Boliden Summary Report

Resources and Reserves | 2022

Kristineberg Mine

Prepared by
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1 SUMMARY

This annual summary report concerns Boliden's wholly owned Kristineberg mine (Sweden) and is a summary of underlying technical reports which have been prepared in accordance with the guidelines set out in the Pan-European Reserves and Resources Reporting Committee (PERC) "PERC Reporting Standard 2021". The report is updated and issued annually to provide the public (stakeholders, shareholders, potential investors, and their advisers) with:

- An overview of the Kristineberg mine and Boliden Area Operations; and
- Mineral Resource and Mineral Reserve statements as of December 31, 2022

Kristineberg mine has a production capacity of 750,000t per year and is the largest tonnage contributor to the Boliden Area Operations process plant. The Rävliden North deposit is located around 5km west of the Kristineberg Mine and was added to the mine's Mineral Resources in 2015.

In 2022, Kristineberg mine produced 559kt of mineralised material grading 0.5g/t Au, 33g/t Ag, 0.42% Cu, 4.74% Zn, and 0.3% Pb. Kristineberg mine has been in operation since 1940 producing a combined total of 33.9Mt with an average grade of 1.2g/t Au, 37.1g/t Ag, 1% Cu and 3.7% Zn. Mineral Resources and Mineral Reserves as of December 31, 2022 are presented in Table 1. Major changes are summarised as follows:

- Net increase in Mineral Reserves by 82kt: -563kt by mining activities, +607kt converted from Mineral Resource; and

- Net increase in Mineral Resources by 1078kt: -607kt converted to Mineral Reserve, +992kt added by exploration activities, +883kt geological interpretation changes predominately due to infill drilling and -125kt written off due to lack of Reasonable Prospects for Eventual Economic Extraction ("RPEEE").

Table 1: Mineral Resources and Mineral Reserves in Kristineberg Mine 2022-12-31.

	2022						2021					
	kton	**Au (g/t)**	**Ag (g/t)**	**Cu (%)**	**Zn (%)**	**Pb (%)**	kton 2021-12-31	Au (g/t)	Ag (g/t)	Cu (%)	Zn (%)	Pb (%)
Mineral Reserve												
Proved	**360**	**0.5**	**30**	**0.49**	**4.38**	**0.25**	40	0.6	38	0.45	6.05	0.48
Probable	**4 200**	**0.3**	**75**	**0.80**	**5.44**	**0.63**	4 400	0.3	72	0.76	5.53	0.60
P & P	***4 500***	*0.3*	*72*	*0.77*	*5.35*	*0.60*	*4 400*	*0.3*	*72*	*0.76*	*5.53*	*0.60*
Mineral Resource												
Measured	**660**	**0.4**	**38**	**0.73**	**2.69**	**0.23**	170	0.7	33	0.77	3.42	0.23
Indicated	**6 700**	**0.4**	**58**	**0.64**	**3.06**	**0.35**	3 900	0.5	42	0.63	3.47	0.24
M + I	***7 400***	*0.4*	***56***	***0.65***	***3.03***	***0.34***	*4 100*	*0.5*	*41*	*0.63*	*3.47*	*0.24*
Inferred	**5 900**	**0.3**	**49**	**0.80**	**2.57**	**0.28**	8 100	0.3	60	0.80	3.25	0.43

Notes on Mineral Resource and Mineral Reserve statement.

- *Mineral Resources are reported exclusive of Mineral Reserves.*
- *Mineral Resource and Mineral Reserves is a summary of Resource estimations and studies made over time adjusted to mining situation of December 31 2022.*
- *Mineral Resource are reported with dilution*
- *General reasonable prospects for economic evaluation were defined using Deswik.SO software.*
- *Mineral Reserves are reported from the parts of the block model which fall within mining design volumes (LoMP).*
- *Applied cut-off for Mineral Resources and Mineral Reserves depends on selected mining method*
- *Existing tailings capacity is sufficient to include material from the LoMP up to and including 2028. Studies are on-going to find suitable solutions for material from the remaining years of production and a reasonable capital provision has been made to support this.*
- *Tonnes and grades are rounded which may result in apparent summation differences between tonnes, grade and contained metal content.*

1.1 Competence

The contributors and Competent Persons responsible for the preparation of this report are presented in Table 2 below.

Table 2: Contributors and responsible competent persons for the Kristineberg Mine summary report

Description	Contributors	Responsible CP
R&R Coordinator	Erik Bjänndal	Gunnar Agmalm
Geology	Erik Bjänndal / Helen Thomas / Pierre-Marie Machault	
Resource Estimation	Samuel Baldwin / Suzanna Falshaw	
Mineral Processing	Lisa Malm	Nils-Johan Bolin
Mining	Akos Csicsek / Linda Bjuren	
Environmental, Social and Governance (ESG)	Viktoria Lindberg	Seth Mueller

2 GENERAL INTRODUCTION

This report is issued annually to inform the public (shareholders and potential investors) of the mineral assets in Kristineberg Mine held by Boliden. The report is a summary of internal / Competent Persons' Reports for Kristineberg Mine. The Boliden method of reporting Mineral Resources and Mineral Reserves intends to comply with the Pan-European Reserves and Resources Reporting Committee (PERC) "PERC Reporting Standard 2021".

The PERC Reporting Standard is an international reporting standard that has been adopted by the mining associations in Sweden (SveMin), Finland (FinnMin) and Norway (Norsk Bergindustri), to be used for exploration and mining companies within the Nordic countries.

Boliden is reporting Mineral Resources exclusive of Mineral Reserves.

2.1 Pan-European Standard for Reporting of Exploration Results, Mineral Resources and Mineral Reserves – The PERC Reporting Standard

PERC is the organisation responsible for setting standards for public reporting of Exploration Results, Mineral Resources and Mineral Reserves by companies listed on markets in Europe. PERC is a member of CRIRSCO, the Committee for Mineral Reserves International Reporting Standards, and the PERC Reporting Standard is fully aligned with the CRIRSCO Reporting Template.

The PERC standard sets out minimum standards, recommendations and guidelines for Public Reporting of Exploration Results, Mineral Resources and Mineral Reserves in Europe.

2.2 Definitions

Public Reports on Exploration Results, Mineral Resources and/or Mineral Reserves must only use terms set out in the PERC standard.

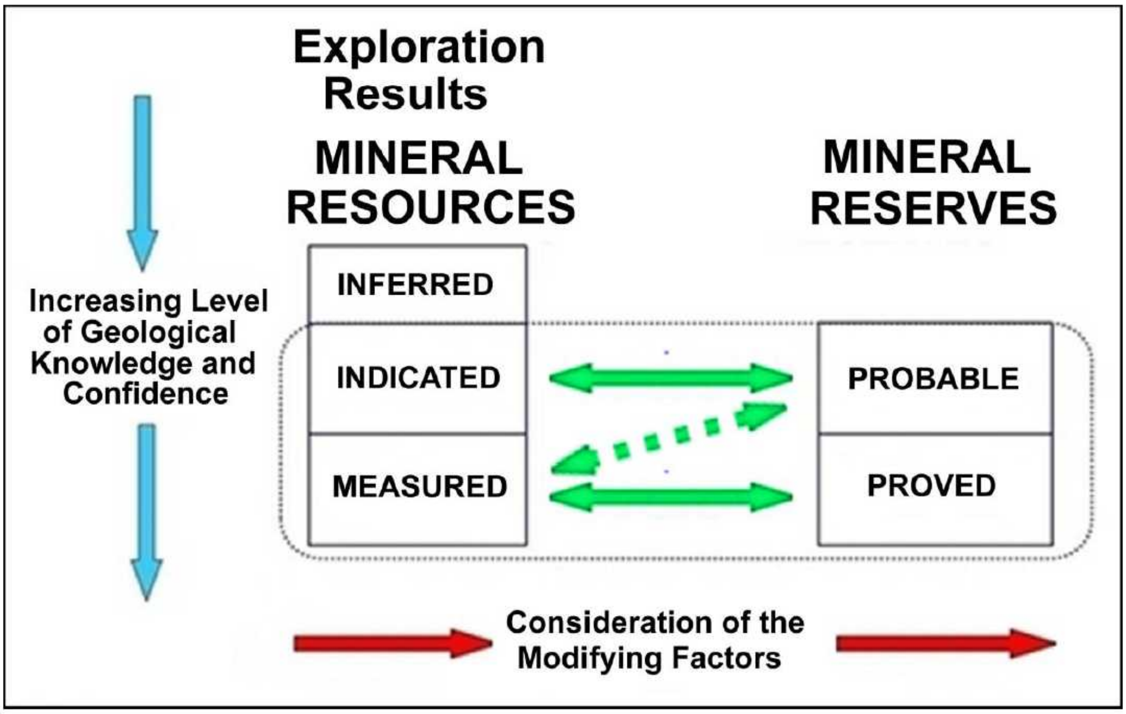

Figure 1. General relationship between Exploration Results, Mineral Resources and Mineral Reserves (PERC, 2021)

2.2.1 Mineral Resource

A Mineral Resource is a concentration or occurrence of solid material of economic interest in or on the Earth's crust in such form, grade or quality and quantity that there are reasonable prospects for eventual economic extraction. The location, quantity, grade or quality, continuity and other geological characteristics of a Mineral Resource are known, estimated or interpreted from specific geological evidence and knowledge, including sampling.

2.2.2 Mineral Reserve

A Mineral Reserve is the economically mineable part of a Measured and/or Indicated Mineral Resource. It includes diluting materials and allowances for losses, which may occur when the material is mined or extracted and is defined by studies at Pre-Feasibility or Feasibility level as appropriate that include application of Modifying Factors. Such studies demonstrate that, at the time of reporting, extraction could reasonably be justified.

3 KRISTINEBERG

3.1 Project Outline

The Kristineberg mine is a polymetallic Volcanogenic Hosted Massive Sulphide (VHMS) ore deposit located approximately 100km west of Boliden in Västerbotten county, northern Sweden. Mineralisation can range in thickness from 1m to 10m, and has been explored to a depth of 1400m, along a plunge of around 3km.

The Kristineberg mine has been in continuous operation for the last 83 years and, to date, has produced upwards of 33 Mt. The Kristineberg mine has a production capacity of around 750,000t/year and is the largest by volume contributor to the Boliden Area Operations Process Plant (BAOPP) located in Boliden. Cu and Zn are the main economic metals at Kristineberg mine, with Au, Ag and Pb credits. Concentrates and precious metal sludge containing gold and silver are transported approximately 50 km from the BAOPP to Boliden's Rönnskär smelter at the port of Skelleftehamn from where refined metals are marketed.

Mining activity is currently focused in mineralisation zones L-Zone, Raimo, and Koppar Klumpen at various levels between 800m and 1350m depth.

3.2 Major changes

3.2.1 Technical studies

Two major technical studies have been completed on the Kristineberg Mine during 2022. Details can be found in Table 3 below.

Table 3:Summary of major technical studies which have been completed at the Kristineberg Mine and Rävliden North during 2022

Study	Date Completed	Main Findings
Rävliden North Mineral Resource Estimate	December 2022	Redefine the Mineral Resource based on exploration and infill drilling.
JB-zone Mineral Resource Estimate	November 2022	New model of a historic mining area to define a Mineral Resource
LW MRE	April 2022	New model of extension based on infill drilling

3.3 Location

The Kristineberg Mine is located within the village of Kristineberg in Lycksele municipality approximately 100km to the west of the village of Boliden (see Figure 2). The Kristineberg Mine is accessible year-round by good quality all weather roads and is connected to Boliden and Skellefteå to the west by highways 370 and 95. A local all-weather sealed road links the main Malå 370 highway to Kristineberg. Total driving distance between the BAOPP and the Kristineberg Mine is approximately 95km.

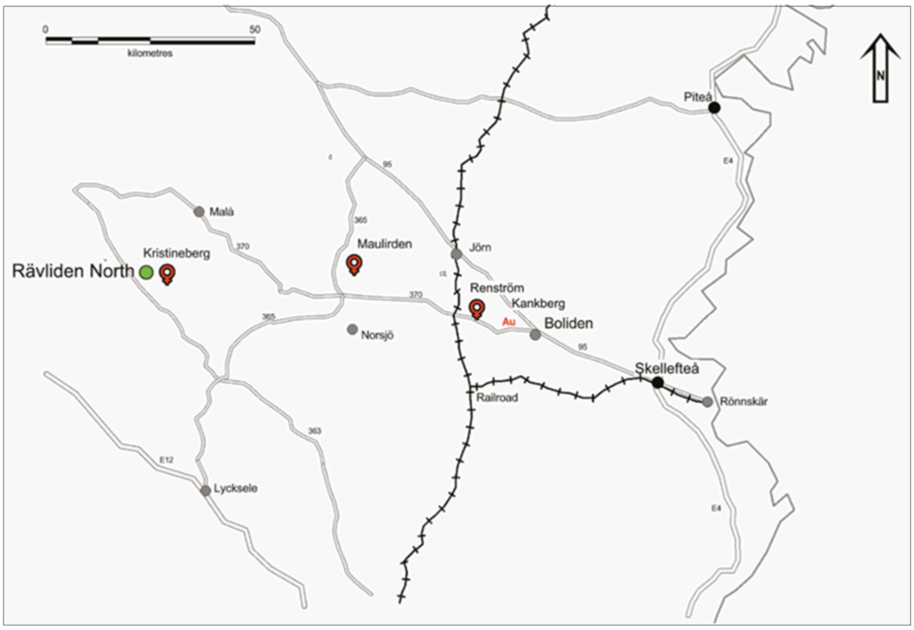

Figure 2. Schematic map showing the location of the Village of Kristineberg, and the approximate location of the Rävliden North Mineral Resource.

A schematic map is presented in Figure 3 showing the Kristineberg Camp. This includes the locations of the Kristineberg Mine, as well as the approximate location of the Rävliden North Mineral Resource and historic mines located in Rävliden, Rävlidmyran, and Hornträsk.

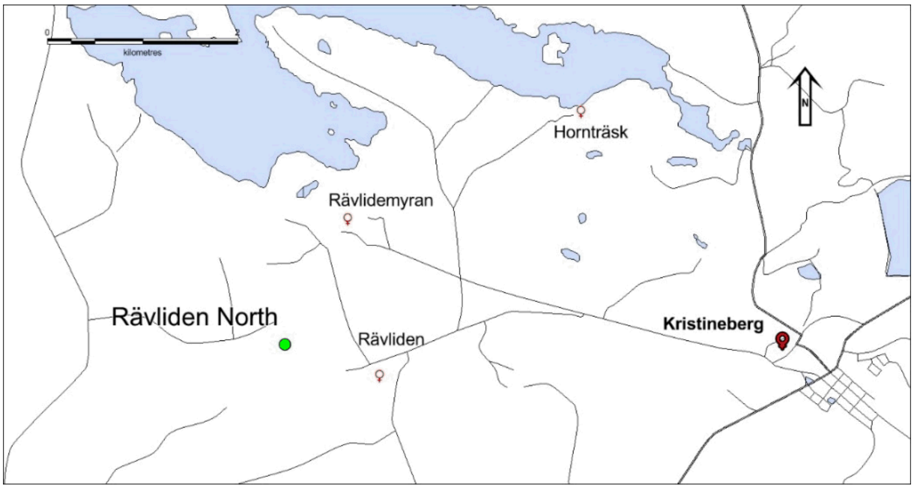

Figure 3. Schematic map of the Kristineberg Camp

The Kristineberg Mine's local coordinate system ("KRIBERGSYSTEMET") is a translated and rotated local Cartesian coordinate system. The original definition of the translation of the origin was based on an old RT system of unknown age; however, the coordinates of the system have been verified according to SWEREF99 TM projection. In KRIBERGSYSTEMET, the Y and X axes are switched so that the relative longitudinal axis becomes Y and the relative latitudinal axis becomes X. Both Rävliden North and the Kristineberg Mine are currently using KRIBERGSYSTEMET.

3.4 History

A summary of the history of the Kristineberg mine is presented in Table 4. Since 1940, the mine has been in continuous operation. In total during this time, the mine has produced around 33.8Mt of mineralised material with average grades of 1.2g/t Au, 37.1g/t Ag, 1% Cu and 3.7% Zn.

Table 4: Brief history of the Kristineberg mine

Year	Events
Pre-1918	Mineralised boulders found on surface in the vicinity of Kristineberg, however no mineralised bodies found in bedrock due to thick glacial cover. Exploration activities commence.
1918	Mineralised body found in the subsurface by Boliden's Electro Magnetic geophysics.
1940	First production year in Kristineberg. Approximately 40,000t of mineralised material was produced.
1943	Cable skip transport was constructed between Boliden and Kristineberg in order to transport mineralised material to the BAO Processing Plant.
1968	The central shaft was sunk to the 790m level. The crusher and the skipping station were placed at the 690m and 751m levels respectively.
1979-1983	The main ramp was built in order to connect the 690m level to the surface.
1991	Mill and Process plant decommissioned
1993	The main ramp reaches the 1000m level
1996	Decision taken to develop the main ramp down to 1100m level. Einarsson Zone (E-Zone) is intersected.
2000	The decision is taken to build a cyanide leach facility in the BAO Process Plant. Production from the Einarsson Au/Cu Zone in Kristineberg begins. Intersection of the K-Zone.
2001	J-Zone is intersected by exploration drilling.
2002	Production starts from the K-Zone (Zn).
2004	L-Zone is intersected by exploration drilling following up on a downhole geophysical anomaly. Production starts in the J-Zone.
2006	M-Zone is intersected by drilling.
2010	Pre-Feasibility on the L-Zone is completed. Development of drifts towards the L-Zone is started. Silver Zone is intersected by drilling. Tommy and Raimo mineralisations intersected with drilling.
2011	K-Zone mined out.
2012	L-Zone production started.
2014	E-Zone mined out. M-Zone extension to the west discovered through drilling.
2015	Rävliden Norra added to Kristineberg's Mineral Resources after a field exploration campaign around the abandoned Rävliden and Rävlidmyran mines.
2016	Drifting started between Kristineberg L-Zone and Rävliden North total 3km. Update to Raimo & Tommy Mineral Resource
2020	Test Mining Rävliden North and Ag1-7. Updates to Rävliden North and A-Zone Mineral Resources. Rävliden Feasibility Study initiated.
2021	Feasibility study Rävliden North concluded. Raimo Mineral Resource estimation. Construction on Ola Orten started. Mining of Raimo mineralisation started.
2022	Test mining in Rävliden North. Updates to LW, JB and Rävliden North Mineral Resources

3.5 Ownership

The Kristineberg Mine is 100% owned by Boliden Mineral AB. No other owners have operated on the property. All Mining permits within the Kristineberg Area are subject to a standard legally prescribed royalty of 0.2% of the annual value of metal recovered after mineral processing. Calculation and other details of this royalty is also governed by the Minerals Act. According to this law the royalty payment is to be distributed at a rate of ¾ to the surface owner and ¼ to the Swedish state. No additional royalties currently apply to the Kristineberg Mine.

3.6 Environmental, Social and Governance (ESG)

Boliden Mineral AB is in possession of all required permits required to mine Zn, Cu, Pb, Ag and Au at the Kristineberg Mine, in addition to owning wholly the rights for exploration covering the Kristineberg Mine and much of the surrounding area. Exploration and Mining permits are issued by Bergstaten and are governed by the Minerals Act (1991:45), issued on the 24th January 1991, which came into force on the 1st July 1992.

3.6.1 Existing permits

Boliden Mineral AB is in possession of all required permits required to mine Zn, Cu, Pb, Ag and Au at the Kristineberg Mine, in addition to owning wholly the rights for exploration covering the Kristineberg Mine and much of the surrounding area. Mining concessions and exploration permits are issued by the Mining Inspectorate of Sweden (Bergsstaten) which is part of the Geological Survey of Sweden (SGU). Summary details of these permits and concessions are presented below and can be found at https://www.sgu.se/en/mining-inspectorate/.

3.6.1.1 Exploration Permits

Boliden Mineral AB wholly owns exploration permits around much of the Kristineberg mine. Valid exploration permits are presented in Table 5. A map of valid exploration permits around the Kristineberg Mine and Rävliden North are displayed in Figure 4.

Table 5. Valid exploration permits which are held by Boliden Mineral AB around the Kristineberg Mine

Name	Owner	Area (ha)	Mineral	Valid from	Valid to
Kristineberg nr 1012	Boliden Mineral AB	125.74	Zn	2010-10-26	2027-10-26
Kristineberg nr 1013	Boliden Mineral AB	106.17	Zn	2012-11-07	2024-11-07
Kristineberg nr 1014	Boliden Mineral AB	81.22	Zn	2013-01-24	2025-01-24
Kristineberg nr 1016	Boliden Mineral AB	4027.40	Zn, Cu, Ag, Au	2016-01-19	2024-01-19
Kristineberg nr 1017	Boliden Mineral AB	136.96	Zn, Cu	2016-05-27	2024-05-27

Kristineberg nr 1019	Boliden Mineral AB	826.96	Zn, Cu, Ag, Au	2018-01-11	2026-01-11
Kristineberg nr 1020	Boliden Mineral AB	3022.10	Zn, Cu, Pb, Ag, Au	2018-06-05	2026-06-05
Kristineberg nr 1021	Boliden Mineral AB	584.13	Zn, Cu, Ag, Au	2020-03-04	2025-03-04
Kristineberg nr 1022	Boliden Mineral AB	4307,09	Zn, Cu, Pb, Ag, Au	2021-03-10	2024-03-10
Kristineberg nr 1023	Boliden Mineral AB	1057,1053	Zn, Cu, Pb, Ag, Au	2021-04-21	2024-04-21
Rävliden nr 1006	Boliden Mineral AB	930.56	Zn, Cu, Pb, Ag, Au	2019-03-04	2024-03-04

3.6.1.2 Exploitation Concessions

Boliden Mineral AB wholly owns the exploitation permits as presented in Table 6. A map of the exploitation permits is presented in Figure 4.

A permit application for Kristineberg K nr 8 which covers a small extension of the Raimo mineralisation is ongoing.

Table 6. Valid Exploitation permits which are held by Boliden Mineral AB around the Kristineberg Mine

Name	Owner	Area (ha)	Mineral	Valid from	Valid to
Kristineberg K nr 1	Boliden Mineral AB	68.2950	Zn, Cu, Pb, Ag, Au	1998-02-20	2023-02-20
Kristineberg K nr 2	Boliden Mineral AB	257.2557	Zn, Cu, Pb, Ag, Au	2000-01-01	2025-01-01
Kristineberg K nr 3	Boliden Mineral AB	20.2031	Zn, Cu, Pb, Ag, Au	2001-10-16	2026-10-16
Kristineberg K nr 4	Boliden Mineral AB	37.3106	Zn, Cu, Pb, Ag, Au	2001-10-01	2026-10-01
Kristineberg K nr 5	Boliden Mineral AB	204.4713	Zn, Cu, Pb, Ag, Au	2007-09-07	2032-09-07
Kristineberg K nr 6	Boliden Mineral AB	77.8600	Zn, Cu, Pb, Ag, Au	2018-10-16	2043-10-16
Viterliden K nr 1	Boliden Mineral AB	31.9353	Zn, Cu, Pb, Ag, Au	2002-08-26	2027-08-26
Kimheden K nr 1	Boliden Mineral AB	63.9905	Zn, Cu, Pb, Ag, Au	2002-12-05	2027-12-05

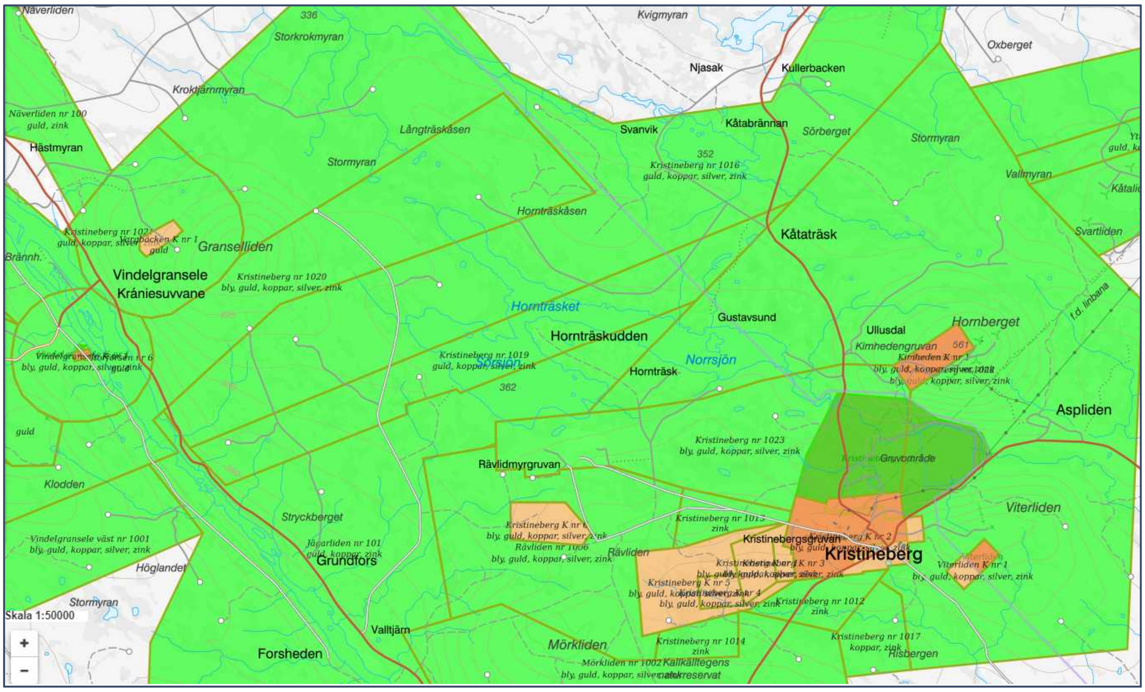

Figure 4. Map of the Kristineberg Mine with Exploitation permits (beige), and exploration permits (green).

3.6.1.3 Environmental Permits

The Kristineberg Mine has a valid environmental permit from the Swedish Environmental Court issued in 2014 with an amendment in 2018 and 2022, shown in Table 7. The Permit is valid for the life of mine under current operating conditions and production levels, any major changes in operations, increase in production or changes to discharge will require a new permit. The permit is in accordance with Swedish national environmental legislation and European Union mining regulations.

Table 7. Valid Environmental permits held by Boliden Mineral AB for the Kristineberg Mine

Owner	Permit	Date
Boliden Mineral AB	Umeå Tingsrätt M 1993-12 Deldom 2014-04-30	2014-04-30
Boliden Mineral AB	Umeå Tingsrätt M 1993-12 Deldom 2018-02-09	2018-02-09
Boliden Mineral AB	Umeå Tingsrätt M 1993-12 Deldom 2022-06-30	2022-06-30
Boliden Mineral AB	Umeå Tingsrätt M 992-21 Deldom 2022-06-30	2022-06-30

The Environmental permit for the Kristineberg Mine encompasses the following aspects:

- production rates for mineralised and waste rock,
- placement of waste rock, management of waste rock
- water management and water treatment,
- discharge water quality,
- noise and vibrations associated with blasting, transport and other operations,
- monitoring programs for dusting, noise, and water quality,
- dam safety and management,
- mine closure and rehabilitation,
- the economic security for mine closure and rehabilitation,
- chemicals and chemical management.

3.6.2 Necessary Permits

The capacity of the tailings management facility at BAOPP is sufficient to include material from the Kristineberg life of mine plan (LoMP) up to and including 2028. The final two to three years of production are expected to exceed the existing tailings dam capacity. It is not certain at this stage how the balance of this tailings material will be accommodated. Studies are however ongoing, a suitable capital provision has been made, and it is reasonable to assume that an appropriate solution will be selected in good time for necessary permitting, design and construction to take place.

3.6.3 Environmental, Social and Governance considerations

3.6.3.1 ESG Commitments

Our business model set our ESG priorities, and take into consideration the risks and opportunities identified by business intelligence and risk mapping, as well as applicable requirements and expectations such as:

- Stakeholder expectations
- Current and potential legislative trends

- ISO 9001, 45001, 14001 and 50001 standards and Forest Stewardship Council (FSC® COC-000122)
- OECD Due Diligence Guidance for Responsible Supply Chains of Minerals from Conflict-affected and High-risk Areas
- GRI Standards (Global Reporting Initiative)
- UN Sustainable Development Goals (SDGs)
- UN Global Compact
- ICMM Mining principles

We regularly consult prioritized stakeholder groups on our sustainability performance from a broader perspective. These stakeholders are asked to comment on Boliden's performance to drive further improvement.

Boliden is a member of ICMM and the national mining associations in the countries where Boliden Mines operates. These commitments imply implementing relevant international and national Environmental Management System (EMS) standards and guidelines, such as, e.g., the Global Industry Standard on Tailings Management on an international level and Mining RIDAS on a national level. In addition to this, Boliden Mines is certified according to a series of standards, such as:

- ISO 14001:2015 - Environmental management systems.
- ISO 45001:2018 - Occupational health and safety management systems.
- ISO 50001:2018 - Energy management systems.

Boliden has implemented an integrated management system (Boliden Management System, BMS) which sets a common base for all activities developed within the company. Boliden strive to run a responsible business and expect it´s business partners to do the same. Good business ethics is essential for sustainable and successful business. Boliden has an ethics and compliance department to boost its compliance work. The department is responsible for the strategic development and coordination of Boliden's work regarding anti-money laundering, anti-corruption, competition law, sanctions, human rights, data protection, whistleblowing and Boliden's employees and management work together to create a compliance culture in which everyone knows what is expected of them - Boliden's codes of conduct. Regular risk assessments, trainings, audits and effective controls are important parts of Boliden's compliance efforts. The Group's whistleblower channel enables all employees and external stakeholders to report suspected and actual misconduct confidentially and anonymously. If misconduct is proven, disciplinary actions must be taken. Reprisals against anyone reporting misconduct in good faith will not be tolerated. Group management and the Board of Directors receive regular reports on risks, non-compliance and the status of initiatives in progress.

Boliden's Code of Conduct provides a framework for corporate responsibility based on the company's values and ethical principles. All employees and members of the Board are subject to the Code, which is based on international standards and relevant legislation. As a complement to the Code, there are internal policies that all employees are expected to comply with. Boliden strives for a sustainable value chain and therefore applies an overarching business ethics and risk management strategy when selecting business partners. The Business Partner Code of Conduct reflects the requirements placed on Boliden's own organization and sets the lowest standard of ethical conduct required of all parties in the value chain, whether Boliden is the buyer or seller. As with the internal Code of Conduct, this code is based on international standards such as the UN's Global Compact, the ILO's standard core conventions and guidance from the OECD. Compliance and sustainability risks are assessed when selecting business partners. If there is a risk of non-compliance by a business partner, a more detailed review is made. Depending on the outcome, an action plan may be developed and agreed upon, or the business relation may be terminated or rejected.

Boliden is a member of the United Nations Global Compact and works constantly to implement its ten principles, including preventing and limiting negative impact in the own operations and those of its external business partners. Boliden runs operations in countries where the risk of human rights violations is considered low. No operations are conducted anywhere in UNESCO's World Heritage List. Boliden supports the right of indigenous peoples to consultations under Svemin's interpretation of Free, Prior and Informed Consent (FPIC). Other important aspects are fair working conditions and the position Boliden has adopted against any form of harassment, discrimination and other behavior that may be considered as victimization by colleagues or related parties. In addition to this, aspects such as child and forced labor as well as the freedom to form and join trade unions are taken into account when evaluating business partners.

Anti-corruption forms a central part of the ethics and compliance work, and Boliden has a zero tolerance policy regarding all types of bribery and corruption. Boliden has an anti-money laundering policy for identifying and managing risks in various parts of the business and to strengthen its anti-money laundering efforts.

3.6.3.2 Socio-economic impact

In the overview plan for Lycksele municipality from 2006 the Skellefteå district-Kristineberg area is named as an important area for the development of industry. The mining industry is described as very meaningful to the economy with the creation of direct and indirect jobs and the effects on other businesses.

The overview plan emphasizes measures that important industry in the area must be promoted as they are important for the municipalities development. The mining industry is described as being able to provide positive development in the region over the coming 30-40 years if mining occurs. A mining operation has large synergy effects within trade, maintenance and transport.

The expansion project at Rävliden is in good agreement with the municipalities overview plan and is necessary for the continuation of the Kristineberg Mine. The mine is also a very important employer within Malå and Lycksele municipalities.

3.6.3.3 Communities and landowners

The mine is located on the property designated Kristineberg 1:215 and is wholly owned by Boliden. The Kristineberg Mine is located directly next to the Kristineberg community. The area, including the existing mine and associated infrastructure, are designated as an area of national interest for mining. Vormbäcken is the recipient of discharge water from Kristineberg Mine's operations and is a tributary to Vindel River, which is a nationally protected river and classed as a Nature 2000 area. The Malå, Gran and Svaipa Sami villages have reindeer migration routes of national interest through the area, as per EIA (MKB, 2021), attachment C. There are no other national interest areas or protected areas.

The Kristineberg Mine has been in operation since 1940. The mine operated as 4 smaller open pits prior to the development of underground infrastructure. Until 1991 there was a mill and concentrator on site. The tailings from the concentrator were deposited in five tailings facilities in the valley below the mine. All of the tailings facilities, with the exception of Magazine 4, have been closed and reclaimed or are being reclaimed. Today Magazine 4 functions as a settling pond after water treatment with slaked lime. A small quantity of waste rock is temporarily stored in the footprint of Magazine 2, this rock will be used as fill under the life of the mine.

Land usage in the area around the Kristineberg Mine is predominately forestry and reindeer herding and grazing. Hunting, fishing and other outdoor activities also take place here. Boliden maintains good working relationships with the Sámi people and forestry companies.

The nearest inhabited area is the Kristineberg community, with houses located approximately 200 m from the industrial area. There are approximately 195 residents in Kristineberg. There are also a few small villages and single homes located approximately 2 km from the industrial area.

For the Rävliden project, a delimitation consultation was undertaken with the county environmental board (the regulator), and individuals who are assumed to be affected by the mine, as well as other national regulators, the municipality and the general public under April and May of 2020.

The general public was informed of the consultation via advertisement in the local newspapers and on the company's website. An additional consultation was held April 28th, 2020 via Skype. There has not been an in person consultation with the general public due to the continued restrictions associated with the spread of the Covid-19 virus. The advertisements were published the 2nd of May, 2020 in the newspaper Norran.
All of the views received have been addressed in the work completed for the permit application and associated background information.

3.6.3.4 Indigenous People

The Kristineberg Mine is located within the Sami villages Måla and Grans total reindeer grazing area. Svaipa Sami village has reindeer migration routes that pass through the area. The current condition of Reindeer husbandry, the impact of the industry and the effects and consequences associated with the mining operation are described in a reindeer husbandry analysis which was developed in consultation with the Sami villages as part of the EIA (MKB, 2021).

3.6.3.5 Historical legacy

There are a number of closed mines in the area, including the Rävliden field, and Kimheden that were closed over 15 years ago. Only complementary closure and rehabilitation measures are ongoing.

3.7 Geology

3.7.1 Regional

The Kristineberg Camp is located on the western extent of the Skellefte district (Figure 5). The Skellefte district is a Paleoproterozoic (1.89 Ga) Volcanic sedimentary area located in Västerbotten, northern Sweden. The area stretches roughly 100 km from the village of Kristineberg in the west to the village of Boliden in the east. The Skellefte district hosts more than 85 VHMS deposits, of which 26 have been, or are currently hosting mining operations.

The VHMS deposits of the area are mostly hosted in the upper parts of a volcanic sequence of intermediate to felsic juvenile volcanoclastic rocks, sub volcanic intrusions and lavas. These rocks together form the Skellefte group, which in turn is the lowest stratigraphic sequence in the Skellefte district. (Allen, Weihed, & Svenson, 1996).

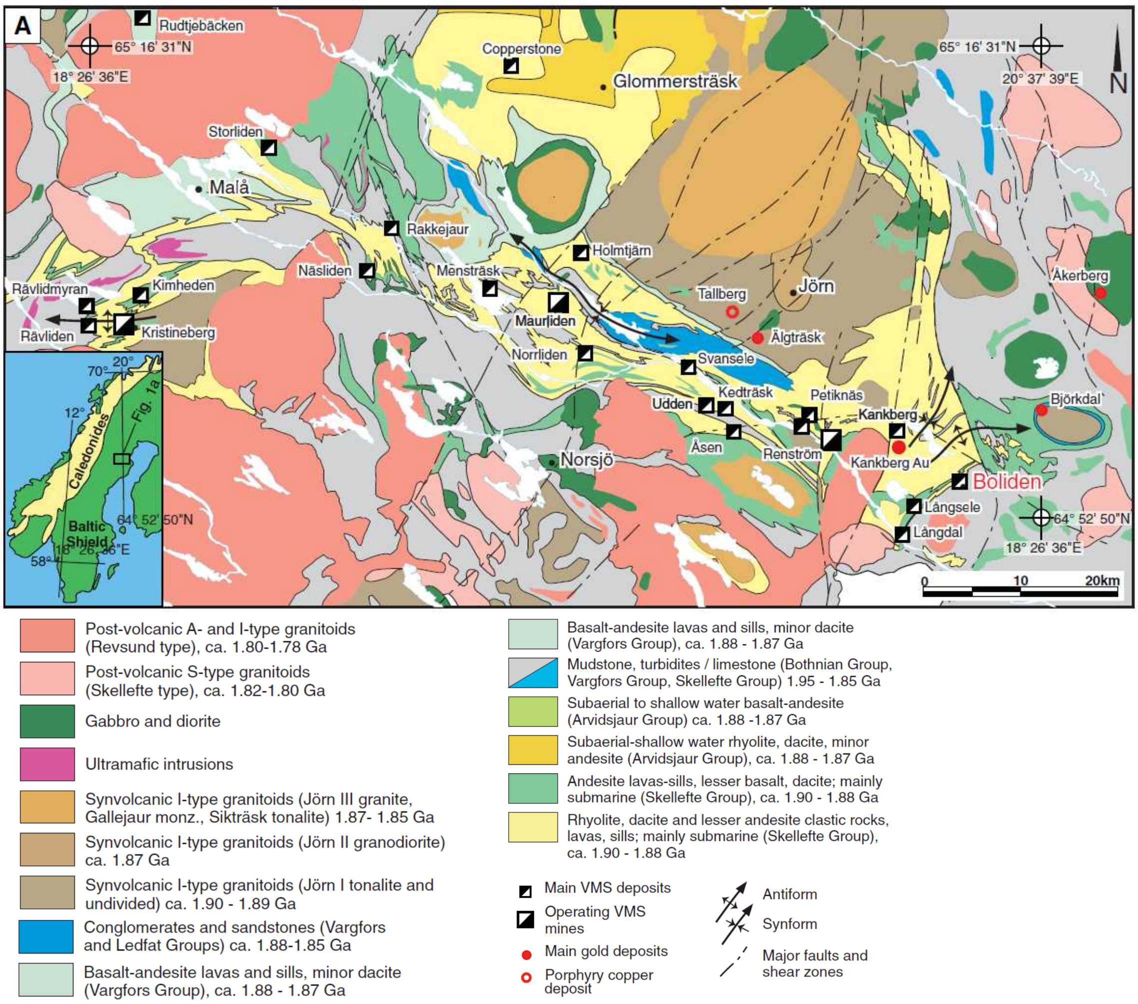

Figure 5. Regional geologic map of the Skellefte District (from Mercier-Langevin et al. (2012), modified after Allen et al. (1996))

The rocks of the Skellefte group in turn are overlain by the Vargfors group, a unit of shales, tubiditic clastic sedimentary rocks and conglomerates. There are local intercalations of volcanic rocks and rare occurrences of limestone.

The Skellefte District is bordered by syn-volcanic granitiods to the north and south. Peak metamorphism is interpreted to have occurred at ~1.84-1.82 Ga and reached upper green schist facies, and amphibolite isograds at the margins to the west and south. (Allen et al., 1996).

3.7.2 Local and property

The Kristineberg Camp mineralisations of the Kristineberg Mine and surrounding mineralisations of Rävliden, Rävliden North, Rävlidmyran, Hornsträsksviken and Kimheden are considered examples of VHMS mineralisations (Figure 6).

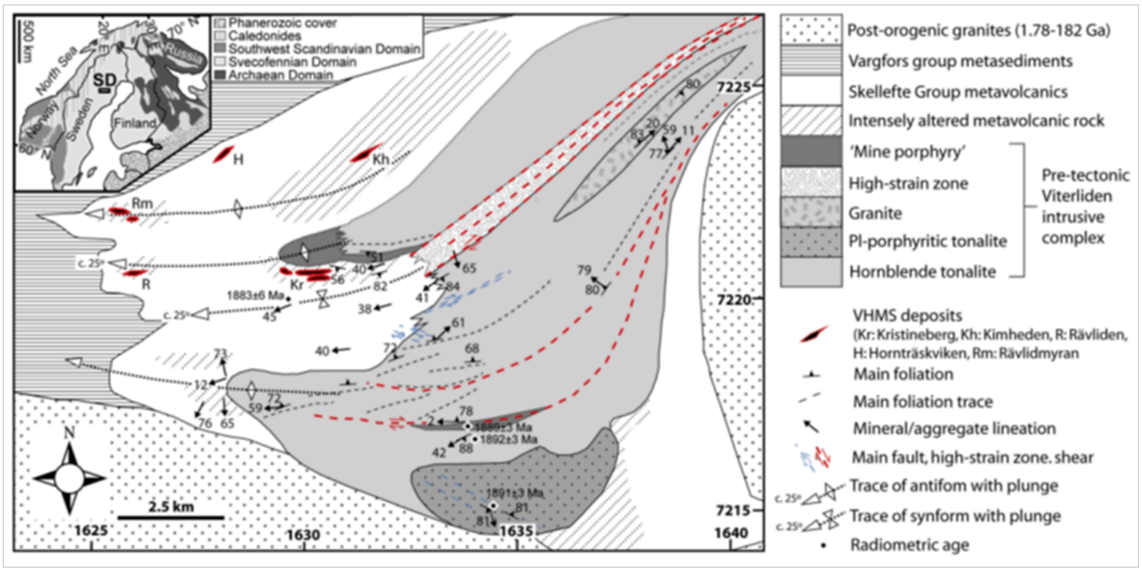

Figure 6.Geologic map showing the Kristineberg Camp, and associated VHMS deposits. Modfied after (Skyttä, Hermansson, Andersson, Whitehouse, & Weihed, 2011)

The mineralisations of the Kristineberg Camp are situated on separate stratigraphic horizons that relate to differing ages and mineralisation events. The economically important Kristineberg Mine mineralisations as well as the Kimheden mineralisation are located on the "Kristineberg Horizon" and Rävliden North deposits are located on the "Rävliden Horizon" together with the Rävliden and Rävlidmyran mineralisations (Lindberg, 1979). The Rävliden horizon is hypothesised to be representative of a distinct stratigraphic and chemostratigraphic shift in the lithology where replacement deposits have been emplaced, whereas the Kristineberg Horizon is assumed to be representative of more primary mineralisation emplacement following a more traditional VHMS formation model (Jansson & Fjellerad Persson, 2014).

The Rävliden North and Kristineberg Mine mineralisations are located within "local" antiformal structures. Rävliden North consists of two major first order antiforms and an intervening synform, or major shear zone (Jansson & Fjellerad Persson, 2014). The Kristineberg Mine mineralisations are located within multiple layers of stacked "lenses" of intensely chlorite altered schists which have been accumulated by thrusting and associated crustal shortening in a NNE-SSW direction (Hermansson, 2012).

3.7.3 Mineralisation

3.7.3.1 Kristineberg Mine

Table 8 summarizes current and historical mineralisations within the Kristineberg mine, along with a brief and general description of the mineralisation types: Of the listed mineralisations, the L-Zone, Koppar Klumpen and Raimo are currently being mined. An overview of the mine and its mineralisations can be found in Figure 7.

Table 8. Summary table of mineralisations that are currently and have been present within the Kristineberg Mine

Mineralisation	Type	Host Rock	Metals	Status
A-Zone	VHMS	Chlorite Schist	Cu-Zn-Au	Historic
B-Zone	VHMS	Chlorite Schist	Cu-Au	Historic
E-Zone	VHMS	Quartzites	Au-Cu	Historic
J-Zone	VHMS	Chlorite Schist	Zn-Cu-Au	Historic
K-Zone	VHMS	Chlorite Schist	Zn	Historic
M-Zone	VHMS	Chlorite Schist	Zn-Cu	Historic
L-Zone	VHMS	Chlorite Schist	Zn-Cu-Au	Mining Area
Koppar Klumpen	VHMS	Chlorite Schist	Zn-Cu	Mining Area
Raimo	VHMS	Chlorite Schist	Zn-Cu	Mining Area
Ag-Zone	Remobilised	Quartzites	Ag-Pb	Mineral Resource

Mineralisations of the Kristineberg mine are hosted in steeply-gently dipping Chlorite Schist lenses, with a gentle plunge towards the SW. The mineralisation generally appears as two “arms”, the southern arm consisting of the B-, E-, J-, K-, M-,and Ag-Zones as well as Raimo, see Figure 7. On the northern “arm” lies the L-Zone and A-Zones. Mineralisations can be generally split into two types:

- Chlorite Schist hosted mineralisations, and
- Ag-Pb “remobilised” mineralisation.

Chlorite schist hosted mineralisation generally contains sulphide mineralisation that is semi-massive to massive in nature with variable abundances of economically important minerals: chalcopyrite (CuFeS2), sphalerite ((Zn, Fe)S) and galena (PbS), with minor silver and gold. The schists themselves contain variable amounts of muscovite, quartz, chlorite, phlogopite, biotite, cordierite, andalusite, pyrite and magnetite. The chlorite schists appear as lenses within colloquially named “quartzites” which are hypothesised to be highly altered rhyolitic to dacitic rocks (Barrett & MacLean, 2000). Chlorite, cordierite, sericite and andalusite as well as quartz, overprint the original rock textures making primary rock identification difficult.

The “remobilised” Ag-Pb type is hosted within silicified cordierite and chlorite quartzites. Five silver bearing minerals are present within the Ag-Zone; freibergite ((Ag,Cu,Fe)12(Sb,As)4S13) being dominant with minor amounts of hessite (Ag2Te) often present. High silver grades are often present in narrow zones associated with galena veins or fracture fillings.

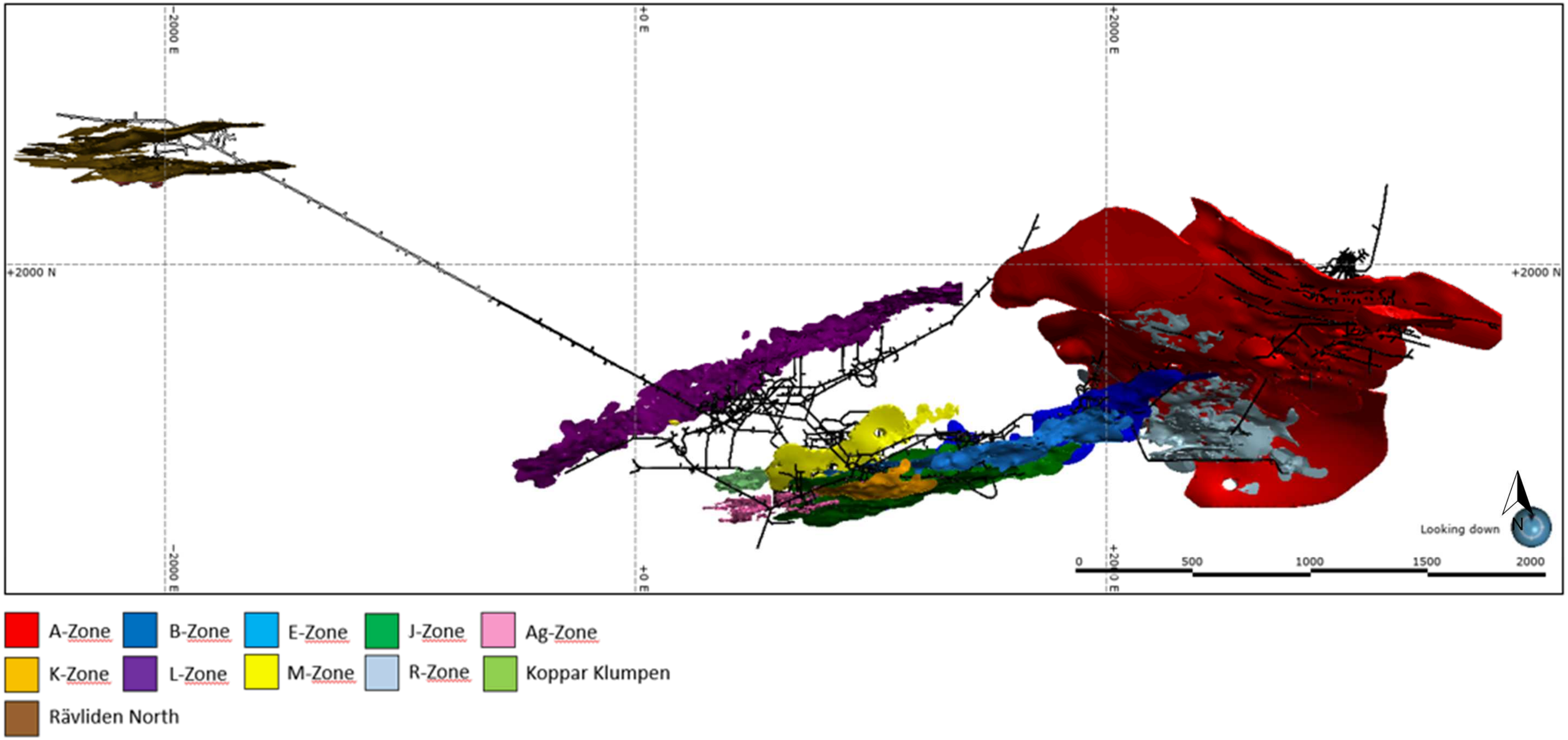

Figure 7. Overview map of mine and location of mineralisations. This map does not show Mineral Resources. This image is taken from a previous working geological model of the mine and is updated as of December 31st 2022. Mine infrastructure is shown in black. This map displays coordinates in KRIBERGSYSTEMET.

3.7.3.2 Rävliden North

Exploration drilling and direct structural measurements in oriented core (Jansson & Fjellerad Persson, 2014) suggest that Rävliden North constitutes a sub-vertical to steeply S-dipping, c. 5 to 25m wide and c. 150 m high mineralised lens, or system of lenses, with a length extent of at least 900 m along plunge (See figure 7). Mineralisation types can be split broadly into two categories:

- massive to semi-massive sphalerite-dominated mineralization, and
- breccia-type Cu-Zn mineralization.

The sphalerite-dominated mineralisation is most commonly associated with tremolite skarns, talc schists, chlorite schists and dolomitic marble. The massive sphalerite mineralization locally carries porphyroblasts of pyrite. Furthermore, it has been observed to be accompanied by zones of massive pyrrhotite mineralisation. Locally, the pyrite porphyroblasts are gathered in bands, giving the mineralisation a crudely banded appearance.

Sulphide-bearing stringers, veins and breccias are present stratigraphically and structurally below the sphalerite mineralization. Large parts of these zones are dominated by pyrrhotite and pyrite, and only carry traces of sphalerite and chalcopyrite. A c. 10-30 m wide part of this zone proximal to, and stratigraphically directly below, the main sulphide lens carries substantially elevated contents of chalcopyrite in association with minor idiomorphic arsenopyrite crystals and sphalerite. Grades are in the range of c. 2-3 % Cu over several meters, and network-style breccias are a common texture.

Lithologically, these zones are predominantly associated with strongly to intensely silicified footwall rhyolite (in which the sulphides are hosted by hydraulic breccias) and strongly to intensely chlorite-altered (dark green) footwall rhyolite. In schistose parts of the latter, the sulphides form a subtle (compared with the veins) but strong impregnation. In contrast, the more common quartz-sericite-altered footwall rhyolite appears to be less endowed in metals, even though it commonly carries minute crystals of pyrite.

Even though the deposits of Rävliden and Rävlidmyran appear to be bound to a certain stratigraphic interval, no universal stratigraphic marker horizon for this given interval has been recognised. Consequently, it is to a large extent identified based on alteration patterns as primary textures are rarely preserved. (Jansson & Fjellerad Persson, 2014).

3.8 Exploration procedures and data

3.8.1 Drilling techniques

Current drilling for Near Mine exploration and Mine infill drilling is carried out by the mine's own drill rigs, as well as contractors. The drill rigs which are currently being used are Atlas Copco rigs of model Diamec PHC 4 or PHC 6 which are adapted to drill a 39mm drill core from a wireline 56 system. In addition to these drill rigs the Mine infill drilling also use 2 Atlas Copco rigs of model Diamec PHC 4 adapted to drill 28 mm drill core from a wireline 46 sytem.

Core is retrieved using a typical wireline and overshot system on the core barrel. When the core is retrieved by the driller, the core is placed carefully into a core box and labelled according to depth. Each run is marked by a core block with its corresponding depth written onto the block. Core boxes are transported to the Kristineberg Mine core shed facilities for logging by a geologist.

3.8.2 Downhole surveying

Near Mine Exploration and Mine Geology departments principally use a DeviGyro down hole gyroscopic deviation tool for hole surveying. A combined deviation and BHEM sonde is used for smaller diameter grade control drill holes for surveying. The BHEM tool utilises a non-magnetic accelerometer and gyroscopic instrument for deviation measurements.

Once the measurements are completed, the data is sent to Boliden's Geodata department, which validates the data and inputs it into the database. The project responsible geologist will verify the survey measurements.

3.8.3 Sampling

Apart from by drilling, there are no other samples routinely taken of in-situ rock. Exploration holes are sampled as half-cores, where core is split length-ways by diamond saw and one half is sent for assaying. The other half is stored for reference. From the mines infill drilling, of those intersections that are sampled, the whole core is submitted as samples. Un-sampled core is stored for a short period of time, after which it is discarded.

Core loss is minimal and is logged as a separate rocktype. The sampling is always broken so as to not have samples extending over coreloss.

3.8.4 Logging

Drill core is logged at Boliden Mineral AB's core logging facilities in Kristineberg and Boliden. Logging data is captured in WellCAD™ software and data is uploaded to an acQuire™ database.

The following fields are logged:

- Rock type acronym.
- Other minerals, sphalerite, galena, chalcopyrite, arsenopyrite, pyrrhotite, pyrite.
- Rock mechanical structures – gouge, disking, crushed drill core – on a 1 to 5 scale: rare, moderate, common, abundant, pervasive.
- Comments. May include small amounts of e.g. gouge, where too small for above logging.

- The start and ends of samples are assigned and length is adjusted to fit with lithological contacts. Length of samples are aimed at 2 m and usually vary between 0.5 and 2 m.

All core is photographed, and the photos stored and made available online to Boliden staff.

3.8.5 Density

Starting in early 2022, pulp density measurements was added as a part of the standard assay suite for Kristineberg. Previously, density in the mine was calculated by a density formula given below:

Density = 0.0043*Cu+0.004*Zn+0.02*Pb+0.0375*S+0.027*As+2.70

Non-mineralised rock was given a density of 2.7. The density formula is based on a regression formula based on test work which was completed historically (Larsson & Agmalm, 1994). A verification of the formula was completed in 2002 (Agmalm, 2003) which concluded that the density formula was suitable.

Density samples have been taken in the Rävliden Norra deposit routinely since 2012, to confirm the above regression formula with satisfactory results (McGimpsey, 2018). During estimation and reporting of tonnages, density calculated from the standard density formula is used.

3.8.6 Analysis and QAQC

Samples from the Kristineberg mine are sent to ALS in Piteå or Malå for preparation, completed using the Prep 31 method to prep the samples for analysis. This involves drying and fine crushing of the core material to 70% passing 2 mm, splitting, and finally a pulverisation stage to 85% passing 75 μm to create the pulps for analysis.

Samples are sent from ALS Piteå prep lab to ALS Loughrea or Vancouver for further analysis. ALS Vancouver and Loughrea are accredited laboratories, completely independent from Boliden AB. ALS Vancouver and Loughrea are accredited under ISO:17025:2017, with the scope of accreditation covering the analysis methods used for the Kristineberg Mine.

Samples from the Rävliden North are sent to MS Analytical ("MSA") in Stensele, Sweden. Upon arrival at MSA the samples undergo the prep method "PRP910" where the sample is crushed to 2mm, split into 250g sub-sample and pulverized to 85% passing 75μm to create pulps for analysis. The pulps are then sent to the MSA laboratory in Langley, Canada for analysis. The laboratory is accredited by the International Accreditation Service under ISO 17025:2017, and as of July 2nd 2021 is accredited for ICP-140.

Starting in 2023 the samples from Kristineberg mine and Near Mine Exploration will be sent to MS Analytical for analysis using the same method as at Rävliden. The MSA analytical method includes more elements than the current ALS method, which may provide better data for geochemical interpretation. This change will also simplify geochemical comparison between deposits.

Analysis packages used are presented in Table 9.

Table 9. Analysis packages used at The Kristineberg Mine and Rävliden North Mineral Resource

	Prep	Cu	Zn	Pb	Ag	As	Au	S
ALS Analysis Package	Prep-31	OG46	OG46/ME-ICPORE (over range)	OG46	OG46	OG46	ICP21/GRA21 (over range)	IR08
MSA Analysis Package	PRP910	ICP140	ICP140	ICP140	ICP140	ICP140	FAS214	S-SPM210

Internal measures are taken within Boliden to ensure that tampering of core and other samples does not occur. In addition, internal procedures are in place to prevent contamination and spoiling of samples prior to packaging and shipping to preparation and analysis laboratories in order to preserve sample integrity.

Near Mine Exploration, Mine and Field Exploration teams use QAQC samples to verify the assay results returned from the laboratory.

All teams use the same QA/QC programme which consists of a combination of in-house and international standards. All standards used are certified reference materials having been analysed by round-robin at various external accredited laboratories. Blank samples are also used, as well as repeat duplicate samples completed internally by the laboratory. Pulp duplicates are also sent to umpire laboratories for external verification. The number of QAQC samples per batch depends on the number of samples in each batch, see Table 10 for the standard workflow.

Table 10: The insertion ratio of QAQC samples per sample batch.

No. of Primary Samples	QA/QC Samples Used	Blank Frequency	Standard Frequency	Check Assay Frequency	Core Duplicate Frequency
< 15	1 blank + 1 standard	5%	5%	0%	0%
16 – 50	1 blank + 1 standard + 1 pulp duplicate	2%	2%	2%	0%
51 – 75	2 blanks + 2 standards + 1 pulp duplicate	2.5%	2.5%	1%	0%
76 – 100	3 blanks + 3 standards + 1 pulp duplicate	3%	3%	1%	0%
100 samples	3 blanks + 3 standards + 1 pulp duplicate + 1 core duplicate	3%	3%	1%	1%

Assay results are verified by the geologist against geology logs and core photos, and any suspect results are sent back to the laboratory for re-analysis. Assay results are also validated when they are uploaded into the database and accepted by the geologist.

3.9 Exploration activities and infill drilling

The objective of the Kristineberg Near Mine Exploration group is to find new and develop existing targets to provide tonnage to the mine in 3-7 years' time. For the last 10 years Near Mine drilling has focused on developing and upgrading known mineralisations, together with a few new targets. Most of the known lenses are now delineated, or close to being delineated.

The plan for Kristineberg during 2022 was to increase the amount of exploration drilling in order to evaluate multiple targets throughout the year i.e., either move them up the "exploration funnel" or drop them from further action. The areas chosen for this in 2022 are illustrated in Figure 8 and outlined below:

- **O-zone** – underground drilling, potential new ore horizon 3-400 m south-east of currently known lenses. Chlorite schist with sphalerite mineralization encountered both 2020 and 2021, large potential in relatively untested area.
- **X**-**zone** – underground drilling, the Ag-zone and Kopparklumpen lenses are faulted off, possible continuation further west. Preliminary results from 2021 showed promising geology in upper part of drilled profile, further drilling was done in 2022, logging and interpretation is ongoing.
- **J-zone Down** – Underground drilling. The J-zone is poorly delineated downplunge, the results from 2022 drilling showed only small discontinuous lenses downplunge of the known lens.
- **L-West** – Drilling during 2022 to explore potential westwards of existing lenses.

In addition, the Near Mine Exploration group also completed infill/upgrade drilling to support grade/tonnage and resource evaluations to the mine. Areas planned for 2022 are illustrated in Figure 8.

- **A4-730** - underground drilling, to inferred-indicated categories. Large area with relatively thin (often <5m) mineralization but with good Cu-Au grades and close to infrastructure. May link to mineralized lenses in L-East, drilling, logging and geological interpretation is ongoing into 2023.
- **L-East** – Delineation drilling in 2022 to link in with the drilling on the lower part of A4, an MRE update is planned for 2023.

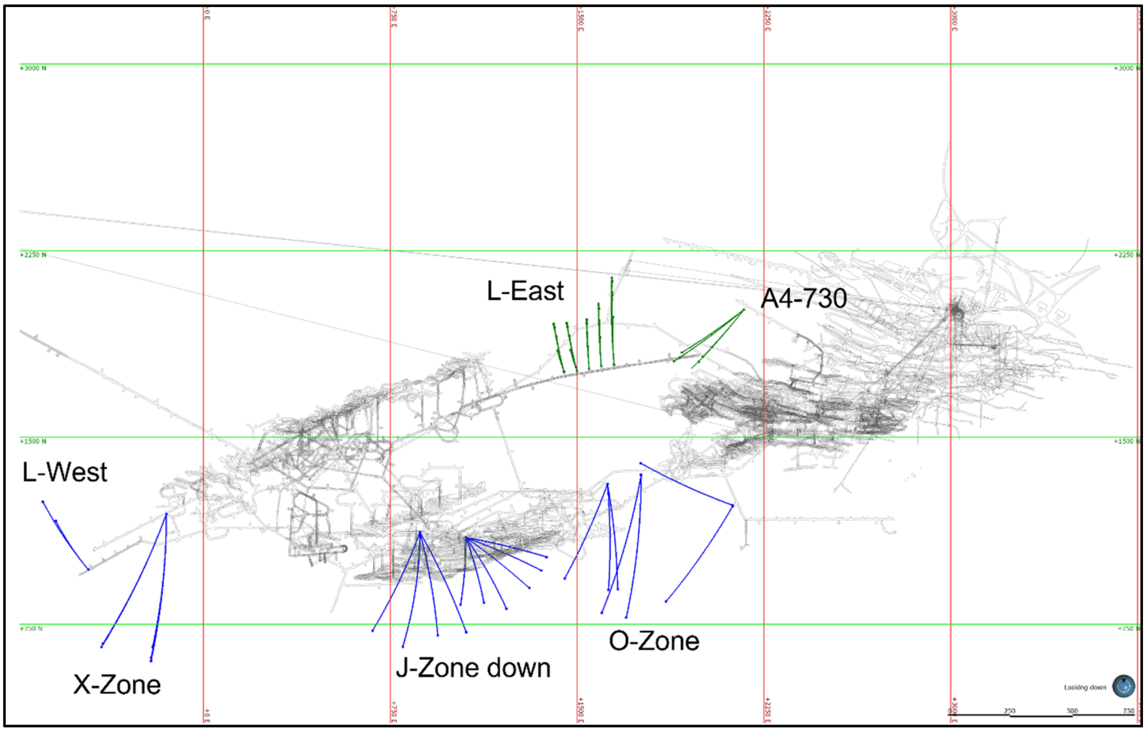

Figure 8: Top view of the Kristineberg Mine infrastructure with 2022 exploration holes coloured blue, and infill drillholes coloured green.

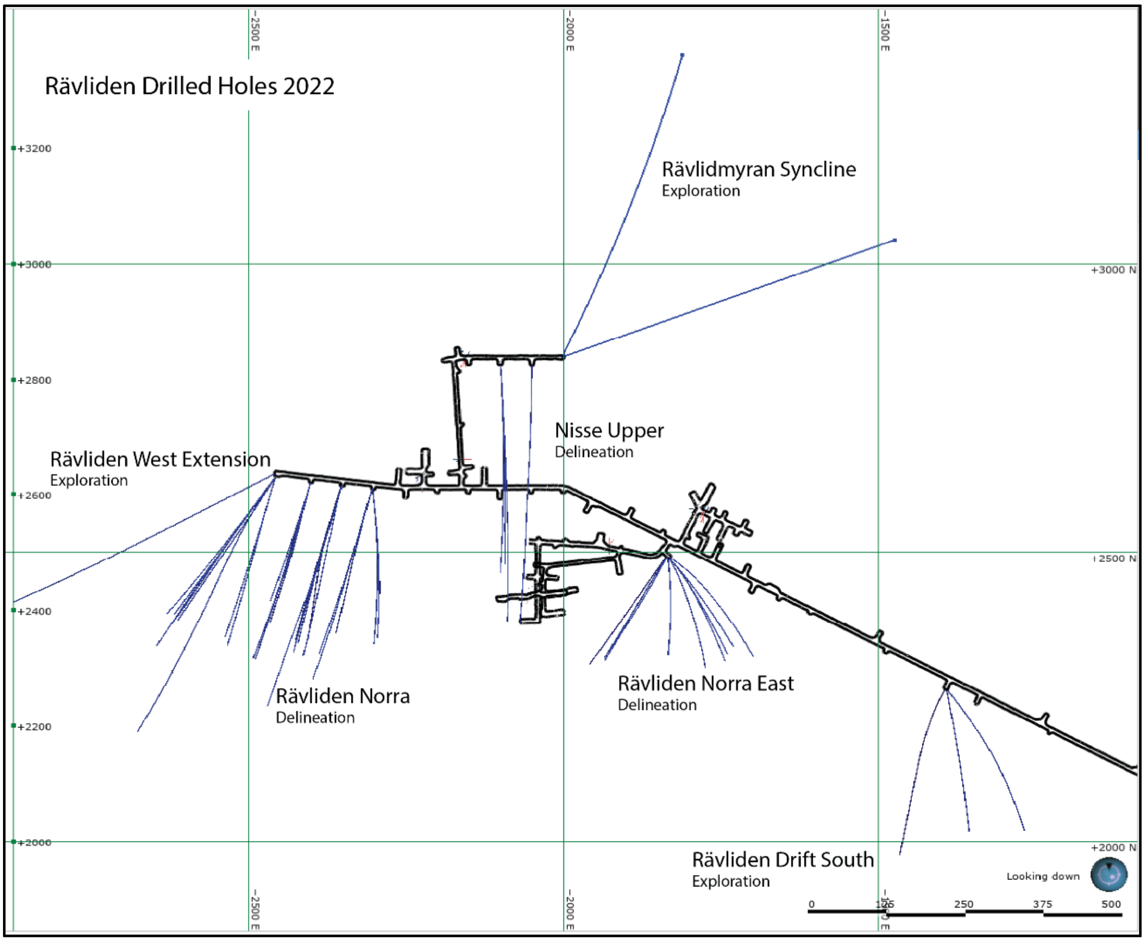

Figure 9: Top view of the Rävliden Mine infrastructure with this year's drill holes highlighted in blue.

In Rävliden, a major focus during 2022 has been to drill the Norra and Nisse lenses lens to indicated resources (approximately 40 x 50 m drill spacing) for the Rävliden MRE 2022. Drifting of the Nisse East drift finished 2022 with a total of 412 m. The drifting was done to access new drill site to be able to upgrade the upper parts of the Nisse lens. Drifting of Norra both towards the new Ola-ramp and the Test mining area with a total of 396 m was done in 2022. This drifting is ongoing and will continue in to 2023. Nisse West is planned to start and finish in 2023 giving access to new drill sites to extend the Norra lens at depth to the west.

The near mine project team have focused on the following targets during 2022 (Figure 9):

- **Rävliden Norra** – The majority off the drilling done in 2022 for delineation, upgrading the lenses to an indicated resource from inferred resource. Extra samples of previous drilling were taken to define the high-grade silver zone discovered in the area.
- **Rävliden West Extension** – Exploration drilling from underground to try to define the western extension of the lenses, however due to bad rock conditions with faulting and water resulted in aborted drill holes. Drilling from surface will be undertaken in 2023 to further define the area.
- **Rävlidmyran syncline -** Two drill holes finished and one ongoing towards Rävlidmyran syncline. Drilling and planning is a collaboration with field department

of targets. Logging is ongoing in 2023 with further drilling both underground and surface to be undertaken in 2023.

- **Rävliden Norra East** – Delineation drilling to upgrade the lower part of the eastern extension of the Norra lens.
- **Rävliden Drift South –** Exploration drilling of three holes to follow up a Zn-intersection intercepted in 2021. No major finds of extension of the Zn-rich intercept.
- **Nisse Upper** – Delineation drilling of the upper parts of the Norra lens and upgrade drilling of the Nisse lens. This drilling is ongoing and continues in 2023.

Field exploration work was comprised of drilling a couple of targets and fieldwork around Kristineberg and Vindelgransele area. Mapping and outcrop sampling was done with the objective to compile a comprehensive data set for a new geological map.

3.10 Mining methods, mineral processing and infrastructure

3.10.1 Mining methods

At the Kristineberg mine, cut and fill mining and drift and fill mining methods are utilised to mine the mineralised material underground. Generally, levels wider than 10m are mined with drift and fill mining. Both cut and fill and drift and fill are bottom-up mining methods, since the lowermost level is mined first, then backfilled either with Hydraulic Fill (HF) or with Cemented Hydraulic Fill (CHF) depending on the fill requirements. In all cases, waste rock from development headings is transported to the mined-out level prior to HF/ CHF filling in order to achieve better stability in the levels above and to avoid transporting waste rock to the surface. In levels with widths between 6-10m, slashing is used to mine any remaining mineralised material on the walls of the mining room. In the uppermost slices, residual mining is also practiced to mine the sill pillars.

In Kristineberg, if the geological and rock mechanical conditions allow, then mineralised bodies are mined with the so-called "Rill" mining method. In Rill mining, a variation of longitudinal open stoping, the mined stope is continuously backfilled with un-cemented rock fill to stabilise the unsupported walls of the stope. The stope height is usually 10-12 m between the roof of the underdrift to the bottom of the drift above.

The planned mining methods for the Rävliden mineralisation are a combination of in-ore along strike development (13%), and longditudinal (55%) and transversal stoping (25%). Approximately 7% of the mineralisation is designed as sill pillars.

Transversal stoping also applies a primary and secondary stoping sequence. Stope heights for both methods is 25 m and stope length for primary transversal stopes is 10 meters and 15 meters for secondary transversal stopes. The stope length for longitudinal stopes is 15 meters. Stope width is dictated by ore thickness with a minimum stope widths of 4 meters applied for longitudinal stopes and a transition to transversal stopes when ore thickness exceeds 15 meters.

Sill pillars are designed with a height of 20 meters and are to be mined in 15 meters long sections. In areas where ore occurs in parallel lenses the distance between the sill pillar and parallel ore lens is at least 15 meters.

3.10.2 Mineral Processing

Metallurgical testing is carried out in Kristineberg to test the properties of the mineralisation and its suitability for processing into a concentrate that can be profitably sold. Currently, these tests are carried out at Boliden's pilot plant which is located at the BAOPP and are performed on ½ core samples which are taken from exploration drill cores, or bulk samples which are "test" mined in-situ. Tests carried out in-house include comprehensive comminution, flotation and hydrometallurgical tests.

Studies carried out as part of the Rävliden FS showed that during the flotation tests and process campaigns the overall metallurgical performance for Rävliden was good. Copper, gold and silver recoveries were higher than estimated by the recovery model from previous studies, however the zinc recovery was slightly lower than the model predicted.

The recovery issues for zinc can be partially explained by poor liberation of chalcopyrite. The difficulties in separating copper and zinc are of concern and the mechanisms for separation are being investigated further.

Metallurgical tests will continue during 2023 with a test planned for testing an extension of the L-West orebody at depth. The intended material will be coarse rejects from infill drilling

During 2022 test mining in Rävliden resumed. As of 31st of December approximatively 30 kton of ore have been mined from the 755 and 780 levels of Rävliden. The material is coming from a footwall lens of the main ore body. The material in between these drifts will get mined through stoping and thereby testing the mining method that will be used for the deposit. In the figures below one can see the 2 headings in a top-down view. Each color represents one month's drifting.

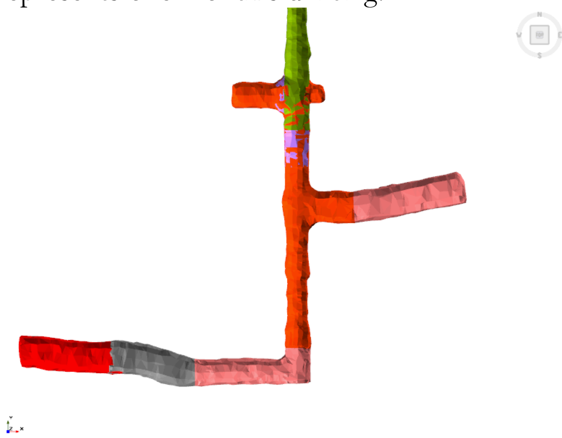

Figure 10: 780 Level of test mining in Rävliden

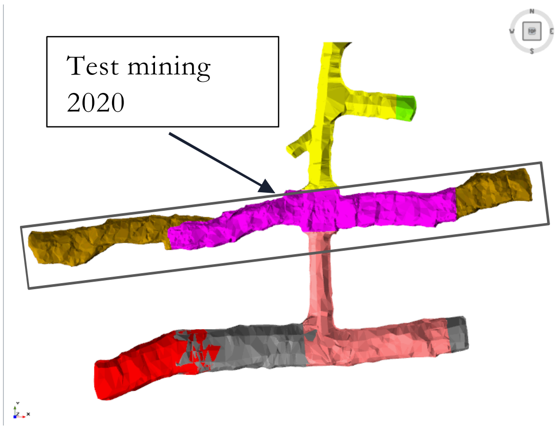

Figure 11: 755 Level of test mining in Rävliden

The plant has so far only processed 10 kton so the outcome of the processing will wait for all the data. This will be finalized under 2023.

The mined, crushed material is delivered by truck to the BAOPP where each truck is weighed on a truck scale in order to determine the tonnage arriving to the process plant. The crushed material is then either taken into the processing plant or stored in a stockpile. Separate stockpiles are kept for each of the individual mines in the BAO. Material from the Kristineberg mine is processed in campaigns where fresh material delivered from the mine is combined with material from the Kristineberg mine stockpile. The feed tonnage to the process plant is determined using a weighing system with a stationary belt scale. Feed tonnage and weights from the trucks scale are used to determine current tonnage on the stockpiles. A simplified diagram of the BAOPP can be found below in Figure 12

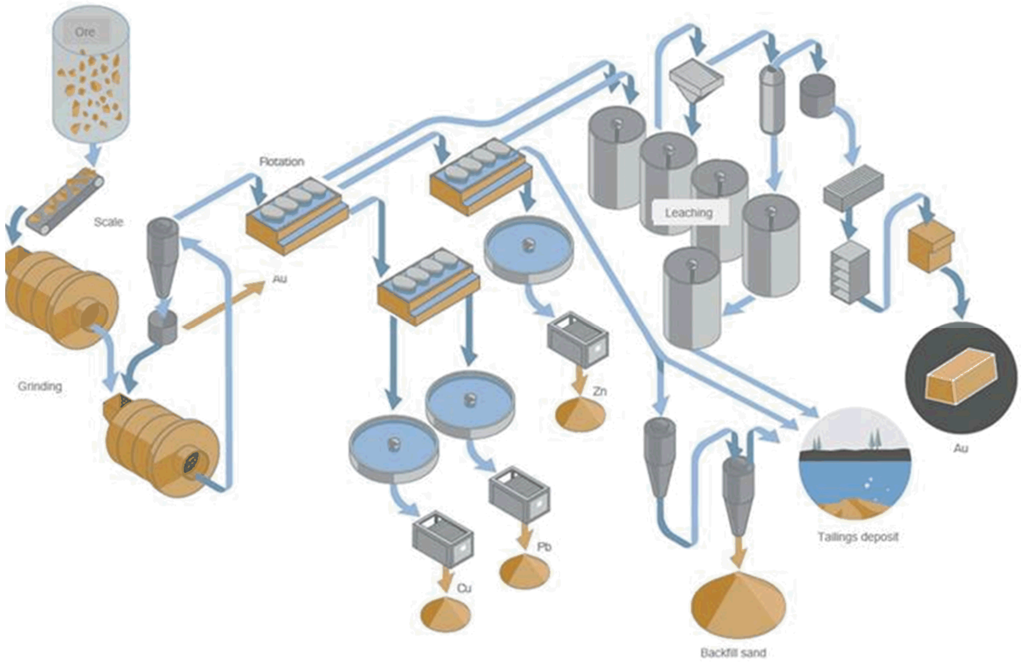

Figure 12: Schematic diagram of the Boliden Area Operations processing plant

In the process plant the material is ground in two stages. The primary mill is a fully autogenous mill and the secondary mill is a pebble mill fed with pebbles extracted from the primary mill. The ground material is classified using screens and hydrocyclones. A gravimetric concentrate containing coarse grained gold bearing minerals is produced in the grinding circuit and a flash flotation cell is used to extract mainly copper minerals with high floatability. The gravimetric concentrate is packed in large bags and delivered by truck to the Rönnskär smelter.

Flotation is done in a three-stage process: copper-lead bulk flotation, copper-lead separation and zinc flotation producing three concentrate qualities, copper, lead and zinc.

The mineral concentrates are dewatered using thickeners and vertical plate pressure filters. The concentrates are transported by truck to the Rönnskär smelter and shipping port. Lead and zinc are transported by boat to Boliden smelters in Norway and Finland or to external buyers.

Metallurgical accounting where a sum of products calculated using assays from daily composite samples of main process streams and assays and tonnage for delivered products together with feed tonnage is used to determine the head grade of the delivered material for that campaign.

3.10.3 Infrastructure

From the active mining areas, trucks transport the mined mineralised material to the underground crusher, located at 620m level through underground transport drifts. Transportation of the material to the surface is handled by the skip hoist, which has a capacity of 160tph. The mine can produce up to 750,000t of mineralised material per year (with a current permitting ceiling of 850kt/yr)

Drift access and other infrastructure to the Rävliden mineralisation currently exists, however, access to ventilation and long trucking distances place a bottleneck on the ramp up of production. A new ramp is being constructed from the main Kristineberg ramp to the Rävliden mineralisation to improve access. The construction started during 2022 and the current progress can be viewed in Figure 13.

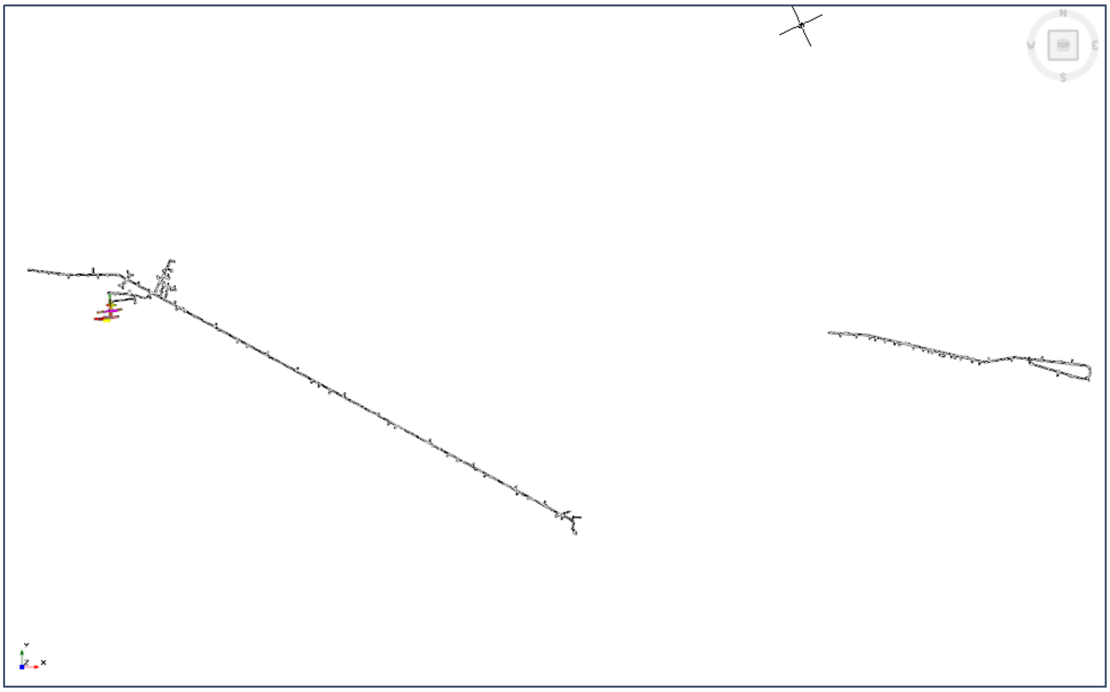

Figure 13: An overview of Rävliden and the progress of the new access drift.

The distance from Rävliden to the downwards part of the access drift is about 3.4 km. The surface entry to the drift at the Kristineberg mine will get finalized during 2023. The drifting will start from Rävliden towards the drift coming down from surface. The drifting is on schedule to complete the drift during 2024. Primary ventilation will be fully operational during the first half of 2023.

Once the material is at surface it is stockpiled at the surface material handling station, where it is then trucked 95km to the BAOPP. The route from Boliden to Kristineberg is via an all-weather road, which presents little difficulties for transporting the mined material. Both underground and surface material handling is outsourced to contractors. Media supplied directly to operational areas including electricity, ventilation, water control etc. are all handled by the mine operations.

Tailings facilities exist both at the mine site and at the BAOPP. The tailings facilities at Kristineberg are currently decommissioned.

Facilities and infrastructure for filling mined rooms also exist where cut and fill operations are conducted. These include a fill mixing station and all other ancillary vehicles necessary for the filling of completed mining rooms.

Other site infrastructure includes offices, and meeting rooms as well as a core logging and sampling facility.

3.11 Prices, terms and costs

The following section lists the long-term prices currently used in the creation of the Net Smelter Return (NSR) formula for the Kristineberg mine, as well as describing the cut-offs used in the Kristineberg mine and the planned operations in Rävliden.

The NSR formula will not be described in detail here, however it considers metal recoveries, smelter treatment charges and costs for penalty elements. As the Kristineberg mine has been operating for 80 years, Boliden has a large amount of experience and data on which to verify the NSR factors, which are based on figures produced by the BAOPP. NSR cash values are used as a proxy to determine the value or "equivalent grade" of a volume of a planned mining area, or drill hole section.

Table 11. Long term planning prices (LTP) currently used in the Kristineberg Mine and Rävliden. Including exchange rates.

	Planning prices, 2022 (2021)
Copper	USD 7,200 (6,800) /tonne
Zinc	USD 2,600 (2400)/tonne
Lead	USD 2,000 (2100)/tonne
Gold	USD 1,400 (1300)/tr.oz
Silver	USD 20 (17)/tr.oz
USD/SEK	8.00

The NSR Formula for Kristineberg is shown below. NSR Values are expressed in SEK/t.

NSR_LTP = (150*Au) + (2.46*Ag) + (431*Cu) + (134*Zn) + (48.9*Pb)

For 2022 the percentual contribution to NSR for Kristineberg was in falling order Zn 64 %, Cu, 20 %, Au 9 %, Ag 6 % and Pb 1 %.

For Rävliden, a separate NSR formula is used to reflect the different metallurgical properties of the mineralisation. The NSR formula applies updated metallurgical results from flotation tests of the Nisse and Norra lenses, updated cost assumptions, and updated long term prices. The Rävliden NSR formula is stated below.

NSR_LTP = (Au*152)+(Ag*3.39)+(Cu*453)+(Zn*119)

The mine's operational cut-offs are calculated yearly, and are calculated inclusive of mining, processing and transportation costs. Marginal cut-offs are also used in operations whether material encountered during mining should be considered as waste or sent for processing. Definitions of different cut-offs used are as presented in Table 12.

Table 12: Operating and marginal cut-off values used for Kristineberg and Rävliden

Area	Cut-Off	Cut-Off Value (SEK/t)
Rävliden	Cut-Off 1	760
Kristineberg	Cut-Off 1	595-760*
Rävliden and Kristineberg	Cut-Off 4	400

** Depending mining method and backfill method applied*

- **Cut-off 1**: Is the breakeven cost, which can be used as a guide for mine planning and Mineral Reserve estimation. In practice, conversion to reserves entails assessment through a simplified cashflow model, where modifying factors specific to the lens (for example infrastructure, development, mining method and distance to crusher etc) are applied to calculate a local breakeven cost. Material with NSR above this breakeven cost is sent to the mill.

- **Cut-off 4**: Marginal cost. When material with an average NSR between 595 SEK/t and 400 SEK/t must be mined to access higher-grade material, the marginal cut-off is applied and this material trucked as ore. Rock below 400 SEK/t would be mined as waste and may be used within the mine as backfill.

3.12 Mineral Resources

Mineral Resource estimates which have been produced for Kristineberg mine and Rävliden prior to January 1st 2018 should be considered estimates which have previously been reported under a classification scheme other than PERC, namely the FRB Standard. The FRB Standard and PERC Standard uses similar classification terminology, and therefore definitions of Mineral Resource classification categories should be considered interchangeable.

Mineral Resource statements of tonnages and grades which are included in the "Table of Mineral Resources" are included under chapter 17 of the PERC Standard and were reported under the FRB Standard in Boliden's 2017 annual report, with the exception of the A-Zone, Silver Zone, Rävliden North, L-West, Koppar Klumpen, and Raimo estimates which were estimated in 2018 - 2022 and are accompanied by a PERC Compliant Mineral Resource statement and report. PERC Compliant Mineral Resources now represent the vast majority of the total Mineral Resources of the Kristineberg mine and the Rävliden North project.

Table 13 outlines each reported Mineral Resource at the Kristineberg mine and its relationship to chapter 17 of the PERC Standard.

Table 13.Summary of estimations carried out at the Kristineberg mine and their relation to PERC Standard chapter 17

Minerali-sation	Estimation Parameters, Author (internal)	Software	Estimation method	Reporting code	Comments	Actions
A	Pabst (2020)	Leapfrog Edge	OK/IDW	PERC	PERC Compliant	None
J/B	Kruuna (2011)	Propack	IDW	FRB	Reconciliation results provide confidence	Updated MRE 2022 is under review
M	Wiik (2009)	Propack	IDW	FRB	Reconciliation results provide confidence – M-Zone mined out.	None
KK	Baldwin (2019)	Leapfrog Edge	OK	PERC	PERC compliant	None
L-East	Kruuna (2011)	Leapfrog Edge	IDW	FRB	Reconciliation results provide confidence.	New MRE scheduled 2023
L-West	Baldwin (2022)	Leapfrog Edge	OK	PERC	PERC compliant	None
Raimo	Baldwin (2021)	Leapfrog Edge	OK	PERC	PERC Compliant	None
Ag-Zone	Baldwin (2020)	Leapfrog Edge	OK	PERC	PERC compliant	None
Rävliden Norra	Pabst (2022)	Leapfrog Edge	OK	PERC	PERC compliant	None

Estimation parameters used in the interpolation of grades varies depending on the lens which is being estimated. Generally, estimates are carried out using the Inverse Distance Weighting (IDW) squared method at Kristineberg, however Ordinary Kriging (OK) has been used in the A-Zone, Rävliden, Silver Zone, L-West and Koppar Klumpen.

To estimate metal grades and tonnages, geological wireframes are constructed from drill hole sections, face maps and other data in Leapfrog Geo. These wireframes are updated by the mine or exploration geologists and are built to represent the mineralisation in 3D. The sections inside the wireframe are then subject to geostatistical analysis to decide on composite length, evaluation of outliers and evaluation of domains in order to preserve the integrity of the grade interpolations done in conjunction with the Resource Geologist attached to the mine.

Leapfrog Edge is then used to draw a block model within the constructed wireframe. Blocks are set to the Smallest Mining Unit (SMU) in Kristineberg, which is typically 4m width (minimum mining width), 5m length, and 6m height.

Following the construction of the block model, Leapfrog Edge is then used to interpolate grades. A 3D search ellipsoid is defined for IDW, which is set to reflect sample spacing within the mineralisation. Variography is used to define a search ellipsoid for OK interpolations, which is carried out in Snowden Supervisor. Grades are interpolated for Au, Ag, Cu, Zn, Pb, S and As. In both cases, variable orientation of the search ellipse is used to allow the interpolation to follow the geometry of the mineralisation.

After interpolation, blocks are classified according to geological confidence into Mineral Resource categories. This is primarily achieved through the assignment of geological confidence, as well as confidence in the estimation. Other factors such as local geological conditions and assay quality also play a role in classification, as well as the mineralisations "Reasonable Prospects for Eventual Economic Extraction" (RPEEE).

Mineral Resources at the Kristineberg Mine are reported following a stope optimisation, which uses simplified parameters to define RPEEE. These parameters allow a volume to be defined which is realistic in terms of geometry and allows the mineralisation to satisfy a minimum mining width in a manner that is not subjective. The optimisation also considers surrounding block grades allowing dilution to be represented in the Mineral Resource. All blocks which fall inside the RPEEE stopes and above their respective cut-off are reported as a Mineral Resource (Table 14). Mineral Resources and Mineral Reserves for Kristineberg mine are presented in Figure 14, the Rävliden North Mineral Resource is presented in Figure 15.

3.13 Mineral Reserves

Mineral Resources are converted to Mineral Reserves through careful planning and application of Modifying Factors. No Inferred Mineral Resources can be converted to Mineral Reserve. The largest technical risks to the operation include poor rock quality and variable geometry and grade of the mineralised bodies.

New positions in the mine, such as Raimo, or Rävliden Norra will be converted by completing a large scale technical and financial evaluation of the mineralisation, and includes pre-feasibility studies and feasibility studies, as well as updates to the Mineral Resource block models. If the Mineral Resource or parts of the Mineral Resource are found to be economically viable to mine, then that portion of the Mineral Resource will be converted to a Mineral Reserve.

Mineralisation which is located adjacent to existing mining positions is taken into the Mineral Reserve after the aforementioned mineralisation has been evaluated by geologists and mining engineers and found to be economically viable to mine. This conversion happens after the mine and resource geologists create or update the geological model and the resource classification of the area has been determined by the responsible resource geologist. The resource classification must be at least an Indicated Resource to be potentially upgraded to Mineral Reserve. The mining engineers also examine the volume´s technical and economical characteristics. This evaluation includes the design of mining method and infrastructure to successfully mine the area in question and a NPV calculation to determine the prospective area´s profitability. All mineralised pillars are included in the Mineral Resource.

Classification of Mineral Reserves into Proved or Probable categories depends on the confidence of the underlying modifying factors, as well as geological confidence. This may include permitting, environmental or social factors as well as technical and economic factors.

Mineral Reserves are presented in Table 14 and Figure 14 and Figure 15.

3.14 Comparison with previous year/estimation

The total Mineral Resource and Mineral Reserve for Kristineberg and Rävliden is presented in Table 14.

Table 14: Total aggregated Mineral Resources and Mineral Reserves Kristineberg Mine as of 31-12-2022 and 31-12-2021. Mineral Resources reported exclusive of Mineral Reserves.

	2022						2021					
Classification	**kton**	**Au (g/t)**	**Ag (g/t)**	**Cu (%)**	**Zn (%)**	**Pb (%)**	**kton**	**Au (g/t)**	**Ag (g/t)**	**Cu (%)**	**Zn (%)**	**Pb (%)**
Mineral Reserves												
Proved	**360**	**0.5**	**30**	**0.49**	**4.38**	**0.25**	40	0.6	38	0.45	6.05	0.48
Probable	**4 200**	**0.3**	**75**	**0.80**	**5.44**	**0.63**	4 400	0.3	72	0.76	5.53	0.60
Total P&P	*4 500*	*0.3*	*72*	*0.77*	*5.35*	*0.60*	*4 400*	*0.3*	*72*	*0.76*	*5.53*	*0.60*
Mineral Resources												
Measured	**660**	**0.4**	**38**	**0.73**	**2.69**	**0.23**	170	0.7	33	0.77	3.42	0.23
Indicated	**6 700**	**0.4**	**58**	**0.64**	**3.06**	**0.35**	3 900	0.5	42	0.63	3.47	0.24
Total M&I	*7 400*	*0.4*	*56*	*0.65*	*3.03*	*0.34*	*4 100*	*0.5*	*41*	*0.63*	*3.47*	*0.24*
Inferred	**5 900**	**0.3**	**49**	**0.80**	**2.57**	**0.28**	8 100	0.3	60	0.80	3.25	0.43

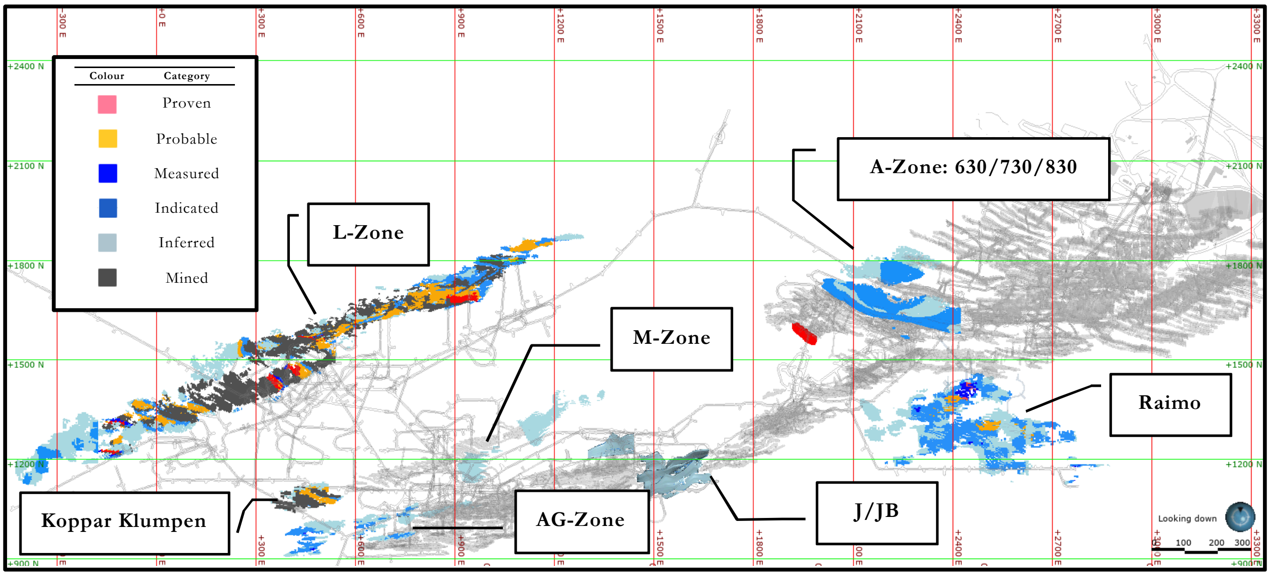

Figure 14: Plan view of the Kristineberg Mine showing mine infrastructure, historical mined areas and locations of Mineral Resources and Mineral Reserves

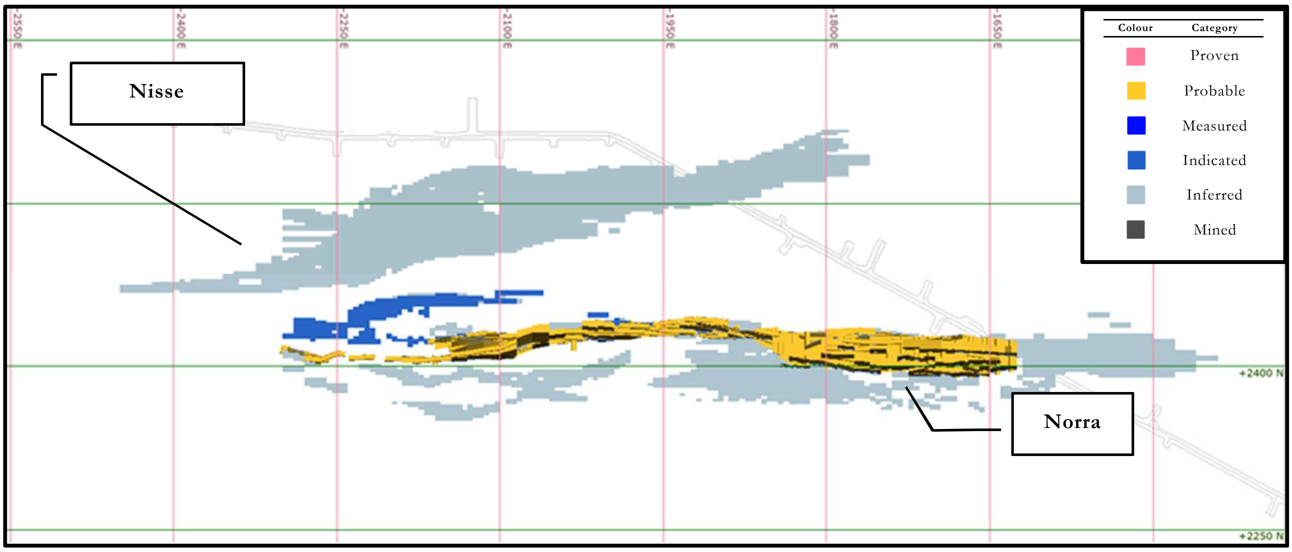

Figure 15:. Plan view of the Rävliden Norra Mineral Resources and Mineral Reserves.

2022 shows a small increase in Mineral Reserves and an increase in Mineral Resources. The breakdown of changes is outlined below.

Mineral Resources

- Overall total increase of 1086 kt.
- 607kt converted to Mineral Reserves from Raimo and L-zone
- 992kt added to Mineral Resources through MRE's in L-West and Rävliden.
- 883kt increase from geological interpretation and infill drilling for L-zone and Raimo
- 377kt upgraded from Inferred Mineral Resource to Indicated or Measured Mineral Resource in L-Zone and Raimo.
- 2907kt upgraded from Inferred Mineral Resource to Indicated or Measured Mineral Resource

Mineral Reserves

- Overall net increase in Mineral Reserves by 82kt
- 563kt mined from A, KK, Raimo and L-Zones
- 607kt converted to Mineral Reserves from L-zone and Raimo
- 28kt written off from Kopparklumpen

3.15 Reconciliation

Reconciliation at the Kristineberg mine is completed for every month of production and aggregated for the year. Mined grades and tonnages are read out from the production block model for every position that has been mined. These predicted grades are then summarised, where the average grade for that month is compared with the average grade and tonnage which has been measured and estimated by the BAO Processing Plant.

The Reconciliation for the year 2022 is shown in Table 15. Reconciliation data shows that mined tonnages show a deviation from the sum of products figures from the BAO processing plant. This is partly accounted for by the stockpiles at the mine and at the plant, which have yet to be skipped to surface and processed into concentrate. Approximately 595kt has been skipped to surface during 2022. Reconciliation with predicted grades show an underestimation of Zn, Cu, Pb and S by 5 to 20 %. The Au is 26 % underestimated in the production block models compared to the plant result. Overall, the reconciliation is deemed acceptable but not without considering improvements to close the gap between predicted and processed grades. Work is ongoing to separate gold-copper rich zones within the informing models.

Table 15: Reconciliation data for the Kristineberg mine 2022, aggregated

Category	Tonnes kt	Au g/t	Ag g/t	Cu %	Zn %	Pb %	S %
Mined	558 500	0.5	32.8	0.42	4.74	0.26	20.0
Sum of Products	594 500	0.6	33.8	0.52	5.21	0.29	22.4
Difference vs. BAO	36 000	0.16	0.96	0.10	0.47	0.03	2.37
Difference vs. Plant (%)	6	26	3	19	9	10	11

The Sum of products includes the definitive results reported from BAOPP for January to September 2022 and the preliminary results for October to December 2022.

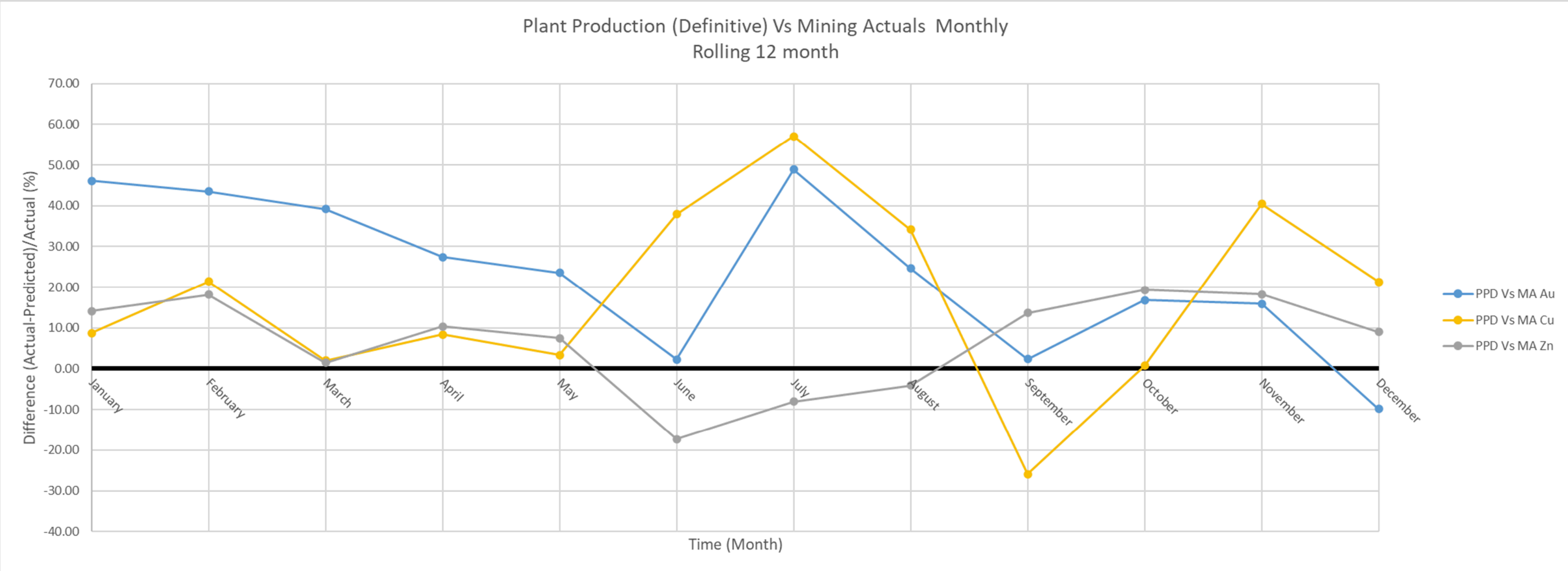

Figure 16: Monthly comparison between mined and processed material per element and month for 2022

The graph (Figure 16) shows the monthly difference between what has been processed and mined for every month. The comparison is made using plant definitive figures for January to September 2022 and for preliminary results for the last quarter of the year. Stockpile effects can be considerable month to month however, reconciliation is reasonable over a longer time period.

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