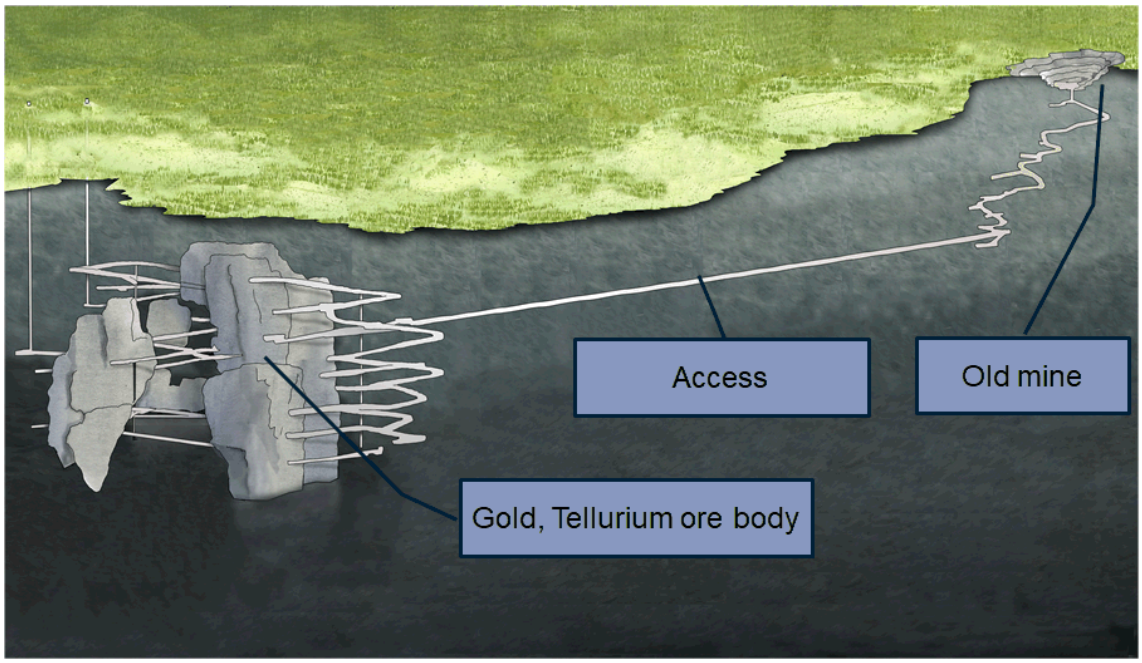
Boliden Summary Report

Mineral Resources and Mineral Reserves | 2022

Kankberg



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1 SUMMARY

This annual summary report concerns Boliden's wholly owned Kankberg 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 Kankberg mine and Boliden Area Operations; and
- Mineral Resource and Mineral Reserve statements for the mine and an overview of methods used to estimate these.

A summary of Mineral Reserves and additional Mineral Resources is presented in Table 1. The block model used as a basis for estimation of Mineral Resources was prepared in November 2022. The block model used as a basis for estimation of Mineral Reserves was prepared in November 2021.

The effective date of this report is 31 December, 2022.

Table 1: Mineral Reserves and additional Mineral Resources from the Kankberg Mine 31-12-2022 and comparison against previously reported on 31-12-2021

Classification	**2022 kt**	**Au (g/t)**	**Ag (g/t)**	**Te (g/t)**	**Bi (g/t)**	2021 kt	Au (g/t)	Ag (g/t)	Te (g/t)	Bi (g/t)
Mineral Reserves										
Proved	**2 227**	**3.2**	**11**	**191**	**91**	2 323	3.7	11	194	95
Probable	**1 629**	**3.6**	**7**	**177**	**119**	1 439	3.9	7	158	100
Total	***3 857***	*3.4*	*9*	*185*	*103*	*3 763*	*3.8*	*10*	*180*	*97*
Mineral Resources										
Measured	**222**	**2.9**	**7**	**116**	**75**	220	3.1	7	116	77
Indicated	**706**	**3.6**	**7**	**137**	**86**	794	3.4	5	147	95
Total M&I	***928***	*3.4*	*7*	*132*	*83*	*1 013*	*3.3*	*6*	*141*	*91*
Inferred	**1 519**	**2.9**	**3**	**110**	**76**	1 825	3.2	4	128	87

See also Section 3.14, 'Comparison with previous year'.

- *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.*
- *Mineral Resources are reported with dilution and recovery, dependent on Resource category*
- *The Mineral Resource is the portion of the block model that is within the high-grade shell (i.e. mainly > 2 g/t gold) and within the low-grade shell (i.e. mainly > 1 g/t gold) with a NSR value ≥ 300 SEK/t. It includes sill pillars and Inferred Mineral Resources that lie both within the LoMP and outside the LoMP.*
- *Mineral Reserves are selected and reported from the parts of the block model which fall within mining design volumes (LoMP).*
- *A cut-off of 525 SEK/t is used to guide mine design (LoMP), as a basis for conversion to Mineral Reserves.*

- *Material that falls outside the mine design is defined by wireframes and is reported as Mineral Resources exclusive of Mineral Reserves.*
- *Minor parts of the LoMP lie outside the extents of the existing environmental permit. Application for an extended environmental permit has been filed.*
- *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 this report

Report Section	Contributors	Competent Persons
Overall report compilation	Birger Voigt	Johan Bradley
Geology	Birger Voigt, Susanne Holmen	
Resource Estimation	Suzanna Falshaw	
Mineral Processing	Lisa Malm	
Mining & Reserve Estimation	Andreas Markström	
Environmental and legal permits	Viktoria Lindberg	

2 GENERAL INTRODUCTION

2.1 Introduction

This report is issued annually to inform the public (shareholders and potential investors) of the mineral assets in the Kankberg mine held by Boliden Mineral AB (Boliden). The report is a summary of internal / Competent Persons' Reports for Kankberg. Boliden's 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.

2.2 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.

2.3 Definitions

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

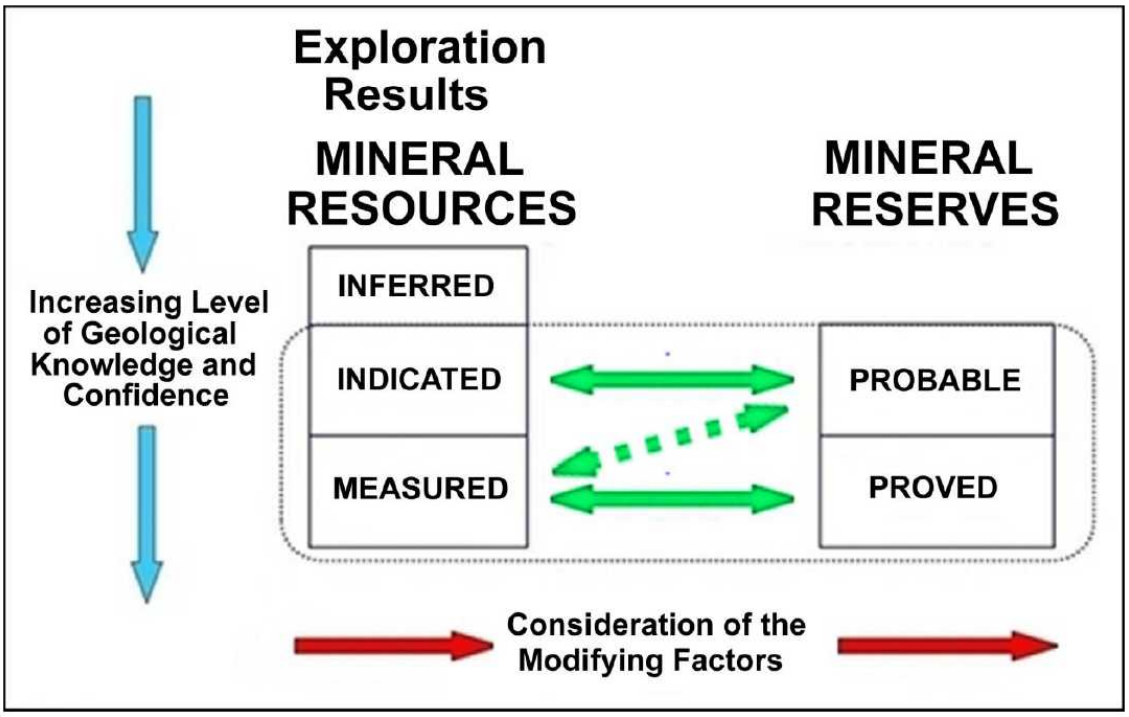

Figure 2.1. General relationship between Exploration Results, Mineral Resources and Mineral Reserves (PERC 2021)

2.3.1 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.

2.3.2 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 KANKBERG

3.1 Project Outline

The Kankberg mine is located 41 km northwest of Skellefteå in Västerbotten county, northern Sweden. Ore is hosted by an alteration zone in a suite of felsic volcanic and volcaniclastic rocks.

In 2022 Kankberg mined 464 kt of ore, with an average grade of 3.66 g/t Au, 10.4 g/t Ag and 164 g/t Te. The mine has produced continuously since 2012 through underground, cut and fill methods, between depths of -530 m and -312 m level, via a ramp-drive system from the historic Kankberg open pit mine to the north.

Production from Kankberg is stockpiled on surface before being trucked to the Boliden Area Operations Processing Plant (BAOPP), a distance of 10 km from the mine. Processing is carried out in campaigns or batches, each of which may take a few weeks. Tailings from Kankberg is deposited at the Hötjärn tailings management facility close to the BAOPP.

Concentrates and precious metal sludge containing gold and silver from the BAOPP are transported roughly 50 km to Boliden's Rönnskär smelter at the port of Skelleftehamn, from where the refined metals are marketed. Tellurium is sold as a concentrate mainly to China.

3.2 Major changes

3.2.1 Technical studies

During 2022, metallurgical testwork on the satellite deposit Nova was initiated. This work includes grinding, gravimetry, flotation and leaching, and is expected to be finalized in early 2023.

3.3 Location

The Kankberg mine is located at latitude 64°55'20" N longitude 20°16'00" E in the north of Sweden, the province and county of Västerbotten and in the Skellefteå Municipality.

Figure 2 shows a road and topography map of the Kankberg - Boliden area. The coordinate system used here is the Svenska Rikssystemet RT 90 2.5 gon väst, and is the older national standard, but is similar to the present national cadastral standard SWEREF99 TM. The location of the 'New' i.e. present Kankberg mine is shown as a blue mine symbol, while the 'Old' Kankberg Mine, which provides access, is shown as an exhausted (upside-down) mine symbol. Ore from the mine is transported 10 km southeast to the Boliden Area Operations Processing Plant (BAOPP), shown as a blue square near the small town of Boliden.

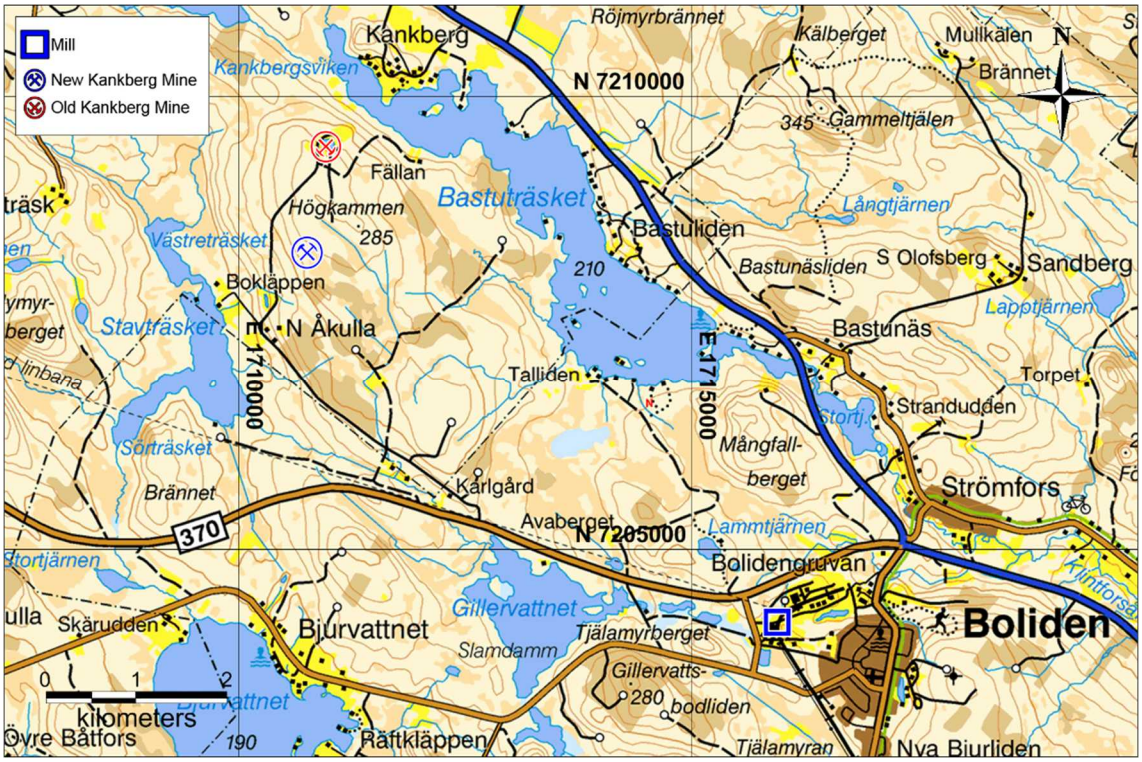

Figure 2: Index Map of the "Kankberg - Boliden" area

3.4 History

Sulfide-hosted copper, gold, silver and zinc were mined from the three historic open pits; Åkulla Östra, Åkulla Västra and Kankberg gruvan, which is now also called 'The Old Kankberg Mine'. Respectively, their ore tonnages were 197 kt, 967 kt and 1.17 Mt. The former two open pits were mined during 1997 to 1998 and 1947 to 1956 respectively. These open pits have been filled and reclaimed. The Old Kankberg Mine was mined in two periods, from 1966 to 1969 and 1988 to 1998. This pit now provides access to the (New) Kankberg Mine, via a decline ramp from the base of the pit to the underground orebody.

Mineralization characteristic of the Kankberg gold mine was first intersected by drilling in 1995 and was followed by exploration development in 1997. Systematic drilling and metallurgical testwork culminated in a feasibility study, which was completed in January 2011. Production from Kankberg commenced in January 2012.

3.5 Ownership and Royalties

Boliden owns the land and has full surface rights surrounding and immediately adjacent to the mine. The main relevant plots are Kankberg 1:35 and Akulla 1:9, Boliden also owns surrounding plots. Since Boliden owns all relevant surface and mineral and mining rights, only an annual royalty of 0.05% is payable to the State, based on contained metal in run of mine ore and average commodity price over the year. No landowner royalties are payable.

3.6 Environmental, Social and Governance (ESG)

3.6.1 Existing Permits

Boliden Mineral AB is in possession of all required permits to mine at the Kankberg Mine and the necessary land use designation from the Mining Inspectorate. 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 Exploitation Concessions

Exploitation concessions at Kankberg held by Boliden Mineral AB are presented in Table 3 below.

Table 3: Mining concessions at Kankberg held by Boliden Mineral AB

Name	Diary No.	Area (ha)	Valid from	Valid to
Östra Åkulla nr 1	2000000066:R	45.1598	2001-02-05	2026-02-05
Östra Åkulla nr 2	2009000945	2.8158	2009-11-10	2034-11-10
Kankberg K nr 1	1998000694:R	95.384	2000-01-01	2025-01-01
Åkulla K nr 1	2000000064:R	33.7698	2001-02-05	2026-02-05

It is notable that three of these concessions are due to expire in 2025-26, some five years prior to the end of forecast production, according to the current life of mine plan (LoMP). Boliden intend to apply for a ten-year extension to this license in good time and in accordance with standard operating procedure. Whilst the detailed terms of any extension are uncertain at this stage, Boliden is not aware of any current or impending material impediments that would negatively influence a decision from the relevant permitting authorities and would reasonably expect an application for extension to be granted.

3.6.1.2 Exploration Permits

Table 4 presents the exploration permits held by Boliden in the Kankberg area.

Table 4: Exploration permits held by Boliden Mineral AB in the nearby area of the Kankberg Mine

Name	Diary No.	Area (ha)	Mineral	Valid from	Valid to
Kankberg nr 1006	2017000666	358.20	Au, Cu	2017-11-07	2024-11-07
Kankberg nr 1007	2018000745	222.62	Au, Cu, Zn	2018-11-14	2023-11-14
Gillervattnet nr 1007	2016000088	293.83	Au	2016-04-14	2023-04-14
Gillervattnet nr 1006	2016000067	266.73	Au	2016-03-10	2023-03-10

3.6.1.3 Environmental Permits

In accordance with the Environmental Law, a main permit as a partial decision: 2011-04-06, mål (case) nr. M739-09 was issued in April 2011 and updated in 2015 with final conditions for discharges as: 2015-01-23, mål (case) nr. M 739-09. These permits cover matters including:

- Maximum production rate 500 ktpa:
- Maximum total concentrations of elements in discharged water (there is no limitation on quantity);
- Maximum noise levels;
- Dust;
- Requirement to run operations as stated in the technical description;

- Acquisition and importation of additional waste rock and/or tailings sand, also temporary storage, for use as fill underground;
- Environmental monitoring;
- Explosives – spillage etc.;
- Remediation plans, to be submitted at least 1 year before closure; and
- As of 2019-11-27 a new financial bank guarantee of 19,2 MSEK was approved by the Environmental Court in case nr M2723-17. The guarantee shall cover all environmental liabilities in case of bankruptcy.

3.6.2 Necessary Permits

On 27 September (2022), Boliden submitted an environmental permit application to include areas of production between levels -50 m to -300 m and levels -600 m to -1000 m. These zones currently lie outside the existing environmental permit boundaries and contain a minor part of the LoMP. The authors are not aware of any material issues currently affect the on-going permit application and consider it reasonable to include this material in the LoMP.

The capacity of the tailings management facility at BOAPP is sufficient to include material from the Kankberg life of mine plan (LoMP) up to and including 2028. The final 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 on-going, 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-economical impact

The Kankberg mine is one of three producing mines owned by Boliden in northern Västerbotten. Together with the BAOPP and Rönnskär smelter, these facilities generate an important source of direct employment and more broadly represent an engine for the local and regional economy. Massive-sulphide ore was initially produced from an open pit close to the current Kankberg mine in the mid-1940's. The current underground mine has operated continuously since 2012, is an important workplace in the district and continues to have a significant positive impact on the socio-economic situation in Skellefteå municipality.

In addition to jobs and tax revenues, Boliden contributes to social sustainability and the socio-economic situation in many other ways. Boliden, for example, is involved in, and supports, many local activities and organizations. The effects of these commitments are difficult to quantify but are considered to contribute positively to the development of the area. Northern Sweden has a long tradition of mining and extractive industries, which has resulted in acceptance and tolerance for even some of the negative effects caused by the industry.

3.6.3.3 Communities and landowners

The Kankberg mine is located south of lake Bastuträsket. On the north side of the lake is the village of Kankberg, which is a village established independently of mining operations. The nearest urban area is Boliden, Skellefteå Municipality. In addition to mining, forestry as well as some agriculture take place in the local area.

Surrounding land constitutes a reindeer herding area with grazing rights for Mausjaure Sami village. The forest environments are largely affected by modern forestry and the wetlands are to some extent affected by trenching. There are also several historic mines, once operated by Boliden.

In addition to forestry and reindeer herding, the most common land use is hunting, fishing, berry picking and recreation. The Kankberg mine and associated facilities at the BAOPP have a moderate impact on land use in the local area.

There are no areas with high conservation value, such as Natura 2000, close to the Kankberg mine.

3.6.3.4 Indigenous people

The Kankberg mine is located within the Mausjaure Sami village reindeer grazing area. Mausjaure Sami village is a forest Sami village that operates between the cultivation boundary[1] and the Gulf of Bothnia.

Mausjaure Sami village keeps its reindeer in the traditional way in close contact with the environment where a fundamental aspect is access to coherent and functional pastures with undisturbed grazing for the reindeer. Within the lands used by the community there are areas that have been declared to be of national interest for reindeer husbandry. In general, with respect to reindeer husbandry, it is not necessarily a single activity that leads to disruption, it is more the accumulated effects. For example, mining affects reindeer husbandry in various ways, such as land requirements, noise, dust and transportation. This often results in the reindeer avoiding certain areas. Boliden is well-aware of the consequences and problems that mining causes for reindeer husbandry. To minimize and compensate for these negative effects, a dialogue is maintained between Boliden and the Sami villages concerned. As part of this dialogue, mutual understanding of the two activities is favored and measures to minimize and compensate for the impacts are developed. In cases where disturbances to reindeer grazing occur, Boliden endeavors to compensate by providing alternatives that are developed together with the Sami village concerned. Examples of measures can be reindeer pastures in strategic locations.

There are also agreements between Boliden and the Sami community concerned that, among other things, regulate financial compensation for losses caused by Boliden's operations. In addition to this, Boliden conducts research projects and compensation measures to, among other things, improve forestry to increase the growth of lichen or facilitate the movements of reindeer herds.

3.6.3.5 Historical Legacy

Production from the current Kankberg mine has continued uninterrupted since 2012, together with processing of ore at the BAOPP and storage of tailings at the near-by tailings facilities.

3.7 Geology

3.7.1 Regional

The Kankberg Mine lies within the eastern part of the Skellefte mining field, one of the most important mining regions in Sweden, where Boliden has been active since the 1920s. It's significance in relation to 52 other known deposits in the field is shown in Figure 3 from a paper by Allen et al (1996) that describes the marine volcanic arc setting of these Zn-Cu-Au-Ag polymetallic massive sulfide deposits, vein Au deposits and porphyry Cu-Au-Mo deposits.

[1] *The boundary for farming as decided by the Swedish government to prevent low productivity farms from interfering with reindeer herding areas.*

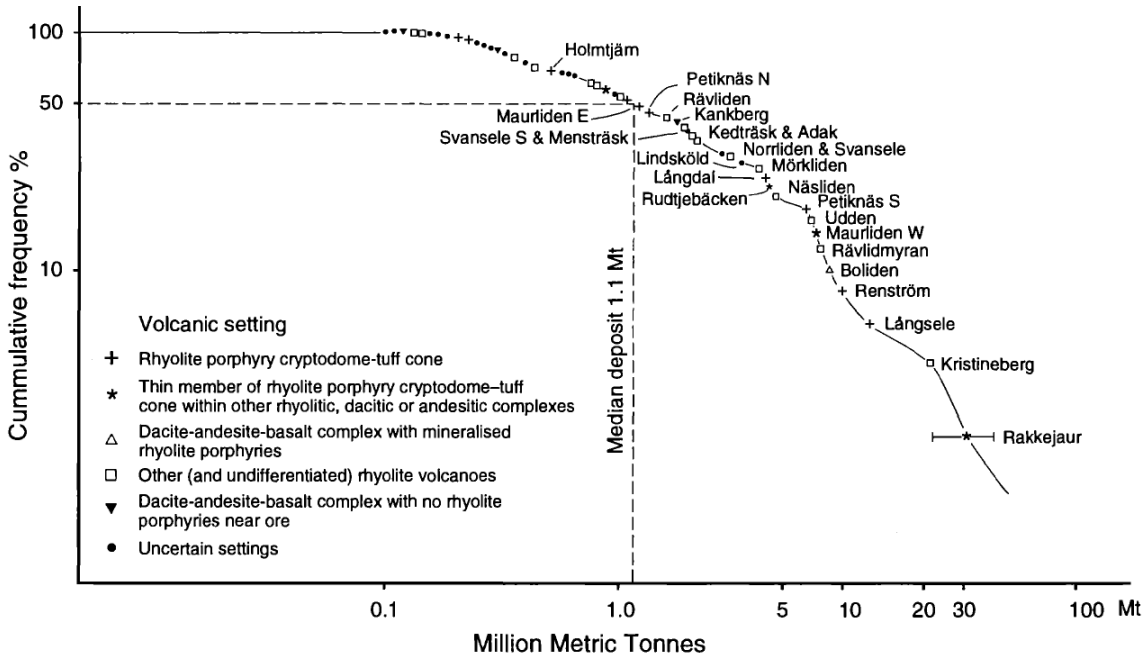

Figure 3: Tonnage-frequency distribution and volcanic setting of the 52 known massive sulphide deposits of 0.1 Mt or more in the Skellefte district (modified from Allen et al (1996)).

The majority of known ore deposits in the Skellefte field occur within the upper parts of the Skellefte group, which is a regionally dominant sequence of volcanic rocks that were formed during a period of intense, extensional, continental margin arc volcanism about 1.89 Ga ago.

3.7.2 Local & Property

The host rock in the Kankberg area is dominated by volcanic rocks of primarily dacitic and rhyolitic compositions forming quartz-feldspar porphyritic, rhyolitic and dacitic rock types. The felsic magmas forming these volcanics intruded as shallow (subvolcanic) dykes and sills and extruded as lavas at the surface where they mixed with sediments and mass flows derived from volcanic slopes. The volcanism initiated a convection of solutions through the rocks. These solutions dissolved and transported minerals and metals to sites of deposition.

After the major volcanic period had ended the area was subsequently deformed and folded. This resulted in a dominantly vertical trend of the rocks and structures. At a later stage, brittle deformation took place. Fractures and fissures were intruded by mafic magma forming basaltic and andesitic dykes, which are common in the Kankberg area.

3.7.3 Mineralization

Gold mineralization is hosted in a complex mix of volcanic rocks consisting primarily of quartz-feldspar porphyry, volcaniclastics and breccias. The host rocks are strongly altered by silicification, andalusite ± topaz alteration and to a varying degree sericitization. The strong alterations form a highly competent body, which is surrounded by dacites. The contact zone is characterized by sericite ± chlorite alteration associated with pyrite ± pyrrhotite.

The economic mineralization is contained in 'metallic' minerals primarily located within the quartz-andalusite ± topaz alteration. It includes fine-grained native gold alloyed with silver at proportions of between 0 to 20%. More commonly, gold occurs as gold-tellurides including

petzite (Ag_3AuTe_2), calaverite ($AuTe_2$) and sylvanite ($AuAgTe_4$). Another common telluride is tellurobismuthite (Bi_2Te_3). Several more telluride minerals have been identified through microscopy. Sulfides, pyrite with less pyrrhotite, sphalerite and chalcopyrite, are of minor significance but generally increase upwards through the deposit.

3.8 Drilling procedures and data

3.8.1 Introduction

The present orebody has no surface expression and has been explored entirely by drilling, at first from the surface but predominantly by underground drilling as described below. There is no other sampling of in-situ rock.

3.8.2 Drilling techniques

Exploration and infill drilling are carried out by wireline double-tube diamond core drilling. At present, this is almost exclusively from underground using four rigs equipped with the Wireline 56 system that produces 39 mm diameter core. Four exploration holes have been drilled from the surface. The Near Mine Exploration Department (UGN) use contracted drilling company Protek AB for exploration drilling. Protek AB use two Diamec U4 drill rigs. The mine uses two in-house drill rigs (Diamec U6 and Diamec S6) for infill drilling.

3.8.3 Downhole surveying

Hole collars are surveyed before drilling and again afterwards. For exploration drilling, downhole deviation surveying is carried out by Protek AB personnel using gyro instruments from Inertial Sensing, Reflex and Devico. For infill drilling, deviation surveying is carried out by Kankberg personnel using a Devico DeviFlex instrument until March 2022. From then on, a Devico DeviGyro instrument was used.

3.8.4 Sampling

Apart from by drilling, there are no other samples routinely taken of in-situ rock. Selection of samples from drilling for assaying is as follows.

Exploration holes are generally sampled (and assayed) to about 65% of their total length. Infill drill-holes are generally drilled from either side of, and outside the alteration that characterises the ore envelope. The start of the hole is generally not sampled. When the logging geologist identifies alteration that indicates proximity to the ore envelope, sampling starts two core boxes up-hole from the contact. It will continue until the end of the hole, even if it seems that the drill hole has emerged from the other side of the ore envelope into unmineralized 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 infill drilling, of those intersections that are sampled, the whole core is submitted as samples. Un-sampled core is stored for a year, after which it is discarded.

Primary samples and QAQC samples (inserted as described below), are bagged and sent by contracted courier service to the ALS geochemistry laboratory in the town of Piteå, about 100 km to the north, where sample preparation – drying, crushing and pulverising - is carried out using procedure PREP – 22. Sample pulps are returned to Boliden where they are stored.

Because the gold and other economic mineralization is so fine grained, the excellent core recovery and drill spacing of 10m x 10m, it is considered that the sampling is representative of the in-situ material collected.

3.8.5 Logging

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

The following fields are logged:

- Rock type acronym. There are 57 standardized rock types, of which the following 14 are most frequent: quartz-feldspar-porphyry, volcanoclastic, sericite-quartzite, sericite-schist, chlorite-quartzite, dacite, andesite, andalusite-quartzite, topaz fragment rock, breccia, basalt (outside mineralization) and clastic sedimentary.
- Alteration types – andalusite, topaz, sericite, chlorite, silicic
- Mineral proportions of talc and muscovite on a scale of 1 to 5, as these affect rock stability and, but of less concern, flotation.
- Other minerals – garnet, tourmaline, sphalerite, galena, chalcopyrite, arsenopyrite, pyrrhotite, pyrite, gold.
- Sulfosalts – tellurides
- 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. Locally, typically where alteration is weak, the length of samples can approach 3 m.

All core is photographed, and the photos are available on-line to Boliden staff.

3.8.6 Density

The Kankberg mine applies a three-stage approach for determining sample density, as outlined in priority order below:

1. Measured density (pychnometer);
2. Regression formula (based on mineralogical rock classification); and
3. Default densities of 2.9 for material within the block model* and 2.8 for material outside the block model.

** In practice the number of default densities applied to mineralized material is negligible.*

3.8.7 Analysis and QAQC

Sample preparation, chemical assaying and measurements of specific gravity are carried out by ALS Piteå – Geochemistry, Hammarvagen 22, SE-943 36 Ojebyn, Piteå Norrbotten, Sweden. These procedures are identical for the mine infill drilling and exploration group drill holes.

All ALS geochemical hub laboratories are accredited to ISO/IEC 17025:2017. As part of the QAQC processes, pulp duplicates are sent from ALS to Hazen Research (Colorado, USA) for Te analysis. Table 5 shows an overview of the methods used. The "Over-range method" applies to samples where assay result reached upper detection limit of the primary method.

Table 5. Overview of ALS's designation of analytical methods.

	Method	Over-range method
Preparation	PREP – 22	
Assay Au	Au-ICP21	Au-GRA21, Au-AA25, Au-SCR21
Assay other	ME-MS61m	Ag-OG62/Ag-GRA21, S-IR08, Te-AA62, (As, Cu, Pb, Zn)-OG62, Hg-ICP42
Specific gravity (core)	OA-GRA08	
Specific gravity (pulp)	OA-GRA08c	

Au-ICP21 is a package of fire assay with an ICP-AES analysis. ME-MS61m is a package of a 4-acid digestion process with an ICP-MS analysis. The Periodic table of elements in Table 6 show which elements (marked in yellow) are assayed for at the Kankberg mine. Results are available in the drilling database, held in acQuire™ software.

Table 6. Periodic Table, highlighted to show assayed elements.

H																	He
Li	Be											B	C	N	O	F	Ne
Na	Mg											Al	Si	P	S	Cl	Ar
K	Ca	Sc	Ti	V	Cr	Mn	Fe	Co	Ni	Cu	Zn	Ga	Ge	As	Se	Br	Kr
Rb	Sr	Y	Zr	Nb	Mo	Tc	Ru	Rh	Pd	Ag	Cd	In	Sn	Sb	Te	I	Xe
Cs	Ba	La*	Hf	Ta	W	Re	Os	Ir	Pt	Au	Hg	Tl	Pb	Bi	Po	At	Rn
Fr	Ra	Ac¨	Ku	Ha													

*	La	Ce	Pr	Nd	Pm	Sm	Eu	Gd	Tb	Dy	Ho	Er	Tm	Yb	Lu
¨	Ac	Th	Pa	U	Np	Pu	Am	Cm	Bk	Cf	Es	Fm	Md	No	Lr

The aims of the exploration and infill drilling differ slightly and standards/certified reference materials (CRM's) and QAQC procedures that are applied differ to address these aims.

Infill drilling insert QAQC samples according to the following guidelines:

- Blanks: 1st blank as the 5th - 10th sample, rate 1:50, and after visible gold and/or particularly strongly mineralized zones;
- Standards/CRM's: rate 1:50, grade of standard reflecting suspected grade of mineralized zone. Added in proportion; 10% low grade, 80% medium grade and 10% high grade. About 10 different international and in-house standards are or have been used; and
- Check assays: rate 1:50, limited to sample series of more than 50 samples, anywhere in sample series.

This result in an average QAQC usage of approximately 5.4% (standards = 2.7%, blanks = 1.7% and check assays = 1.0%).

Exploration drilling generally follows the QAQC recommendation given by the Exploration department, which is documented in Boliden's internal business management system (BMS), as stated below:

- In-house standards ca. 3%
- CRM (certified reference material) ca. 1.5%
- Blanks 2%
- Check assays 0.5%

An evaluation is underway to assess the merits of preparing standard material from Kankberg mineralization.

QAQC is checked for every sample batch before it is approved in the database. In case of deviations appropriate actions are taken such as re-assay of samples or submission of new samples in case of suspicion of contamination. Issues with long term trends are reviewed.

In total, there were 8 failed batches during the year, which required re-assay.

3.9 Exploration activities and infill drilling

Exploration mainly focused on drilling in both the upper and lower parts of the main mineralization which currently lie outside the LoMP. Minor drilling was also carried out on outlying targets, which in some cases was supported by geophysical surveying.

Infill drilling is focused on increasing the drill hole density within the existing mineralized zones and LoMP. Infill drilling aims at maintaining a lead time of approximately three years ahead of planned production.

3.10 Mining methods, mineral processing and infrastructure

3.10.1 Mining methods

The mining method at Kankberg is a cut-and-fill process that can also be described as room-and-pillar with fill. The ore is mined in 6 m high horizontal rooms or stopes (7 m if it is a bottom room). The rooms are stacked vertically in 4 to 6 levels, which are accessed from the ramp, as shown in Figure 4 (left). The mining starts from a bottom undercut and advances upwards. As shown in Figure 4 (right), the mining cycle is comprised of drilling of the ore, loading of blast holes, blasting, loading of the ore, cleaning of the exposed rock and reinforcing with cemented iron rods and shotcrete.

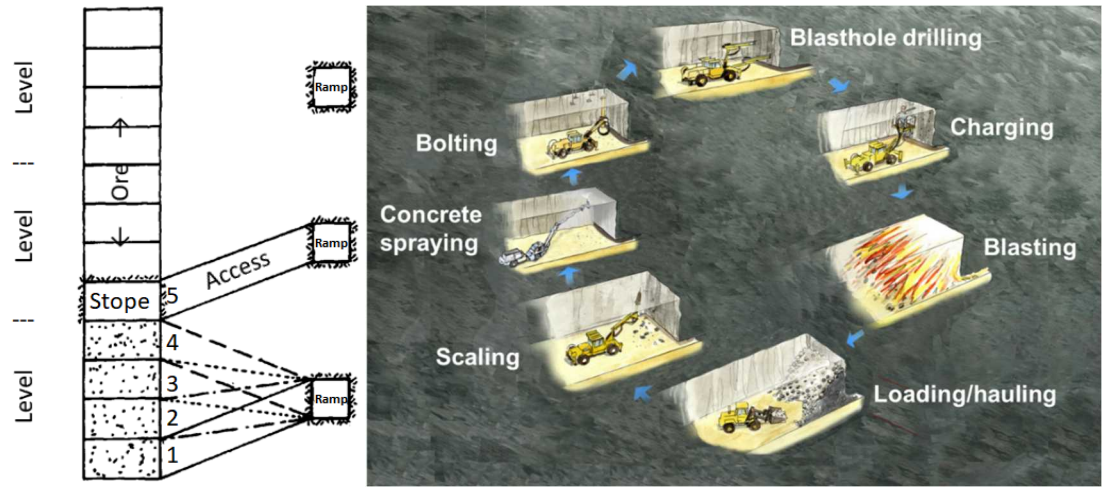

Figure 4: (Left) Sketch profile showing stope access. (Right) Illustration of the mining cycle.

Once the stope is mined, media like water, power supply and ventilation are retreated, as the stope is backfilled with waste material. The fill material serves both as support for the stope walls and as working platform for the next stope. The width of stopes varies between 4.5m to 10m. Where the width of the stope exceeds 10 m, pillars of 6 x 6 m are left at 10 m intervals within the stope. On average 4 to 5 different stopes are in production at any given time with one primary backfill area. Pillars on successive levels are vertically aligned.

Ground support is through rock bolting and shotcreting with fiber-reinforced concrete.

Backfill uses waste rock either from elsewhere in the mine, which comprises around 51% of the total requirement, or waste material which is currently trucked from Rönnskär.

3.10.2 Mineral processing

The ore is delivered by truck to the BOAPP, weighed by truck weigh-bridge and either delivered directly into the plant or stockpiled separately from ore from other mines. Ores from the different mines are processed in batches or campaigns. The feed tonnage to the processing plant is measured using a weighing system with a stationary belt scale. The feed tonnage and the truck weights are used to determine current tonnage in the stockpiles.

As shown in Figure 5 below, there are two stages of grinding. 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 ore is classified using screens and hydro-cyclones. A gravimetric concentrate containing coarse grained gold bearing minerals is produced in the grinding circuit. The gravimetric concentrate is packed in bags of about 800 kg and delivered to the Rönnskär smelter by truck.

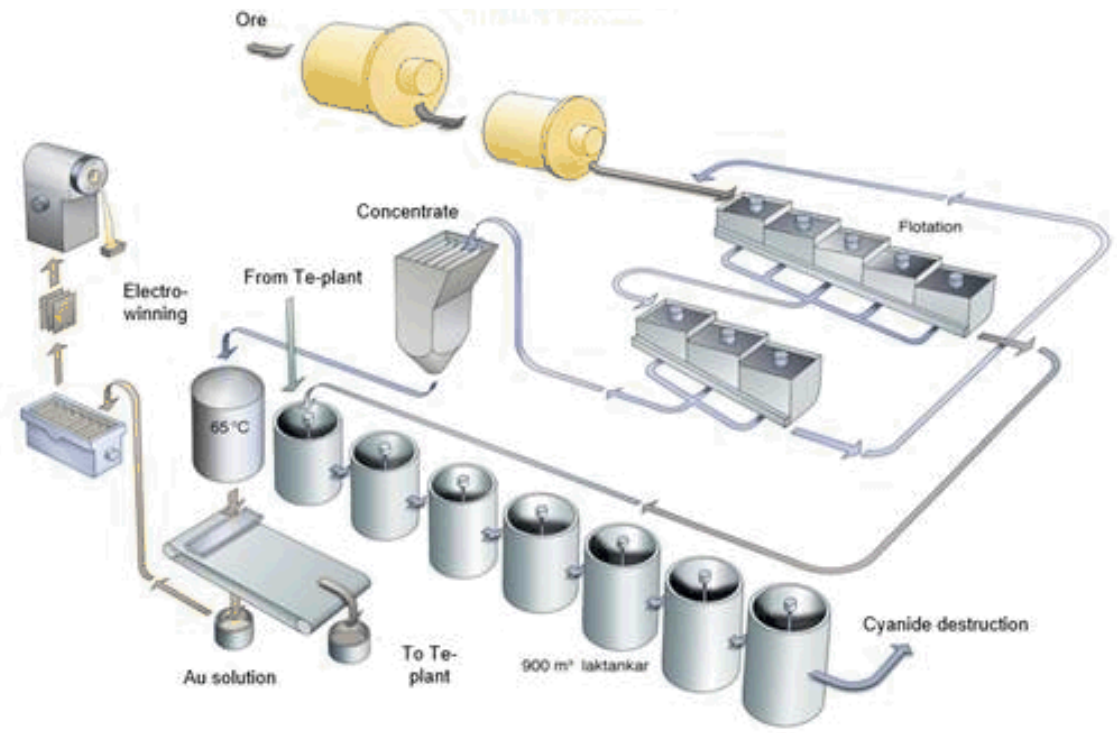

Figure 5: Simplified overview of the different stages of Kankberg ore processing at BAOPP.

Flotation is used to produce a precious metals and tellurium concentrate. The concentrate is accumulated in a leaching tank over a four to five-week campaign. After the completion of a campaign, the concentrate is hot cyanide leached to extract precious metals as a solution. This is done as a batch process. This solution is then separated from the tellurium-rich leach residue using a belt filter. The solution is pumped through a column containing active carbon to recover precious metals. These are then stripped from the carbon as a solution. Electrowinning is used to precipitate the precious metals in the solution to a sludge. This sludge is transported to the Rönnskär smelter for further processing.

The tellurium-rich leach residue is stored in a tank so that onward processing can proceed continuously. The residue is leached again in a proprietary process to recover the tellurium to a tellurium concentrate 'cement'. This is a grey-black powder containing principally tellurium and bismuth oxides with 10% moisture. It is packed in steel drums for sale.

The flotation tailings which are cyanide-leached at ambient temperature in a CIL process using active carbon. The active carbon is stripped to produce a solution containing precious metals. In the same process, but not at the same time as the batch described above, electrowinning is used to precipitate the precious metals in the solution to a sludge that is sent to the Rönnskär smelter for further processing.

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 ore.

Metallurgical recoveries are presented in Table 7 below.

Table 7: Metallurgical Recoveries 2022

Metal	Average Metallurgical Recovery
Au	85%
Ag	43%
Te	44%

3.10.3 Infrastructure

Mine access is via a decline from the historic Kankberg open pit. The run of mine ore is transported by truck to stockpiles at surface before onward transport by truck to the BAOPP.

Air intake to the mine is via a ventilation shaft equipped with two 1800 mm fans on surface. To avoid freezing during winter months, air is heated with a heat exchanger between intake and return air and two propane gas burners as required during the coldest winter temperatures. Current capacity amounts to approximately 600,000 m3/h.
Air is distributed underground via 900 or 1000 mm fans to individual stopes. Active stopes with no activity are ventilated with around 5 m3/s and 16 m3/s during loading.
Return air from the south ramp exits the mine via an exhaust air shaft located in the south ramp area. Return air from the north ramp exits the mine either via the exhaust shaft or the mine ramp system.

The underground facilities for managing water at the mine consist of a system of pump stations and sumps, where mine water is collected and pumped to surface in stages.
Several oil separators are installed adjacent to workshops and filling stations.
Surface water from the industrial areas flow via drainage ditches to collection ponds for subsequent pumping to the mine water treatment plant.

3.11 Prices, terms and costs

3.11.1 Metal prices

Boliden's planning prices, which are an expression of the anticipated future average prices for approximately 10 years, are presented in Table 8 below.

Table 8. Long-term metal prices and currency exchange rates

Metal prices		**LTP 2024->**
Gold	USD/tr.oz	1 400
Silver	USD/tr.oz	20.0
Tellurium	USD/kg	35

Currency rates	**LTP 2024->**
USD/SEK	8.00

3.11.2 Costs

Mining, transportation and processing costs are summarized in Table 9.

Table 9: Mining, transport and process operating costs

	Costs (SEK/t)
Mining (including transport of ore in mine)	255
Ore transport (from the mine to BAOPP)	20
Process (without depreciation)	250
Total	**525**

The total of these costs gives the break-even cut-off used for mine planning.

3.11.3 Net Smelter Return

For revenue evaluation, a 'Net Smelter Return' (NSR) value is effectively the value in Swedish Kronor (SEK) for each gram of each contained product or by-product metal attributed to ore arriving at the BOAPP from Kankberg, within Boliden's accounting system. Being a combined product value, it is used as a grade to describe tonnages in terms of SEK/t and is derived from long-term metal prices, metallurgical recoveries (Table 7) and smelter terms.

The long-term NSR Factors are given for 1 gram of each metal below:

- Au = 311 SEK
- Ag = 1.70 SEK
- Te = 0.13 SEK

3.11.4 Cut-off grades

The operational costs and NSR factors provided above together define the cut-off grade, which is expressed as a combined NSR value/tonne. The relative contribution of individual metals to this cut-off grade will vary according to location, but in general Au accounts for around 97% of the revenue for any single block. This is equivalent to the following:

- Operational cut-off (525 SEK) = 1.64 Au g/t
- Marginal cut-off (350 SEK) = 1.13 Au g/t
- Resource cut-off (300 SEK) = 0.97 Au g/t
- Waste material (<300 SEK) = <0.97 Au g/t

3.12 Mineral Resources

Three-dimensional grade shells are created in Leapfrog Geo and used in Datamine Studio RM as estimation domains for grade interpolations. The grade shells are based on the following Au grades:

- Very high-grade domain = Au >=25 ppm (introduced 2022)
- High grade domain = Au >=2 ppm
- Low grade domain = Au >=1 ppm
- Waste grade domain = Au >= 0.5 ppm

These threshold grades roughly reflect historic cut-off grades and are used to reduce smoothing and produce a more local grade estimate. In addition, a high Sulphur and Zinc domain is also created to provide a more local S and Zn estimate within the Au-rich zones. This grade shell is based on a cut-off grade of S >= 5% and Zn >= 0.15%

Histograms and log probability plots were used to identify the presence of outlier grades for Au, Ag, Te and Bi. The top-caps for Au, Ag, Te, Bi were retained from the previous update however, an additional top-cap for Au was introduced within the VHG zone to prevent over-smoothing within this localised outlier population.

- Au = 75 ppm (VHG Zone only)
- Au = 50 ppm
- Ag = 200 ppm
- Te = 1500 ppm
- Bi = 1500 ppm

Drill core samples are usually taken at 2 m length within geological domains. Length-weighted composites with a target length of 2 m were calculated for the grade estimation process, as for previous estimations.

Previous variogram parameters were reviewed in Snowden Supervisor and were deemed reasonable to retain in this update. The structural trend planes that influence the surface anisotrophy were updated in 2022 to extend to surface and include more localised planes than previously defined (based on observed structural features and high-grade Au trends). The same planes are used as inputs in both the grade shell build and dynamic anisotropy within the Au domain. A restricted search ellipse was introduced for the VHG Au domain otherwise the search parameters are in line with previous estimates. In general, the minimum number of composites required for a block estimate is five, although this is reduced to one for the final search pass.

Ordinary Kriging was used for the grade estimation of Au, Ag, Te, Bi, Cu, S, Al and Fe. Inverse distance weighting (IDW) was used for grade estimation of Sb, Hg, Pb, As, Zn and Density. Any Au estimates within the high-grade zone that were estimated with a negative Au grade were re-estimated with IDW however, in practice, this affected an insignificant number of blocks.

A parent block size of 6 x 6 x 6 m is utilized with sub-blocking to 1.5 x 1.5 x 1.5m based on QKNA completed in Snowden Supervisor and an approximate drillhole spacing of 10-20m.

To check the estimation strategy is appropriate, the block model is validated using various techniques:

- Statistical comparison of raw composite data against block model estimates
- Validation (swath) plots comparing the block model estimates against input data
- Visual validation of block estimates against informing composite data

Overall, the global block estimates are slightly conservative however, reasonable correlation exists between the sample data and the block estimate to consider the resource estimate reliable.

Mineral Resources are classified into Measured, Indicated and Inferred categories. The Mineral Resource classification is based upon key indicators including the quality and quantity of informing data, confidence in the block estimates, and assurance in the reasonable continuation of mineralization.

In general, a minimum sample spacing of 60 x 60m is required for Inferred, 20 x 20m for indicated and 10 x 10m for Measured. Classification strings are manually reviewed and updated in Datamine Studio RM according to these key indicators.

The basis for defining Mineral Resources is that:

(a) it includes the HG (high grade) domain;
(b) it includes material from the LG (low grade) domain for those blocks with a grade above the resource cut-off (300 SEK/t) and with RPEEE; and
(c) excludes material from the waste domain (WG).

Mineral Resources may include sill pillars and Inferred material that lie within the LoMP.

Waste rock dilution and mining recovery are incorporated into Mineral Recourses as outlined in Table 10 below.

The Mineral Resource statement is presented in Table 1 above.

3.13 Mineral Reserves

Mineral Resources are converted into Mineral Reserves when the rooms that will mine them are planned, and that material left in pillars can be excluded. Mineral Reserves are selected and reported from the parts of the block model which fall within mining design volumes (LoMP), which could include Inferred Mineral Resources. Material that falls outside the mine design is defined by wireframes and is reported as Mineral Resources exclusive of Mineral Reserves.

Where mining design volumes include Measured and Indicated Mineral Resources, then these are transferred into Proved and Probable Mineral Reserves, respectively, but excluding material in pillars. It may include small quantities of material that are Inferred Mineral Resources that are not transferred. Vertical pillars are included in the mine design but are not transferred into Mineral Reserves and are not reported.

Mineral Resources are always reported as additional to Mineral Reserves.

The Mineral Resources and Reserves are estimated with waste rock dilution and recovery percentage per category according to Table 10.

Table 10: Waste rock and dilution per category

Waste rock dilution (%)	Recovery (%)	Category	
3.5	100	RESCAT=1 (Proved)	Reserve
15	85	RESCAT=2 (Probable)	Reserve
3.5	90	RESCAT=3 (Measured)	Resource
15	75	RESCAT=4 (Indicated)	Resource
20	70 or 80	RESCAT=5 (Inferred)	Resource

In effect, Measured Mineral Resources are similar to Proved Mineral Reserves, except that the pillars are explicitly omitted from the Proved Mineral Reserves, whereas in the Measured Mineral Resources, the pillars have not been planned, but they are implicitly omitted by the Recovery Factor. The same relationship exists between Indicated Mineral Resources and Probable Mineral Reserves.

All other modifying factors, namely processing, metallurgical, infrastructure, economic, marketing, legal, environmental, social and governmental factors, that are required to transfer Mineral Resources to Mineral Reserves are already in place and considered to be favourable. If, for example, potentially economic mineralization was found by drilling at Kankberg that required different processing to that presently used for Kankberg ore, then this material would require a separate Feasibility Study to develop a separate mine with separate mineral asset reporting.

Using NSR as calculated above, a break-even mining cut-off grade of 525 SEK/t is used to guide mining design and in Mineral Reserve and additional Resource Estimation. When rock below this cut-off must be mined, mainly to access higher-grade material, a marginal cut-off of 350 SEK/t is applied and this material is trucked as ore. Rock below 350 SEK/t would be mined as waste and used within the mine as backfilling material.

For production planning and Reserve classification, the entire room must average at least 525 SEK/t to be mined (this could include material which has a grade below 525 SEK/t).

The Mineral Reserve statement is presented in Table 1 above.

3.14 Comparison with previous year/estimation

The total Mineral Reserve tonnes for 2022 have been reduced by 94 kt in comparison with the 2021 statement (Figure 6). This reduction is primarily due to depletion through production ("Mined (total)" -464 kt). In addition, an adjustment of -111 kt ("Written-off"), was made to downgrade reserve to resource for certain material at the end of the LoMP, in accordance with the Boliden Area strategic plan. A total of 669 kt has been added to the reserve through a combination of resource conversion and technical adjustments.

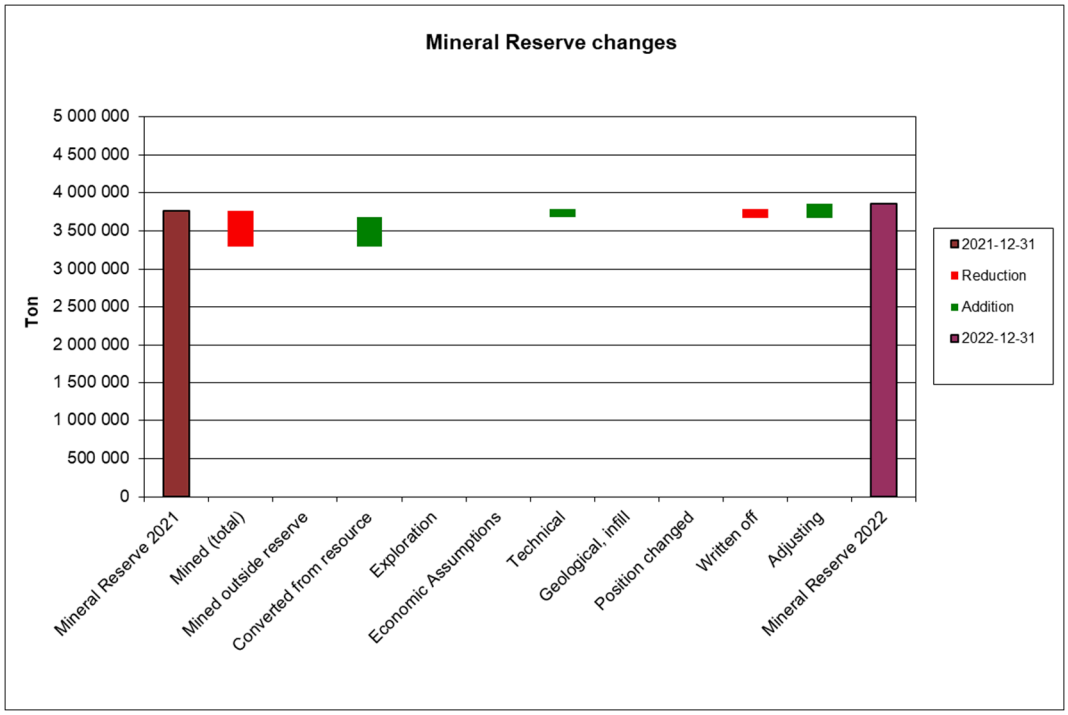

Figure 6: Changes to Mineral Reserves (P+P)

Mineral Resources have decreased by 391 kt, the majority of the change due to conversion to reserve (Figure 7).

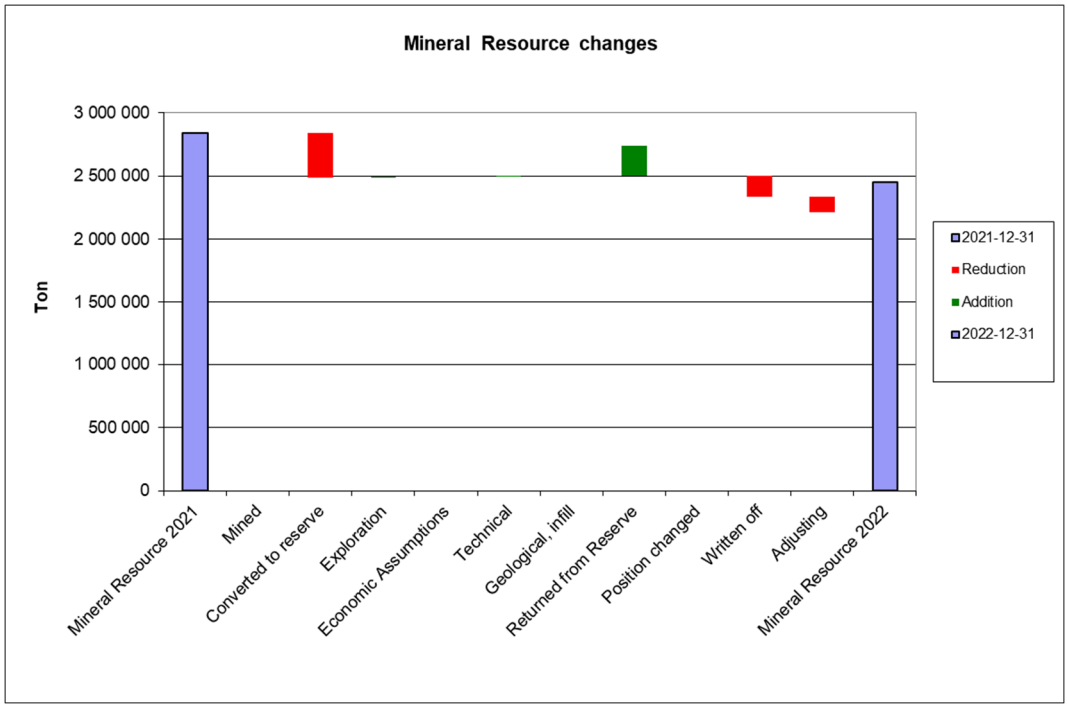

Figure 7: Changes to Mineral Resources (M+I+I)

3.15 Reconciliation

Reconciliation at the Kankberg Mine is completed for every month of production and aggregated for the year. Mined grades and tonnages are read from the block model for every position that has been mined. These predicted grades are then summarized, where the average grade for that month is compared with the average grade and tonnage which has been reported by the BAOPP.

The reconciliation for 2022 is shown in Table 11. Reconciliation data shows that mined tonnages show a small deviation (+2%) from those reported by the BAOPP. Reconciliation of mined grades against process plant reported grades shows good correlation with Au and Te at 2% with Ag at 8%.

Table 11: Kankberg Reconciliation 2022 (DMS #1150727)

2022 Reconciliation - Kankberg				
Category	**Tonnes kt**	**Au g/t**	**Ag g/t**	**Te g/t**
Mined (Kankberg)	464	3.7	10.4	164
Processed (BAOPP)	472	3.7	11.2	160
Difference (Mined vs. Processed)	8	0.1	0.8	-4
Difference (Mined vs Processed %)	2%	2%	8%	-2%

4 REFERENCES

Internal References

- DMS #1150727, Kankberg reconciliation file.

External References (public domain):

- Kankberg Annual Summary Report 2021 (bol_main-1847687-v1-resources-and-reserves-kankberg-2021-12-31.pdf (boliden.com))
- Pan-European Standard for reporting of Exploration results, Mineral Resources and Mineral Reserves (The PERC Reporting standard 2021.) www.percstandard.eu