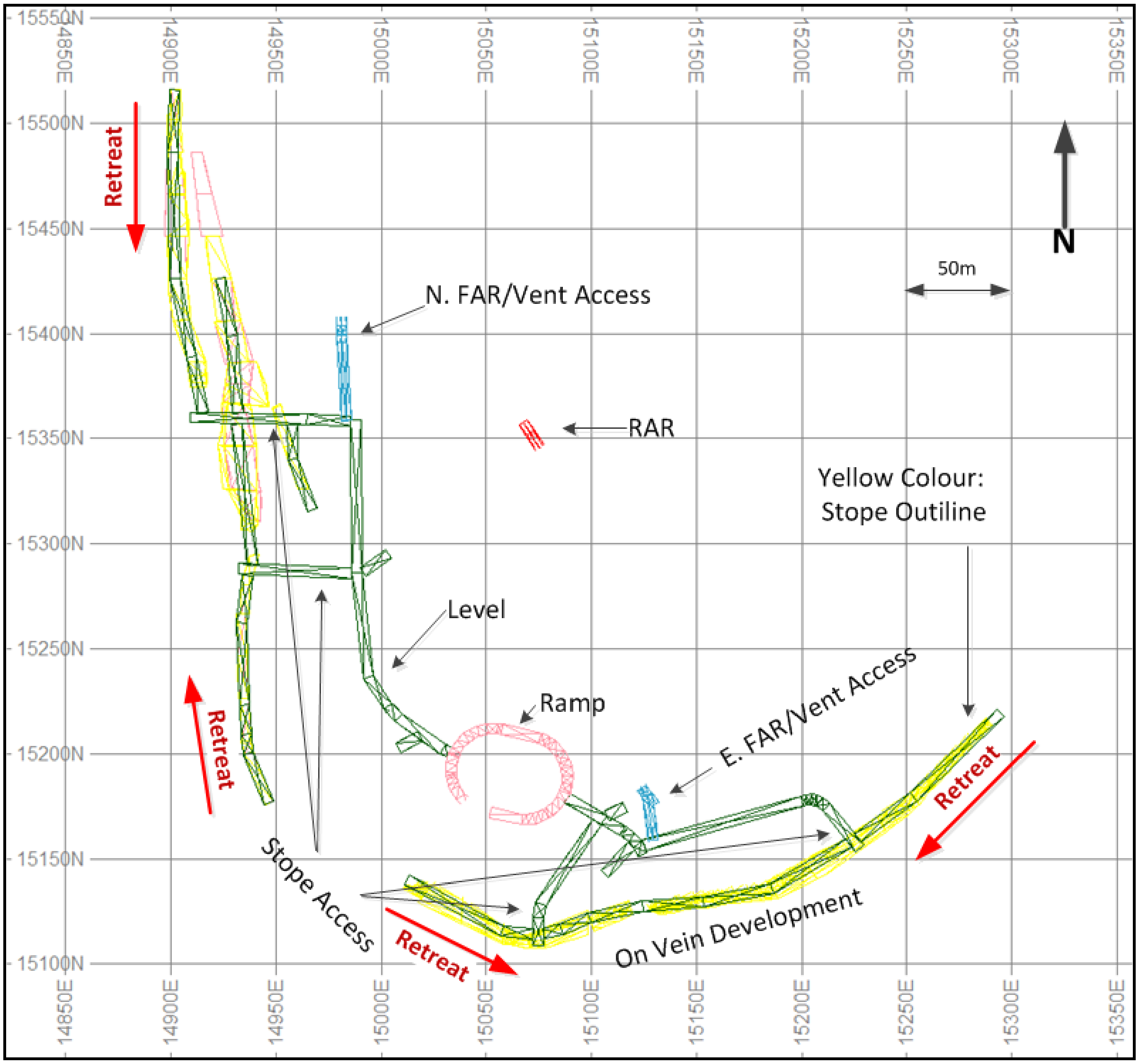


Figure 31: Plan View of 2060 Level Sub 2 (2080 mEL)
(SRK 2014)

Development on lens will be limited to a maximum width of 5.0 m. Blast holes will consist of parallel down holes 16 to 20 m in length. Some drill holes will be fanned out where lens width exceeds 5.0 m. the drill factor on average is 9.57 t (mill feed)/m.

Blast holes will be loaded with either emulsion or ANFO depending on local water conditions, to an average powder factor of 0.34 kilogram per tonne (kg/t). Slots will be opened by drop raising on the first stope only of each retreating mining front. On average, one slot raise will suffice for four stopes.

Standard stope dimensions are planned at 20 m on strike, 20 m in height, and lens width. At an average in situ stope width of 4.6 m, a standard stope will yield 8,560 t of plant feed including the development tonnes.

Production mucking will be undertaken by 10-tonne capacity load-haul-dump (LHD) mobile equipment for 91% of the planned stope tonnage. A smaller LHD will be used for stopes in the narrow sections of the lenses. Economic materials mucked from draw points will be trammed to remuck bays located on each level close to the main ramp, where 10-tonne capacity LHDs will load 45-tonne capacity haul trucks. Loaded trucks will then travel up the ramp and dump material on the plant feed pad located adjacent to the mill conveyor.

Generally all stopes will be backfilled with development waste rock, supplemented by back hauled waste rock from surface waste rock stockpile. Waste rock will be hauled by truck to remuck bays near the lens, then trammed by LHD along lens to the stope dumping point on the upper drilling level (Top Sill in Figure 30), or hauled by ejector truck and directly dumped into the backfilling stope if the stope sill drift is wide enough for the haul truck.

Stope production is planned to start on sublevels 2360-Sub 4 (Lens 3), 2360-Sub 1 (Lens 4 and Lens 6), and 2260-Sub 2 (Lens 1) where the existing historical development is ready for stope production preparation. Within each stoping block, mining will progress along strike and up dip from these starting elevations. Non-recoverable sill pillars cannot be avoided because unconsolidated backfill will be placed in the stope block sills.

The goal of the mine plan is to recover portions of the planned sill pillars based on a high-level geotechnical review by SRK. The sill pillar mining method will be an up hole retreat with a maximum width of 6 m. Planned sill pillar recovery percentage varies with stope width, pillar depth from surface, occurrence of parallel stopes, occurrence of fault structures, etc., in order to maintain pillar stability.

The crown pillar will remain intact and is not considered for any recovery due to a lack of local geotechnical information to support mine planning.

15.6 Potential Plant Feed Estimate

15.6.1 Block Models Used in Mine Planning

SRK 2013 Block Model

This is the resource block model discussed in details in Section 13 “Mineral Resource Estimates”, referred to as the SRK 2013 high grade model. As recommended by project geologists, the PEA is supported by the SRK 2013 (high grade) model as updated by Trevali in 2014 (below).

Trevali 2014 Block Model (Update)

Based on the SRK 2013 (high grade) block model, Trevali prepared an update in 2014 for the Caribou resource block model (Trevali 2014), which is the SRK 2013 high grade model with surrounding "waste" or low grade massive sulphides interpolated. The purpose of this update was to estimate the grades of dilution materials because all the dilution grades were set at zero in SRK 2013 high grade model. Guy Dishaw, PGeo, of SRK, and Gilles Arseneau, PGeo, of SRK Associate acting as QP for the SRK 2013 high grade model, have reviewed the Trevali 2014 updated block model and concluded that the interpretation in the Trevali 2014 block model is correct and that the model is suitable for dilution estimation in the PEA mine planning.

Figure 32 shows the relationship between Trevali 2014 block model and SRK 2013 high grade block model which is a subset of Trevali model. The Trevali 2014 block model fills in data for the low grade mineralization surrounding the SRK 2013 high grade block model.

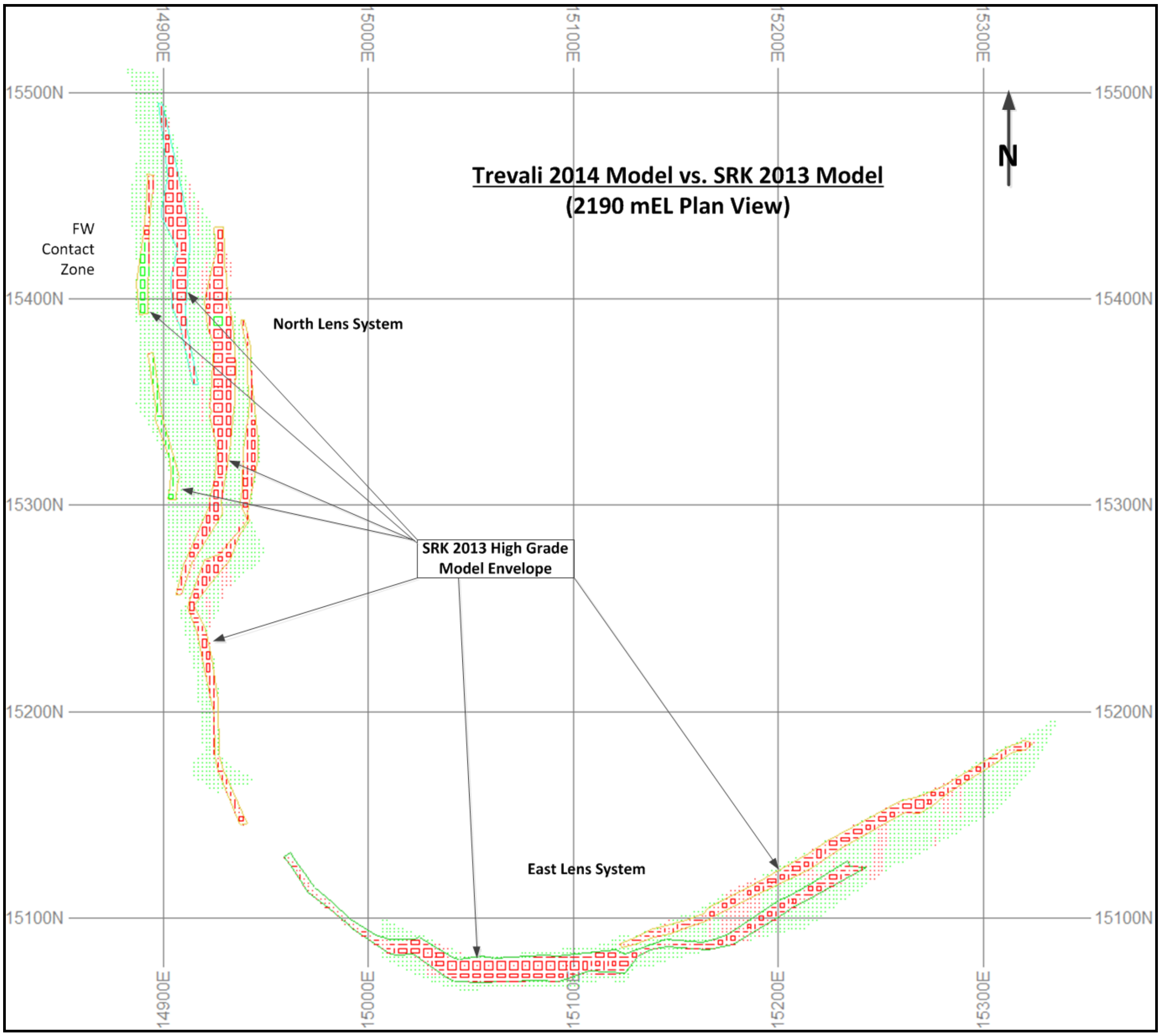


Figure 32: Trevali 2014 Block Model Versus SRK 2013 Block Model (2190 mEL Plan View)

15.6.2 NSR Calculation

In the PEA, SRK used a net smelter return (NSR, $/tonne) value as an indicator to determine if a mining shape/stope met the economic cut-off criteria for inclusion into the mining plan. Table 31 shows the assumptions and parameters used in the NSR factor which was incorporated into the resource block model for mine design. The off-site cost ($30.62) is a constant that is subtracted in the NSR calculation.

Table 31: Parameters Used in NSR Calculation

Item	Metal Price			Mill Recovery*	Payable
	Unit	In USD	In CAD		
Zn	$/lb	1.00	1.05	83.6%	85%
Pb	$/lb	1.00	1.05	64.7%	95%
Cu	$/lb	3.00	3.16	42.2%	95%
Ag	$/oz	21.00	22.11	35.3%	95%
Au	$/oz	1200.00	1263.16	7.6%	95%
Exchange Rate	C$/US$	0.95			
Off-Site Cost	$/t-Mill Feed		30.62		

* Early estimated life of mine average mill recovery rate.

15.6.3 Initial Cut-off Value (CoV)

Table 32 represents an early estimate of the underground NSR cut-off value (CoV) supporting the selection of $85/t NSR as the plant feed CoV. After applying allowances for internal and external dilution, an in situ CoV of approximately $100/t NSR was estimated as the cut-off criterion for targeting blocks in the resource block model when designing mining shapes for the Caribou underground mine.

The table shows the initial estimates of the site milling rate, underground mining rate, and associated site operating cost, and royalties. These costs were based on:

- Mining, milling, G&A, environmental costs based on preliminary cost modelling developed by Trevali, SRK compared with internal database benchmarked data;
- NSR value based on previous section discussed;
- Royalties based on SRK's back estimation from Trevali preliminary cash flow model;
- Estimates of internal and external dilutions were based on the results of Trevali initial stope design work and a detailed study of external dilution assessment undertaken by SRK.

In this study dilution is defined as waste divided by undiluted economic material (dilution = W/O x 100%).

In the table the plant feed CoV is shown as $84.43/t; the CoV for a designed mining shape before external dilution was $91/t; and the target mineralization in situ NSR value was $100/t when designing a mining shape. SRK used a plant feed CoV $85/t and a designed mining shape CoV $90/t (before external dilution) as preliminary criteria to review Trevali's initial stope design.

Table 32: Initial NSR Cut-off Value Estimation

Item	Unit		NSR CoV
U/G Production Rate Estimate	tpd		3,000
Mining Operating Cost	$/t		36.75
Milling Operating Cost	$/t		30.25
G&A Cost	$/t		6.57
Environmental Cost	$/t		1.36
Site Total Operating Cost/Tonne Milled	$/t		**74.93**
Royalty	$/t		9.50
Total Cost	$/t		84.43
Plant Feed NSR CoV	$/t		**84.43**
External Dilution at Value	16.0%	$42.31/t	42.31
Inside Mining Shape	$/t		**91**
Internal dilution at Grade	22.0%	$49.76/t	49.76
Block Model In Situ CoV (Target)	$/t		**100**

15.6.4 Stope Design

Trevali’s initial stope design work was guided by a 7% zinc equivalent (refer to Section 13.11) in situ cut-off grade criterion. SRK used a plant feed CoV of $85/t and in situ mining shape CoV of $90/t to check the initial stope designs. SRK found excessive internal dilution caused by the application of an unreasonable 5.0 m minimum mining width. This resulted in approximately 10% of the initial stope design being uneconomic, and 20% of potential plant feed being below the stated plant feed CoV (but above an estimated incremental CoV of $65/t).

Trevali and SRK mutually agreed to revise the Caribou stope designs using design guidelines that included an NSR CoV as discussed in the previous section and a minimum mining width of 2.4 m. The revised stope design process followed these steps:

- Generation of a $90/t NSR shell by Trevali geologist(s) using the SRK 2013 resource model;
- Selection of mining level spacing and elevations, including sill pillar locations which generally followed the Trevali initial mining shapes design sill pillar locations;
- Slicing the $90/t NSR shell into potential mining shapes using stope dimension guidelines discussed in Sections 15.3 and 15.5;
- Using the Trevali 2014 block model to report in situ tonnes, NSR and metal grades inside the mining shapes;
- Checking internal dilution. Mining shapes were not fully optimized due to time constraints (Trevali decided to leave further optimization for future work);
- Application of estimates for external dilution, dilution grades, and mining recoveries/losses;
- Splitting the tonnage into development tonnes and stope tonnes for scheduling.

Mining shapes were manually designed by slicing the $90/t NSR shell using mine design software Amine version 3, a specialized module of 3D AutoCAD 2012. Some mining shapes exhibiting high internal dilution were checked and it was concluded that optimization of the shapes was possible but will be left for the next stage to refine, which is a future upside potential for the project. For the total plant feed, internal dilution averaged approximately 20% with $56/t NSR value.

15.6.5 Dilution Assessment & Mining Recovery Parameters

Except for seven useable historical CMS sections which were all in the east lens system, there is limited information to demonstrate historical mining global external dilution. As discussed in Section 15.3 Mine Geotechnical, underground mining will target massive sulphide high grade materials which are in "fair" to "good" ground conditions; while hangingwall and footwall contact zone rock masses are generally in "poor" ground conditions which will adversely affect stope stability and external dilution. Due to lack of a 3D contact zone model, the occurrence and characteristics of the contact zones are unclear. In this study, SRK assumed that the contact zone resides just outside the massive sulphide zone which has been modelled. A typical plan view is shown in Figure 33.

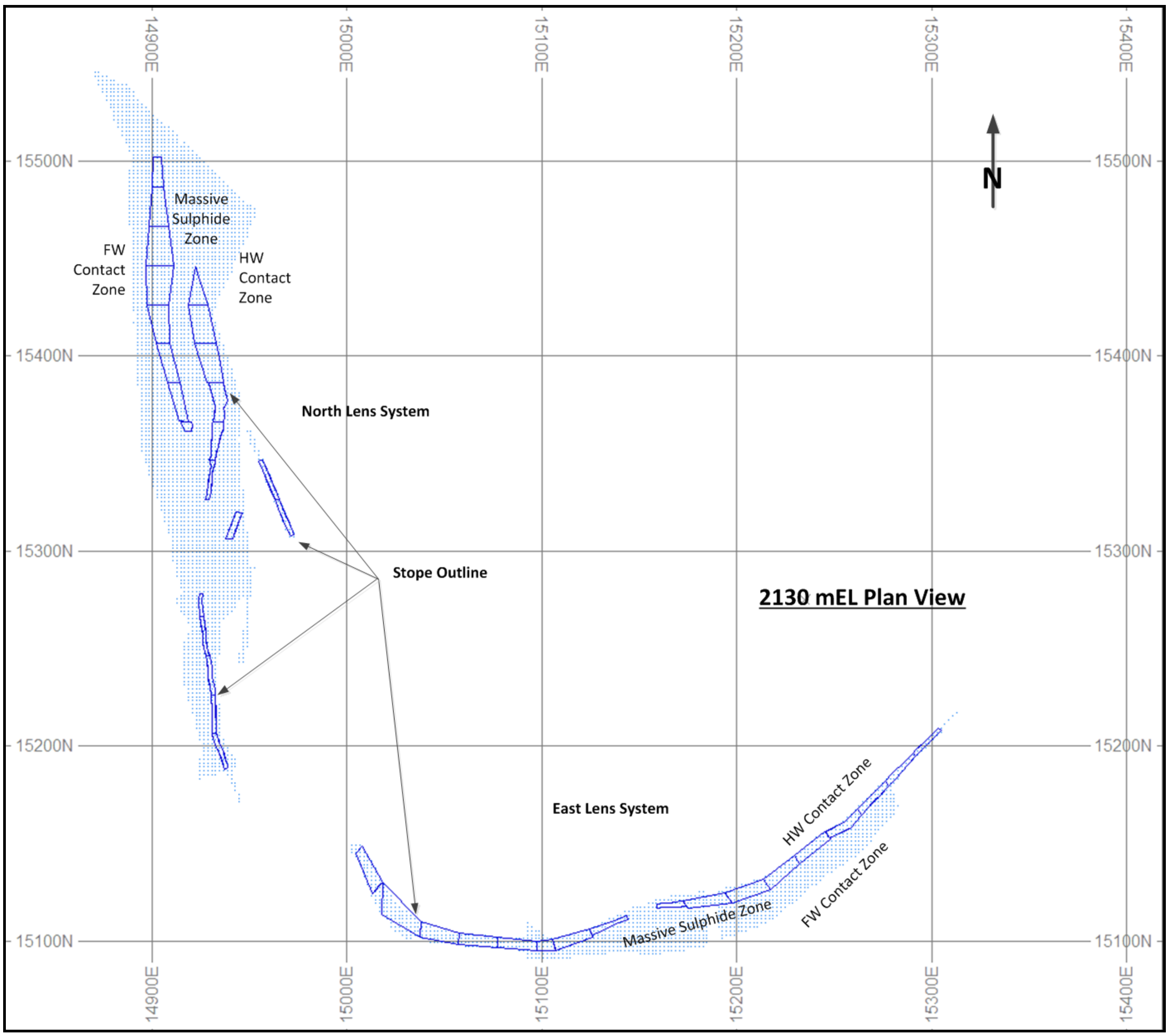


Figure 33: Planed Stope Versus Massive Sulphide and Assumed Hangingwall/Footwall Contact Zone (2130 mEL Plan View)

SRK notes:

- For north lens system stopes, stope hangingwalls and footwalls will be comprised mainly of the massive sulphide rock mass – relatively favourable in terms of external dilution;
- For east lens system stopes, stope hangingwalls will be the hangingwall contact zone and some of the stope footwalls will be the footwall contact zone – with a relative increase in stope external dilution expected;
- Approximately 60% of tonnes enclosed in mining shapes will be from the north lens system stopes and 40% from the east lens system stopes.

For the external dilution estimate, SRK assumed:

- A 0.8 m layer (sum of hangingwall and footwall) of stope wall rock with some metal grades would be mined with each stope;
- 10% overbreak for development external dilution with some metal grades;
- An average of 1.0 m end-wall and 0.5 m floor backfill materials will be mucked out as additional external dilution at zero grade during stope mucking.

External dilution of the total plant feed averages 16% with a NSR value averaging $43.15/t, derived from 1.85% zinc, 0.60% lead, and 0.20% copper. Dilution is defined as waste tonnes/economic material tonnes (W/O).

External dilution grades were estimated manually and by using mining planning software. The manual checks involved checking NSR value/grades of Trevali 2014 block model in the rock immediately surrounding the mining shapes. Mining software was used to incrementally expand mining shapes while reconciling NSR/grades. Results from the two methods were compared where possible, and a conservative approach was taken by arbitrarily reducing the zinc, lead, and copper grade estimates, and nulling silver and gold grades. This work resulted in external dilution with a $43.15/t NSR value derived from 1.85% zinc, 0.60% lead, and 0.20% copper.

In estimating external dilution as a ratio of tonnes (W/O), the high density of economic material (4.27 t/m^3) versus the lesser densities of waste rock (2.70 t/m^3) and backfill materials (assumed 2.0 t/m^3), tends to reduce the external dilution amount expressed as a percent.

Mining recovery for normal AVOCA stopes was set at 94%, and for stopes close to historical mined stopes (20 m or less, termed as At Risk) mining recovery was set at 85%, while 100% recovery was used for all sill development plant feed. Based on a high level geotechnical review of planned sill pillar and surrounding rock performed by SRK, sill pillar recovery estimates range from 20% (below 2200 mEL) to 40% (above 2200 mEL), and average 27.2%.

15.6.6 Potential Plant Feed for Mine Plan

Table 33 shows how the in situ mineralized materials contained inside planned mining shapes converted to plant feed. NSR values are calculated using the assumptions and parameters shown in Table 31.

Table 33: Estimation of Underground Plant Feed

Category	Plant Feed						
	Tonnes (kt)	Zn (%)	Pb (%)	Cu (%)	Ag (gpt)	Au (gpt)	NSR ($/t)
Measured	2,461	6.18	2.45	0.32	68.20	0.89	131
Indicated	554	6.19	2.48	0.35	67.70	0.88	132
Subtotal of Measured and Indicated	**3,014**	**6.18**	**2.46**	**0.33**	**68.11**	**0.89**	**131**
Inferred	3,138	6.04	2.52	0.35	67.70	0.83	130
Subtotal of Inferred	**3,138**	**6.04**	**2.52**	**0.35**	**67.70**	**0.83**	**130**

* Figures have been rounded.
** The estimated plant feed is partly based on Inferred Mineral Resources that are considered too speculative geologically to have the economic considerations applied to them that would enable them to be categorized as Mineral Reserves, and there is no certainty that the preliminary economic assessment based on these Mineral Resources will be realized.
*** The reader is cautioned that the mineralized material should not be misconstrued as a mineral resource or a mineral reserve. The quantities and grade estimates are derived from the block model and include mining dilution and losses.

Table 34 shows the mineral resources that were not included in the current mine plan.

Table 34: Mineral Resources Not Included in the Mine Plan

	Mineral Resources Not Included In Mine Plan					
	Tonnes(kt)	Zn(%)	Pb(%)	Cu(%)	Ag(gpt)	Au(gpt)
Measured	1,557	7.13	2.90	0.48	84.90	0.64
Indicated	475	7.20	2.83	0.33	85.04	1.06
Subtotal of Measured and Indicated	**2,033**	**7.15**	**2.88**	**0.44**	**84.93**	**0.74**
Inferred	1,027	7.04	2.98	0.29	78.81	1.39
Subtotal of Inferred	**1,027**	**7.04**	**2.98**	**0.29**	**78.81**	**1.39**

* There are potential rounding errors in subtotal and total numbers

** Values calculated using an NSR cut off value of 100$/t

*** The Mineral Resources listed above include Inferred Mineral Resources that are considered too speculative geologically to have the economic considerations applied to them that would enable them to be categorized as Mineral Reserves.

15.7 Underground Mine Model

15.7.1 Underground Mine Layout

Figure 34 shows the 2080 elevation (2060 Level Sub 2) plan view. Figure 35 shows the 3D mine model in a vertical projection view (looking northeast).

Figure 36 shows an isometric view of the 3D mine model looking southwest from hangingwall side of the deposit. The entire development infrastructure is on the horseshoe centre of the hangingwall side. It should be noted that the names “conveyor portal” and “conveyor ramp” have been carried forward from previous mine plans. The PEA does not involve conveyor transport.

The starting areas for stope production will be from lateral development historically completed on elevations 2420 (2360_Sub 4) and 2280 (2260_Sub 2) of the north lens system and elevation 2360 of the east lens system (2360_Sub 1).

Access to the underground mine is planned by ramps, with an existing main portal located on the north side of the deposit and an existing conveyor portal located on the east side of the deposit. The existing conveyor ramp will be connected with the main ramp by a 390 m connection ramp (see Figure 36) between elevations 2473 and 2415. All of the existing ramp will be rehabilitated or slashed to a minimum cross-section of 5.0 m wide by 5.0 m high to accommodate 45-tonne capacity haul trucks and meet ventilation requirements. Underground haulage trucks will transport economic materials through the configured underground ramp system and out of the mine through the conveyor portal, where surface stockpile pads and the process plant are close by.

All new ramp is designed at an average gradient of -15% with dimensions of 5.0 m wide by 5.0 m high, being sized to meet air flow requirements in the ramp.

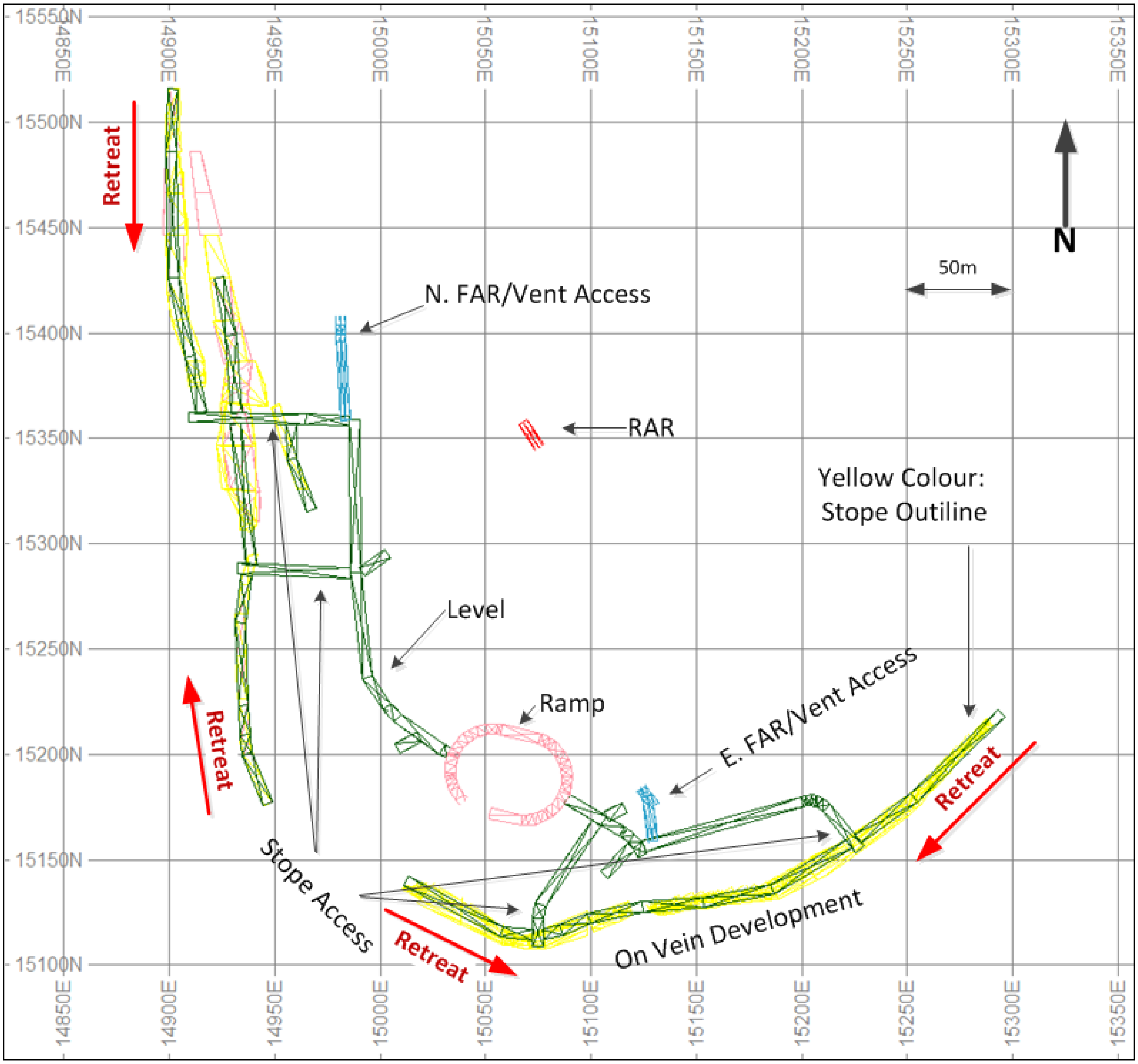


Figure 34: 2080 Elevation Plan View

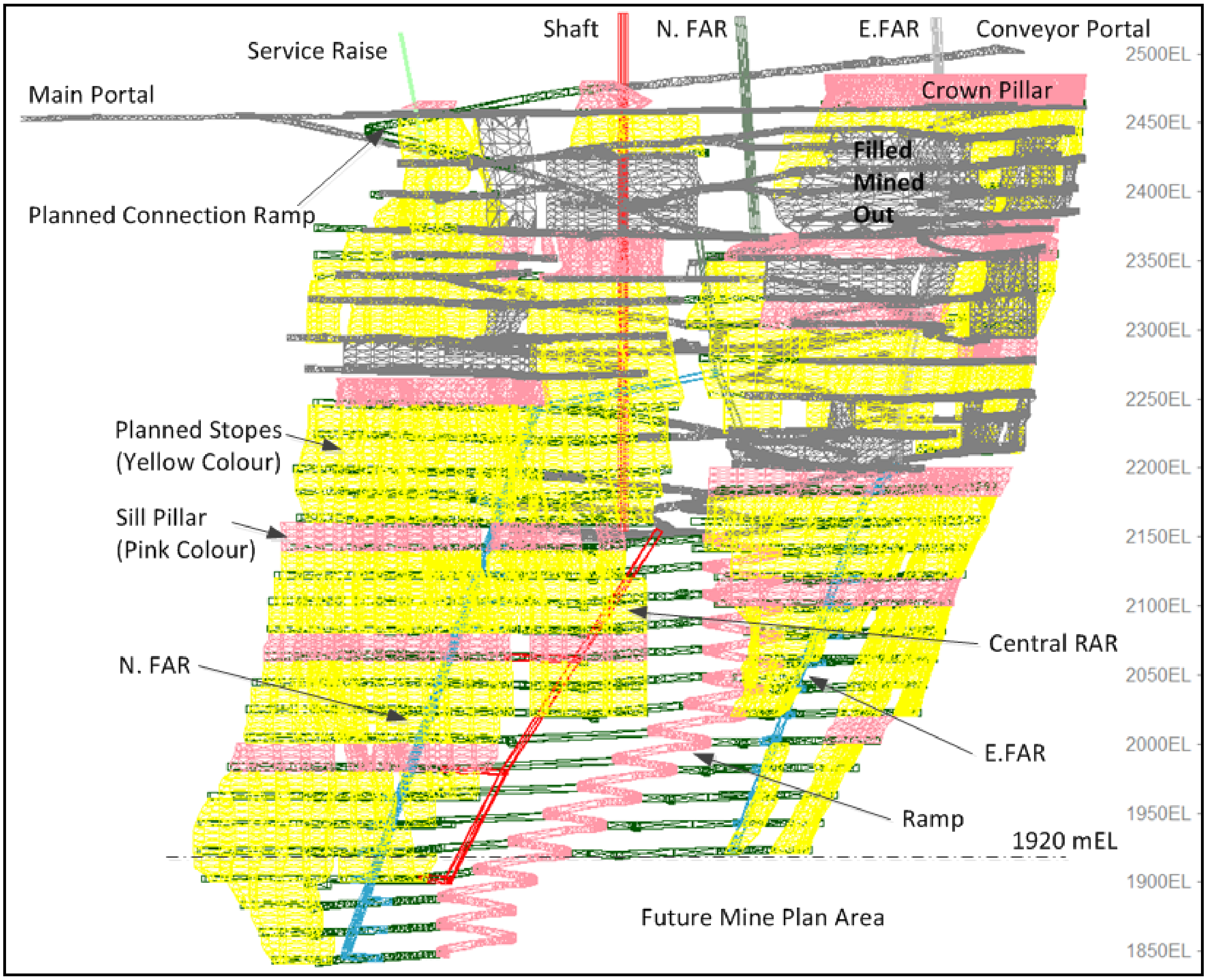


Figure 35: Vertical Projection View (Looking Northeast)

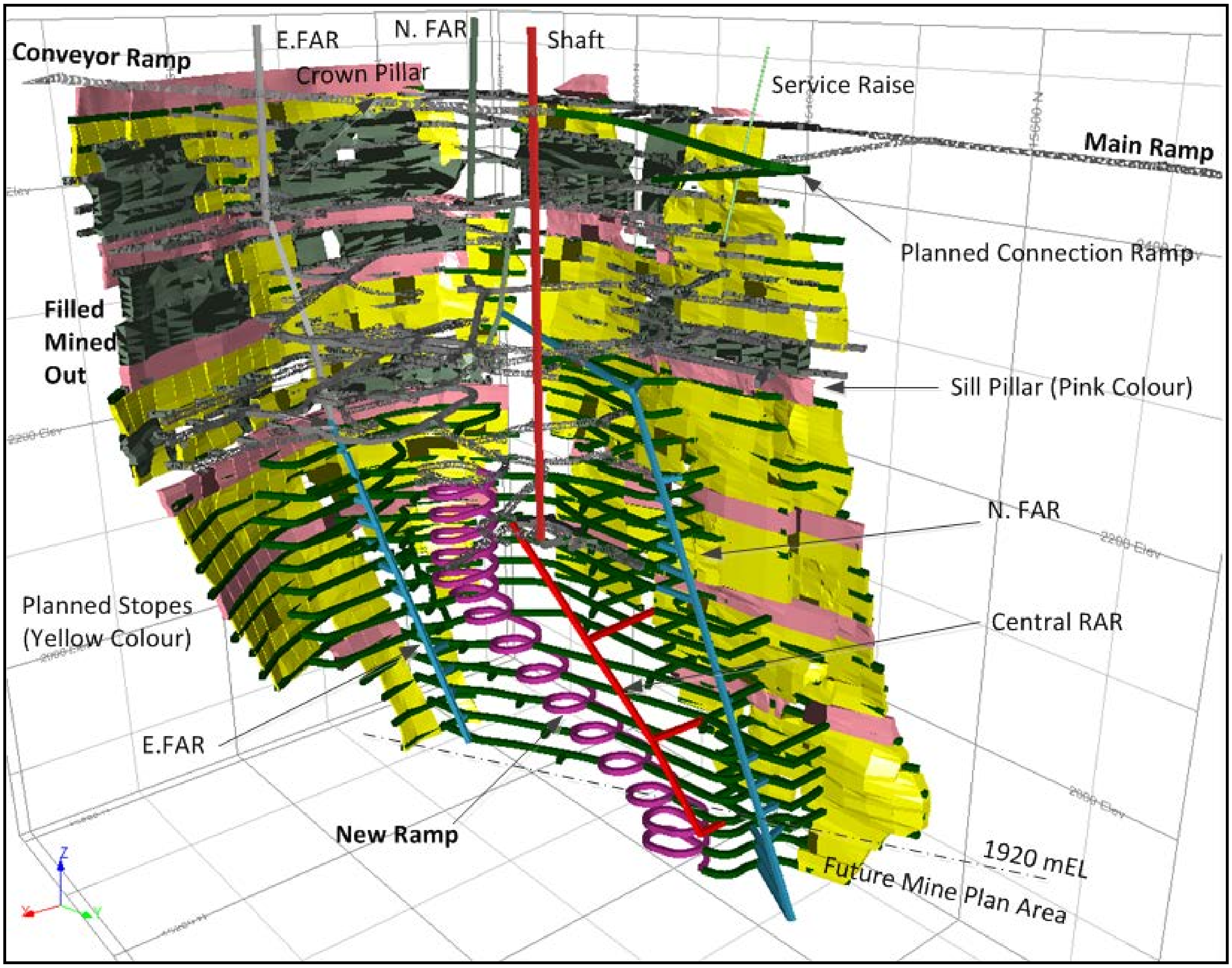


Figure 36: 3D Mine Model Isometric View Looking Southwest

The existing east fresh air raise (E.FAR) will be slashed to a cross-section of 4.7 m x 4.7 m from surface to elevation 2220, then extended to elevation 1920 (mine bottom). The existing north fresh air raise (N.FAR) will also be slashed to a cross-section of 4.7 m x 4.7 m from surface to elevation 2266, and then extended from elevations 2240 to 1920, connected by a ventilation drift between these two segments.

A central return air raise (Central RAR) will be developed, also sized at a cross section of 4.7 m x 4.7 m, from elevations 2154 to 1977, which will be connected to the existing Caribou shaft (7.0 m x 2.7 m) at the lowest shaft station elevation.

15.7.2 Lateral Development

Table 35 is a summary of LoM lateral development requirements. All the waste development quantities shown include an average 15% mark-up in addition to the modelled amounts. This was done to account for development not modelled in 3D mine design such as safety bays, level sumps, electrical cut outs, gear storage areas, explosive magazines, etc.

Table 35: Summary of LoM Lateral Development Requirements

Heading	Type	Length (m)	Size (m x m)
Capitalized			
Rehab/Slash			
Line Metre	Waste	2,997	Varied
Equivalent Metre	Waste	548	5 x 5
Lateral Waste Development	Waste	2,671	5 x 5
Subtotal Capitalized		**3,219**	**5 x 5**
Expensed			
Rehab/Slash			
Line Metre	Waste	2,896	Varied
Equivalent Metre	Waste	530	5 x 5
Lateral Waste Development	Waste	14,698	5 x 5
On Lens Development	On Vein	12,746	Varied
Subtotal Expensed		**27,974**	
Total Lateral Development		**31,193**	

Note: waste development metres include 15% markup

With lateral development totalling 31,193 m, the project achieves a development ratio of 198 t/m. Waste development tonnages (including vertical development, slashing) is estimated at 926,000 t yielding a waste/plant feed ratio of 0.15.

15.7.3 Raise Requirement

Table 36 is a summary of LoM raising requirements. These are all ventilation raises, as the project does not require any rock passes. Slot raising for the first stope of each mining front is excluded from the table.

Table 36: Summary of LoM Raise Development Requirements

Heading	Type	Length (m)	Size (m x m)	Manway
North Fresh Air Raise Slash	Waste			N
Line Metre	Waste	265		
Equivalent Metre	Waste	157	4.7 x 4.7	
East Fresh Air Raise Slash	Waste			N
Line Metre	Waste	332		
Equivalent Metre	Waste	197	4.7 x 4.7	
North Fresh Air Raise Development	Waste	355	4.7 x 4.7	N
East Fresh Air Raise Development	Waste	280	4.7 x 4.7	N
Return Air Raise Development	Waste	300	4.7 x 4.7	Y
Total Equivalent Metres	Waste	**1289**	4.7 x 4.7	

15.8 Production Schedule

The production rate analysis was derived from first principles, using the rated capacity of equipment and available mining fronts. Historical mine production achievements were considered during this analysis. SRK notes that rules-of-thumb predict a mining rate that varies from 2,400 tpd to 3,000 tpd.

The Caribou underground mine preproduction period is defined as a 9-month period from April 1, 2014 (re-start of dewatering and start of underground rehabilitation) to December 31, 2014. In H1 2015, an average production rate 2,040 tpd is planned, which is 68% of the designed underground mine capacity. The production period extends from January 1, 2015 to March 2021 for a period of 6.3 years. At full production the planned mining rate is 3,000 tpd (1.095 Mt per year).

Planned LoM production is 6,152 kt at $130/t NSR, with metal grades of 6.11% zinc, 2.49% lead, 0.34% copper, 67.89 g/t silver, and 0.86 g/t gold.

Underground development advance rates were scheduled at not more than 360 m/month or 120 m/month/jumbo with multiple headings planned most of the time.

Table 37 shows the LoM production plan. Table 38 shows the LoM waste rock handlings and backfill material balance.

Table 37: Underground Mine LoM Production Plan

Name		Unit	2014	2015	2016	2017	2018	2019	2020	2021	Total
Days		d	Preproduction	365	365	365	365	365	365	365	2,555
Daily Production Rate		tpd		2,333	2,724	3,000	2,987	3,000	2,586	225	2,408
Development											
Mill Head Tonnes		kt		274	147	196	102	108	109	0	936
Head Grades											
	Zn	%		5.90	6.46	6.35	5.97	6.01	6.22	0.00	6.14
	Pb	%		2.48	2.47	2.60	2.40	2.27	2.36	0.00	2.45
	Cu	%		0.35	0.32	0.30	0.29	0.31	0.30	0.00	0.32
	Ag	g/t		70.26	70.28	73.54	61.66	59.12	61.83	0.00	67.75
	Au	g/t		0.69	0.80	0.91	1.16	1.18	1.12	0.00	0.91
Stoping											
Mill Head Tonnes		kt		577	847	899	989	987	835	82	5,216
Head Grades											
	Zn	%		5.78	6.24	6.08	5.98	6.49	5.94	5.55	6.10
	Pb	%		2.50	2.66	2.50	2.46	2.68	2.18	1.97	2.49
	Cu	%		0.32	0.33	0.35	0.41	0.30	0.32	0.29	0.34
	Ag	g/t		68.02	74.31	66.28	71.72	72.64	55.38	43.66	67.91
	Au	g/t		0.55	0.68	0.84	0.81	0.80	1.30	1.26	0.85
Total Mill Head											
Tonnes		kt		**852**	**994**	**1,095**	**1,090**	**1,095**	**944**	**82**	**6,152**
Grades											
	Zn	%		5.82	6.27	6.13	5.98	6.44	5.97	5.55	6.11
	Pb	%		2.49	2.63	2.52	2.45	2.64	2.20	1.97	2.49
	Cu	%		0.33	0.33	0.34	0.40	0.30	0.32	0.29	0.34
	Ag	g/t		68.74	73.71	67.58	70.78	71.31	56.13	43.66	67.89
	Au	g/t		0.59	0.70	0.85	0.84	0.84	1.28	1.26	0.86
Contained Metals											
	Zn	Mlbs		109.2	137.6	148.0	143.7	155.6	124.3	10.0	828.3
	Pb	Mlbs		46.8	57.6	60.7	59.0	63.6	45.8	3.6	337.1
	Cu	Mlbs		6.2	7.2	8.3	9.6	7.2	6.6	0.5	45.6
	Ag	Moz		1.88	2.36	2.38	2.48	2.51	1.70	0.12	13.43
	Au	Moz		0.02	0.02	0.03	0.03	0.03	0.04	0.00	0.17

Table 38: LoM Waste Rock Handlings and Backfill Material Balance

Name	Unit	2014	2015	2016	2017	2018	2019	2020	2021	Total
Waste Rock Handling										
Broken Underground	kt	**36**	**111**	**160**	**116**	**188**	**196**	**118**	**0**	**926**
Waste Direct to Backfill	kt		111	160	116	188	196	118		889
Waste Trucked to Surface	kt	36	0	0	0	0	0	0	0	36
From Surface to Backfill	kt	0	273	267	371	304	192	29	0	1436
Total Backfill Placed	kt		**384**	**428**	**487**	**491**	**388**	**147**		**2325**

15.9 Equipment, Manpower, Services and Infrastructure

15.9.1 Contractor Involvement

In the preproduction period and the first year of the production period (2014 – 2015), the underground mine will be operated by a mining contractor to be selected by Trevali, based on a competitive bidding process.

The scope of work for the mining contractor will generally include underground rehabilitation, preproduction development, initial stope production, and operation and maintenance of underground services, supplying all supervision, labour, tools, materials, equipment and services as required. The mining contractor will be responsible for:

- Supplying all supervision and labour;
- Supplying all underground drilling, blasting materials and small tools;
- Supplying all underground mobile equipment;
- Slashing and rehabilitation work in the underground mine;
- Development of ramps and levels;
- Longhole stope preparation, drilling, blasting, and mucking;
- Backfilling the mined-out stopes;
- Hauling the slashed material and development waste to designated locations;
- Hauling plant feed materials from remuck bays to the surface plant feed pad;
- Installing ground support and providing other mine services.

Trevali will be responsible for providing:

- Compressed air plant;
- Plant process water supply;
- Plant power supply;
- Dry facilities;
- Main and auxiliary fans;
- Road maintenance to site access road;
- Mine water disposal;
- Communications (leaky feeder, telephone lines, internet, etc.);
- Engineering design;
- Site security;
- Surveying, external dilution monitoring and reporting;
- Ground support materials and accessories;
- Central blasting system;
- Ground movement and seismic monitoring system;

- Garbage disposal;
- Surface fire protection and mine rescue equipment.

Caribou mine has been on care and maintenance since 2008. Trevali staff re-entered the mine for inspection in the summer of 2013. There were areas of the mine that have been dewatered and flooded which caused significant oxidation in these areas. Trevali estimated that approximately 3,000 m will be rehabilitated as per Trevali's ground support standards, see Figure 37. It is unknown at this time exactly how much of this area will need to be slashed to accommodate new equipment. The amount of material to be slashed will vary on a per heading basis to a maximum of 5.0 m x 5.0 m. In the PEA study, the rehabilitation work has been scheduled to be completed in seven (7) months with two crews at a maximum scheduled advance rate of 14 m/d (versus contractor quoted maximum of 24 m/d), considering the uncertainties requiring some contingency.

Additionally, longhole drilling and blasting will also be contracted throughout the life of mine. Stopes will be drilled using 64 mm holes with 1.8 m burden and 2.0 m spacing to achieve the required fragmentation and dilution control. Holes will be loaded and blasted using a bulk emulsion product or ANFO where conditions are dry.

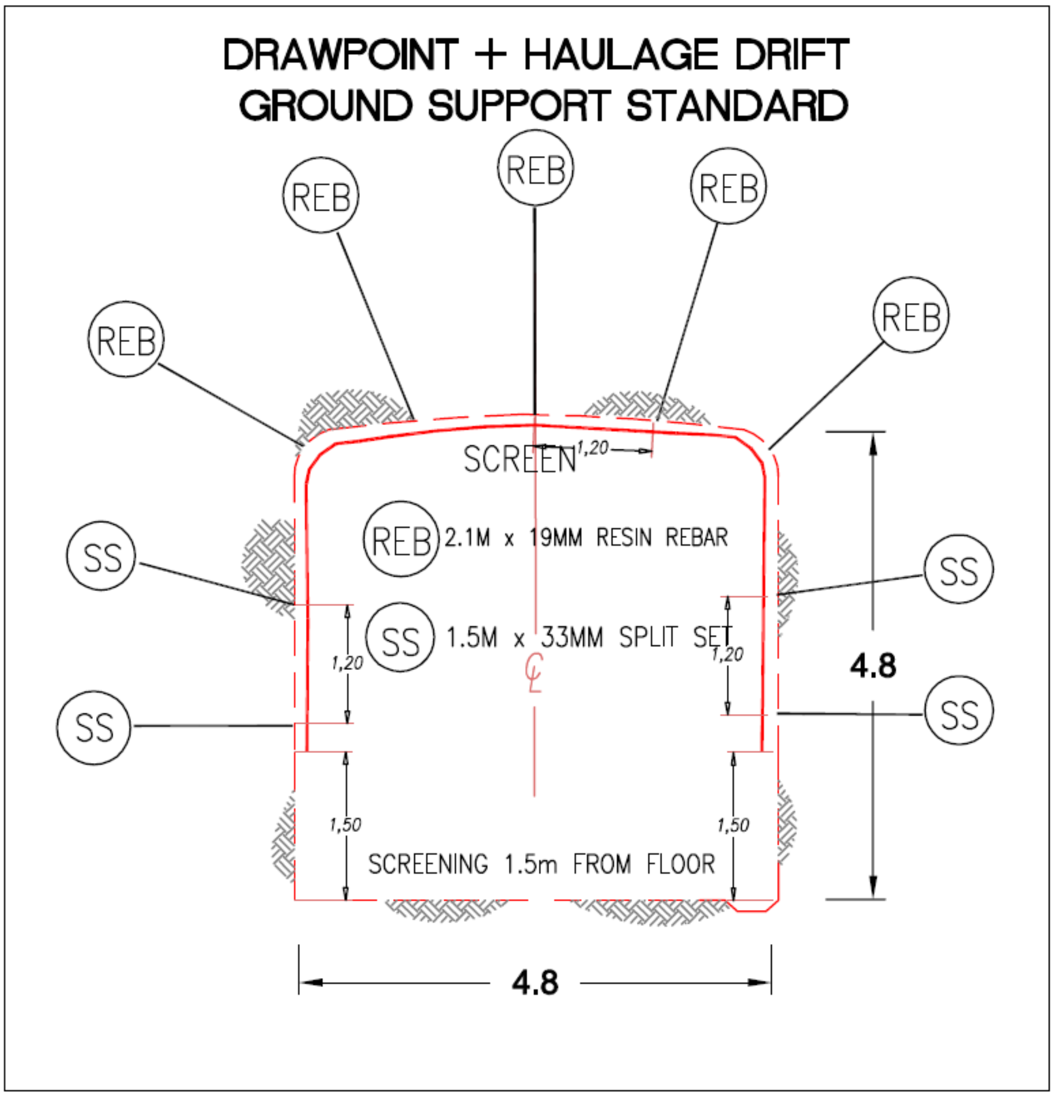


Figure 37: Caribou Mine Ground Support Standards

15.9.2 Mine Equipment

Table 39 shows the planned mining fleet, including the surface units required to support the mine plan. The maximum number of units is shown for each equipment type, and these numbers vary throughout the mine life, especially trucks.

Major underground equipment requirements will vary with time, especially haul trucks and LHDs.

Table 39: Planned Mining Equipment

Underground Equipment	Peak Units	Comment
10-Tonne UG LHD	4	
45-Tonne UG Truck (Dump-Box)	6	
45-Tonne UG Truck (Ejector-Box)	1	
120M Grader (CAT)	1	
Jumbo (Boomer 282)	3	
Scissor Lift	3	
Buggie Drill	2	
Boom Truck	1	
Toyota Man Carriers (Crews)	2	
Truck c/w Boom	2	
Toyota Truck (Technical)	1	
Toyota Truck (Shifters)	1	
Toyota Truck (Electrical)	1	
Toyota Truck(Mechanical)	1	
Tractor UG Forklifts	2	
BTI Rockbreaker/Blockholer	1	Purchased
Longhole Drill	3	Contractor
Shotcrete Unit	1	
Emulsion Bulk Loader	1	Contractor
6-Tonne UG LHD	1	
Fuel/Lube Truck	1	
Subtotal Underground	**39**	
Surface Equipment		
Surface Pickup Truck	4	Lease
Surface Forklift	1	
Mine Rescue Vehicle (MINECAT UT99C)	1	
Loader for Backfill (Surface)	1	
Subtotal Surface	**7**	
Total Underground & Surface	46	

The following section describes the application of the equipment in the mining plan.

Equipment of both waste and on lens development will consist of:

- 2-boom face jumbo;
- 10-tonne and 6-tonne capacity LHDs;
- Scissor lift for ground support, face loading explosives, and services work.

Longhole stope production mucking will employ 10-tonne and 6-tonne capacity LHDs depending on stope width. These units will also be used to tram waste rock backfill along strike into empty stopes.

10-tonne capacity LHDs will be used for loading plant feed materials into 45-tonne trucks for haulage to surface and for loading waste into 45-tonne trucks for haulage to surface or to underground remuck bays for backfill supply.

The blockholer unit will be used to drill and blast oversize materials that may block draw points, and will also operate on remote control as needed to drill and blast large oversize materials that may occur inside stopes beyond the brow.

The production drill will work in longhole stopes drilling down holes or up holes for sill pillar recovery.

The shotcrete spray unit will be a skid mounted unit supplied by bulk bags of dry shotcrete. It will be used in development headings as needed, depending on ground conditions.

Supplies will be moved underground by the main ramp. Nipping will be done underground using a boom truck and forklift, while on surface a forklift will be used to prepare materials for transport.

Toyota carriers and trucks will provide transportation for operations and maintenance supervision and for technical staff. The personnel carrier will move employees in and out of the mine at shift change.

The grader will maintain the ramps and will work at times with a scoop cleaning up slimes or spreading road bed aggregate.

Maintenance crews will have available a service truck, a boom truck, a scissor lift (for electrical work), a fuel and lube truck, and a tractor.

On surface the wheel loader will be used to load underground trucks with waste rock for backfill.

15.9.3 Mine Manpower

Table 40 shows the composition of the Caribou mine workforce on the owner’s payroll during the full production period. During preproduction period, Trevali will mainly perform supervision work and manpower cost has been incorporated in mine cost model accordingly.

Staff positions include mine supervision, human resources and safety & training, finance, maintenance supervision, environmental, and technical services.

Operations and maintenance hourly employees include vacation/spare employees.

Table 40: Caribou Mine Manpower – Full Production Period

Function	Payroll
Mine Supervision	14
HR, Safety & Training	9
Stope Mucking and Materials Handlings	42
Longhole Drilling (Contractor)	
Stope Ground Support	4
Backfilling	16
Development Drilling & Blasting	16
Development Waste Handlings	16
Development Ground Support	24
Underground Mine Services	37
Surface Maintenance	3
Maintenance Supervision	6
Maintenance	24
Technical Services	18
Environmental	2
Finance	8
Total Mine Employees	**239**

15.9.4 Mine Services and Infrastructure

Site Development Plan and Major Infrastructure

Figure 38 shows the Caribou mine site development plan and the underground mine major surface infrastructure and major underground infrastructure surface projection view (top portion only).

It should be noted that all of the surface infrastructure is already in place, on care and maintenance, observed to be in good conditions during SRK's site visit. This includes the shaft and headframe, main portal, conveyor portal, east ventilation raise collar and associated main fans, etc. The major underground infrastructure, including the main ramp, conveyor ramp, north and east ventilation raises will be rehabilitated or slashed to designed heading sizes during the planned mine dewatering and rehabilitation period. The connection ramp is a new ramp segment and will be developed during the preproduction period.

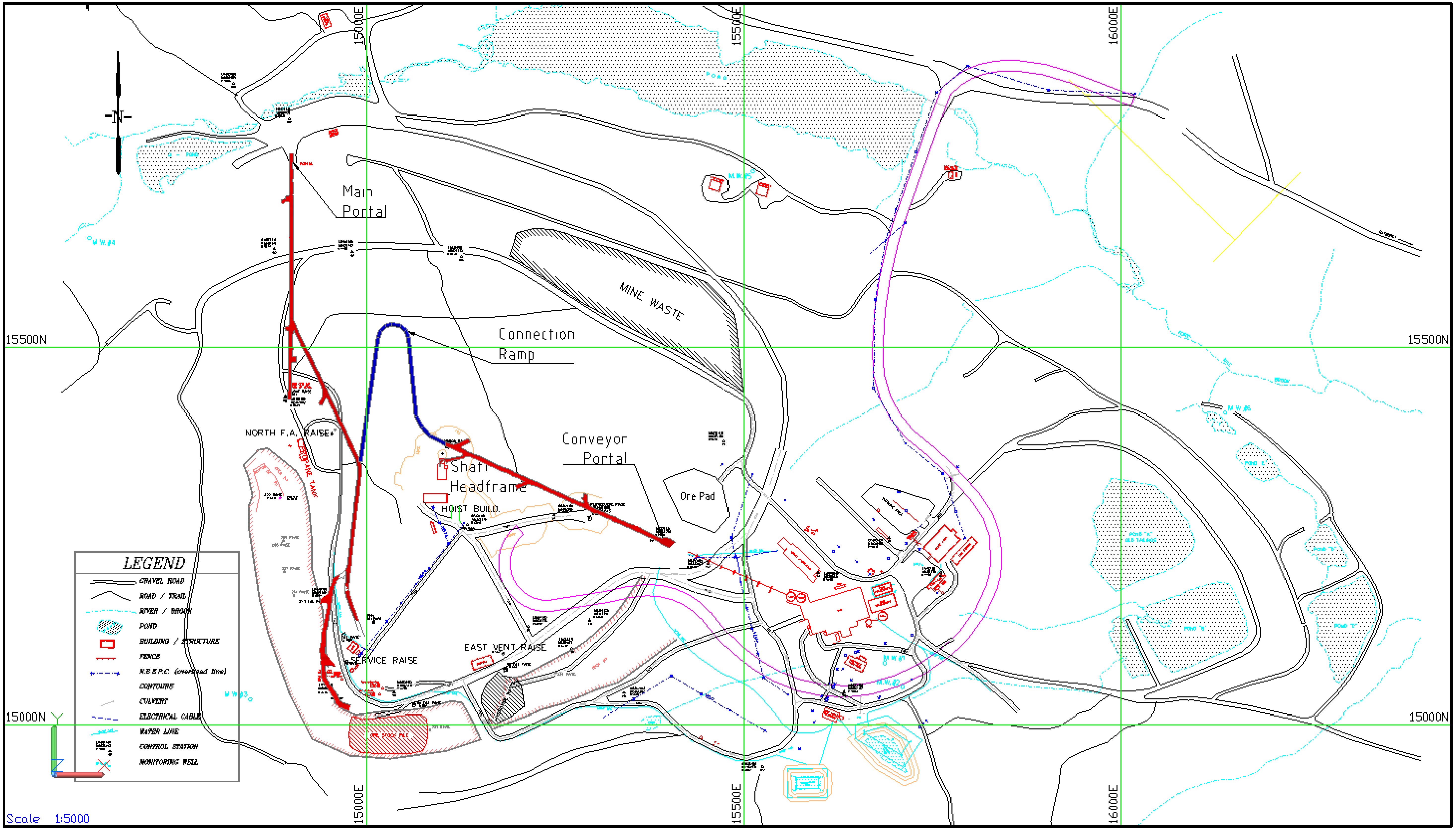


Figure 38: Caribou Underground Mine Major Surface Infrastructure and Major Underground Infrastructure Surface Projection View (Trevali 2014)

Definition Drilling

A definition drilling unit cost of $0.36/t plant feed is included in the PEA. A detailed drilling plan has not been prepared. Considering that approximately 65% of targeted mineralization is in the Measured and Indicated resources categories which will require less definition drilling, it is SRK's opinion, the planned unit cost for definition drilling should be sufficient for the Caribou project.

Materials Handling

Mining will utilize mechanized equipment. Truck haulage was selected over shaft hoisting based on the following considerations:

- Reduced capital expenditure;
- Utilization of the existing declines;
- Operations reliability.

Primary access for workers and equipment will be via an existing portal and decline (main ramp) from surface. A segment of second decline (connection ramp – connecting existing conveyor ramp to the existing main ramp) will be developed to reduce the surface plant feed haulage distance, see Figure 38. The main ramp will be extended to the designed mine bottom (1920 mEL) at an average -15% gradient with a cross-section of 5.0 m wide by 5.0 m in height. All plant feed and waste handlings will use 10-tonne LHDs loading 45-tonne trucks. Plant feed trucks will be loaded at remuck bays planned near the main ramp at a maximum distance of 150 m from the production stopes, and travel up the ramp system to the surface plant feed stockpile.

Waste backfill materials will be either back hauled from surface waste rock pile to remuck bays, or hauled from underground waste development headings using 45-tonne ejector type truck to backfill stopes or dump in remuck bays. A dedicated LHD and truck will be assigned to backfill delivery.

Trucking depths will range from 50 m to 590 m below surface (conveyor portal). The truck requirements will vary from early year production of 4 trucks at shallow depth to late year production of 7 trucks at greater depth.

Mine Ventilation

SRK and Trevali estimated the total air flow required for the Caribou underground mine based on the utilization of the planned mining equipment plus contingency. New Brunswick mining regulations require a ratio of 0.066 cms per kW of engine power. This is equivalent to 105 cfm per engine horsepower (hp). SRK estimated ventilation requirements at 330 cms or 700,000 cfm for a production rate of 3,000 tpd (Table 41). It should be noted that major ventilation air ways and main fans were sized based on achieving 425 cms or 900,000 cfm airflow requirement, which provides a 29% contingency. A forced-air system with two fresh air raises was used in the past during Caribou mining operations, and the same concept has been adopted for the PEA mine plan.

The planned air flows in and out of the mine are shown in Figure 39.

Planned initial ventilation is based on the two existing fresh air raises (FAR), each with one 224 kW (300 hp) fan forcing fresh air into the mine, for a combined capacity of approximately 212 cubic metres per second (cms) or 450,000 cubic feet per minute (cfm). One FAR is located on the East limb, and another one on the North limb. Currently, the East limb FAR delivers air to the 2160 Level via three individual raises in succession, and the North limb FAR delivers air first to the 2360 Level, and then through a by-pass raise to the 2160 Level. The mine will exhaust air through the main ramp, the shaft, the conveyor ramp, the main service raise, and various historical rock passes throughout the mine.

Based on the total ventilation requirements of425 cms or 900,000 cfm, a second 224 kW (300 hp) fan will be added to each FAR, to double the current ventilation capacity. The fans will be installed in parallel, with a new plenum design/set-up required. The parallel system will allow for one fan to be isolated for repairs in order to reduce the effect on air flow provided to the mine during maintenance periods. The increase in air flow requirements and total mine depth requires a larger cross-sectional area in the raises, and therefore it is planned to slash the two main FARs to 4.7 m by 4.7 m. The raises will be slashed sequentially in order to provide some ventilation to the mine during start-up activities and construction; as well, the new fans will be brought online in the same manner.

Beyond the current FARs, two additional raises will be driven at 4.7 m by 4.7 m to provide fresh air to the mine bottom. Ventilation will be drawn from these main raises to ventilate each main level and auxiliary ventilation systems will be utilized to provide all mine headings/sublevels with adequate air flow, as required. LoM exhaust includes a main exhaust raise from the mine bottom to the 2160 Level, equipped with services and a manway for secondary mine egress, as well as exhaust through the main ramp system.

Table 41: Planned Mining Equipment and Ventilation

Underground Equipment	Peak Unit	Required (cfm/hp)	hp per Unit	cfm per Unit	Derating Factor	cfm Required
10-Tonne UG Scoop	5	106	295	31,270	80%	125,080
45-Tonne UG Truck	7	106	589	62,434	75%	327,779
120M Grader	1	106	138	14,628	50%	7,314
Jumbo (Boomer 282)	3	106	78	8,268	50%	12,402
Scissor Lift	3	106	116	12,296	50%	18,444
Buggie Drill/StopeMate	4			8,000	50%	16,000
Boom Truck	1	106	246	26,076	50%	13,038
Toyota Man Carriers (Crews)	2	106	128	13,568	40%	10,854
Truck c/w Boom	2	106	99	10,494	50%	10,494
Toyota Truck (Technical)	1	106	128	13,568	50%	6,784
Toyota Truck (Shifters)	1	106	128	13,568	50%	6,784
Toyota Truck (Electrical)	1	106	128	13,568	50%	6,784
Toyota Truck(Mechanical)	1	106	128	13,568	50%	6,784
Tractor UG Forklifts	2	106	71	7,526	50%	7,526
BTI Rockbreaker/Blockholer	1			8,000	50%	4,000
Shotcrete Unit	1	106	201	21,306	50%	10,653
Emulsion Bulk Loader	1	106	147	15,582	50%	7,791
ST3.5 Scoop	1	106	182	19,292	20%	3,858
Fuel/Lube Truck	1	106	147	15,582	40%	6,233
No. of Units in Fleet	**39**					
				Calculated cfm		**608,602**
				Contingency	15%	91,290
				Required (Rounded cfm)		**700,000**
				Required in Cubic Metre per Second (cms)		**330**
				Designed (cfm)		900,000
				Designed (cms)		424.8
				Contingency		**29%**

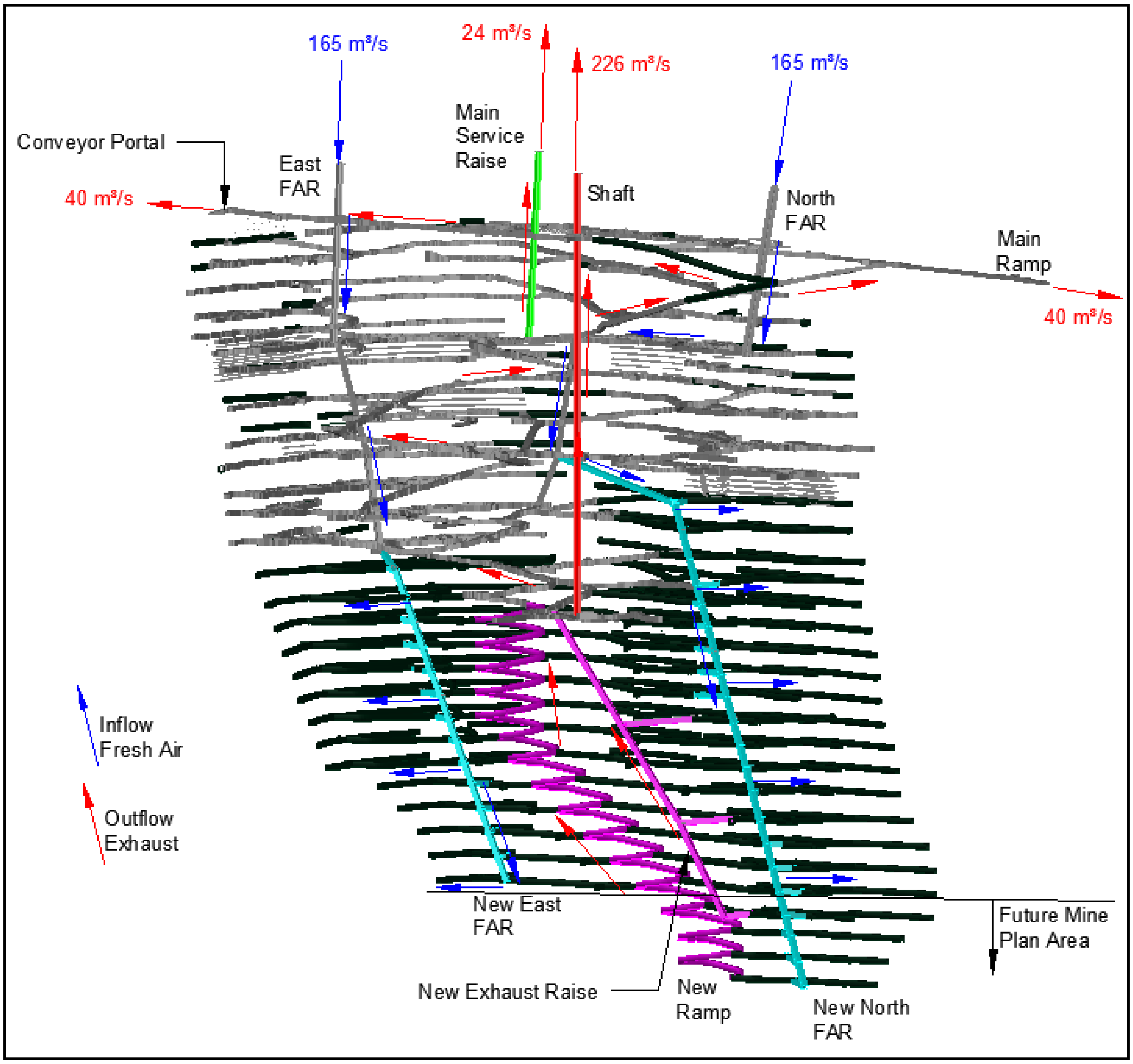


Figure 39: Caribou Underground Ventilation Schematic (Oblique View) (Trevali 2014)

Backfill Method

Unconsolidated rock backfill (RF) will be used to fill the majority of mining voids. The stope voids created by mining over the mine life will be treated as follows:

- 13% of voids not backfilled;
- 87% of voids filled with RF.

The voids that will not be filled are in the areas where up hole retreat stoping is planned such as sill pillar mining areas.

A total of 2,325 kt of waste rock for backfill will be sourced from underground development waste (889 kt) and a surface waste stockpile (1,336 kt), refer to Table 38. The surface waste rock stockpile has been reviewed by Trevali and deemed sufficient to meet the life of mine requirements.

The surface waste backfill material will be transported underground via truck backhaul. The material will be dumped into established waste storage bays (remucks) located along the ramp. LHDs will tram backfill from the remuck bays to the empty stopes, dumping into the stopes using remote control.

Mine Dewatering

Pre-Development Dewatering

Dewatering of the Caribou mine is to proceed in parallel with pre-production activities, in preparation for the re-opening of the underground facilities. Currently, untreated mine effluent is pumped via the main shaft using a Grunfos™ deep well submersible type pump with a stainless steel 112 kW (150 hp) Subteck™ motor. The pump is installed at a depth of 220 m (2310 mEL) and is capable of pumping 136 m³/hour (600 GPM). As the mine is dewatered below second level (2360 mEL) and underground operations resume, the previous pumping set up at 2360 Level will be reinstated. The pumping station at 2360 Level will be used as the central pumping station at which point all underground water will be pumped from this location, through the main service raise, and to the sedimentation pond for treatment. This arrangement will eliminate the need to have a pump down the shaft.

The remainder of the mine below 2360 Level will be dewatered by progressing down ramp using pneumatic and electric water pumps, with water directed to the 2360 Level sump. As sub-levels are dewatered and opened, staged sumps will be reinstated, with main sump stations located on the 2260 Level and 2160 Level (which will pump up to the 2360 Level sump for transfer out of the mine).

The mine water level was at 2370 mEL as of May 20, 2014. With an approximate inflow of 6.3 L/s (100 GPM) and a maximum pumping capacity of 42.9 L/s (680 GPM), pumping 24 hours a day, 7 days a week will result in the mine being 100% dewatered in approximately 4 months.

As mining levels are dewatered, and sumps are installed and sludge is removed, rehabilitation may proceed to these areas and coincide with the remainder of mine dewatering activities (with consideration for proper ventilation).

Steady-State Dewatering

Life of mine dewatering activities will consist of sump stations located on all of the main levels, (1960 Level, 2060 Level, 2160 Level, 2260 Level, and 2360 Level), with enough pump capacity to move water up to the next main level – approximately 100 vertical metres. Interim sumps will be located on all sub-levels (at 20 m intervals between main levels), with all effluent flowing to the main level sump station below it, and consequently being pumped up to the main sump station on 2360 Level to be pumped out of the mine via the main service raise.

Auxiliary dewatering activities will take place during mining activities to keep mining faces free from water, in the form of low horsepower electric pumps or pneumatic pumps.

Maintenance Facilities (surface/underground)

Maintenance facilities for the mine mobile fleet will consist of a surface repair shop and an underground central lube station. The surface maintenance shop is in place and was observed to be in good condition during SRK’s site investigation.

The surface shop is a 45 m by 20 m, steel frame building with partial height concrete block walls. The building contains four double length equipment bays with electrically operated steel doors. A 10-tonne overhead bridge crane services the equipment bays. A 16 m by 16 m steel Quonset hut, housing an oil storage and hose repair area adjoins the shop. Attached to the maintenance shop is a 13 m by 18 m heated warehouse.

The existing underground central lube station located on 2260 Level will be rehabilitated. Although no major underground maintenance facilities are planned, the mine capital cost estimate includes $1,500,000 for purchasing maintenance tools and equipping the underground lube station, etc.

Electrical Power Distribution

Under a long term contract, power to support the mine infrastructure will be provided from New Brunswick Power Transmission Corporation’s (NB Power) power grid to the delivery point 138 kV substation, designated by the Transmitter No. 5497. The supply voltage is converted to 4160 V through a 10 MVA fan cooled transformer. Trevali owns the transformer and associated switchgear. The hydro power charges in the PEA base case plan assume that Trevali will subscribe to a 3 MW base load interruptible power agreement with NB Power, and will qualify for a new user’s incentive program that is now in effect.

A 450 kW diesel generator has been planned and included in capital to serve the mine site as a standby generator for emergency use.

At the service raise substation, 4160 V electrical power is delivered to underground substations where the power is stepped down to 600 V for mine equipment.

Table 42 shows the existing underground electrical substations in inventory at Caribou which have been kept dry and free from damage since the mine was put on care and maintenance. In addition, the mine capital cost estimate includes $2,237,000 for underground electrical distribution system upgrade.

Table 42: Caribou Existing Underground Electrical Substations

Item	Quantity	Transform	Power (kVA)
Substation #1 - 2nd Level	1	4160 --> 600	500
Substation #2 (#97)	1	4160 --> 600	300
Substation #7 (#93)	1	4160 --> 600	300
Substation #8 (#94)	1	4160 --> 600	300
Substation #__ (#92)	1	4160 --> 600	600
Substation- 211 Clark Ramp	1	4160 --> 600	500
3rd Level Substation	1	4160 --> 600	1000
4th Level Substation	1	4160 --> 600	1000
Total	**8**		

Compressed Air Supply

Average compressed air consumption during the mine production period is estimated to be relatively low at approximately 1.51 cms or 3,200 cfm. This includes a 10% contingency and an allowance of 20% for air leakage.

There are four Sullair model LS-25 200LAC 1000 cfm compressors, each driven by a 149 kW (200 hp) motor, installed at the compressor house near the shaft headframe with a total capacity of 1.89 cms or 4,000 cfm. They appeared to be in good condition during SRK’s site investigation. No provision has been made to purchase additional air compressors for the underground mine.

Surface Temporary Plant Feed Storage

There is an existing plant feed storage area, historically called “Ore Pad” (see Figure 38), located 80 m from the conveyor portal with an approximately 5,000 m² area which meets the requirement for temporally plant feed storage.

16 Recovery Methods

16.1 Plant Flowsheet and Process Description

A generalised flowsheet of the rehabilitated plant is shown in Figure 40 with details of the equipment provided in the subsequent sections.

16.2 Grinding

The plant feed will be delivered as primary crushed mineralized rock at nominally 100 mm (4 inch) top size by inclined conveyor from the mine to two 2,000 tonne storage bins at the concentrator. Belt feeders will discharge each bin individually, controlled by a weightometer located on each bin's discharge conveyor.

The plant feed will be delivered to the 6.7 m (22 ft) diameter by 2.1 m (7 ft) long Hardinge Semi-autogenous primary SAG mill equipped with a 1,491 kW (2,000 HP) drive motor. A maximum ball charge of 4% will be allowed in the mill to reduce the feed material to nominal 3.18 mm (1/8 inch) as feed to the secondary ball mill. The discharge from the SAG mill will be pumped to a Derrick vibratory screen, with 4.5 mm (0.18 inch) apertures, to classify the mill discharge and recycle the oversize particles back to the SAG mill feed. Derrick screen undersize will gravitate to the secondary ball mill cyclone feed pump for secondary classification in a battery of 508 mm (20 inch) diameter Krebs cyclones.

Overflow at 80% passing nominal 30-35 microns will pass directly to flotation while the cyclone underflow will recycle to the 4.3 m (14 ft) diameter by 6.7 m (22 ft) long Nordberg secondary ball mill, equipped with a 1,864 kW (2,500 hp) drive motor, for further grinding.

Secondary ball mill discharge will combine with the SAG mill product in the cyclone feed pump sump. Soda ash and sodium cyanide will be added to the grinding circuit as pyrite and sphalerite depressants.

16.3 Lead Flotation

Product from the grinding circuit at nominal 35% solids by weight and pH 8.2 will gravitate to the pre-aeration circuit for depression of the pyrite.

16.3.1 Pre-Aeration

The first two cells in the lead rougher bank consist of two cells each consisting of a DR500 unit which are used to pre-aerate the slurry and tarnish the iron minerals to aid in their depression. There is no flotation in this circuit, as the cells are simply to provide aeration of the pulp.

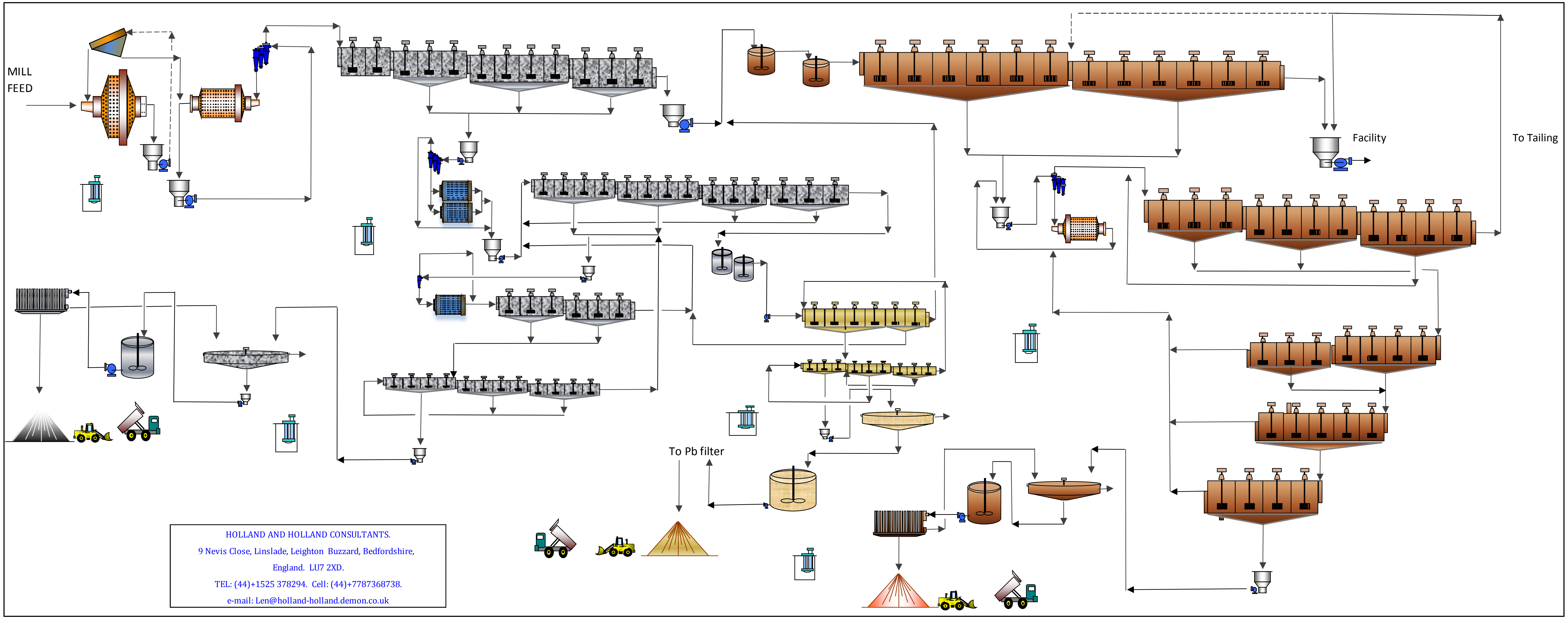


Figure 40: Caribou Concentrator Flowsheet

16.3.2 Lead Rougher-Scavenger

Discharge from the pre-aerators will pass directly to the lead rougher bank consisting of seven Outokumpu 16 cubic metre (565 cubic ft) units for recovery of the lead and copper mineralization. The R241 cyanamid collector will be used to recover the lead and copper mineralization selectively from the zinc with MIBC being used as the frother. Rougher tailing will flow by gravity direct to the scavenger bank consisting of a single bank of three cells each consisting of DR500 units. The combined rougher and scavenger concentrate will be sent for regrinding, while the scavenger tailing will form the feed to the zinc circuit.

16.3.3 Lead Regrind

The combined rougher-scavenger concentrate will pass to the lead regrind circuit where it will be classified in a battery of 152 mm (6 inch) cyclones to divert the plus 12 micron mineralization to two M1000 Isa regrind mills each rated at 500 kW (670 HP) operating in parallel.

Mill discharge will combine with the cyclone overflow at nominal 12 microns as feed to the primary cleaning.

The primary cleaner concentrate will be secondary reground in an additional M1000 Isa mill using 100 mm (4 inch) diameter cyclones as classifiers. Product at nominal 8 microns will pass to secondary cleaning.

16.3.4 Lead Cleaning

The primary cleaner consists of an eight cell rougher and a six cell scavenger with all cells being DR300 units. The rougher concentrate will pass to secondary regrind while the scavenger concentrate will be recycled back to the head of the primary cleaner. Primary cleaner tailing will form the feed to the copper circuit. The primary cleaner will therefore operate in open circuit.

The lead secondary cleaner consists of six DR300 cells with total secondary concentrate passing to tertiary cleaning. Secondary cleaner tailing will combine with the rougher concentrate as feed to the regrind cyclone ahead of the primary cleaner.

Second cleaner concentrate will pass to the combined tertiary and quaternary cleaner consisting of twelve DR100 cells for final cleaning of the lead, and depression of the contaminant copper and zinc mineralization. The quaternary cleaner concentrate will form the final lead concentrate and will be pumped to dewatering while the tertiary cleaner tail will report to the cyclone feed sump prior to the secondary cleaner. The quaternary cleaner tail will report to the feed sump to the tertiary cleaner.

The cleaner scavenger tail which previously fed the zinc circuit, will feed the copper circuit, with no adverse effect on the historical lead operation.

16.4 Copper Flotation (new)

Total lead cleaner tailing will be combined and pumped to a two stage conditioner for reagent addition ahead of copper flotation. Conditioner overflow at typically 30-35% solids by weight will report to the copper rougher circuit consisting of a single bank of six DR300 flotation cells, where the copper mineralization will be recovered.

The copper scavenger concentrate will be recycled to the head of the circuit while the rougher concentrate will pass to a single bank consisting of the primary and secondary cleaners.

The primary cleaner consists of six DR18SP cells and the secondary cleaner consists of three DR18SP cells with the cleaner bank arranged as a single bank. Primary cleaner tailing will recycle to the rougher while the secondary cleaner tailing will flow by gravity direct to the head of the primary cleaner tailing. Secondary cleaner concentrate as final copper concentrate will be pumped to the dewatering circuit.

16.5 Zinc Flotation

Combined lead scavenger and copper scavenger tailing will combine as feed to the zinc circuit.

16.5.1 Conditioning

Two conditioners are utilized as reagent addition stages to allow activation, and promotion, of the zinc mineralization and to adjust the pH for pyrite depression.

16.5.2 Zinc Rougher-Scavenger

Overflow from the conditioners will gravitate to a combined zinc rougher-scavenger circuit arranged as twelve cells with the rougher being six DR600 cells while the scavenger bank consists of six DR500 units.

16.5.3 Zinc Regrind

The combined rougher and scavenger concentrate will be pumped to a single stage 3.0 m (10 ft) diameter by 6.7 m (22 ft) long regrind ball mill equipped with a 746 kW (1000 HP) drive motor. All mill feed will report to the cyclone feed box for classification in a battery of 254 mm (10 inch) diameter Krebs cyclones with a product of nominal 80% passing 14 microns. The cyclone underflow will recycle to the regrind mill, maintaining the regrind in closed circuit. The cyclone overflow will pass by gravity to the cleaner circuit for upgrading to final concentrate specification.

16.5.4 Zinc Cleaners

The cleaner circuit consists of a four stage cleaning plant with the final three stages of cleaning operating in open circuit with the tailing recycling to the zinc regrind circuit. The primary cleaner tailing will operate in open circuit with the tailing passing direct to final tailing, with the option of recycling to the scavenger feed.

The primary cleaner consists of a single bank of eleven cells each DR500 cells with total primary cleaner concentrate product passing direct to the secondary cleaner bank of seven DR300 cells. The tailing from the secondary cleaner will recycle to the regrind mill, while the total secondary concentrate will pass to the tertiary cleaner, which is formed from five DR300 cells, operating in open circuit. Tailing will combine with the other cleaner tails as feed to the regrind, while the third cleaner concentrate will be delivered to the fourth cleaner operating as a four cell DR300 unit, as final cleaner bank. Tailing will recycle to the regrind mill while the concentrate as final concentrate will be delivered to the dewatering section.

16.6 Lead Dewatering

The final lead concentrate from the fourth cleaner will be pumped to a 9.1 m (30 ft) diameter conventional thickener for recovery of the excess water. The underflow at approximately 60% solids will be pumped to a holding stock tank ahead of the VPA 1515-33 plate and frame type filter.

Filtrate from the filter operation will recycle to the lead thickener. Thickener overflow will be pumped back to the lead circuit as launder water.

16.7 Copper Dewatering

The final copper concentrate will be pumped to a 6.1 m (20 ft) diameter conventional copper thickener for recovery of the excess water which will be pumped back as recycle water to the copper float launders. The thickener underflow at nominal 60% solids will be pumped to a holding tank ahead of the VPA1515-33 lead filter. The lead filter will be used on a batch basis to filter both the copper and the lead concentrates.

16.8 Zinc Dewatering

The final zinc concentrate from the fourth cleaner will be pumped to a 9.1 m (30 ft) diameter conventional thickener for recovery of the excess water. The underflow at approximately 60% solids will be pumped to a holding stock tank ahead of a VPA 1515-33 plate and frame type filter. Filtrate from the filter operation will recycle to the zinc thickener. Thickener overflow will be pumped back to the zinc circuit as launder water.

16.9 Tailing Disposal

Tailings will be pumped from the mill to the tailings management facility (TMF) and deposited sub-aqueously via floating pipeline. Reclaim water will be pumped back from the TMF to feed the mill.

16.10 Plant Design and Equipment Specifications

The Caribou process plant is a rehabilitated concentrator which previously operated as a stand-alone plant. The present design and equipment specifications pertain solely to the copper circuit that is being added to the existing plant.

16.10.1 Copper Circuit Flowsheet

The copper circuit flotation design was based on the testwork carried out in RPC under the direction of DRA. The flowsheet is a simple rougher-scavenger flotation followed by a two stage cleaner circuit to achieve marketable grades of copper concentrate.

16.10.2 Copper Circuit Design

The design of the copper circuit is based on industry practice residence times for a chalcopyrite mineralization, with conventional forced air flotation cells being used for maximum operator control. The dewatering of the additional copper concentrate will be carried out in batch mode utilizing the lead filter with a separate concentrate storage area for the copper concentrate.

16.10.3 Requirements

The rehabilitated concentrator will use virtually identical amounts of services in the form of labour, power and water, as previously required during processing of the Caribou-Restigouche plant feed. Additional services will not be required other than the possibility of a small blower for the additional copper flotation cells.

17 Project Infrastructure

The entire basic infrastructure required for the project is in place, and has been kept in a serviceable state since the 2008 mine closure. Power has been maintained and heat has been supplied to buildings that could not otherwise be protected against freezing.

Figure 1 shows the major access road (provincial Highway 180) to the Caribou project. Figure 41 is an aerial view of the site infrastructure and Figure 42 shows the location of the surface facilities at the Caribou site. The following sections describe the major items of the site infrastructure.

Figure 41: Aerial View of Caribou Site Infrastructure

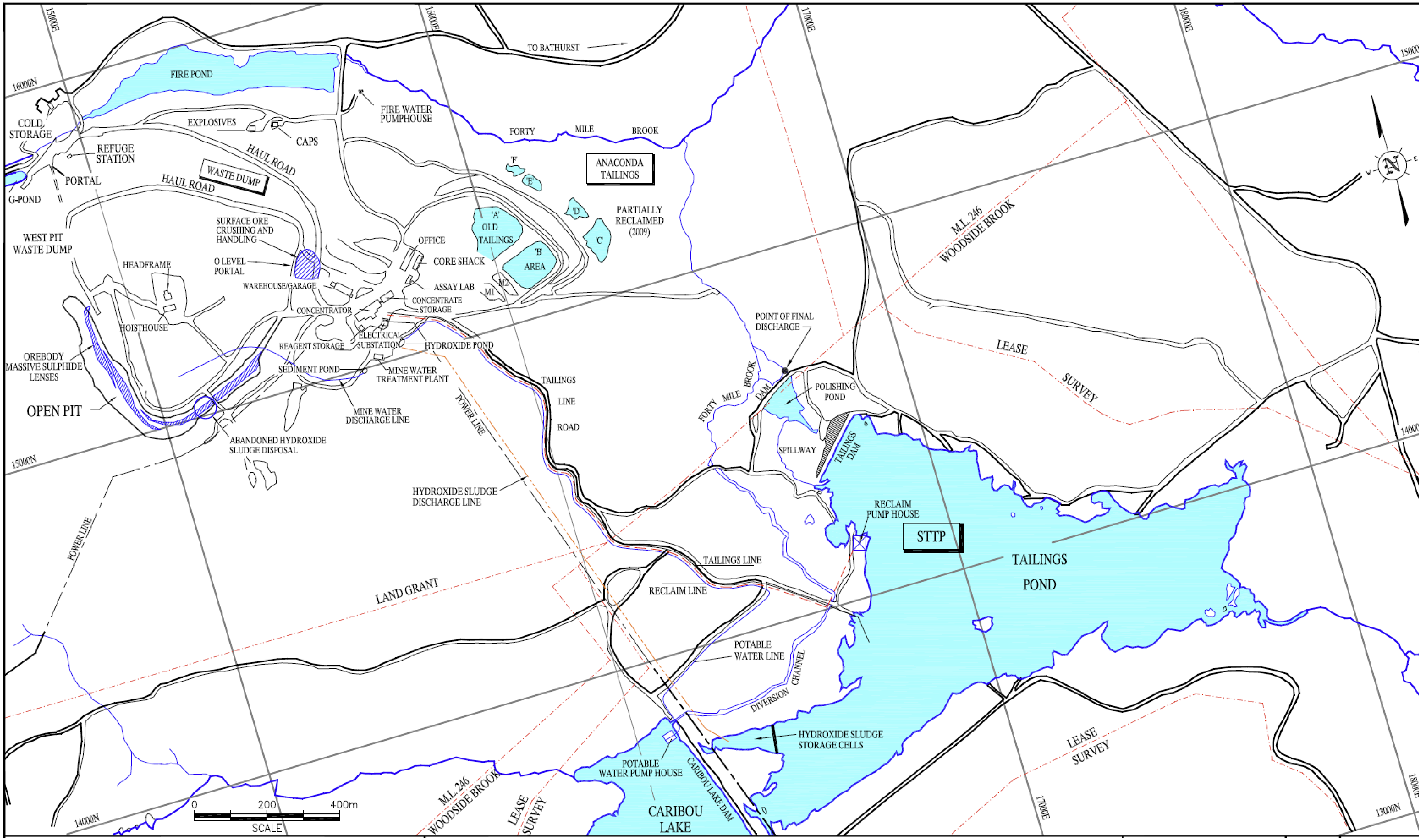


Figure 42: Caribou Site Infrastructure Layout

(Stantec, 2011)

17.1 Administration Building

The administration building is situated at the entrance to the mine property. The building is a relatively new, metal clad, two-story structure that houses administration, security, engineering, mine offices, and mine dry. The engineering section of the main administration building was in poor condition due to roof leakage and water damage. The roof of this building has been repaired and the walls of the office have been repaired and resurfaced to good condition. Minor renovations will be carried out prior to re-opening to restore the building to proper operating condition.

The mine dry is a full service unit equipped to handle 260 people. It has facilities for 240 male and 20 female employees. The heating unit for the mine dry has failed since 2008 and will be repaired prior to starting work.

17.2 Core Shack

The core shack is a wooden building which houses drill core. The structure is located adjacent to the administration building. This facility also includes a drill core sampling and preparation area as well as office space.

17.3 Mill Plant

The mill is a multi-level structure occupying an area of approximately 4,000 m^2. The building is steel construction on concrete foundations and includes overhead service cranes with capabilities ranging from 3 to 10 t. The building is a combination of an older structure, which will hold the primary grinding, zinc regrinding, and zinc flotation equipment, and a newer (1996) construction that will hold the lead regrinding, lead and copper separation flotation, and lead and copper dewatering equipment. Both sections of the mill building are clad with matching dark brown siding. The interior of the office area has been damaged due to leaking of the office area roof. There are some minor roof leaks elsewhere on the main buildings. Otherwise, the buildings are in good condition.

Two 2000-tonne coarse plant feed bins are located adjacent to the mill and supply plant feed to the SAG mill.

There are a total of six grinding mills installed in the mill building, including primary grinding, zinc regrinding and lead regrinding. Flotation cells and thickeners are already installed and in good condition. Some pumps will have to repaired or replaced before start up. Some minor pieces of equipment have been removed and shipped offsite and will be replaced.

Adjacent to the mill are two concentrate storage sheds. The zinc storage shed has a storage capacity of 6,500 t. The lead and copper concentrate storage shed has a storage capacity of 3,000 t. Both sheds are connected by a breezeway where concentrate transport trucks will be loaded. All the concentrate storage and load out buildings are of steel construction with metal cladding. The concentrate storage buildings have 3-m concrete side walls. The zinc concentrate storage shed roof has to be repaired to keep concentrates dry.

17.4 Existing Mine Water Management Infrastructure

17.4.1 Caribou Mine Water Treatment Plant

The Caribou mine water treatment plant is located 200 m southeast of the milling complex. The water treatment plant building is a metal clad building housing a lime based treatment facility. Next to the building is a 40 t hydrated lime silo. The facility is currently designed to treat a maximum of 180 m³/hr (800 GPM). The facility includes two reactor tanks, a lime slurry mix tank, a flocculation mix tank, and associated pumps. The basic flow diagram of the plant is shown in Figure 43.

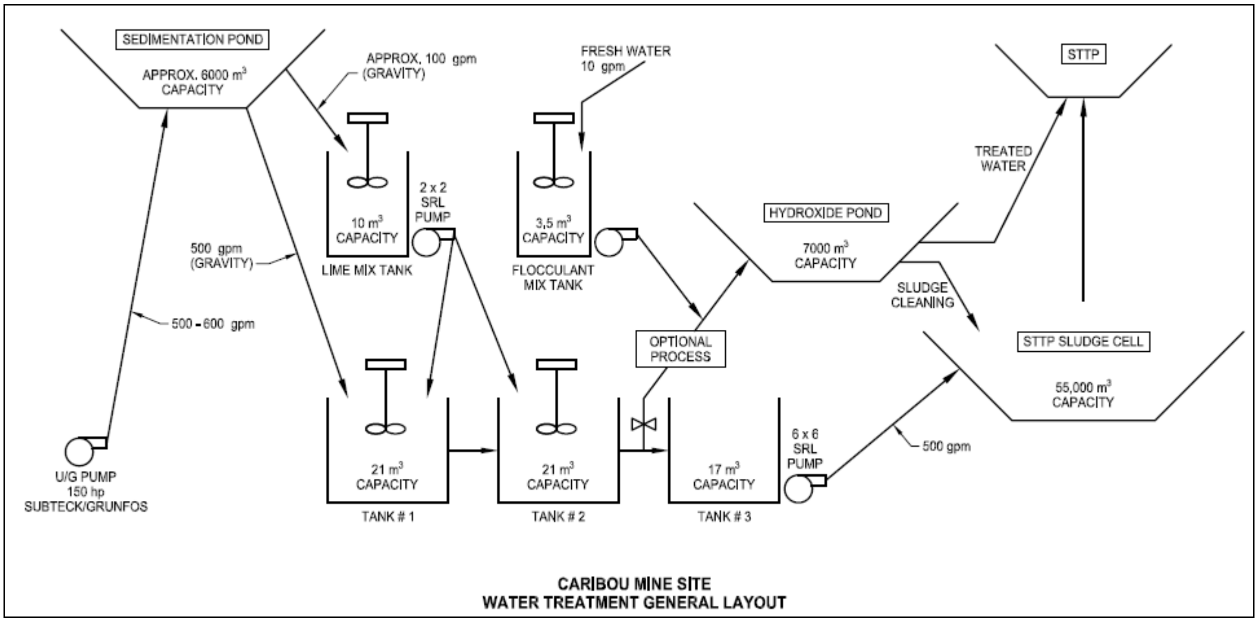


Figure 43: Caribou Water Treatment Plant Layout

Untreated mine effluent will be pumped via the main mine shaft using a Grunfos™ deep well submersible type pump with a stainless steel 112 kW (150 HP) Subteck™ motor. The pump is installed to a depth of 220 metres (722 ft) (mine grid elevation of approximately 2310 m) and is capable of pumping 136 m³/hr (600 GPM). As the mine is dewatered below second level and underground operations resume, the previous underground pumping set up will be reinstated. The pumping station at sub-level 2 will be used as the central pumping station at which point all underground water will be pumped from this location to the sedimentation pond for treatment. This arrangement will eliminate the need to have a pump down the main shaft.

The treatment cycle involves the mine water being pumped to a sedimentation pond where it is gravity fed into tank #1 and the pH adjusted to approximately 8.5 before being gravity fed to tank #2 where a flocculent is added and the pH is adjusted to 9.5. From this tank the water is gravity fed into a hydroxide pond after which the treated water as well as the hydroxide sludge are pumped directly into the south tributary tailings pond (STTP) sludge cell via the tailings line. The hydroxide sludge settles and remains in the sludge cell while the water permeable perimeter barriers slowly release the treated effluent into the main tailings pond (STTP). During a recent site visit, the STTP sludge cell appeared to be approximately 90% full and will need expanding in order to accommodate additional sludge from the planned mining (the current sludge cell area has room to the south for expansion).

An alternate sludge handling circuit is in place where a small hydroxide sludge pond receives the plant flow and the treated water and sludge is surface decanted into the tailings deposition line and then pumped into the STTP sludge cell for permanent storage. When the tailings line is no longer available when production starts, a dedicated sludge line leading to the STTP sludge cell will be constructed. This is the preferred treatment and discharge path since it avoids double handling sludge and reduces the risk of environmental incidents due to manipulation.

17.4.2 South Tributary Tailings Pond (STTP) Lime Addition System

As part of the past Owner's Certificate of Approval (CoA), a lime addition system was installed at the STTP to control possible pH depressions caused by thiosalt oxidization.

The system is constructed on a concrete slab and is open to the environment. It consists of a 27-tonne hydrated lime silo, a lime slurry mix tank and agitator, transfer pump, discharge pump as well as a semi-automated lime addition system. The lime slurry addition system is currently designed to deliver approximately 21 m³/hr (92 GPM) of slurry to the STTP via a floating discharge line. Refurbishment of this lime addition plant will likely be required in order to put it online. The basic layout of the plant is shown in Figure 44.

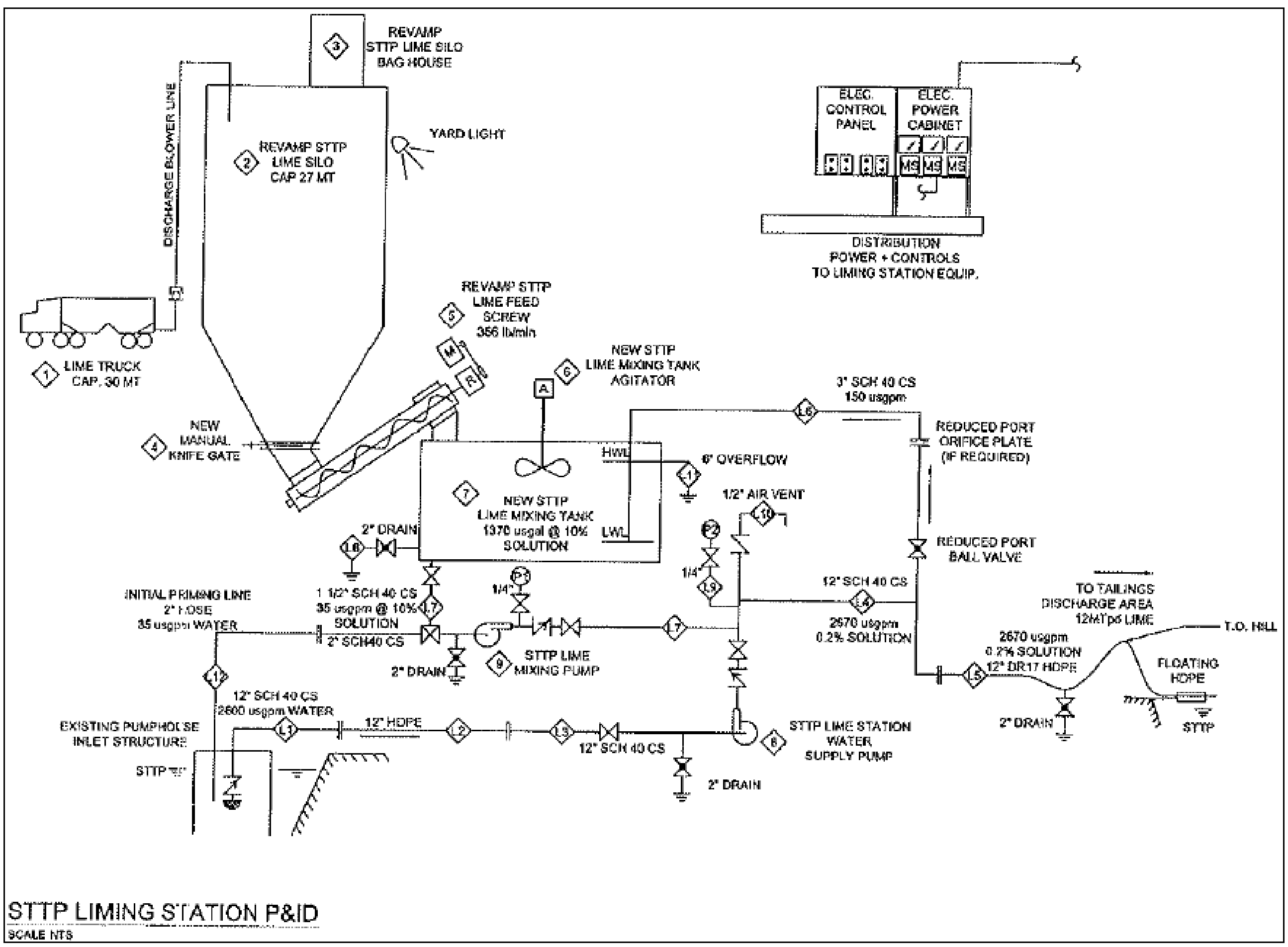


Figure 44: South Tributary Tailings Pond Lime Water Treatment Plant Layout

17.4.3 Septic Facility

The existing system consists of a septic tank located to the south of the office/assay lab area. The effluent is piped underneath the roadway to a conventional septic field, located to the south of the tank. The volume of the existing tank is estimated to be approximately 13,250 L (3500 US gal). The working capacity of the tank is estimated to be approximately 9,460 L (2500 US gal). The entire field measures approximately 21 m x 21 m by 1 m deep, located 3 m to the south of the toe of slope of the existing roadway. Currently this system is significantly undersized and plans are in place to upgrade it prior to re-opening. The new waste water facility will be a prefabricated steel extended aeration activated sludge waste water treatment system. The waste water system will have an average design flow of 17 m³ (4,500 US gal) per day of domestic wastewater which is suitable for 250-300 people.

17.4.4 Caribou Dams

Five dams are found on the Caribou property.

1. Caribou Lake dam (formerly Diversion dam);
2. STTP dam, formerly Tailings dam (Main dam);
3. Polishing Pond dam;
4. STTP Saddle dam(s);
5. Fire Pond dam.

Information with regard to the style and condition of these dams is detailed in Stantec’s most recent dam inspection report conducted at Caribou mine (Stantec, 2014).

17.5 Existing Tailings Management Facility

The tailings management facility (TMF) is comprised of three ponds: the polishing pond, the south tributary tailings pond (STTP), and the Caribou Lake. Each of the ponds has an associated dam across the south branch tributary of Forty Mile Brook, and in addition, there is a diversion channel that routes fresh water around the three dam structures. Flow from each of the ponds is by gravity. The relationship of these ponds is shown in Figure 45.

The polishing pond was created below the dam of the tailings pond to provide a buffering pool for any seepage through the tailings dam, and to provide time for settling of metal hydroxides if lime treatment of the tailings effluent were required. This pond has a surface area of approximately 1.7 hectares and a volume of 30,000 m³. Discharge is by means of a concrete flume/spillway near the east end of the dam. An emergency spillway is also present along the dam.

The tailings pond is situated immediately downstream of Caribou Lake and covers an area of 90 ha. In 2008, a 2.1 m lift was added to the STTP dam to provide adequate storage capacity as part of the thiosalt management program required under the previous owners provincial CofA. The STTP flow to the polishing pond is regulated by a hydraulic control structure and a spillway. In addition to the raise, a saddle dam along the south shore of the STTP was also built to avoid potential tailings effluent seepage into the adjacent watershed. All tailings stored in the pond will be under a minimum of 1 m of water cover to maintain adequate pH in the pond. During operations, tailings will be discharged into the pond via a 406 mm (16 inch) floating HDPE pipeline. The pipeline originates in the mill building and follows a 2 km roadway to a location situated in the southeast corner of the pond. Reclaim water from the tailings pond is pumped back to the mill through a 457 mm (18 inch) HDPE pipe via a pumphouse located approximately 160 m south of the tailings dam.

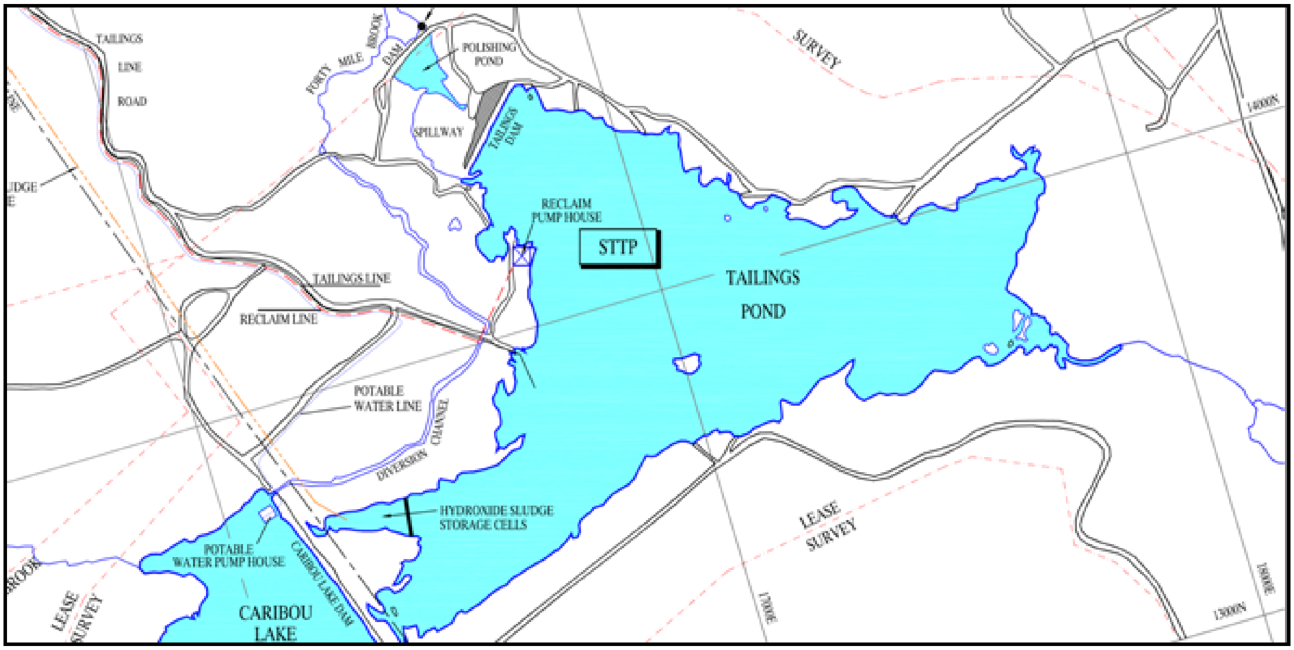


Figure 45: General Layout of South Tributary Tailing Pond (STTP)
(CanZinco drawing CB97-01)

Effluent discharged from the TMF is regulated under CofA I-8310 and the Metal Mining Effluent Regulation (MMER). Water quality parameters are specified under Condition 28 of the CofA and under Schedule 4 of the MMER are summarized in Table 43.

Table 43: Water Quality Parameters

Parameter	Instantaneous Reading	Maximum (mg/L) Monthly Average	Maximum (mg/L) Grab Sample	Maximum (mg/L) Composite
pH	6.5-9.0; 6.0-9.5			
Copper		*0.300*	*0.600*	0.450
Lead		*0.200*	*0.400*	0.300
Zinc		*0.500*	*1.000*	0.750
Arsenic		0.500	1.00	0.750
Cyanide		1.00	2.00	1.50
Nickel		0.500	1.00	0.750
Radium 226 (Bq/L)		0.37	1.11	0.74
Total Suspended Solids		*15*	*30*	22.5
Acute lethality		Non-acutely lethal at all times		

CofA ; MMER; *CofA & MMER*

Caribou Lake is the uppermost pond and is a naturalized man-made lake created to impound water and make up for loss of habitat resulting from the downstream construction of the tailings and polishing pond. Caribou Lake covers approximately 12 ha and is contained by an earthen dam with an inverted filter construction on the downstream face. Water level in the pond is controlled by a spillway to the diversion channel and an emergency overflow spillway near the centre of the dam which is typically active for a few days during spring flood conditions.

The diversion channel drains the upper watershed and Caribou Lake to the south branch tributary at a location downstream of the polishing pond. The channel was designed for a maximum flow of 0.6 m^3/s (9,500 GPM). Observations recorded since the 1988 construction indicate that the capacity of the channel is under designed as frequent over flow occurs at the emergency overflow spillway on the Caribou Lake dam during peak flow periods. This issue was raised in the 1998 Dam Inspection Report (Golder Associates) which pointed out some minor downstream channeling had occurred at the emergency spillway. Remedial repairs were completed as recommended in the inspection report and involved the consolidation of the erosion protection on the spillway with concrete. In a recent dam inspection report (2008), it was recommended that the Caribou dam crest elevation be raised a minimum of 600 mm and the riprap wave run up area along the upstream face of the dam be repaired and raised to match the new crest grade (Stantec, 2014).

In 2006, the upper right bank (looking down stream) portion of the diversion channel was raised by 1 m to avoid over flow of fresh water into the STTP during high flow events. Furthermore, in response to the Department of Fisheries and Oceans (DFO) fish passage requirements, extensive fish habitat and fish passage work as well as channel re-alignment/re-location were completed on the diversion channel in 2007 subsequent to the mine re-opening. Major precipitation events that occurred in 2008 have highlighted certain areas within the channel that need to be repaired and/or upgraded to ensure long-term stability (i.e., adequate crossings).

In late 2006 a new hydroxide sludge storage cell with a capacity of 15,500 m^3 was constructed in the south west corner of the STTP. To create this cell, a dyke was built to prevent the sludge from entering the STTP. In 2008, the capacity of the existing sludge cell was increased by 35,380 m^3 totaling 50,880 m^3 of storage. Based on current sludge production rates from the Caribou WTP and recent visual inspection conducted while on site, the cell is approximately 80 to 90% full. Another sludge cell will likely be needed when mine production resumes. A potential area to construct the new sludge cell is located on the south side of the small peninsula on which STTP sludge cell berm ties into.

17.5.1 South Tributary Tailings Pond (STTP)

Mill tailings were produced during the last four operating periods of the mine in 1988-89, 1990, 1997-98, and 2007-08. These tailings are stored in the STTP, which is located approximately 1.5 km south of the mine site. The tailings contain iron sulphides and would be classified as potential acid producers (AP) if exposed to the atmosphere. The tailings pond is designed to maintain a minimum 1 m water cover over the tailings.

The STTP dam was upgraded in 2008 as part of the process to implement a thiosalt contingency plan as required by the regulatory authorities and the CofA as issued from the Province of New Brunswick at that time.

Currently, only treated mine water is pumped into the STTP via the sludge storage cell. The water level in this pond is maintained by surface drainage from the surrounding topography and periodic emergency overflow/discharge from Caribou Lake located immediately west and up-gradient of the main TMF.

Water from the STTP currently exits from two 610 mm (24 inch) diameter pipes controlled by valve structures installed above the intake block. An emergency spillway located at the northern end of the pond may also serve as a discharge location if the STTP discharge surpasses the intake block capacity and/or if the intake block valves are closed. Prior to final discharge to the environment, the discharge water is retained in a 1.7 ha polishing pond. The polishing pond permits additional retention time for the tailings water discharge.

At present with the current operating level (maintained below the normal spillway level for thiosalt contingency planning) a total available volume of approximately 2 million cubic metres of storage is available. Assuming a void ratio of 1.0 this corresponds to approximately 5 years of storage. Test work is planned to be carried out prior to mill commissioning to verify the void ratio of the deposited tailings, but the assumed value agrees reasonably well with mill throughput and bathymetric survey data completed during the previous operation. The stage storage curve for the STTP is presented in Figure 46.

A tailings deposition plan will be developed to optimize tailings placement and ensure that the minimum specified 1.0 m of water cover is maintained over the tailings to prevent ARD generation.

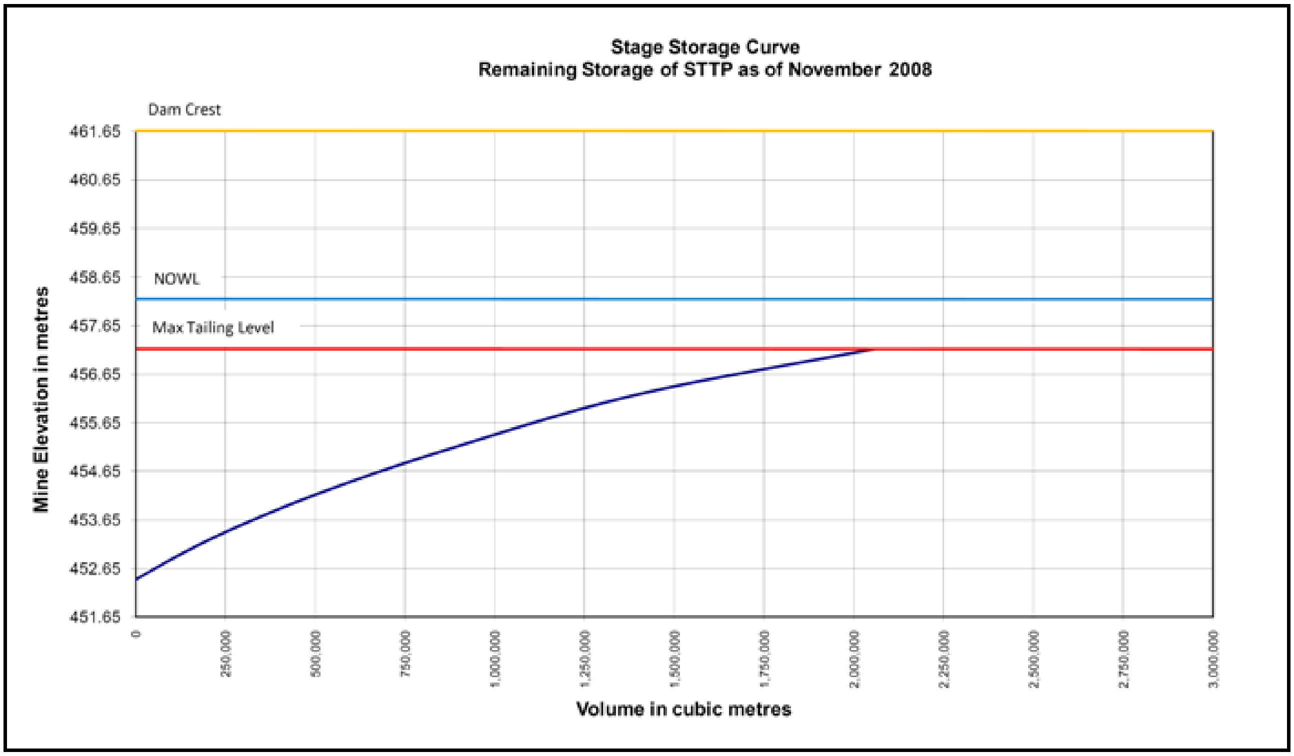


Figure 46: Stage Storage Curve

17.5.2 "G" Pond

Partially upgraded in 2007-2008, the G pond area is a HDPE lined pond that collects the underground flow from the mine workings that reports to the surface at the portal as well as drainage waters from the perimeter of the West open pit where it is then re-circulated back to the mine by pumping to a point in the mine where it combines with the mine water and is then pumped back to surface for treatment. No active treatment of water occurs at the G pond which is used for containment only. The completion of the pond upgrade is slated to occur when the mine resumes operations.

17.5.3 Diversion Channel

The diversion channel was originally constructed in 1989 and was intended to function as a clean water bypass for flow from Caribou Lake around the tailings pond and polishing pond and returning flow into Forty Mile Brook. Due to channel instability, erosion, and low quality fish habitat, the channel was upgraded in 2007 as part of a commitment to the Department of Fisheries and Oceans (DFO). The upgraded channel also serves to reduce the flow over the Caribou dam emergency spillway during high flow events (Jacques Whitford, 2007).

17.5.4 Assay Lab Building and Equipment

The assay lab is located directly behind the core shed on the mine property and was refurbished in 2007. The assay lab facility consists of two sections; one for sample preparation and the second for sample digestion and analytical work. The facility is equipped with an atomic absorption analyzer as well as a graphite tube analyzer. Both units are used to analyze metals in water, soil, and concentrate.

17.5.5 Plant Feed Storage Areas

At present there are four approved plant feed storage locations on the Caribou project. The portal plant feed transfer pad was dismantled prior to the end of the last mining campaign which can be reinstated pending regulatory approval.

During the last mining phase, plant feed was trucked from the nearby Restigouche mine and from the Caribou underground and stockpiled on the Caribou crusher plant feed storage pad near the 0 level portal. This stockpile was the primary feed to the concentrator and had a capacity of 50,000 t. Drainage from this pad was collected within a collection sump which was dismantled during the last mining campaign. This sump will have to be put back into service for plant feed storage to resume at this location.

The Restigouche raise plant feed pad is located approximately 200 m south east of the hoist room. This plant feed pad has a capacity of 100,000 t. ARD runoff from this pad is collected down the Restigouche raise which drains into the underground mine.

The third plant feed storage area is located near the East open pit located due west of the hoist room. The East open pit plant feed pad has a storage capacity of 150,000 t. ARD runoff draining from this area is collected within the east open pit which drains into the mine workings.

The forth plant feed storage area is located near the entrance of the underground portal and is known as the portal plant feed transfer pad. This storage area served as a transitional area for plant feed being brought up to surface by mine trucks to be transferred onto highway trucks for transport to the Caribou crusher plant feed pad. This storage pad had a capacity of 10,000 t. The stockpile was dismantled at the end of the last mining campaign at the request of regulators. In order to re-instate this stockpile, TMNBL shall seek approval from NBDELG (CofA I-8310, Cond. 16a).

17.6 Emergency Fire Fighting and Sprinkler System

The mill building and conveyor belts are protected by an automatic combination wet/dry sprinkler system installed in 1998. Water is stored in a 680 m^3 (180,000 US gal) tank and can be delivered by a 32 L/s (500 GPM) automatic diesel fire pump. The fire pump and associated controls are installed in an 8.5 m by 7.3 m heated metal clad, steel building. All lines in and out of the building are heat traced and insulated. Funds are included in the business plan to upgrade fire protection systems on site.

The fire protection lines in the mill have been drained to prevent freezing during the winter months while the mill is not operating.

17.7 Mobile Equipment Shop and Warehouse

The repair shop is a 45 m by 20 m, steel frame building with partial height concrete block walls. The building contains four double length equipment bays with steel electrically operated doors. A 10 t overhead bridge crane services the equipment bays. A 16 m by 16 m steel Quonset hut housing an oil storage and hose repair area adjoins the shop. The floor of the shop is in need of repair. Minor repair work and insulation are to be completed before start-up. Attached to the equipment repair shop is a 13 m by 18 m heated warehouse.

17.8 Main Mine Ventilation Fans

The Caribou underground mine was ventilated by two 447 kW (600 HP) Joy axial vane fans, producing 113 cms (240,000 cfm) each. The fans are located at the north and east ends of the mine. Each fan is equipped with a propane burner to supply heated air during the winter. Both of the burners are in good condition but will be reviewed and approved by the manufacturer and regulators prior to starting up. All propane storage tanks were removed from the site and will need to be replaced before starting the burners. As mining progresses and additional ventilation is required, the capacity of the main mine ventilation fans is planned to double through the addition of two more fans of similar size.

17.9 Hoist Room and Headframe

The hoist room is a 17 m by12 m insulated steel heated building and houses a Nordberg double drum 3.0 m by 1.8 m (120″ by 72″) hoist, powered by two 336 kW (450 hp) AC motors. This hoist is not included in the current re-opening plan.

17.10 Electrical Power

NB Power supplies incoming power under a long-term contact. Supply voltage is 138 kV and is converted to 4160 V through a 10 MVA fan cooled transformer. The mine owns the transformer and associated switchgear. The hydro power charges in the base case plan assume that Caribou will subscribe to a 3 MW base load, interruptible power agreement with NB Power and will qualify for a new user’s incentive program that is now in effect. A 450 kW diesel generator will be purchased to serve the mine site as a standby generator.

17.11 Mine Compressed Air

The mine compressors are located near the headframe and provide compressed air to the mine through a service raise. The compressor building is a metal clad Quonset hut that houses four Sullair model LS-25 200LAC, 0.47 cms (1000 cfm) compressors, each driven by a 149 kW (200 hp) motor.

17.12 Information Services

The information services hardware and software will be replaced to provide the operations with a modern, fully integrated IS system. Warehousing and payroll software must be purchased and integrated with mine services.

17.13 Fire Pond Pumphouse

The fire pond pumphouse is situated along the main access road leading to the administration building on the downstream side of the fire pond dam. The fire pond pumphouse collects water from the fire pond and via a distribution system can direct water to the underground mine as well as provide a portion of the process water to the mill and to the on-site fire suppression system. The fire pumphouse has undergone severe damage from multiple ice seasons. An allowance has been made in this PEA for rehabilitation of the pumphouse.

17.14 Other Mine Infrastructure

Other existing infrastructure around the site includes the main portal, the conveyor portal (the main materials handlings portal in the PEA mine plan), the explosive magazine, the cap magazine, the main services raise, waste dumps (i.e. bone yard, major sources of supplemental underground waste backfill) seen in the top left center of Figure 42, 0 Level portal, and old rock quarry, and main access and site roads.

17.15 Required Infrastructure Improvements for Environmental Management

17.15.1 Septic Facility

A 2008 study performed by Jacques Whitford (now Stantec Consulting) reported the septic facility currently installed at Caribou to be undersized and deficient. This study recommended that a traditional septic system (septic tank and distribution field) would not be sufficient to accommodate the sewage generated onsite (based on 200-300 employees onsite). The report recommends consideration of biological consolidators and/or other mechanical type treatment. Installation of a new septic facility at Caribou is planned to occur prior to start-up.

17.15.2 Reclaim Pump House Grade Raise & Lime Plant Re-Location

In 2008, the STTP dam was raised to implement a thiosalt management plan. As part of the management plan, the STTP must be able to operate near its maximum water level during the winter months (semi-batch treatment method) to naturally oxidize thiosalt. As part of the STTP dam raise, the area surrounding the reclaim pumphouse and intake and the lime treatment station required a grade raise to prevent inundation. This work was not undertaken during the last operating period and needs to be completed prior to re-opening.

17.15.3 G-Pond Upgrade (Completion)

The G pond area is a HDPE lined pond that collects the underground flow from the mine workings and surface run-off from the ARD piles located at the western end of the pond. The pond was partially upgraded in 2007-2008 with the placement of a new HDPE liner. Due to financial considerations, the previous owner did not complete the upgrade and the following work will have to be completed in order to ensure stable operations at G pond:

1. Liner leak detection testing;
2. Construct catch basins and berms south of G pond;
3. Complete interior berm within G pond;
4. Installation of a permanent pumping facility.

17.15.4 Diversion Channel Crossings

DFO carried out an inspection of the channel in June of 2008 and noted that the tailings dam road culvert was under sized and hanging and while being an obstruction to fish passage, it also contributed to bank erosion and sediment mobilization upstream and downstream of the culvert. In order to mitigate these issues, DFO's request was to have the culvert replaced by a proper structure. A second crossing along the diversion channel which accesses the reclaim area also needs to be replaced and/or upgraded since the current culvert and bridge system are prone to flooding and need to be raised. In conjunction, the current road grade will also be adjusted to meet the alignment of the new bridge, and provide better truck access to the area.

17.15.5 New STTP Sludge Cell

The current sludge cell located in the STTP is nearing full capacity. In order to provide additional sludge storage volume, a new sludge cell located to the south of the actual STTP sludge cell is required.

17.15.6 STTP Dam Raise

As part of the possible expansion of Caribou's mineral reserves past year 5 of production, a raise to the STTP will be required. A 2.0 m raise of the main tailings dam, saddle dams, and diversion dam will be required to provide adequate capacity for the LoM. The raise will be done using the upstream method as was done in 2007 and will be constructed with locally sourced materials.

17.15.7 New Water Treatment Facility

The construction of a new water treatment facility will be required in order to treat additional waters as part of the mine closure and/or until the acid generation process stops after subaqueous deposition is completed. An Actiflow™ type system is envisioned with an estimated treatment capacity of 2000 m^3/d (367 GPM).

17.15.8 Water Treatment Plant Dedicated Sludge Line

As described in Section 18.1, the current water treatment plant generates sludge. This sludge is currently directed the STTP sludge cell via the tailings line. When the mine becomes operational, this line will no longer be available. In order to continue sending sludge directly into the STTP sludge cell and to avoid double handling costs associated with storing of sludge in the nearby hydroxide pond, a dedicated sludge line will be constructed. An SLR type pump and a 1,700 m sludge line will be installed prior to the tailings line being put into service.

17.15.9 Plant Feed Storage

As previously discussed, four approved plant feed storage areas exist on the Caribou project. In order to resume the usage of these stockpiles, conditions under CofA I-8310 (Cond. 16) must be met. Prior to the commencement of plant feed stockpiling, TMNBL shall submit for review and approval engineering drawings containing seepage collection information and the prevention of spills of plant feed into the north branch of Forty Mile Brook for the portal plant feed transfer pad as well as re-instate the seepage collection system initially installed at the Caribou plant feed stockpile near 0 Level. Furthermore, TMNBL shall ensure that all runoff from the portal plant feed transfer pad, the crusher plant feed pad, the Restigouche raise plant feed pad and the East open pit plant feed pad is collected and transferred underground or is directed to the mine water treatment plant for treatment.

18 Market Studies and Contracts

18.1 Market Studies

Based on global demand-supply and long term metal price forecast studies, Trevali concludes that zinc macro-fundamentals are positive with significant production closures underway over next 12-18 months, resulting in approximately 10% of global supply coming offline while forecast consumption continues to grow; for lead, "refined market to return to deficit in 2014 after seven years of surplus" (Mackenzie, 2013), lead price will increase in the next few years.

The planned copper concentrates with high amounts of gold and silver would be attractive to smelters due to the enriched gold and silver content. Penalty charges for zinc and lead in the copper concentrates were applied based on agreements that similar projects have with smelters. Zinc concentrate with a planned grade of 50% zinc will be sold to smelters at normal industry terms and a small iron penalty was assumed. Lead concentrate with a planned grade of 45% lead with high amounts of gold and silver would be attractive to smelters and will be sold to smelters at normal industry terms.

The metal prices of zinc and lead used in the economic analysis were provided by Trevali based on consensus long-term prices. Prices of copper, gold, and silver are based on three year trailing average metal prices.

The author has reviewed the concentrate treatment charges, payable amounts and commodity prices projected by Trevali and the results support the assumptions used in this technical report.

18.2 Contracts

The following contracts will be part of the construction and/or operation of the Caribou mine:

- Zinc, lead, and copper concentrate offtake agreements are in place with Glencore Xstrata plc, a large, diversified resource conglomerate and commodity trader, for LoM feed at International Benchmark terms, as defined by average respective commodity price on the London Metal Exchange for the relative shipping period;
- Dewatering of the underground mine is currently being carried out by a New Brunswick mining contractor (CSI Mining & Equipment);
- Underground rehabilitation and development slashing work will be conducted by a mining contractor during pre-production and during year one of production all mining will be done by contractor. SRK understands that Trevali is currently negotiating this contract;
- Production drilling and blasting will be conducted by a well-established mining contractor throughout the life of mine. SRK understands that contract discussions by Trevali are well advanced;
- Primary crushing on surface of the plant feed will be contracted out.

SRK has not reviewed any of these contracts or documents related to tendering.

19 Environmental Studies, Permitting, and Social or Community Impact

19.1 Environmental Permits and Current Status

19.1.1 Provincial Permits

Provincial legislative environmental requirements to operate the Caribou mine project are specified in the New Brunswick *Mining Act* (Chapter M-14.1), *Clean Environment Act* (Chapter C-6), and the *Clean Water Act* (Chapter C-6.1). The *Mining Act* is administered by the New Brunswick Department of Energy and Mines (NBDEM) while the *Clean Environment Act* and the *Clean Water Act* are administered by the New Brunswick Department of Environment and Local Government (NBDELG). Authorization to operate is controlled under the following regulations:

Under the *General Regulation 86-98 - Mining Act*: A requirement exists for the submission and approval of a "Program for Protection, Reclamation and Rehabilitation of the Environment". A reclamation plan is currently on file with the government and was submitted in June of 2012 and approved on January 11, 2013.

The project is subject to the New Brunswick Environmental Impact Assessment Regulation – *Clean Environment Act* (referred to as the EIA Regulation). The EIA Regulation requires that the proposed construction, operation, modification, extension, abandonment, demolition or rehabilitation of certain projects or activities, called "undertakings" and described in Schedule A of the Regulation, must be registered. Schedule A includes 24 categories of projects or activities, one of which is "(a) all commercial extraction or processing of a mineral as defined in the *Mining Act*". On February 20, 1996, determination review of the Caribou mine project was completed and approved. At the time of writing, the resumption of mining activities at Caribou will not trigger a project registration, although the proposed addition of a new dam as described in the reclamation plan and the addition of a new copper circuit in the mill may require registration under the EIA Regulation. Following a review of the EIA registration documentation and the subsequent provision of information or response to questions arising from its review, the Minister of the NBDELG will decide if the Project can proceed directly subject to conditions ("Determination Review") or whether a more comprehensive EIA is required ("Comprehensive Review"). Due to the larger scope of constructing a new dam, a Comprehensive Review will likely be required. This determination is made solely by the Minister in view of the magnitude of the project and the associated environmental effects, and there is no way to determine which outcome will result.

Should a Comprehensive Review be required, the Minister would issue draft guidelines which establish the scope of the EIA, which are finalized following public input. Terms of Reference are developed by the proponent to outline the work plans that will be carried out to meet the final guideline requirements. Following finalization of the Terms of Reference, baseline and environmental studies are carried out to characterize existing conditions and provide predictions on environmental effects to inform the EIA. The EIA Report is prepared following the completion of baseline and any predictive environmental studies, and submitted to the NBDELG for review.

Typically, the completion of a Comprehensive Review (should one be required) would take approximately 18-24 months or more following initial registration of the project, depending on the level of regulatory diligence being applied and the timing for carrying out of time-sensitive biological studies that will be required to inform the EIA Report. A Determination Review could be carried out within 6-8 months or more, depending on the availability of information and the level of regulatory diligence applied to the project information by regulatory reviewers. However, neither the regulatory decisions, outcomes, or timelines associated with the completion of these processes are in the control of the proponent, and the requirements are highly subject to regulatory discretion, external influence (e.g., public intervention), and other factors.

Pursuant to the Water Quality Regulation (Regulation 82-126) under the *Clean Environment Act* and the Air Quality Regulation (Regulation 97-133) under the *Clean Air Act*, a Certificate of Approval (CofA) to operate needs to be obtained. Currently, the Caribou mine site is operating under CofA I-8310 conditions issued on April 5, 2013 to Trevali Mining New Brunswick Ltd (TMNBL). CofA I-8310 which is valid from April 5, 2013 to March 31, 2018 allows for the operation of the underground mine, the surface concentrator plant, the mine water treatment plant and the tailings impoundment. The CofA is issued pursuant to paragraph 8(1) of the New Brunswick Water Quality Regulation - *Clean Environment Act* (Chapter C-6). A copy of the current CofA is provided in Appendix B.

Pursuant to the Petroleum Product Storage and Handling regulations (Regulation 87-97) under the *Clean Environment Act*, a license which applies to the storage, handling and use of petroleum products for any facility capable of holding a capacity of 2000 liters or more of petroleum products is required. Currently, TMNBL holds a petroleum license (lic#7313) which is valid until September 30, 2014.

Historically, there has not been a requirement for an Air Quality CofA for the operation at Caribou mine, as there are few emission sources associated with this operation.

19.1.2 Federal Permits

Federal legislative environmental requirements to operate at the Caribou mine are specified in the *Canadian Fisheries Act* (c. F-14), *Environmental Protection Act* (c. 33), and the *Environmental Assessment Act* (c. 19, s. 52).The project is a “project” as defined under the *Canadian Environmental Assessment Act* (*CEAA*). Though possibly avoidable through careful planning and avoidance of sensitive environmental features like productive watercourses, there may still be several “triggers” for an environmental assessment (EA) under *CEAA* as a result of authorizations that are likely to be required under the *Fisheries Act,* the *Navigable Waters Protection Act* (c.N-22), and the *Explosives Act* (c.E-17) - (*e.g.,* possible impact(s) of waters frequented by fish; possible interference with navigation; release of deleterious substances; construction and operation of tailings impoundment). Of particular relevance is the requirement for any new tailings impoundment in fish habitat to be added to Schedule 2 of the *Metal Mining Effluent Regulations* (*MMER*) under the *Fisheries Act*, which if a new tailings impoundment is required would be an automatic trigger for an EA under *CEAA*. These issues would require confirmation with regulatory agencies upon initial registration of the project, and are key considerations.

If the project triggers the need for an EA under *CEAA*, it would be a Comprehensive Study as the planned mine production rate is 3,000 tpd. Under recent amendments to *CEAA*, the Canadian Environmental Assessment Agency (the Agency) will be the lead agency responsible for carrying out the Comprehensive Study. Other responsible authorities (RAs) that could be involved in the EA include Fisheries and Oceans Canada (DFO), Transport Canada (TC), and Natural Resources Canada (NRCan). The Major Projects Management Office (MPMO) would also likely provide a management and coordination role with the RAs.

Pursuant to the Metal Mining Effluent Regulations, (SOR/2002/222) under the *Fisheries Act*, all mines and recognized closed mines are required to conduct acute lethality testing, effluent characterization, and Environmental Effects Monitoring (EEM). The mine became subject to this regulation in November of 2007, and TMNBL continues to adhere to MMER requirements. TMNBL will be submitting their Cycle 1 Environmental Effects Monitoring report in 2015. An Emergency Response Plan (ERP) for the mine is also required under the MMER. An ERP will be completed by TMNBL prior to the start of production.

Pursuant to the Environmental Emergency Regulations, (SOR/2003-307) under the Canadian *Environmental Protection Act*, a list of 174 substances are required to be reported to federal authorities and an environmental emergency plan including prevention of, preparedness for, response to and recovery from an environmental emergency with respect of a substance is required. Currently, the sulfur dioxide storage capacity at Caribou mine may be greater than the applicable concentration set out in the regulations; therefore an environmental emergency plan for this substance may be required and will be submitted prior to plant start-up, if needed. Upon re-opening the mine, an on-site substance list is to be reviewed to ensure compliance with the above noted regulations. Furthermore, the Caribou mine will be required to file an annual report (usually in June) under the Federal National Pollutant Release Inventory (NPRI) if the reporting limit thresholds to submit an NPRI are surpassed.

Pursuant to section 24 of the *Nuclear Safety and Control Act*, all nuclear substances, sealed sources, and radiation devices require licensing and certification. Several nuclear devices are installed in the Caribou milling complex and are subject to the *Nuclear Safety and Control Act*. Annual compliance reporting is also required under this Act. Trevali NB currently holds a Clear Substances and Radiation Devices License (14806-1-15.0) which is valid until April 30, 2015.

19.2 Required Permitting for Re-Opening

TMNBL acquired MMC in November of 2012 and were issued the current Approval to Operate I-8310 on April 5, 2013 which allows the company to fully operate the mine and mill. Trevali is currently in compliance with the permit conditions, and is working toward meeting the conditions of upcoming deadlines. The current approval is valid to March 31, 2018. An annual fee of $32,000 is required to maintain the CofA in good standing.

An inventory of all active and inactive petroleum storage tanks at the Caribou site was completed in 2012. At the time of writing, TMNBL currently hold a petroleum storage permit (lic# 7313) which is valid until September 30, 2014. An annual licensing fee will be automatically sent by the province for renewal.

As stated previously, Caribou mine is subject to the Federal Metal Mining Effluent Regulations (MMER). TMNBL will continue to adhere to the MMER requirements as is currently the case. This will result in the continued monitoring requirements set forth at the site, including the requirement to conduct a formal EEM program for receiving waters and associated fish and benthic communities.

Other federal requirements such as an Environmental Emergency Response Plan under MMER and another Environment Emergency Plan under the E2 regulations will require to be completed for the mine site as part of operations.

In addition, upon re-opening of the Caribou mine site, reporting of releases to the environment annually under the Federal National Pollutant Release Inventory (NPRI) will resume depending on total hours worked for that particular year. The trigger for reporting is any site with in excess of

20,000 hours worked (approximately 10 full time employees) at such time, a report will need to be filled with Environment Canada.

Several nuclear devices are present in the Caribou mine milling complex. A Clear Substances and Radiation Devices license is currently held by TMNBL and is valid until April 30, 2015. This license authorizes the licensee to: possess, transfer, use and store prescribed nuclear devices and substances onsite as well as conduct licensed activities in the milling complex.

As part of the re-opening process other environmental based permits and/or authorizations may be required for the mine property. These would include but not be limited to the Transport or Dangerous Goods, explosives storage and use, and others.

19.3 Existing Conditions

19.3.1 Land Use

The Caribou mine is located in northern New Brunswick in Restigouche County at latitude 45.57° N and longitude 63.29° W. Specifically the site is located 45 km west of the City of Bathurst. From Bathurst, the mine is accessed via Provincial Route 180 and the site is located approximately 4 km south off Route 180 via a gravel road. The mine is located on Crown Land, although the concentrator area is owned by TMNBL. The mine site is located in a remote setting and is bordered by forested areas. Forestry activities are on-going around the mine site as well as recreational trail systems for ATVs and snowmobiles.

The mine’s footprint includes a concentrator, office buildings, a water treatment plant, a shop/warehouse, a hoist room, a shaft, a compressor room, an electrical sub-station and several pump stations. The site also includes several historical tailings storage areas known as the Anaconda tailings (Ponds A, B, C, D, E, F and G pond). The current tailings area is located 1.5 km south east of the concentrator. The site is also characterized by a fire water retention pond called the “Fire Pond” which supplements the mill with process water.

Caribou mine is a historical mine site with development activities going back to 1966. Since that period, the mine has operated sporadically due to poor metal recoveries and fluctuating metal prices with the last mining campaign dating back to 2008, after which the mine entered into care and maintenance.

19.3.2 Noise and Air Quality

The mine site is located in an environment close to a highway, and is situated in a remote area with no other industrial and/or private activities. Existing anthropogenic noise sources in the area include care and maintenance activities going on at the mine site, road traffic and recreational activities from the nearby ATV and snowmobile trails.

There is no heavy industry in the direct vicinity of the mine site and background concentrations of air contaminants are expected to be minimal. Site specific background air quality data were carried out in 2007-2008 when the mine was in production and it was determined that air quality was not an issue. During very dry periods, fugitive dust was handled using a water truck to moisten the haul roads. The same technique will be used if this situation arises during production.

19.3.3 Terrestrial Environment

Caribou mine is situated in the Atlantic Maritime Ecozone. More specifically, the site is situated within the Tetagouche Ecodistrict and is a transitional area between the highlands of Ganong and Upsalquitch ecodistricts to the west and the lower terrain of the Tjigog Ecodistrict to the east. The Tetagouche Ecodistrict is intermediate in elevation (200-400 m) between the highlands of Ganong and Upsalquitch ecodistricts to its west, and the lowlands of Tjigog Ecodistrict to the east (NBDNR, 2007).

No formal wildlife and/or terrestrial surveys have been conducted at Caribou mine during the past few years. As such, the descriptions provided below are generally applicable for New Brunswick as a whole. Some of the species described below, may or may not be present in the immediate mining area. Underlined species have been visually identified while doing work in and around the Caribou mine site during the recent years.

The forested areas around the mine site are typical Acadian Forests with a mix of conifers and deciduous trees. Typical conifers found are red spruce, black spruce, white spruce, balsam fir, red pine, jack pine, eastern white pine, tamarak, eastern white cedar and eastern hemlock. Deciduous trees include yellow birch, white birch, paper birch, sugar maple, red maple, striped maple, balsam poplar, pin cherry, speckled alder, beech, black ash, white ash, butternut, ironwood, basswood, white elm and red oak.

Plants in the area include blueberry, sphagnum moss, kalmia heath, smooth serviceberry, violets, wild lupins, starflower, trailing arbutus, lady slipper, pitcher plant, ostrich fern and purple loosestrife (introduced species).

Animals found within the area include large carnivores such as black bear, lynx and bobcat. The most common large herbivores are the moose, and whitetail deer. Small carnivores such as the red fox, muskrat, raccoon, striped skunk, marten, fisher, coyote, mink and river otter. Small herbivores include the eastern chipmunk, beaver, porcupine, snowshoe hare, northern flying squirrel, and woodchuck.

Birds of prey found in the area include, osprey, Cooper’s hawk, broad-winged hawk, red tail hawk, common nighthawk, northern goshawk, northern saw-whet owl, short-eared owl and long-eared owl. Typical song birds include, red-winged blackbird, ruby-throated hummingbird, cedar waxwing, purple finch, and blue jay but to name a few. Other forest birds include the ruffed grouse, spruce grouse, northern flicker, downy woodpecker, pileated woodpecker. Waterfowl include the great blue heron, Canada goose, common loon, American bittern, common snipe, ring-necked duck, wood duck, American black duck, northern pintail and blue-winged teal.

Reptiles and amphibians found in the region are the American toad, northern leopard frog, mink frog, green frog, pickerel frog, wood frog and the spring peeper. Five species of salamanders and newt are found in the region: yellow-spotted salamander, blue-spotted salamander, dusky salamander, eastern redback salamander and the eastern newt. Fresh water turtles such as the common snapping turtle and wood turtle may be found in the region (Canadian Biodiversity Website, February 2014).

19.3.4 Hydrology

The Caribou mine is located in the headwaters of the Forty Mile Brook, a tributary to the Nepisiguit River which drains into Nepisiguit Bay and Chaleur Bay, approximately 45 km west of Bathurst.

North Branch of Forty Mile Brook drains out of the fire pond to join the main Branch of Forty Mile Brook. The South Branch of Forty Mile Brook drains the Caribou Lake watershed and the South Tributary Tailings Pond (STTP). Staff gauges are installed at the mouth of Caribou Lake, at the outlet of the STTP and at the outlet of the fire pond in order to determine flow rates.

19.3.5 Aquatic Environment

Fish and Fish Habitat

Numerous fish and fish habitat studies have been conducted within the North and South Branches of Forty Mile Brook and the Nepisiguit River. Due to the historical nature of the mine site and the lack of environmental knowledge on the effects of Acid Rock Drainage (ARD) back in the 1960's, several locations along the North and South Branches of Forty Mile Brook are impacted. Most notably, the North Branch of Forty Mile Brook near the current location of G pond is seeing continued seepage from ARD due to the historical storage of waste rock along its banks. Furthermore, at the confluence of the North and South Branches of Forty Mile Brook is characterized by copper and zinc seepage coming from the historic Anaconda Tailings Area. This habitat is characterized by the absence of aquatic vegetation, fish species and benthic communities. Typically, the bottom at this location is covered with a "red and grey sludge precipitate" and has been deemed unproductive (R.A. Currie, 1988).

Sections of North Branch Forty Mile Brook above the current location of G pond and tributaries leading to the fire pond as well as Caribou Lake and its tributaries, the Diversion Channel and the South Branch of Forty Mile Brook between the STTP outfall and Station B are still intact and provide suitable habitat for fish, aquatic vegetation and benthic communities.

In 1989 the STTP and polishing pond were constructed over portions of the South Branch of Forty Mile Brook in order to increase the tailings disposal capacity. As compensation for the loss of fish habitat in the tributary, Caribou Lake was constructed. In addition, a Diversion Channel was constructed to by-pass clean water discharged from Caribou Lake around the STTP and polishing pond areas. As part of the Caribou mine re-opening in 2006, the Department of Fisheries and Oceans (DFO) requested that upstream fish passage be restored. As such, in 2007 the required work was completed and the channel now provides fish passage and fish habitat as per DFO requirements (Jacques Whitford, 2007).

Numerous fisheries related studies have been conducted within Forty Mile Brook and the Nepisiguit River since the 1980's. Several electrofishing surveys have concluded that there is a decrease in fish populations in the Nepisiguit River immediately below the confluence with Forty Mile Brook as a result of metal concentrations in water exceeding the upper limits for fish. Although brook trout (*Salvelinus fontinalis*), Atlantic salmon (*Salmo salar*) and blacknose dace (*Rhinichthys atratulus*) were present at the mouth of Forty Mile Brook, numbers were low. Electrofishing results at control locations above the mine site suggest the presence of fish such as brook trout, blacknose dace, white sucker (*Catostomus commersonii*) and chub sp. (Mtl. Engineering, 1980; R.A. Currie, 1987).

In terms of recreational fisheries, Caribou Lake is now a Crown Reserve and is managed by the New Brunswick Department of Natural Resources (NBDNR). As such the lake is stocked with Brook trout. Recreational anglers are required to acquire day permits in order to fish in the lake. Other smaller tributaries of North and South Branch Forty Mile Brook may be fished by recreational anglers, but due to the mines proximity, other more suitable locations are used by anglers.

Fish Tissue

Two fish tissue studies have been conducted on Forty Mile Brook and on the Nepisiguit River. The first study compared brook trout livers collected at Caribou Lake (control location) and in Forty Mile Brook (located approximately 10 km upstream of the confluence with the Nepisiguit River) for mean metal concentrations. The study determined that cadmium, copper and lead were significantly higher in Forty Mile Brook when comparing the two, while mercury and zinc stayed within background levels at all stations (Washburn and Gillis, 1998).

The second study carried out tissue analysis on both livers and fillet of brook trout collected at Station B, at the polishing pond, and in the STTP. The study determined that livers had higher metal concentrations than the fillet and that the polishing pond and the STTP showed higher metal concentrations compared to samples previously collected in Upsalquitch Lake (Jacques Whitford, 2006).

Benthic Studies

Several benthic invertebrate surveys have been carried in Forty Mile Brook and in the Nepisiguit River. Studies dating back to 1972 determined an overall decrease in benthic communities within Forty Mile Brook and below its confluence with the Nepisiguit River. Although some improvements were noted in a 1980 study at the mouth of Forty Mile Brook, the north and south tributaries of Forty Mile Brook adjacent to the mine property remained devoid of invertebrate fauna. More recently, studies dating back to 1995 continued to support these findings in showing decreased invertebrate diversity in Forty Mile Brook. These decreases in benthic communities within Forty Mile Brook are attributed in large part to changes in water quality where copper and zinc concentrations have increased 4 to 5 folds from background levels due to the historical placement of tailings and acid generating waste rock near Forty Mile Brook (Environment Canada, 1972-1975; Anaconda Company, 1976; Montreal Engineering, 1980; Currie Ltd., 1978; R.A. Currie, 1989, 1990, 1991, 1992, 1995).

19.3.6 Water Quality

Water quality monitoring at the Caribou mine site has been on-going for several years. The mine is subject to conditions set forth in its CofA as well as conditions set forth under the MMER. The mine as one designated final discharge location called the polishing pond discharge (PPD). This location is sampled five days per week for metals including zinc, copper and lead, as well as for pH. Since the mine has been under care and maintenance, no exceedances have been reported at PPD. During the last mining period, a toxicity event at PPD was reported between January and March of 2008. Although the toxic agent was never fully identified, specialized analysis of water quality and fish toxicity data revealed that a non-persistent organic compound(s) was likely the cause.

As discussed previously, historical mining activities at the site have severely impacted portions of North and South Branch Forty Mile Brook. Well and surface monitoring data show a direct correlation between the historical Anaconda Tailings and elevated metal concentrations and low pH values found in Forty Mile Brook. Responsibilities and cost sharing details related to several historical legacies identified at Caribou that are the responsibility of the Province of New Brunswick are further discussed in Section 19.4 (Limited Environmental Agreement).

Current and historical water quality monitoring data are on file at Stantec and can be made available upon request.

19.4 Limited Environmental Liability Agreement

In November of 2012 TMNBL signed a limited environmental liability agreement (LELA) with the province of New Brunswick. This agreement states that TMNBL agrees to be responsible for all environmental liability and reclamation costs associated with the Caribou mine on closure, other than in respect to any Historical Liabilities as defined under Section 5.6 of the Reclamation Plan (Stantec, 2012). These Historical Liabilities include the “Anaconda Tailings Area”, the “Open Pit”, and the “Waste Rock Storage Areas”. Furthermore, the agreement states that if post closure long-term water treatment is required, these costs will be divided on a 1/3rd, 2/3rd basis between TMNBL and the province of New Brunswick respectively. In lieu of the cost sharing arrangements set out in the limited environmental agreement under the post closure long-term water treatment, if TMNBL and/or the province of New Brunswick can secure a permit for the construction of a new dam as contemplated in Section 6.6 of the Reclamation Plan, the province of New Brunswick and TMNBL agree to cost share the construction of the new dam on a 50/50 basis. The new dam has the potential to flood historic liabilities and eliminate the need for water treatment in perpetuity. To this end, the province will reimburse TMNB 50% of the costs of constructions of the new dam up to a maximum of $15,000,000, and any costs thereafter shall be the full responsibility of TMNBL.

The LELA signed between TMNBL and the province of New Brunswick covers all aspects of the above mentioned historical liabilities, therefore TMNBL does not assume any responsibilities for matters related to the period on or before the signing of the LELA. Matters exist on-site that continue to present an environmental exposure and liability, however, TMNBL does not hold this responsibility and it is born by others.

19.4.1 Anaconda Tailings Ponds

An estimated 296,000 t of tailings were deposited in an area, east of the administration building at the Caribou mine during operations prior to 1972. The tailings were deposited by Anaconda Canada Exploration Ltd., the owner/operator of the property at that time.

The Anaconda Tailings cover a surface area of approximately 7 ha, and are situated approximately 150 m east of the administration building. The area is composed of four unlined tailings ponds (A, B, M-1, M-2), a tailings dam constructed of waste rock and glacial till, and four seepage ponds (C, D, E, F). The Anaconda Tailings area is indicated in Figure 47.

Precipitated sludge from the treated underground mine water was stored in the Anaconda Tailings area until 1996. As a result, an estimated total of 8,760 t of metal-laden hydroxide sludge had been added to the four ponds since 1972, as a cover layer. This practice was discontinued in 1996 when Breakwater Resources upgraded the mine water treatment system and constructed hydroxide holding ponds that directed sludge to a holding area in the abandoned open pit on the Caribou mine site.

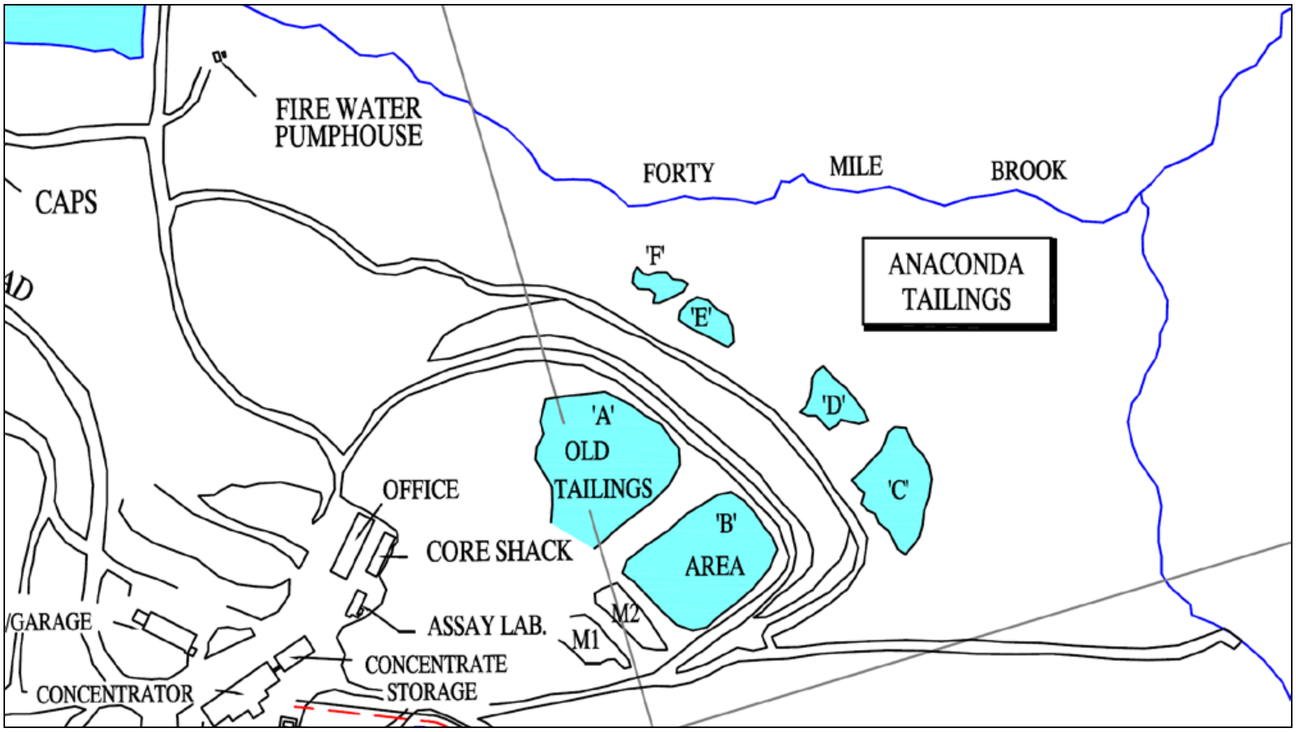


Figure 47: General Location of the Anaconda Tailings
(CanZinco drawing CB97-01)

Precipitation and surface run-off continue to introduce water into the Anaconda Ponds. As the tailings are acid generating, the water becomes acidic and metal-laden before eventually being released into Forty Mile Brook, approximately 150 m down gradient of the seepage ponds. The water quality in Forty Mile Brook has degraded to the extent that it has been unable, historically, to support aquatic wildlife (JWA 1995, 1996, 1997). Environmental effects of the drainage from the Anaconda Tailings area have been historically measured throughout the 26 km downstream flow of Forty Mile Brook and for several kilometers after the confluence of the Brook with the Nepisiguit River. Reclamation of the Anaconda Ponds began in June 1998, in accordance with the then approved Reclamation Plan but was discontinued when the tailings material was deemed unsuitable to use as underground backfill. Approximately 2,200 t of material were reclaimed and hauled underground prior to making this determination.

An Operating Agreement was signed between CanZinco Ltd. and BioteQ Environmental Technologies Inc. on October 1, 2004, in which BioteQ agreed to the continued operation of the wastewater treatment processes at Caribou, for treating mine water. Furthermore, BioteQ under agreement with CanZinco Ltd. was required to have all of the old Anaconda Tailings removed and the area reclaimed over a six year period. Up to June 2007 when BioteQ's contract was terminated, an estimated 15,000 t of material was reclaimed and sent to the STTP for disposal. Difficulties associated with the movement of the old tailings prohibited BioteQ from fulfilling their agreement with CanZinco Ltd.

Blue Note Metals Inc. acquired the Caribou mine from CanZinco, a wholly owned subsidiary of Breakwater Resources Ltd., on August 9, 2006. As part of the sale of the property, a Limited Environmental Liability Agreement (LELA) was signed between the province and Blue Note Metals Inc. on July 31, 2006. The activities associated with the historical liability have consisted primarily of waste rock movement in 1997-1998, studies to evaluate the potential reclamation of the Anaconda tailings, and the initial movement of Anaconda tailings between 2005 and 2008.

In September 2006, Blue Note Caribou Mines Inc. entered into a contract to relocate the Anaconda tailings by suction dredge method with disposal to the STTP tailings basin. Following dredging, a cut and haul contract was awarded in October 2007. Subsequently, the removal of tailings from Pond B was completed by the end of 2007 with a total of 41,000 m^3 of tailings relocated to the STTP via suction dredge and trucking. In addition, a significant portion of Pond A was also reclaimed up to March 2008, at which time work was suspended due to inclement weather conditions and financial constraints. A total of 130,000 m^3 of tailings were relocated from Pond A to the STTP via suction dredge and trucking. Survey data for the remaining tailings in Pond A have not been completed, and best estimates indicate that approximately 14,000 m^3 of tailings still remain in Pond A.

As part of the continuing closure of the former Anaconda Tailings area, the construction of the Forty Mile Dam would see the Anaconda Tailings area become a tailings storage facility and would be flooded at the end of mine life in order to proceed with subaqueous disposal of ARD material and tailings. See section 19.6 for further information.

19.4.2 Abandoned Open Pit at Caribou Mine

Development of the open pit at the Caribou mine site was commenced in 1969 with the quarrying of waste rock to construct haul roads at the site. Extraction continued through the 1970’s with the mining of gossan, massive sulphides, and low grade sulphide footwall rock. The northern and eastern most tips of the crescent shaped pit were subsequently backfilled, contoured, and re-vegetated. The backfill consisted of 70,600 t of leached massive sulphides, 61,700 t of leached gossan and 182,100 t of low grade footwall rock (Cavalero 1992).

During the more recent operations (post 1990) the pit has received additional backfilling including approximately 600 m^3 of tailings that were relocated from the STTP during the 1992 dam construction (Klohn-Crippen 1993). The east end of the pit has been used for the disposal of metal hydroxide sludge following construction of the new mine water treatment system since 1997. This cell was operated by Breakwater and Bioteq. The long term fate of the “dry” hydroxide sludge is addressed in the site Reclamation Plan and no immediate need to relocate or cap this area has been identified. Best estimates indicate that approximately 79,000 m^3 of “dry” hydroxide sludge is stored in the cell.

19.4.3 Acid Rock Drainage (ARD)

Sulphide oxidation processes and resulting acid rock drainage were historically the major cause of degraded water quality associated with the Caribou mine site. Ground water monitoring supported by review of a variety of historic documents, indicates that the Caribou site has been affected by the Anaconda tailings, surface waste rock piles, and mine workings. Several waste rock piles exist on site resulting from past activities associated with mining and these remain a significant long term concern for environmental control and closure. These piles are indicated in Table 44.

Table 44: Surface Waste Rock

Source	Tonnes (estimated)
Anaconda Embankment Waste Rock Acid Generating	96,000(1)
Anaconda Embankment Waste Rock Non Acid Generating	1,004,000
West Pit Waste Dump and Haul Road Acid Generating	378,000
West Pit Waste Dump and Haul Road Non Acid Generating	840,000(2)

Notes:

(1) Potential acid generating portion of total 1,100,000 t waste rock and till used for embankment construction. The remaining 1,004,000 t are to be reclaimed as in place.

(2) Remaining non-acid generating quantity of West pit and haul road waste dump waste rock (1,218,000 t less 378,000 t of potential acid generating waste rock).

19.5 Environmental Capital Costs Associated with Re-Opening

The required environmental infrastructure costs associated with re-opening are presented in Table 45.

Table 45: Environmental Capital Costs Associated with re-Opening

Description	Estimated Cost
Septic Facility Upgrade	$250,000
Reclaim Pump House & Lime Plant Grade Raise	$150,000
G-Pond Upgrade (completion)	$100,000
Dedicated Sludge Line (WTP to STTP)	$77,000
Diversion Channel Crossings	$30,000
Equipment	$62,500
New Sludge Cell at STTP	$250,000
STTP Dam Raise(1)	$3,365,990
New Water Treatment Plant (2)	$3,424,400

Notes:

(1) Only required on Year 5 of production

(2) Only required on Year 6 of production

19.6 Reclamation

19.6.1 Position of Financial Security

In accordance with the New Brunswick Regulation 86-98-General Regulation of the *Mining Act*, Caribou mine requires an approved Program for the Protection, Reclamation, and Rehabilitation of the Environment. A Reclamation Plan was submitted under Maple Minerals Corporation's name on June 4, 2012 to the New Brunswick Department of Energy and Mines and subsequently approved by the Minister on January 11, 2013.

At present, the monies being held in securities for the Caribou mine site are included in the assets that were acquired by TMNBL. The current reclamation assets on file with the province totals $4,733,000. Based on the current reclamation plan, a total of $6,250,000 reclamation security bond is required to be on file with NBDNR. TMNBL will post an additional $1,517,000 to top up the current reclamation security. Additionally, as per the Trevali's Approval to Operate I-8310 (Cond.15b), an additional $1,500,000 environmental protection bond will also be posted with the DELG. Trevali will also be responsible for posting an annuity for water treatment in perpetuity totaling $12,833,333, or as an alternative to water treatment in perpetuity, constructed a dam across the Forty Mile Brook to flood the portal and historic liabilities (under this agreement the province has agreed to contribute 50% of the construction cost up to $15M).

The above mentioned financial securities are separate from the assets described under Section 19.4 (i.e., Limited Environmental Liability Agreement).

Reclamation securities can take the form of:

1. An irrevocable letter of credit;
2. Bonding by a third party company; or
3. Cash.

20 Capital and Operating Costs

The PEA capital cost estimates reflect the joint efforts of SRK, Holland and Holland, Stantec, and Trevali. SRK and Trevali coordinated the cost data into the cost estimate. The Qualified Persons accepting professional responsibility for this section are Benny Zhang, PEng (PEO # 100115459) of SRK, Leonard Holland, CEng (IMMM # 41498) of Holland and Holland, Jeffrey Barrett, PEng (APEGNB # M6890) of Stantec. Table 46 outlines the responsibilities of each contributor to the cost estimates.

Table 46: Cost Estimate Responsibility

Company	Responsibility
SRK	Supervise and review mine design and estimates for pre-production and sustaining CAPEX and OPEX for the underground mine and its equipment.
Holland and Holland	Design and estimate for pre-production and sustaining CAPEX and OPEX for the Caribou mill complex.
Stantec	Design and estimate for the pre-production and sustaining CAPEX and OPEX for the tailings storage facility, the water and sewage treatment plant, and other environmental and permitting related work.
Trevali	Underground mine cost estimates and owner's costs under SRK's supervision, depreciation and taxation, and manage the interface between the contractors in relation to the battery limits.

20.1 Capital Costs

The Caribou project total capital cost estimate is $125.1 million, comprised of $36.3 million in pre-production or initial capital and $88.8 million in sustaining capital.

Capital cost estimates were prepared to an accuracy level of +/- 40 % and are presented in Canadian dollars as at the second quarter of 2014 (2Q14).

The capital cost estimate for underground mine was prepared by Jeremy Ouellette, PEng (APEGNB # M7352) of Trevali, under the supervision of Benny Zhang, PEng (PEO #100115459) of SRK. The capital cost estimate for mill complex was prepared by Leonard Holland, CEng (IMMM # 41498) of Holland and Holland, with the support of Shaun Woods, PEng, of Trevali. The capital costs estimate for the tailings storage and environmental infrastructure was prepared by Jeffery Barrett, PEng (APEGNB # M6890) of Stantec. This section presents summary of the Caribou project capital cost estimates.

The capital cost estimates include varied contingency rates. The following rates are examples for underground mining capital:

- 5% contingency for mobile equipment (based on suppliers' quotes);
- 15% contingency for drift slashing (based on contractor quote);
- 20% contingency for mine dewatering;
- 25% contingency for electrical;
- 30% contingency for rehabilitation (based on contractor's quote);
- 15% contingency for miscellaneous items.

Similar to mine capital estimates, the mill complex and environmental capital cost estimates also included varied contingency rates.

No escalation has been applied to the capital costs.

The exchange rate used to develop the costs is US$0.95 per Canadian dollar.

The following items are specifically excluded from the capital cost estimate:

- No allowance has been made for escalation of prices;
- No allowance has been made for currency exchange rate variations;
- No allowance has been made for HST;
- No allowance has been made for owner's sunk costs prior to project implementation.

Table 47 shows a summary of LoM estimated project capital costs, including initial capital and sustaining capital costs.

Table 47: Estimated Life of Mine Project Capital Costs

Items	LoM Capital (M$)	Initial Capital (M$)	Sustaining Capital (M$)
UG Mine Mobile Equipment	21.5	0.0	21.5
UG Mine Infrastructure	23.0	9.0	14.0
UG Contingency (Mobile & Infrastructure)	6.0	0.0	6.0
UG Mine Mobile & Infrastructure Subtotal	**50.5**	**9.0**	**41.6**
Underground Mine Development	26.5	6.2	20.3
Mine Energy	1.1	0.1	1.0
Mine Total	**78.2**	**15.3**	**62.9**
Tailings & Other Ponds	23.4	1.1	22.3
Grinding	3.5	3.4	0.1
Flotation, incl. Adding Cu Circuit	5.4	5.4	0.0
Dewatering Zn/Pb/Cu	1.6	1.6	0.0
Concentrate Storage & Handling	2.7	1.2	1.6
Reagent Mixing	0.8	0.8	0.0
Services	1.3	0.8	0.5
Misc. Equipment	1.2	1.2	0.0
Milling and Tailing Total	**39.9**	**15.5**	**24.4**
Environmental	1.6	1.2	0.3
Project General & Administration	5.4	4.2	1.2
Project Grand Total	**125.1**	**36.3**	**88.8**

Details of the project capital cost estimate are described below.

The underground mine rehabilitation and pre-production development and stope preparation work will be contracted out from start of dewatering and rehabilitation (Q2 2014) to Q4 2014 and continuing to the end of the first year production in 2015, and owner operated from Q1 2016 to the end of mine life.

Work on the dewatering and rehabilitation will commence on April 1, 2014. Initial capital costs are based on the 9-month pre-production period from April 1, 2014 through to December 31, 2014. Mining sustaining capital costs are for the period from January 1, 2015 through to March 2021 which is a 6.3-year production period.

Significant contributions to the mining cost estimates were sourced from unit rates and costs from mining quotations received by Trevali. The mining capital cost estimate is based on:

- Contractor quotations for underground dewatering, rehabilitation, and mine development and production;
- Contractor quotation for longhole drilling and blasting;
- SRK and Trevali first principles cost build ups for some construction items;
- Quotations for mining equipment and supplies;
- SRK and Trevali's in house cost database;
- Owners staffing costs and fully loaded labour rates provided by Trevali.

The summarized mill complex initial capital costs shown in Table 47 represent the estimated capital costs required for the Caribou mill complex rehabilitation, and expansion prior to plant start-up. The copper circuit will be added to the existing lead and zinc circuits to maximize revenue from the re-commissioned plant.

The costs were developed from a detailed estimate of the rehabilitation work required in the plant based upon quoted costs, while the copper circuit requirements were quoted from a detailed breakdown of the equipment requirements, rough layout drawings for take-off purposes and factored installation costs.

The overall process plant capital cost of $39.9 million represents the total capital cost of rehabilitating the plant from receipt of run-of-mine plant feed at the plant site to load-out of concentrates into trucks, and discharge of the thickened tailing to the tailing impoundment facility. A contingency of nominal $693,000 has been included for the installation of the replacement SAG mill. The mill complex sustaining capital costs are comprised of a tailings pond upgrade, water treatment plant upgrade, reclamation ponds, staged construction of the tailings dam, and Trevali's portion of mine closure as per provincial agreement.

20.2 Operating Costs

On site operating costs averaging $74.77 per tonne processed are estimated from January 1, 2015 through March 2021.

Operating cost estimates and are presented in Canadian dollars as at the second quarter of 2014 (2Q14).

Table 48 shows a summary of LoM estimated project site operating costs.

Details of the site operating cost estimate are presented below.

Table 49 shows the details of the average estimated life of mine operating cost. Costs in the table include contractor costs and Trevali costs.

Contractor's costs include a mining contractor's full cost for the first year underground mine development and production, and a contractor cost for the life of mine longhole drilling and blasting. Refer to detailed responsibilities described in Section 15.9.1.

Table 48: Estimated Life of Mine Project Operating Costs

Items	Unit	Values
Mining	$/t-Milled	37.06
Milling	$/t-Milled	30.14*
G&A	$/t-Milled	5.99
Environmental	$/t-Milled	1.59
Total Site Operating Cost	**$/t-Milled**	**74.77**

* Milling operating cost includes $3.30/t-milled contracted crushing cost.

Table 49: Mine Operating Cost Estimate

Mine Operating Cost	$/t-Milled
Manpower	7.38
Supplies	5.78
Maintenance	7.98
Contractors	7.59
Plant Feed Surface Haulage	0.12
Waste Surface Backhaul	0.42
Rehabilitation	2.31
Mine Energy	5.47
Rental	0.01
Total $/t-Milled	**37.06**

SRK notes that some operating costs that would normally be attributed to the underground mine are included in the G&A operating cost estimate (Table 50). These are technical services at $1.88/t and underground definition drilling at $0.36/t. With these costs included, estimated mine operating cost would be $39.30/t.

Table 50 provides a breakdown of the G&A operating cost estimate.

Table 50: Estimated G&A Operating Cost

G&A Item	$/t-Milled
Labour	2.03
Mine Technical Services	1.88
Accommodations	0.02
Training, Professional Development, Consultants	0.34
Software	0.03
Insurances/Tax/Leases/General Permits	0.32
Office Supplies	0.03
Communications	0.05
General Site Maintenance	0.41
Freight	0.52
Mine Geology - Resource Delineation	0.36
Total $/t-Milled	**5.99**

Table 51 shows a breakdown of the average mill complex operating cost estimate.

Table 51: Mill Operating Cost Estimate

Mill Operating Cost	$/t-Milled
Manpower	2.69
Mill Consumables	14.87
Assay Lab	0.24
Mill Maintenance	4.03
Mill Energy	4.75
Contract Shutdown	0.25
Subtotal	**26.84**
Contracted Crushing Cost	3.30
Total $/t-Milled	**30.14**

Table 52 shows a breakdown of the environmental operating cost estimate.

Table 52: Estimated Environmental Operating Cost

Environmental Operating Cost	$/t-Milled
Equipment	0.02
Fixed Costs	0.00
Consumables	0.04
Operational Costs	0.04
Licensing Fees	0.03
Consultant Fees	0.15
Site Environmental Clean Up	0.00
Water Treatment Plant	1.07
Environmental Manpower	0.23
Total $/t-Milled	**1.59**

21 Economic Analysis

This section summarizes the economic analysis completed to support the preliminary economic assessment of the Caribou project. The Qualified Person taking professional responsibility for this section is Benny Zhang, PEng (PEO #100115459) of SRK, with inputs from Leonard Holland, CEng (IMMM # 41498) of Holland and Holland, metallurgy and processing QP; Jeffery Barrett, PEng (APEGNB # M6890) of Stantec, environmental and permitting QP; and support from Jeremy Ouellette, PEng (APEGNB # M7352), of Trevali. For depreciation, royalty, and taxes calculations, SRK has relied on the expertise of Ms. Anna Ladd, Certified Management Accountant, CFO, of Trevali.

21.1 Valuation Methodology

The Caribou project has been valued using a discounted cash flow (DCF) approach. This method of valuation requires projecting yearly cash inflows, or revenues, and subtracting yearly cash outflows such as operating costs, capital costs, royalties, and provincial and federal taxes. Cash flows are taken to occur at the end of each period. The resulting net annual cash flows are discounted back to the date of valuation, second quarter of 2014, and totalled to determine net present values (NPVs) at the selected discount rates. The internal rate of return (IRR) is calculated as the discount rate that yields a zero NPV. The payback period is calculated as the time needed to recover the initial capital spent from production start.

The results of the economic analysis represent forward-looking information that are 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.

This preliminary economic assessment is preliminary in nature. The results of the economic analysis performed as a part of this PEA are based in part on inferred mineral resources. Inferred mineral resources are considered too speculative geologically to have the economic considerations applied to them that would enable them to be categorized as mineral reserves, and there is no certainty that the preliminary economic assessment will be realized.

All monetary amounts are presented in Canadian dollars (CAD), unless otherwise specified, and financial results are reported on both post-tax and pre-tax basis.

21.2 Assumptions

The metal prices used in the economic analysis were provided by Trevali. Prices of zinc and lead are based on consensus long-term metal price; prices of copper, gold, and silver are based on three year trailing average metal prices.

Table 53 shows the key assumptions used in the economic analysis.

Table 53: Assumptions Used in Economic Analysis

Item	Metal Price			Mill Recovery*	Payable**	Off-site Costs
	Unit	In USD	In CAD			
Zn	$/lb	1.00	1.05	84.0%	85%	TC/RC, Deductibles Vary with Smelter Locations, Smelter Terms and Conditions
Pb	$/lb	1.00	1.05	65.0%	95%	
Cu	$/lb	3.00	3.16	45.0%	95%	
Ag	$/oz	21.00	22.11	37.5%	95%	
Au	$/oz	1200.00	1263.16	10.58%	95%	
Base Case Discount Rate				5%		
Exchange Rate (US$/C$)				0.95		
Schedule 1 - NB 2% Royalty				2%		
Schedule 2 - NB 16% Royalty				16%		
10% NPI - Fern Trust based on Taxable Profit				10%		
Provincial Income Tax				12%		
Federal Income Tax				15%		

* Provided by Leonard Holland, CEng, processing QP.

** Similar project concentrates sold to smelters at normal industry market terms.

21.3 Plant Feed and Concentrate Production

The underground mining schedule was presented in Table 37 in Section 15.8 of this report and mill feed schedule and concentrate production is shown in Table 54. Life of mine mill feed totals 6,152 kt at grades of 6.11% zinc, 2.49% lead, 0.34% copper, 67.89 g/t silver, and 0.86 g/t gold. Plant feed commences in January 2015 and continues for 6.3 years until March 2021.

21.4 Cost Estimates

Capital and operating cost estimates are presented in Section 20 of this report. Initial capital is estimated at $36.3 million and sustaining capital is estimated at $88.8 million. Site operating cost is estimated at $74.77/t-milled.

Capital Costs

A summary of estimated capital costs can be found in Table 47.

Operating Costs

A summary of estimated operating costs can be found in Table 48 for mining, processing, environmental, and G&A.

Royalties and Taxes Calculation

Royalty and tax payments are calculated according to Canadian Mining Taxation applicable to the province of New Brunswick and specific agreements. For royalty and tax calculations, SRK has relied on the expertise of Ms. Anna Ladd, Certified Management Accountant, CFO, of Trevali. Royalties and taxes applicable to the Caribou project are presented in Table 53. The current financial model estimates the LOM total value of royalty and tax payments to be $57.3 million.

Offsite Costs

The base case incorporates the transport charges of US$60 to US$100 per dry tonne of concentrate dependent on concentrate shipping to the assumed smelter destinations.

Other offsite costs include concentrate treatment charges, penalty charges, handling and losses, etc.

Table 54: Life of Mine Plant Feed Schedule and Concentrate Production

	2014	2015	2016	2017	2018	2019	2020	2021	Total
UG for Plant Feed									
Tonnes of Plant Feed (kt)		852	994	1,095	1,090	1,095	944	82	6,152
Zn Grade		5.82%	6.27%	6.13%	5.98%	6.44%	5.97%	5.55%	6.11%
Pb Grade		2.49%	2.63%	2.52%	2.45%	2.64%	2.20%	1.97%	2.49%
Cu Grade		0.33%	0.33%	0.34%	0.40%	0.30%	0.32%	0.29%	0.34%
Ag (g/t)		68.74	73.71	67.58	70.78	71.31	56.13	43.66	67.89
Au (g/t)		0.59	0.70	0.85	0.84	0.84	1.28	1.26	0.86
Metal Mill Recovery									
Zn Recovery		84.00%	84.00%	84.00%	84.00%	84.00%	84.00%	84.00%	84.00%
Pb Recovery		65.00%	65.00%	65.00%	65.00%	65.00%	65.00%	65.00%	65.00%
Cu Recovery		45.00%	45.00%	45.00%	45.00%	45.00%	45.00%	45.00%	45.00%
Ag Recovery		37.50%	37.50%	37.50%	37.50%	37.50%	37.50%	37.50%	37.50%
Au Recovery		10.58%	10.58%	10.58%	10.58%	10.58%	10.58%	10.58%	10.58%
Concentrate Production									
Zinc Concentrate Grade		50%	50%	50%	50%	50%	50%	50%	150%
Ag in Zn Con g/t		126.00	126.00	126.00	126.00	126.00	126.00	126.00	126.00
Au in Zn Con g/t		0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Pb in Zn Con %		1.22%	1.22%	1.22%	1.22%	1.22%	1.22%	1.22%	1.22%
Cu in Zn Con %		0.70%	0.70%	0.70%	0.70%	0.70%	0.70%	0.70%	0.70%
Fe in Zn Con %		9.6%	9.6%	9.6%	9.6%	9.6%	9.6%	9.6%	9.6%
Cd in Zn Con %		0%	0%	0%	0%	0%	0%	0%	0%
As in Zn Con %		0%	0%	0%	0%	0%	0%	0%	0%
Lead Concentrate Grade		45%	45%	45%	45%	45%	45%	45%	45%
Zn in Pb Con %		6%	6%	6%	6%	6%	6%	6%	6%
Cu in Pb Con %		0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40
Ag in Pb con g/t		655.00	655.00	655.00	655.00	655.00	655.00	655.00	655.00
Au in Pb con g/t		2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Copper Concentrate Grade		20%	20%	20%	20%	20%	20%	20%	20%
Zn in Cu Con %		6%	6%	6%	6%	6%	6%	6%	6%
Pb in Cu Con %		8%	8%	8%	8%	8%	8%	8%	8%
Ag in Cu con g/t		394.00	394.00	394.00	394.00	394.00	394.00	394.00	394.00
Au in Cu con g/t		3.10	3.10	3.10	3.10	3.10	3.10	3.10	3.10
Zn Concentrate DMT (kt)		83.2	104.8	112.8	109.5	118.6	94.7	7.6	631.2
Pb Concentrate DMT (kt)		30.6	37.8	39.8	38.7	41.7	30.0	2.3	220.9
Cu Concentrate DMT (kt)		6.4	7.4	8.5	9.8	7.4	6.7	0.5	46.6

21.5 Indicative Economic Results

Base case (a discount rate of 5%) indicative economic results as summarized in Table 55 are favourable for the Caribou project.

The base case project pre-tax NPV5% is $150 million and the internal rate of return is 69%. The cumulative cash flow value for the project pre-tax is $198 million and the discounted payback period is 1.9 years over the planned mine life of 6.3 years.

Table 55: Base Case Indicative Economic Results Summary

Items	Units	LoM Total
Revenue		
Gross Revenue from Concentrates	$M	1,006
Offsite Costs	$M	(222)
Net Revenue	$M	784
Operating Costs		
Mine	$M	(194)
Mill	$M	(185)
Site Power	$M	(34)
Administration	$M	(37)
Environment	$M	(10)
Total Site Operating Cost	$M	(460)
EBITDA	**$M**	**324**
Royalties and Taxes		
10% NPI - Fern Trust based on Taxable Profit	$M	(6)
2% NB Royalty	$M	(12)
16% NB Mining Royalty	$M	(27)
Federal & Provincial Income Taxes	$M	(13)
Total Royalties and Taxes	**$M**	**(57)**
Net Income After NPI	**$M**	**266**
Capital Expenditures		
Development	$M	(27)
Energy	$M	(1)
Environment	$M	(2)
Capital Infrastructure and Mobile Equipment	$M	(90)
Mining Dept G&A	$M	(5)
Total Capital Expenditures	$M	(125)
Project Net Cash Flow, pre-tax	**$M**	**198**
NPV5%	$M	150
IRR	$M	69%
Payback Period	years	1.9
Project Net Cash Flow, post-tax	**$M**	**141**
NPV5%	$M	106
IRR	$M	57%
Payback Period	years	2.1

The base case project post-tax NPV5% is $106 million and the internal rate of return is 57%. The cumulative cash flow value for the project post-tax is $141 million and the discounted payback period is 2.1 years over the planned mine life of 6.3 years.

The PEA detailed cashflow model can be found in Appendix C.

It should be noted that the estimated plant feed is partly based on Inferred Mineral Resources that are considered too speculative geologically to have the economic considerations applied to them that would enable them to be categorized as Mineral Reserves, and there is no certainty that the preliminary economic assessment based on these Mineral Resources will be realized.

21.6 Sensitivity Analysis

The results of the base case sensitivity and other sensitivity analyses are summarized in Table 56 to Table 59, Figure 48 and Figure 49.

Sensitivity analysis was performed on the base case taking into account variations in metal prices, operating cost, capital cost, plant feed head grades, and external dilution. As usual with projects of this type, analysis shows that the Caribou project economic results are most sensitive to changes in metal prices and then plant feed head grades, because they affect directly the entire revenue stream. The sensitivity analysis shows that the project is less sensitive to operating cost, capital expenditure, and external dilution.

Table 56: Post-Tax NPV and IRR Sensitivity Analysis

Input Parameters	Range	Value	Post-Tax NPV (M$)	Post-Tax IRR
Base Case Post Tax NPV and IRR at 5% Discount Rate:			**106.0**	**57%**
Long-Term Metal Prices (All Metal Prices Varied Together)	20%		169.7	97%
	10%		140.9	77%
	0%		**106.0**	**57%**
	-10%		60.9	33%
	-20%		(1.3)	4%
Project Capital Cost (Initial + Sustaining) (M$)	20%	150	90.3	43%
	10%	138	98.2	50%
	0%	**125**	**106.0**	**57%**
	-10%	113	113.8	65%
	-20%	100	121.4	75%
Project Site Operating Cost ($/t-Milled)	20%	90	56.6	31%
	10%	82	84.5	44%
	0%	**74.8**	**106.0**	**57%**
	-10%	67.3	126.6	69%
	-20%	59.8	142.9	80%
Metal Grades (All Metal Grades Varied Together)	20%		162.5	90%
	10%		138.1	75%
	0%		**106.0**	**57%**
	-10%		67.4	37%
	-20%		13.6	12%
External Dilution (%)	20%	19.2%	104.8	54%
	10%	17.6%	105.6	56%
	0%	**16.0%**	**106.0**	**57%**
	-10%	14.4%	106.5	58%
	-20%	12.8%	106.9	60%
Limits	**Max Worse Case**		**(1.3)**	**4%**
	Max Best Case		**169.7**	**97%**

Table 57: NPV and IRR Sensitivities to Zinc Price Only at Different Discount Rates

Zinc Price (US$/lb)	Post-Tax (NPV in M$)			Pre-Tax (NPV in M$)		
	NPV (5%)	NPV (8%)	IRR (%)	NPV (5%)	NPV (8%)	IRR (%)
0.8	**46**	36	27	**61**	49	34
0.9	**81**	67	43	**106**	88	52
1.0	**106**	**89**	**57**	**150**	**128**	**69**
1.1	**130**	111	70	**195**	167	86
1.2	**148**	127	81	**238**	205	102

Table 58: NPV and IRR Sensitivities to Lead Price Only at Different Discount Rates

Lead Price (US$/lb)	Post-Tax (NPV in M$)			Pre-Tax (NPV in M$)		
	NPV (5%)	NPV (8%)	IRR (%)	NPV (5%)	NPV (8%)	IRR (%)
0.8	**87**	72	46	**116**	97	55
0.9	**96**	81	51	**133**	112	62
1.0	**106**	**89**	**57**	**150**	**128**	**69**
1.1	**115**	98	62	**167**	143	76
1.2	**125**	106	67	**185**	158	83

Table 59: NPV and IRR Sensitivities to Zinc and Lead Prices Only at Different Discount Rates

Zinc Price (US$/lb)	Lead Price (US$/lb)	Post-Tax (NPV in M$)			Pre-Tax (NPV in M$)		
		NPV (5%)	NPV (8%)	IRR (%)	NPV (5%)	NPV (8%)	IRR (%)
0.8	0.8	16	9	13	27	19	18
0.9	0.9	68	56	37	89	73	45
1.0	**1.0**	**106**	**89**	**57**	**150**	**128**	**69**
1.1	1.1	138	118	74	212	182	93
1.2	1.2	161	139	89	272	235	116

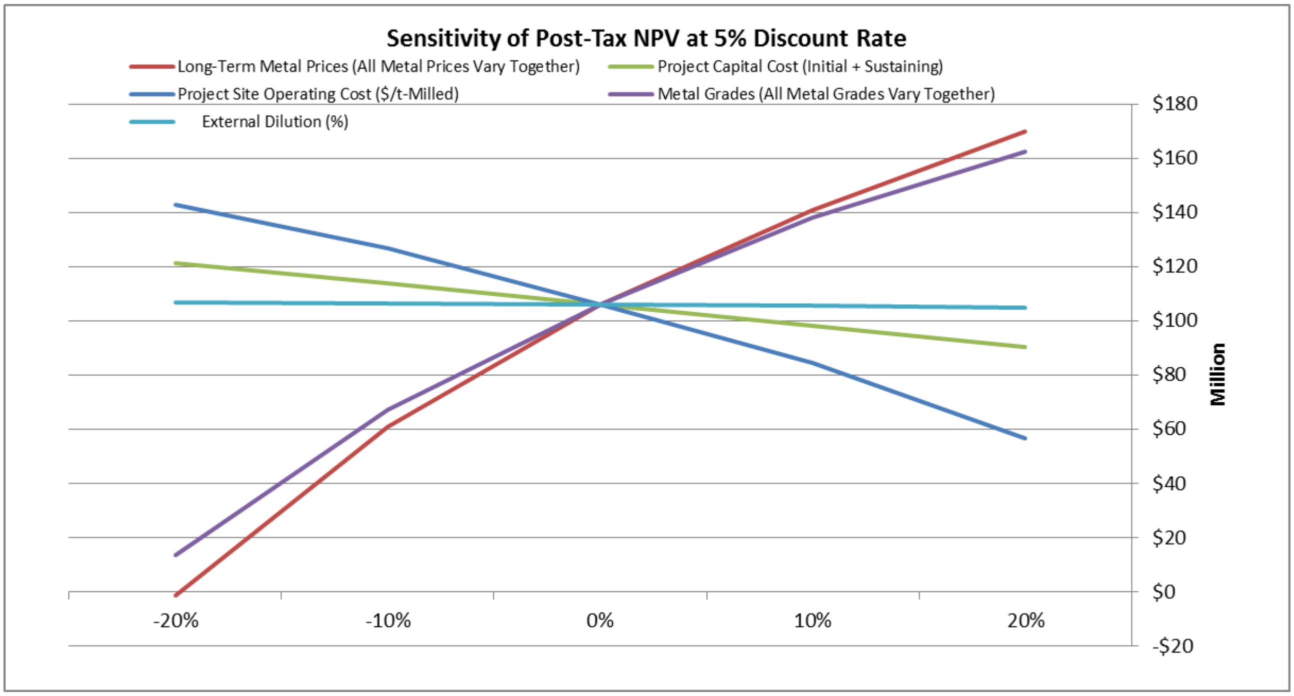


Figure 48: Post-tax NPV5% Sensitivity to Key Input Parameters (Table 56 Dataset)

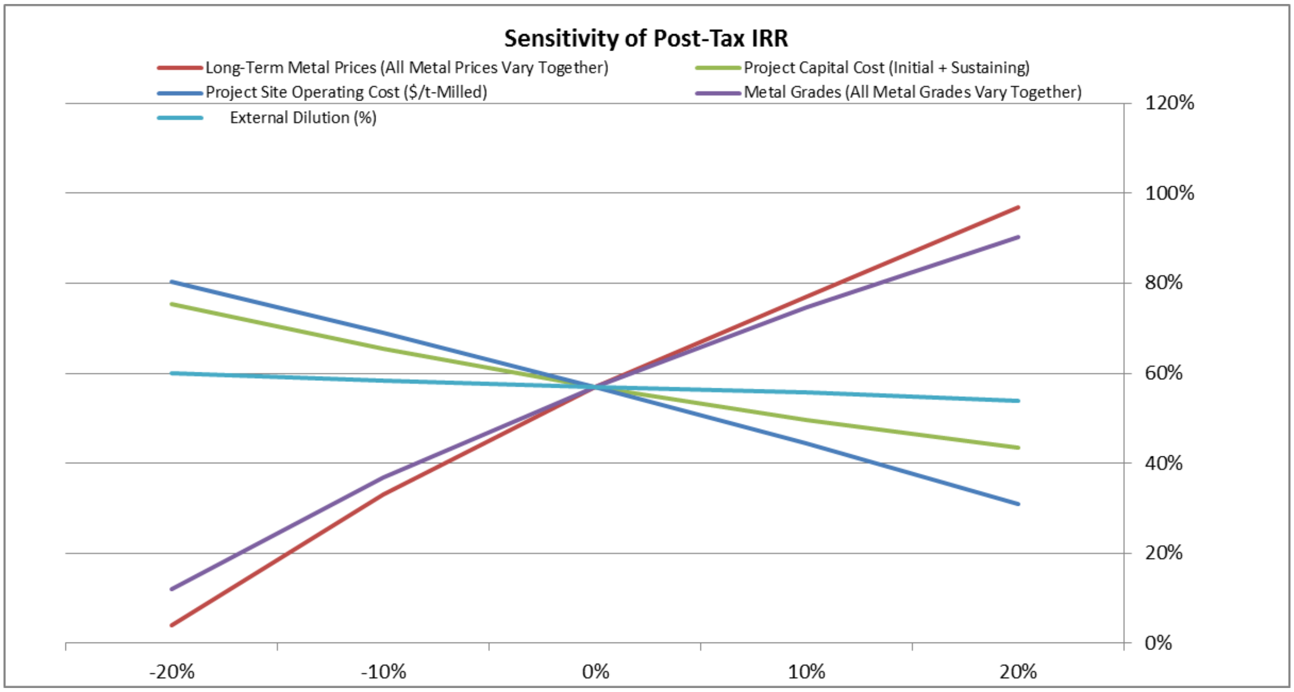


Figure 49: Post-tax IRR Sensitivity to Key Input Parameters (Table 56 Dataset)

22 Adjacent Properties

The Caribou project is situated within the Bathurst mining camp. There are some 46 mineral deposits with defined tonnage and another hundred mineral occurrences within a 50 km radius of the property. The Woodside and Restigouche deposits are situated near and within similar geological setting to the Caribou deposit (Figure 50).

SRK has been unable to verify the information about the mineral properties discussed in this section of the technical report and the information in this section of the report is not necessarily indicative of the mineralization on the Caribou project.

The Restigouche Property is registered to 8100896 Canada Inc. The Property contains a massive sulphide deposit elongated in form and plunges to the north- northwest at 15 to 20 degrees, oblique to the northeast regional trend of the geology. The zone is 490 m long and averages 90 m wide and 30 m thick, and has been traced to a vertical depth of 183 m to the north.

The deposit comprises at least two separate lenses of massive sulphide, which coalesce in the central part of the deposit and is underlain by a chlorite-pyrite stringer zone.

In 1999, the total undiluted *in situ* measured and indicated mineral resources were estimated at 1,756,200 t grading 5.55% lead, 7.11% zinc, and 101.8 g/t silver (Puritch, 1999). The mineral resources for the Restigouche deposit are considered historical mineral resources; SRK has not done the work necessary to verify their validity or reliability. The mineral resources are reported with categories that are set out in NI 43-101 but the key assumptions and parameters used to prepare the estimate have not been verified by SRK and as such the estimates should not be relied upon.

The Woodside Brook project is located in Restigouche County immediately south of the Caribou deposit (Figure 50). The property consists of 33 active claims owned by Trevali and covers approximately 528 ha. The property holds the tailings dam for the Caribou deposit.

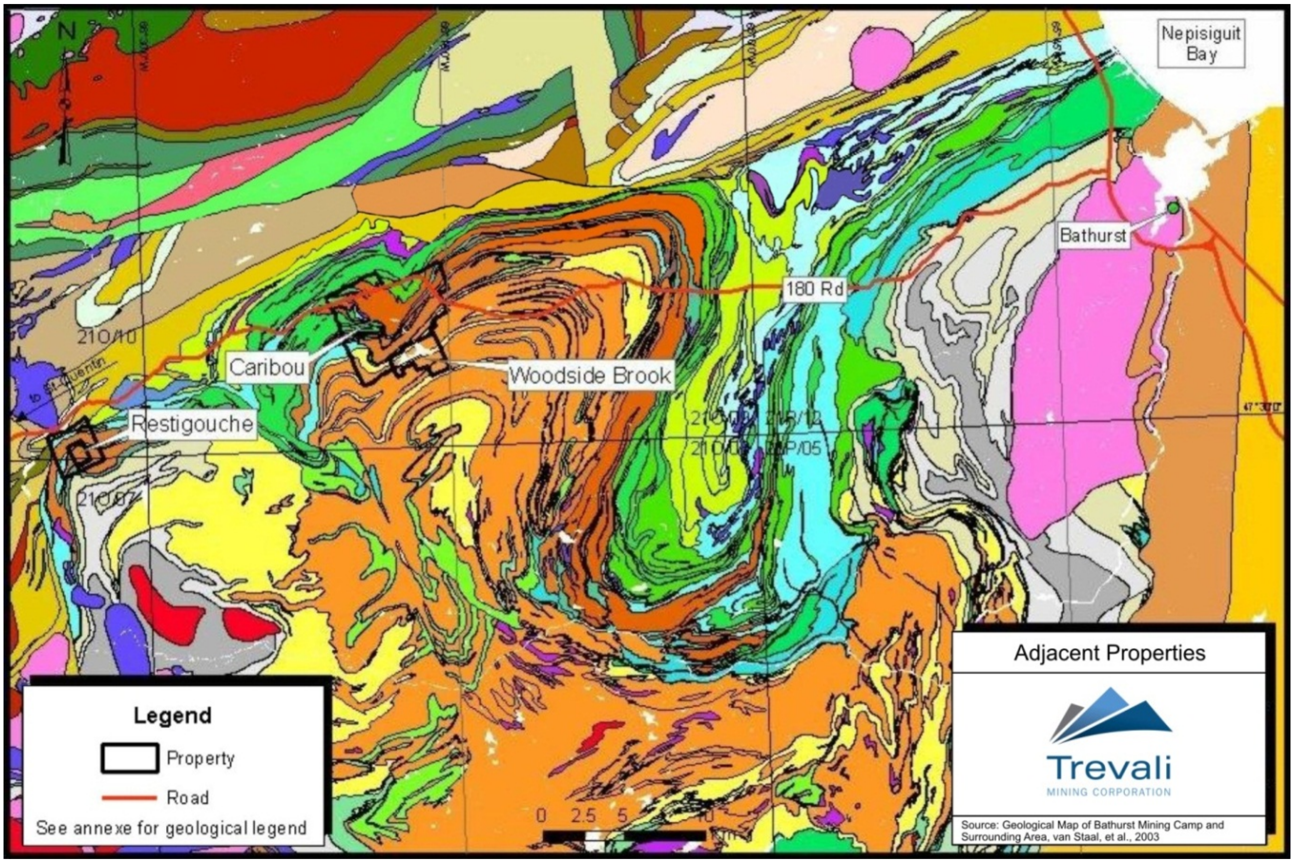


Figure 50: Location of Woodside and Restigouche Properties

23 Other Relevant Data and Information

If the closure approach of constructing a new dam to flood the historic liabilities and eliminate the generation of ARD is chosen, there is the option of using the new basin for tailings storage. This potential new dam would need to be permitted before construction could begin, but gives the option of increased tailings storage should additional resources be found at the Caribou mine, or to provide capacity for toll milling campaigns.

24 Interpretation and Conclusions

24.1 General

In January 2014, SRK, Holland and Holland, and Stantec were mandated by Trevali to prepare a preliminary economic assessment conforming to NI 43-101 standards to demonstrate the economic viability of the Caribou underground mine and mill project. The project is based on all mineral resource categories defined in the Caribou massive sulphide deposit, as stated in a separate SRK technical report titled "Independent Technical Report for the Caribou Massive Sulphide Project, Bathurst New Brunswick, Canada", dated February 25, 2013, amended November 21, 2013.

This technical report provides a summary of the results and findings from each major area of investigation including exploration, geological modelling, mineral resource and plant feed estimations, mine design, metallurgy and updated process design, infrastructure, environmental management, capital and operating costs and economic analysis. The level of investigation for each of these areas is considered to be consistent with that normally expected with preliminary economic assessment for resource development projects.

Conclusions

The results of this preliminary economic assessment indicate that the Caribou project has financial merit at the base case assumptions considered. The results are considered sufficiently reliable to guide Trevali's management in a decision to further advance the project. This would typically involve the preparation of a preliminary feasibility study or a feasibility study.

Risks

SRK notes that putting a mineral project into production without first establishing mineral reserves creates a higher risk of technical and economic failure.

24.2 Geology

Conclusions

The Caribou project is an advanced stage lead-zinc-copper-silver+/ gold deposit, located in eastern Canada. It is located 50 km west of Bathurst, New Brunswick. Trevali owns a 100% interest, subject to royalty interest.

This report is based on information collected by SRK during a site visit performed between November 21 and 23, 2012 and on additional information provided by Trevali throughout the course of SRK's investigations. Other information was obtained from the public domain. SRK has no reason to doubt the reliability of the information provided by Trevali.

The Caribou deposit is situated within the Bathurst mining camp which occupies a roughly circular area of approximately 70 km diameter in the Miramichi Highlands of northern New Brunswick. The area boasts some 46 mineral deposits with defined tonnage and another hundred mineral occurrences, all hosted by Cambro-Ordovician rocks that were deposited in an ensialic back-arc basin.

Mineralization within the Caribou deposit is composed of seven lenses that are zoned mineralogically and chemically from a copper-rich vent-proximal facies (vent complex) near the bottom and western part of each lens, to a lead-zinc-rich vent-distal facies (bedded sulfides) near the top and eastern part of each lens. Although it is impossible to rule out one large sulfide lens that was dismembered during deformation, the common clustering of modern and ancient deposits in vent fields is consistent with multiple vent sites at Caribou.

Block model quantities and grade estimates for the Caribou project were classified according to the CIM *Definition Standards for Mineral Resources and Mineral Reserves* (November 2010) by Guy Dishaw, PGeo, of SRK, under the supervision of Dr. Gilles Arseneau, PGeo. Both are appropriate independent Qualified Persons as this term is defined in National Instrument 43-101.

SRK is satisfied that the geological modelling honours the current geological information and knowledge. The location of the samples and the assay data are sufficiently reliable to support resource evaluation. The sampling information was acquired primarily by diamond drilling on sections spaced at 15 m.

The selection of the search radii and rotations of search ellipsoids were guided by the geometry of the estimation domains and the modelled ranges of continuity from variograms. In addition, the search radii were established to estimate a large portion of the blocks within the modelled area with limited extrapolation. The parameters were refined by conducting repeated test resource estimates and reviewing the results as a series of plan views and sections.

Each block was interpolated with at least three composites representing at least two drill holes. A maximum of 12 composites were used to estimate any given block.

Mineral resources were considered for the Measured category for blocks generally above the lowest mined levels, developed within the mineralized domains. Within this volume, most blocks are estimated by at least three composite samples from a minimum of two drill holes from the first and second interpolation pass, which searched out to 35 m. Mineral resources were considered for the Indicated category where blocks are estimated by at least three composite samples from a minimum of two drill holes from the first and second interpolation pass which searched out to 35 m (exclusive of the volume considered for Measured). Measured and Indicated candidate blocks were reviewed in 3 dimensions to assess how they related to each other and the drill hole data. The Measured and Indicated candidate blocks were used to design wireframe models of the final Measured and Indicated category volumes. All remaining estimated blocks within the estimation domains are classified as Inferred.

Based on the above parameters, SRK estimated that at a 5% zinc equivalent cut-off, the Caribou deposit contained 7.23 Mt grading 6.99% zinc, 2.93% lead, 0.43% copper, 84.43 g/t silver, and 0.89 g/t gold in the Measured and Indicated categories and an additional 3.66 Mt grading 6.95% zinc, 2.81% lead, 0.32% copper, 78.31 g/t silver, and 1.23 g/t gold in the Inferred category.

Risks

- There is some risk related to lack of quality assurance and quality control data (QA/QC) in the Caribou database. SRK was not able to review and assess any QA/QC results. However, from historical records it is evident that QA/QC samples were collected in the past and that protocols for collecting such samples were in place;
- There was no specific gravity data available in the database supplied to SRK for resource estimation. SRK used a fixed specific gravity of 4.27 for the massive sulphide derived from past reports, production data, and reconciliations. There is some uncertainty in this estimate that could impact the resource estimate;

- Due to the mine being in a flooded state in November 2012, SRK was not able to personally inspect the underground mine in terms of mined out openings, geology, mineralization or structures.

Opportunities

Further definition drilling should convert some of the existing Inferred mineral resources to Indicated or Measured category. This will be a benefit for future higher level technical studies.

The deposit remains open for possible expansion at depth.

24.3 Underground Mining

Conclusions

- Based on rock mass classification systems, the massive sulphide mineralization zones can be classified as ‘fair” to ‘good” quality. The phyllite that can comprises both footwall and the hangingwall close to the mineralization can be estimated to be of ‘poor’ quality;
- The target lenses have an average in situ thickness of 4.6 m, ranging from 2 m to 20 m;
- The planned mining method is modified AVOCA with stopes 20 m along strike, 20 m height sill to sill, and lens width. Backfill will be unconsolidated waste rock;
- A standard stope will yield 8,560 t of plant feed including the development tonnes;
- An in situ cut-off value of $100/t NSR was estimated as the cut-off criterion for targeting blocks in the resource block model;
- SRK determined an economic mining limit at 1920 m elevation corresponding to a depth of 600 m below the portal;
- Plant feed totals 6,152 kt with an average NSR value of $130/t;
- Internal dilution averages 20% with $56/t NSR value while external dilution averages 16% with $43.15/t NSR value;
- Access to the underground mine is planned by two ramps;
- Ventilation is planned at 425 cms or 900,000 cfm which provides a 29% contingency;
- Initial underground work includes approximately 3,000 m to be rehabilitated (including slashing/widening and ground support);
- Lateral development totals 31,000 m, yielding a development ratio of 198 t/m; Waste rock tonnage is estimated at 926,000 t yielding a waste/plant feed ratio of 0.15;
- The mine pre-production period is defined as a 9-month period from April 1, 2014 to December 31, 2014. The production period extends from January 1, 2015 to March 2021 for a period 6.3 years;
- The planned full production rate is 3,000 tpd (1.095 Mtpa);
- Total mine manpower at full production is estimated at 239 employees;
- The underground mine total capital cost estimate is $78.2 million, comprised of $15.3 million in initial capital and 62.9 million in sustaining capital;
- Underground mine operating costs are estimated at an average $37.06/t.

Risks

There are two major risks identified that could adversely affect the project economics:

The mine is only about 40% dewatered at the time of PEA mine planning. There are uncertainties related to the time required for full dewatering, and uncertainties regarding the total quantity and scheduling of the rehabilitation/slashing work that will ultimately be required. An increased quantity of rehabilitation/slashing work and/or schedule delays could adversely affect the PEA economic results.

There is a risk that excessive gouging of wall rocks during development could lead to more external dilution than planned, as could excessive deviation of production blast holes. This would reduce the mill head grade and have a negative impact on revenue.

Mitigation of the external dilution risk will depend on maintaining good mining control when following the lens during sublevel on lens development. This will involve:

- Completing definition drilling;
- Accurate face mark ups by Trevali geologists;

- Face sampling and geological mapping;
- Grade control modelling using new information as it becomes available;
- Selection of LHD size appropriate to local lens width;
- Accurate face drilling;
- Accurate production drilling.

Opportunities

The following opportunities are identified within the preliminary economic assessment:

- Maximize sill pillar recovery by replacing waste backfill with paste backfill. The current mine plan includes sill pillar recoveries ranging from 40% above 2200 elevation to 20% below 2200 elevation, with an overall low sill pillar recovery of 27.2% due to the unconsolidated waste rock backfill planned for placement immediately above the sill levels. The potential advantages of using paste backfill include:
  - Increase sill pillar recovery from current 27.2% to nearly 100% which could bring up to 1.5 Mt of plant feed into the mine plan at grades of 6.00% zinc, 2.59% lead, 0.29% copper, 71.75 g/t silver, and 0.75 g/t gold, enough to extend the mine life by 1.5 years with minimal additional development required;
  - Increase stope backfilling productivity and shortened stope cycle time, thus increasing stope stability and improving external dilution control;
  - Reduced backfill operating cost. The estimated operating cost of backfilling with waste rock is nominally \$11 to \$13 per tonne of plant feed, comparable to using paste fill at \$7 to \$9 per tonne of plant feed (typical of mines in northern Ontario and northern Quebec);
  - Reduced ventilation requirements due to less underground mobile equipment required;
  - Reduced requirement for life of mine tailings pond capacity, and potentially savings in environmental expenditures.

A trade-off analysis is required to weight these potential advantages against the expected increase in capital costs for installing a paste backfill system.

- Further stope design optimization will lead to reduced internal dilution and increased plant feed head grades. Due to time constraints and the inherent nature of the accuracy of the PEA design work, the stope designs have not been fully optimized. Overall internal dilution in the planned stopes is approximately 20% (waste tonnes/target mineralization tonnes), or (W/O). In SRK's opinion, it should be possible to reduce internal dilution to less than 15% and increase plant feed head grades by roughly 4.3%.
- There is potential to bring more mineralized materials into the mine plan in the PEA planned mining areas. There are 3.06 Mt in situ mineralized materials above \$100/t NSR CoV excluded from the PEA mining shapes in the planned mining area at grades 7.11% zinc, 2.91% lead, 0.39% copper, 85.31 g/t silver, and 1.12 g/t gold. Reasons for the excluded amounts include parallel lenses where only one lens can be mined, stand-off distances from historical mining areas, areas too narrow relative to the current minimum mining width, and isolated areas. Further design optimization could potentially bring some of these mineralized materials into the mine plan and extend mine life.

24.4 Metallurgy

Conclusions

The rehabilitation of the process plant to process Caribou plant feed, including modifications to recover the copper values, is a relatively simple and straight forward project requiring nominally $40 million in capital, and will result in a 3,000 tonnes per day process plant requiring nominally $30 per tonne to operate.

The predicted metallurgy as provided in Section 12 along with the costing in Section 20 are regarded as realistic estimations based upon sound interpretations of the available data.

Risks

- The project risk associated with the concentrator operation and metallurgical performance is minimal. However there is a risk that the predictive metallurgy will not be consistently achieved with a negative impact on project revenue;
- The process plant has an historical track record of performance and the additional copper circuit is very basic and minimal in terms of additional equipment;
- A risk at present is the ability to recruit suitably trained staff for a relatively difficult plant feed to process.

Opportunities

Owing to the historical operations being based upon a mixture of Caribou and Restigouche plant feed with the Restigouche plant feed known to be the more difficult to process, the potential to improve the predicted metallurgical forecast for Caribou plant feed only, is most likely.

24.5 Environmental and Permitting

Conclusions

The Caribou mine site is a fully permitted facility that allows for mining and milling under the existing CofA. The addition of a copper circuit to produce a copper concentrate will need to be permitted.

A Reclamation Plan was submitted for the Caribou mine under Maple Minerals Corporation’s name on June 4, 2012 to the New Brunswick Department of Energy and Mines and subsequently approved by the Minister on January 11, 2013.

Risks

On January 31, 2013 Trevali entered into a Limited Environmental Liability Agreement with the Province of New Brunswick, where the province would accept the environmental liability associated with historic liabilities.

There is some uncertainty related to the final total cost for mine closure. Trevali will be responsible for posting an annuity for water treatment in perpetuity totaling $12,833,333, or as an alternative to water treatment in perpetuity, constructing a dam across the Forty Mile Brook to flood the portal and historic liabilities (under this agreement the province has agreed to contribute 50% of the construction cost up to $15M).

24.6 Indicative Economic Results

Conclusions

The financial analysis performed as part of this preliminary economic assessment used the following base case assumptions.

The base case project post-tax NPV5% is $106 million and the internal rate of return is 57%. The cumulative cash flow value for the project post-tax is $141 million and the discounted payback period is 2.1 years over the planned mine life of 6.3 years.

The PEA plant feed is partly based on Inferred Mineral Resources that are considered too speculative geologically to have the economic considerations applied to them that would enable them to be categorized as Mineral Reserves, and there is no certainty that the preliminary economic assessment based on these Mineral Resources will be realized.

25 Recommendations

The results of the preliminary economic analysis indicate that the re-opening of the proposed Caribou project has financial merit at the base case assumptions considered. The results are considered sufficiently reliable to guide Trevali's management in a decision to advance the project to a prefeasibility study or a feasibility study.

Analysis of the results and findings from each major area of investigation completed as part of this preliminary economic assessment suggests several recommendations for further investigations to mitigate risks and/or improve the base case designs. The following paragraphs summarize the key recommendations arising from this study. Each recommendation is not contingent on the results of other recommendations and can be completed in a single phase, concurrently. Where appropriate a cost for the recommended work is included, otherwise the cost is included in the estimated capital and/or operating cost for the project.

25.1 Geology

SRK recommends that Trevali continues to explore the Caribou deposit and acquire metallurgical samples to confirm the metallurgical recoveries outlined by Blue Note in 2010.

SRK recommends three HQ diamond drill holes to collect samples of the mineralization for metallurgical testing. SRK estimates that the total program will cost approximately $165,000 as outlined in Table 60.

Table 60: Estimated Cost for the Exploration Program Proposed for the Caribou Project

Description	Total Cost (C$)
Diamond Drilling (450 m in three holes @ $200/m)	
Diamond drilling (all inclusive)	$100,000
Metallurgical Testing	$50,000
Sub-total	**$150,000**
Contingency (10%)	$15,000
Total	**$165,000**

SRK is unaware of any significant factors or risks that may affect access, title, or the right or ability to perform the exploration work recommended for the Caribou project.

25.2 Mining

- Evaluation of backfilling alternatives, such as paste backfill, that may be more cost efficient than the planned use of unconsolidated rock fill and has potential to increase sill pillar recovery rate (estimated cost $50,000);
- Optimize stope design and re-evaluate minimum mining width and the smallest mobile equipment size in order to reduce internal dilution and improve total mining recovery of the Caribou mineral resources;
- Perform a comprehensive geotechnical study to support future technical studies, which includes the generations of a three-dimensional lithological model, a three-dimensional structural model, development of three-dimensional geotechnical design domains and

establishment of representative geotechnical parameters for each domain. The study should include development support requirement guidelines for both in waste and in mineralization (estimated cost $80,000);

- Review hydrogeological information and assess the requirement for development of a hydrogeological model (estimated cost $20,000).

25.3 Metallurgy

- Draw on the experience recorded in the detailed operational logs of past producers at Caribou to focus their efforts on the critical areas to improve plant efficiency and increase metallurgical performance moving forward.

25.4 Environmental and Permitting

- Engineering and planning studies should commence in early to mid-2014 for the environmental infrastructure upgrades discussed in Section 18;
- Discussion with NBDELG should continue on permitting the addition of a copper circuit as the production of a copper concentrate is not currently in the CofA;
- CofA permit conditions should be reviewed regularly to ensure compliance is achieved and condition deadlines are met;
- If the new tailings dam is envisioned to be required as part of ongoing operations for future tailings storage, engineering and planning studies should be undertaken 2-3 years prior to needing the facility to allow adequate permitting time.

26 References

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APPENDIX A

Mineral Tenure Information

COX & PALMER | coxandpalmerlaw.com

New Brunswick | Newfoundland and Labrador | Nova Scotia | Prince Edward Island

To: Anna Ladd, Chief Financial Officer, Trevali Mining Corporation

From: George L. Cooper

Date: June 16, 2014

Re: Trevali Mining (New Brunswick) Ltd./Caribou Mine Tenure Report

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Thank you for your request for a report on title and tenure information pertaining to the interest of Trevali Mining (New Brunswick) Ltd. ("Trevali NB") in the Caribou Mine, located at or near Bathurst Camp, New Brunswick. We are able to report as follows:

<u>Title, Tenure and Registered Encumbrances</u>

1. The Caribou Mine is comprised of:

    a) Mineral Claim 1773 (also known as Woodside Brook and hereinafter the "Mineral Claim");

    b) Mining Lease No. ML-246 (the "Mining Lease");

    c) The freehold lands located in the Province of New Brunswick, known as PID 50072032 (the "Freehold Lands"); and

    d) Industrial Surface Lease No. SIML2271 (also referred to as Crown Lands Lease #415060027and hereinafter referred as the "Surface Lease").

2. The Mineral Claim is presently held in the name of Trevali NB, as the holder of the claim on record. The Mineral Claim is in good standing and expires June 15, 2015. The Mineral Claim is subject to a Limited Environmental Liability Agreement dated as of January 30th, 2013, as well as a Debenture in favor of Computershare Trust Company of Canada filed with the Recorder of Mines under the Mining Act (New Brunswick) on May 29th, 2014.

3. The Mining Lease is presently held in the name of Trevali NB as the holder or lessee on record. The Mining Lease is in good standing and is renewed to October 27th, 2028; the annual rent is paid to October 27th, 2014. The Mining Lease is subject to a Limited Environmental Liability Agreement dated as of January 30th, 2013, as well as a Debenture in favor of Computershare Trust Company of Canada filed with the Recorder of Mines under the Mining Act (New Brunswick) on May 29th, 2014.

4. The Surface Lease is held in the name of Trevali NB and is registered over the lands and premises located in the Province of New Brunswick identified as apparent PID

50237924 (the "Leasehold Lands"). It is presently in good standing and the last site inspection conducted in 2012 showed that the physical site was in conformance with departmental terms and conditions per the terms of the Surface Lease. Rent is paid in full for 2014. It is subject to a Debenture in favor of Computershare Trust Company of Canada filed with the Department of Natural Resources (New Brunswick) on May 29th, 2014. The freehold interest in the Leasehold Lands is held by the New Brunswick Department of Natural Resources & Energy. The underlying freehold interest in the Leasehold Lands is subject to Easement #27017459 (registered on 2009-04-09) in favour of New Brunswick Power Transmission Corporation, which easement is over a small portion (approximately 20m x 30m) of the Subject PID, being Lot 93-1, Plan 3255, which is near the Settling pond at Caribou Lake.

5. Title to the Freehold lands is registered to Trevali NB. Trevali NB's title to the Freehold Lands is subject to a Debenture in favor of Computershare Trust Company of Canada registered in the Restigouche County Registry Office on May 29th, 2014, as document no. 33812364.

6. The Caribou Mine (including the Mineral Claim, the Mining Lease, the Surface Lease and the Freehold Lands) is subject to a 10% Net Profits Interest in favour of the Fern Trust. The 10% Net Profits Interest in the Caribou Mine, in favour of the Fern Trust, affects the Freehold Lands, notwithstanding that it is not listed as an encumbrance on the Certificate of Registered Ownership pertaining to the Freehold Lands.

<u>Scope of Report</u>

For the purposes of this report, we have examined an executed copy of the Mining Lease and the Surface Lease. We have also examined copies of certificates of public authorities, corporate records and other documents and materials, and have made such investigations, as we have determined are relevant and necessary or appropriate as a basis for providing this report.

For purposes of this report, we have also assumed and relied upon the following:

1. With respect to all documents examined by us, the genuineness of all signatures, the legal capacity of individuals signing any documents, the authenticity of all documents submitted to us as originals and the conformity to authentic original documents of all documents submitted to us as certified, confirmed, telecopied or photocopied copies;

2. The accuracy, currency and completeness of the indices and filing systems maintained by the public offices and registries where we have searched or enquired or have caused searches or enquiries to be made; and

3. The accuracy and completeness of the records maintained by the Recorder of Mines, appointed pursuant to the Mining Act (New Brunswick), including abstracts and indices prepared by the Recorder, which records and indices suffer from inherent weaknesses, as unrecorded but delivered instruments may affect title to mining

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leases or mineral claims and unrecorded instruments may give rise to the assertion of interests in the Mineral Claim, the Mining Lease or the Surface Lease by parties unknown to us and undiscoverable by a search of the records

Qualifications of Report

Our report is subject to the following qualifications which may affect title to the Mining Lease, the Surface Lease, the Freehold Lands or the Leasehold Lands, but to which we have not investigated:

1. Title to the underlying freehold interest of the New Brunswick Department of Natural Resources & Energy to the Leasehold Lands, prior to January 1st, 2012.

2. The existence of any intervening rights of any party having an interest in the Mineral Claim, the Mining Lease, the Surface Lease, the Freehold Lands or Leasehold Lands that is not discoverable on a search of the public registries and subject to applicable bankruptcy and insolvency legislation or similar laws affecting the rights of creditors generally.

3. Potential aboriginal title or interests, whether by treaty or otherwise, in and to in the Mineral Claim, the Mining Lease, the Surface Lease, the Freehold Lands or the Leasehold Lands.

4. A physical inspection of the lands or premises to which the Mining Lease, the Surface Lease, the Leasehold Lands or the Freehold Lands pertains.

5. Certificates or reports pertaining to environmental matters affecting the Freehold Lands or the Leasehold Lands or the Mining Lease and Mineral Claim.

6. Overriding incidents set out in section 17(4) of the Land Titles Act of New Brunswick, as well as:

    a) any subsisting exceptions, reservations, covenants and conditions in favour of the Crown contained in or implied by grant of the land from the Crown or excepted or reserved by statute, including any standing trees and timber vested in the Crown;

    b) the right of a lessee under a subsisting lease or agreement for a lease for a period not exceeding three years where there is actual occupation of the land under the lease or agreement; and

    c) any rights which may have been acquired by prescription or adverse possession (squatters rights) in respect of the real property or any part thereof.

The contents of this report are not to be construed as a legal opinion of Cox & Palmer but only as a report concerning matters of title.

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APPENDIX B

Approval to Operate I- 8310, as issued by New Brunswick Environment

(Page 1 Attached, for Details, contact Trevali Mining Corporation)

New Nouveau Brunswick

APPROVAL TO OPERATE

I-8310

Pursuant to paragraph 8(1) of the *Water Quality Regulation - Clean Environment Act*, this Approval to Operate is hereby issued to:

Trevali Mining (New Brunswick) Ltd.
for the operation of the
Caribou Mine

Description of Source:	**the Caribou Mine**	
Source Classification:	**Fees for Industrial Approvals Regulation - Clean Water Act**	**Class 1A**
Parcel Identifier:	**50072032, 50237924**	
Mailing Address:	**385 Pleasant St. Suite 4 Miramichi, NB E1V 1X4**	
Conditions of Approval:	**See attached Schedule "A" of this Approval**	
Supersedes Approval:	**I-7532**	
Valid From:	**April 05, 2013**	
Valid To:	**March 31, 2018**	

Recommended by: ______________________
Community Planning & Environmental Protection Division

Issued by: ______________________ April 10/13
Minister of Environment and Local Government Date

APPENDIX C

Trevali Caribou Preliminary Economic Assessment
Detailed Life of Mine Plan and Base Case Cash Flow Model

Trevali Mining Corporation – Caribou PEA – LOMP and CF

C$ 000's unless stated otherwise

	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	Total
Pricing Assumptions											
Zn (US$/lb)	$1.00	$1.00	$1.00	$1.00	$1.00	$1.00	$1.00	$1.00	$1.00	$1.00	
Pb (US$/lb)	$1.00	$1.00	$1.00	$1.00	$1.00	$1.00	$1.00	$1.00	$1.00	$1.00	
Cu (US$/lb)	$3.00	$3.00	$3.00	$3.00	$3.00	$3.00	$3.00	$3.00	$3.00	$3.00	
Ag (US$/oz)	$21.00	$21.00	$21.00	$21.00	$21.00	$21.00	$21.00	$21.00	$21.00	$21.00	
Au (US$/oz)	$1,200.00	$1,200.00	$1,200.00	$1,200.00	$1,200.00	$1,200.00	$1,200.00	$1,200.00	$1,200.00	$1,200.00	
US$/$C	$0.95	$0.95	$0.95	$0.95	$0.95	$0.95	$0.95	$0.95	$0.95	$0.95	
Concentrate Production											
Tonnes of ore milled (000)	0	851,709	994,312	1,095,000	1,090,411	1,095,000	943,865	81,967	0	0	**6,152,263**
Zn Grade %		5.82%	6.27%	6.13%	5.98%	6.44%	5.97%	5.55%			6.11%
Pb Grade %		2.49%	2.63%	2.52%	2.45%	2.64%	2.20%	1.97%			2.49%
Cu Grade %		0.33%	0.33%	0.34%	0.40%	0.30%	0.32%	0.29%			0.34%
Ag in Ore - g/t		68.74	73.71	67.58	70.78	71.31	56.13	43.66			67.89
Au in Ore - g/t		0.59	0.70	0.85	0.84	0.84	1.28	1.26			0.86
Zn Recovery %	84.00%	84.00%	84.00%	84.00%	84.00%	84.00%	84.00%	84.00%	84.00%	84.00%	
Pb Recovery %	65.00%	65.00%	65.00%	65.00%	65.00%	65.00%	65.00%	65.00%	65.00%	65.00%	
Cu Recovery %	45.00%	45.00%	45.00%	45.00%	45.00%	45.00%	45.00%	45.00%	45.00%	45.00%	
Ag Recovery %	37.50%	37.50%	37.50%	37.50%	37.50%	37.50%	37.50%	37.50%	37.50%	37.50%	
Au Recovery %	10.58%	10.58%	10.58%	10.58%	10.58%	10.58%	10.58%	10.58%	10.58%	10.58%	
Concentrate grade - Zn	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	
Ag in Zn Con g/t	126.00	126.00	126.00	126.00	126.00	126.00	126.00	126.00	126.00	126.00	
Au in Zn Con g/t	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	
Pb in Zn Con %	1.22%	1.22%	1.22%	1.22%	1.22%	1.22%	1.22%	1.22%	1.22%	1.22%	
Cu in Zn Con %	0.70%	0.70%	0.70%	0.70%	0.70%	0.70%	0.70%	0.70%	0.70%	0.70%	
Fe in Zn Con %	9.6%	9.6%	9.6%	9.6%	9.6%	9.6%	9.6%	9.6%	9.6%	9.6%	
Cd in Zn Con %	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
As in Zn Con %	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
Concentrate grade - Pb	45%	45%	45%	45%	45%	45%	45%	45%	45%	45%	
Zn in Pb Con %	6%	6%	6%	6%	6%	6%	6%	6%	6%	6%	
Cu in Pb Con %	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	
Ag in Pb con g/t	655.00	655.00	655.00	655.00	655.00	655.00	655.00	655.00	655.00	655.00	
Au in Pb con g/t	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	
Concentrate grade - Cu	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	
Zn in Cu Con %	6%	6%	6%	6%	6%	6%	6%	6%	6%	6%	
Pb in Cu Con %	8%	8%	8%	8%	8%	8%	8%	8%	8%	8%	
Ag in Cu con g/t	394.00	394.00	394.00	394.00	394.00	394.00	394.00	394.00	394.00	394.00	
Au in Cu con g/t	3.10	3.10	3.10	3.10	3.10	3.10	3.10	3.10	3.10	3.10	
Zn Concentrate DMT	0	83,245	104,820	112,764	109,508	118,551	94,698	7,644	0	0	
Pb Concentrate DMT	0	30,642	37,765	39,782	38,651	41,702	29,992	2,328	0	0	
Cu Concentrate DMT	0	6,353	7,368	8,495	9,760	7,374	6,707	527	0	0	
Production Schedule											
Tonnes of Ore Milled	0	851,709	994,312	1,095,000	1,090,411	1,095,000	943,865	81,967	0	0	6,152,263
Zn (%)		5.82%	6.27%	6.13%	5.98%	6.44%	5.97%	5.55%			6.11%
Pb (%)		2.49%	2.63%	2.52%	2.45%	2.64%	2.20%	1.97%			2.49%
Ag (g/mt)		68.74	73.71	67.58	70.78	71.31	56.13	43.66			67.89
Cu (%)		0.33%	0.33%	0.34%	0.40%	0.30%	0.32%	0.29%			0.34%
Payable Zn (lbs)	0	77,080,315	97,056,866	104,412,304	101,397,495	109,771,209	87,684,778	7,077,474	0	0	584,480,441
Payable Pb (lbs)	0	28,372,588	34,967,882	36,835,788	35,788,956	38,613,228	27,770,625	2,156,032	0	0	204,505,100
Payable Cu (lbs)	0	2,661,019	3,086,090	3,558,447	4,088,280	3,088,673	2,809,288	220,662	0	0	19,512,460
Payable Au (oz)	0	1,343	1,626	1,760	1,807	1,747	1,346	105	0	0	9,734
Payable Ag (oz)	0	636,715	779,585	829,391	822,567	852,385	628,640	48,874	0	0	4,598,156

	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	Total
Gross Revenue Zn	0	81,137,174	102,165,122	109,907,689	106,734,205	115,548,641	92,299,766	7,449,973	0	0	615,242,570
Gross Revenue Pb	0	29,865,882	36,808,297	38,774,514	37,672,586	40,645,503	29,232,237	2,269,507	0	0	215,268,527
Gross Revenue Cu	0	8,403,219	9,745,548	11,237,200	12,910,357	9,753,705	8,871,435	696,829	0	0	61,618,294
Gross Revenue Au	0	1,696,946	2,053,981	2,223,178	2,282,039	2,206,378	1,700,541	132,520	0	0	12,295,583
Gross Revenue Ag	0	14,074,744	17,232,937	18,333,897	18,183,058	18,842,203	13,896,243	1,080,365	0	0	101,643,448
Gross Revenue Total	**0**	**135,177,966**	**168,005,885**	**180,476,478**	**177,782,245**	**186,996,430**	**146,000,222**	**11,629,194**	**0**	**0**	**1,006,068,420**
Total Charges on Revenue (USD)	0	28,257,983	35,265,383	37,860,592	37,079,266	39,458,429	30,925,718	2,472,073	0	0	211,319,444
Total Operating Costs (USD)	**1,596,747**	**75,840,023**	**66,974,412**	**74,804,849**	**71,974,898**	**73,691,381**	**65,415,432**	**6,722,848**	**0**	**0**	**437,020,591**
Zn Equivalent Pounds	**-**	**128,419,067**	**159,605,591**	**171,452,654**	**168,893,133**	**177,646,608**	**138,700,211**	**11,047,734**	**-**	**-**	**955,764,999**
Payable Revenue Per Zn Equiv Lbs	**-**	**1.05**	**1.05**	**1.05**	**1.05**	**1.05**	**1.05**	**1.05**	**-**	**-**	**1.05**
Opex Costs Per Zn Equiv Lbs - USD	**-**	**0.59**	**0.42**	**0.44**	**0.43**	**0.41**	**0.47**	**0.61**	**-**	**-**	**0.46**
P&L											
Revenue											
Zinc concentrates	-	81,137,174	102,165,122	109,907,689	106,734,205	115,548,641	92,299,766	7,449,973	-	-	615,242,570
Lead Concentrates	-	43,561,634	53,687,668	56,555,542	54,948,298	59,284,520	42,637,415	3,310,247	-	-	313,985,325
Copper Concentrates	-	10,479,157	12,153,095	14,013,247	16,099,742	12,163,269	11,063,041	868,974	-	-	76,840,526
Gross Revenue	***-***	***135,177,966***	***168,005,885***	***180,476,478***	***177,782,245***	***186,996,430***	***146,000,222***	***11,629,194***	***-***	***-***	***1,006,068,420***
Treatment Charge Zinc	-	(14,921,158)	(18,788,206)	(20,212,067)	(19,628,462)	(21,249,440)	(16,973,963)	(1,370,053)	-	-	(113,143,348)
Treatment Charge Lead	-	(5,294,960)	(6,525,790)	(6,874,383)	(6,679,021)	(7,206,093)	(5,182,620)	(402,364)	-	-	(38,165,230)
Treatment Charge Copper	-	(656,048)	(760,844)	(877,299)	(1,007,924)	(761,481)	(692,602)	(54,402)	-	-	(4,810,600)
Freight/mktg.(in NSR)-Zinc	-	(5,783,367)	(7,282,216)	(7,834,098)	(7,607,895)	(8,236,178)	(6,579,024)	(531,026)	-	-	(43,853,805)
Freight/mktg.(in NSR)-Lead	-	(1,935,279)	(2,385,140)	(2,512,549)	(2,441,145)	(2,633,787)	(1,894,219)	(147,062)	-	-	(13,949,182)
Freight/mktg.(in NSR)-Copper	-	(668,709)	(775,528)	(894,231)	(1,027,377)	(776,177)	(705,968)	(55,452)	-	-	(4,903,442)
Handling Loss - Zn	-	(231,241)	(291,171)	(313,237)	(304,192)	(329,314)	(263,054)	(21,232)	-	-	(1,753,441)
Handling Loss- Pb	-	(116,387)	(143,442)	(151,104)	(146,810)	(158,395)	(113,918)	(8,844)	-	-	(838,901)
Handling Loss - Cu	-	(28,332)	(32,858)	(37,887)	(43,528)	(32,885)	(29,911)	(2,349)	-	-	(207,749)
Marine Insurance	-	(109,764)	(136,262)	(146,400)	(144,452)	(151,437)	(118,108)	(9,398)	-	-	(815,820)
Offsite Costs	**0**	**(29,745,245)**	**(37,121,456)**	**(39,853,254)**	**(39,030,806)**	**(41,535,189)**	**(32,553,387)**	**(2,602,182)**	**0**	**0**	**(222,441,520)**
Net Revenue	**-**	**105,432,721**	**130,884,429**	**140,623,224**	**138,751,439**	**145,461,241**	**113,446,835**	**9,027,012**	**-**	**-**	**783,626,900**
Operating (Site) Costs											
Mine	1,050,786	41,871,598	27,846,883	32,267,364	30,298,245	31,815,978	27,289,606	1,903,951	-	-	194,344,412
Mill	630,000	25,423,913	29,925,408	32,703,610	32,617,124	32,748,715	28,530,921	2,827,754	-	-	185,407,443
Site power	-	4,893,800	5,335,223	5,912,832	5,564,499	5,588,562	5,280,238	1,056,591	-	-	33,631,744
Administration	-	6,051,574	5,833,627	6,218,159	5,747,509	5,851,347	6,137,598	1,015,057	-	-	36,854,871
Environment	-	1,590,718	1,558,240	1,639,981	1,535,674	1,565,274	1,619,987	273,330	-	-	9,783,204
Total Operating (Site) Cost	**1,680,786**	**79,831,603**	**70,499,381**	**78,741,947**	**75,763,051**	**77,569,875**	**68,858,349**	**7,076,682**	**-**	**-**	**460,021,675**
	(1,680,786)	**25,601,117**	**60,385,048**	**61,881,277**	**62,988,388**	**67,891,366**	**44,588,486**	**1,950,330**	**-**	**-**	
EBITDA	**(1,680,786)**	**25,601,117**	**60,385,048**	**61,881,277**	**62,988,388**	**67,891,366**	**44,588,486**	**1,950,330**	**-**	**-**	**323,605,226**
Interest expense											
financing expense											
LOC interest & bank fees											
Caribou - FX G/L											
Caribou - unreal gain/loss											
Caribou - FX G/L on US$ debt											
PBT											
10% NPI - Fern Trust based on Taxable Profit	-	-	-	-	(625,228)	(3,588,420)	(1,873,045)	-	-	-	(6,086,694)
2% NB Royalty	12,600	(1,576,471)	(1,992,808)	(2,132,020)	(2,096,314)	(2,227,878)	(1,671,946)	(123,985)	-	-	(11,808,823)
16% NB Mining Royalty	-	(57,115)	(5,346,936)	(3,958,061)	(6,374,529)	(7,133,959)	(3,707,266)	-	-	-	(26,577,867)
Federal & Provincial Income Tax	-	-	-	-	-	(7,762,667)	(5,057,223)	-	-	-	(12,819,890)
Net Income After NPI	**(1,668,186)**	**23,967,531**	**53,045,303**	**55,791,196**	**53,892,317**	**47,178,441**	**32,279,005**	**1,826,345**	**-**	**-**	**266,311,952**
Capital											
Development by Source											
Manpower	-	649,412	3,540,695	3,896,472	3,879,915	3,896,472	3,362,426	300,014	-	-	19,525,407
Supplies	2,712,034	6,995,002	3,963,533	3,963,533	3,809,697	4,035,021	2,956,361	-	-	-	28,435,181
Maintenance	539,017	1,178,809	3,185,124	3,306,573	3,300,921	3,306,573	3,124,269	431,823	-	-	18,373,110

	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	Total
Contractor	-	14,666,000	-	-	2,316,000	4,500,400	1,917,600	-	-	-	23,400,000
Rehab	2,997,000	2,896,000	-	-	-	-	-	-	-	-	5,893,000
Waste Haulage	-	-	-	-	-	-	-	-	-	-	-
Contingency	-	3,459,645	1,603,403	1,674,987	1,995,980	2,360,770	1,704,098	109,776	-	-	12,908,659
100% Development Costs	**6,248,051**	**29,844,868**	**12,292,755**	**12,841,565**	**15,302,513**	**18,099,237**	**13,064,754**	**841,612**	**0**	**0**	**108,535,356**
Pro-rate Amount (%)											
Development Capex (pro-rated)	**6,248,051**	**3,631,957**	**2,512,528**	**-**	**4,900,276**	**5,571,023**	**2,839,625**	**841,612**	**-**	**-**	**26,545,071**
Stope Production	-	-	-	-	-	-	-	-	-	-	-
Energy	121,500	107,623	204,071	-	330,949	324,270	43,887	-	-	-	1,132,301
Rentals	-	-	-	-	-	-	-	-	-	-	-
Enviro	1,229,986	49,264	81,741	-	104,307	74,707	19,994	-	-	-	1,559,998
Milling/Crushing/Ore Surface Haulage	-	-	-	-	-	-	-	-	-	-	-
Capital Infrastructure	**26,285,917**	**17,367,770**	**15,709,391**	**6,120,891**	**9,356,891**	**9,320,891**	**5,364,391**	**895,473**	**-**	**-**	**90,421,614**
Mining Dept G&A	4,233,579	186,835	304,532	-	390,650	286,813	75,571	-	-	-	5,477,979
Total Capital Expenditures	**38,119,032**	**21,343,449**	**18,812,263**	**6,120,891**	**15,083,073**	**15,577,704**	**8,343,467**	**1,737,085**	**-**	**-**	**125,136,963**
After-tax Cashflow	**(39,787,218)**	**2,624,082**	**34,233,040**	**49,670,305**	**38,809,245**	**31,600,737**	**23,935,538**	**89,260**	**0**	**0**	**141,174,988**
After-tax Cashflow Cumulative	**(39,787,218)**	**(37,163,137)**	**(2,930,097)**	**46,740,209**	**85,549,453**	**117,150,190**	**141,085,728**	**141,174,988**	**141,174,988**	**141,174,988**	
Per Tonnes Milled											
Revenue	**-**	**123.69**	**131.61**	**128.45**	**127.22**	**132.86**	**119.90**	**18.44**	**-**	**-**	
Operating Cost / Tonnes Milled	**-**	**96.03**	**70.86**	**71.96**	**69.55**	**70.84**	**72.91**	**14.19**	**-**	**-**	
Capex Cost / Tonnes Milled	**-**	**23.72**	**18.77**	**5.59**	**13.84**	**14.21**	**8.95**	**2.95**	**-**	**-**	
Total	**0.00**	**119.75**	**89.62**	**77.55**	**83.39**	**85.05**	**81.86**	**17.14**	**0.00**	**0.00**	
NPV @ 5% & IRR Tax:											
105,983,170											
57%											
Pre-tax Cashflow	**(39,799,818)**	**4,257,668**	**41,572,785**	**55,760,386**	**47,905,315**	**52,313,662**	**36,245,019**	**213,245**			
Pre-tax Cashflow Cumulative	**(39,799,818)**	**(35,542,150)**	**6,030,634**	**61,791,021**	**109,696,336**	**162,009,999**	**198,255,017**	**198,468,262**			
NPV @ 5% & IRR Tax:											
150,218,903											
69%											

CERTIFICATE OF QUALIFIED PERSON

To accompany the report entitled: *Technical Report on Preliminary Economic Assessment for the Caribou Massive Sulphide Zinc-Lead-Silver Project, Bathurst, New Brunswick, Canada* dated June 26, 2014 and amended on May 14, 2015.

I, Yao Hua (Benny) Zhang, do hereby certify that:

1) I am a Principal Consultant (Mining) with the firm of SRK Consulting (Canada) Inc. (“SRK”) with an office at Suite 1300, 151 Yonge Street, Toronto, Ontario, Canada;
2) I am a graduate of the Central South University with a BEng in Mining Engineering in 1984. I obtained an MEng in Applied Rock Mechanics for Mine Planning from McGill University in 2006. I have practiced my profession for over 28 years. I have been directly involved in mine design and planning, technical review and audit, due diligence, mining project valuation, mine operations, equipment selection, ventilation, geomechanics and ground support, and providing various technical services for more than 45 base metal and precious metal mines / projects, including volcanogenic sulphide deposits. Since 2000 I have been focusing my career on mining project related consulting services worldwide;
3) I am a Professional Engineer registered with the Professional Engineers of Ontario (PEO) of the province of Ontario (PEO#100115459);
4) I personally visited the project area from February 10 to 12, 2014;
5) I have read the definition of Qualified Person set out in National Instrument 43-101 and certify that by virtue of my education, affiliation to a professional association, and past relevant work experience, I fulfill the requirements to be a Qualified Person for the purposes of National Instrument 43-101 and this technical report has been prepared in compliance with National Instrument 43-101 and Form 43-101F1;
6) I, as a Qualified Person, am independent of the issuer as defined in Section 1.5 of National Instrument 43-101;
7) I am a co-author of this report and responsible for Executive Summary (mine planning and economics), Sections 1, 2, 3.1, 3.2, 14, 15, 17.1, 17.2, 17.7 to 17.14, 18, 20 (mining and G&A), 21, 24.1, 24.3, 24.6, 25.2, Appendix A, and Appendix C, and accept professional responsibility for those sections of this technical report;
8) I have had no prior involvement with the subject property;
9) I have read National Instrument 43-101 and confirm that this technical report has been prepared in compliance therewith;
10) SRK Consulting (Canada) Inc. was retained by Trevali Mining Corporation to prepare a preliminary economic assessment, including a mineral resource statement, for the Caribou massive sulphide project located in New Brunswick, Canada in accordance with National Instrument 43-101 and Form 43-101F1 guidelines. This assignment was completed using CIM Estimation of Mineral Resources and Mineral Reserves Best Practice Guidelines and Canadian Securities Administrators’ National Instrument 43-101 guidelines;
11) I have not received, nor do I expect to receive, any interest, directly or indirectly, in the Caribou project or securities of Trevali Mining Corporation; and
12) That, as of the date of this certificate, to the best of my knowledge, information and belief, this technical report contains all scientific and technical information that is required to be disclosed to make the technical report not misleading.

["signed and sealed"]

Toronto, Ontario — Yao Hua (Benny) Zhang, PEng (PEO#100115459)
May 14, 2015 — Principal Consultant (Mining)

CERTIFICATE OF QUALIFIED PERSON

To accompany the report entitled: *Technical Report on Preliminary Economic Assessment for the Caribou Massive Sulphide Zinc-Lead-Silver Project, Bathurst, New Brunswick, Canada* dated June 26, 2014 and amended on May 14, 2015.

I, Dr. Gilles Arseneau, P. Geo., residing in North Vancouver, B.C. do hereby certify that:

1) I am an Associate Consultant with the firm of SRK Consulting (Canada) Inc. (“SRK”) with an office at Suite 2200-1066 West Hastings Street, Vancouver, BC, Canada;
2) I graduated with a B.Sc. in Geology from the University of New Brunswick in 1979; an MSc in Geology from the University of Western Ontario in 1984 and a Ph.D. in Geology from the Colorado School of Mines in 1995. I have practiced my profession continuously since 1995. I have worked in exploration in North and South America and have extensive experience with base metal deposits such as the Caribou Project;
3) I am a Professional Geoscientist registered with the Association of Professional Engineers and Geoscientists of British Columbia, registration number 23474;
4) I have personally inspected the Caribou Base Metal Project on November 21 to 23, 2012;
5) I have read the definition of “qualified person” set out in National Instrument 43-101 and certify that by virtue of my education, affiliation to a professional association and past relevant work experience, I fulfill the requirements to be a “qualified person” for the purposes of National Instrument 43-101 and this technical report has been prepared in compliance with National Instrument 43-101 and Form 43-101F1;
6) I, as a Qualified Person, am independent of Trevali Mining Corporation, the issuer, as defined in Section 1.5 of National Instrument 43-101;
7) I am a co-author of this report and responsible for the Executive Summary (geology and resource), Sections 4-11, 13, 22, 24.2 and 25.1 of the report and accept professional responsibility for all sections of this technical report;
8) I have had prior involvement with the Caribou Project. I am the author of a technical report entitled “Independent technical Report for the Caribou Massive Sulphide Project, Bathurst New Brunswick, Canada”, dated November 21, 2013;
10) SRK Consulting (Canada) Inc. was retained by Trevali Mining Corporation to prepare a preliminary economic assessment, including a mineral resource statement, for the Caribou massive sulphide project located in New Brunswick, Canada in accordance with National Instrument 43-101 and Form 43-101F1 guidelines. This assignment was completed using CIM Estimation of Mineral Resources and Mineral Reserves Best Practice Guidelines and Canadian Securities Administrators’ National Instrument 43-101 guidelines;
11) I have not received, nor do I expect to receive, any interest, directly or indirectly, in the Caribou Project or securities of Trevali Mining Corporation; and
12) That, as of the effective date of this Report, to the best of my knowledge, information and belief, this technical report contains all scientific and technical information that is required to be disclosed to make the technical report not misleading.

Vancouver, BC	*[“Original Signed and Sealed”]*
May 14, 2015	Gilles Arseneau, PGeo (APEGBC # 23474) Principal Geologist

CERTIFICATE OF QUALIFIED PERSON

To accompany the report entitled: *Technical Report on Preliminary Economic Assessment for the Caribou Massive Sulphide Zinc-Lead-Silver Project, Bathurst, New Brunswick, Canada* dated June 26, 2014 and amended on May 14, 2015.

I Leonard Holland do hereby certify that:

1) I am a Consultant Minerals Engineer with the firm of Holland & Holland Consults, England UK, with an office at 9, Nevis Close, Linslade, Bedfordshire, England. LU72XD.
2) I am a graduate of the University of Wales UK in 1968, and I obtained an Honours degree in Extractive Metallurgy. I have practiced my profession continuously since 1968. My experience has been obtained in all aspects of concentrator operations of varying sizes, processing a variety of differing minerals in plants throughout the world;
3) I am a professional Engineer registered with Institute of Materials Minerals and Mining (IMMM # 41918).
4) I have personally inspected the Caribou concentrator in April and June 2012.
5) I have read the definition of Qualified Person set out in National Instrument 43-101 and certify that by virtue of my education, affiliation to a professional association, and past relevant work experience, I fulfill the requirements to be a Qualified Person for the purposes of National Instrument 43-101 and this technical report has been prepared in compliance with National Instrument 43-101 and Form 43-101F1;
6) I, as a Qualified Person, am independent of the issuer as defined in Section 1.5 of National Instrument 43-101;
7) I am the co-author of this report and responsible for Executive Summary pertaining to metallurgy and processing; Sections 12, 16, 17.3, 17.6, 20 (pertaining to the process plant), 24.4, and 25.3, and accept professional responsibility for those sections of this technical report;
8) I have had no prior involvement with the subject property.
9) I have read National Instrument 43-101 and confirm that this technical report has been prepared in compliance therewith;
10) Holland and Holland Consultants were retained by Trevali Mining Corporation to prepare a preliminary copper circuit design and a concentrator materials balance, with a predicted metallurgy for the Caribou massive sulphide project in accordance with National Instrument 43-101 and Form 43-101F1 guidelines;
11) I have not received, nor do I expect to receive, any interest, directly or indirectly, in the Caribou Project or securities of Trevali Mining Corporation and
12) That, as of the date of this certificate, to the best of my knowledge, information and belief, this technical report contains all scientific and technical information that is required to be disclosed to make the technical report not misleading.

Linslade, Bedfordshire, England	*["signed and sealed"]*
May 14, 2015	Leonard Holland, CEng (IMMM # 41918)
	Consultant Minerals Processing Engineer.

CERTIFICATE OF QUALIFIED PERSON

To accompany the report entitled: *Technical Report on Preliminary Economic Assessment for the Caribou Massive Sulphide Zinc-Lend-Silver Project, Bathurst, New Brunswick, Canada* dated June 26, 2014 and amended on May 14, 2015.

I, Jeffrey Barrett, do hereby certify that:

1) I am an Associate (Geotechnical Engineer) with the firm of Stantec Consulting Ltd. (Stantec) with an office at 845 Prospect St., Fredericton, NB, E3B 2T7;
2) I graduated from the University of New Brunswick with a B.Sc. in Civil Engineering in 2006, and the University of New Brunswick with a M.Sc. in Geotechnical Engineering in 2009. I have practiced my profession continuously since my graduation in 2006. My relevant experience includes environmental permitting, tailings and waste rock management, and mine closure, in iron ore, base metals, and gold projects.
3) I am a professional Engineer registered with the Professional Engineers of Ontario (#100183437), Association of Professional Engineers and Geoscientists of New Brunswick (#M6890), and Professional Engineers and Geoscientists of Newfoundland and Labrador (#07090);
4) I have personally inspected the subject project on numerous occasions since 2007, and most recently on October 2, 2013;
5) I have read the definition of Qualified Person set out in National Instrument 43-101 and certify that by virtue of my education, affiliation to a professional association, and past relevant work experience, I fulfill the requirements to be a Qualified Person for the purposes of National Instrument 43-101 and this technical report has been prepared in compliance with National Instrument 43-101 and Form 43-101F1;
6) I, as a Qualified Person, am independent of the issuer as defined in Section 1.5 of National Instrument 43-101;
7) I am a co-author of this report and responsible for Executive Summary (environmental and permitting), Sections 3.3, 3.4, 3.5, 17.4, 17.5, 17.15, 19, 20 (environmental related), 23, 24.5, 25.4, Appendix B, and accept professional responsibility for those sections of this technical report;
8) I have been involved in permitting, closure planning, tailings management, ore storage, dam inspections, care and maintenance activities, and reopening planning on the property since 2007, for previous owners including; Blue Note Caribou Mines Inc., the Province of NB, and Maple Minerals Corporation, and I am currently involved with Trevali for ongoing reopening planning;
9) I have read National Instrument 43-101 and confirm that this technical report has been prepared in compliance therewith;
10) Stantec Consulting Ltd. was retained by Trevali Mining Corporation to prepare the environmental and permitting sections of a preliminary economic assessment, for the Caribou massive sulphide project in accordance with National Instrument 43-101 and Form 43-101F1 guidelines;
11) I have not received, nor do I expect to receive, any interest, directly or indirectly, in the Caribou Massive Sulphide Project or securities of Trevali Mining Corporation; and
12) That, as of the date of this certificate, to the best of my knowledge, information and belief, this technical report contains all scientific and technical information that is required to be disclosed to make the technical report not misleading.

["signed and sealed"]

Fredericton, New Brunswick	Jeffrey Barrett, MScE, PEng (APEGNB #M6890)
May 14, 2015	Associate (Geotechnical Engineering)