Boliden Summary Report

Mineral Resources and Mineral Reserves | 2019

Tara Mine

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1 SUMMARY

This report is issued annually to inform the public (shareholders and potential investors) of the mineral assets held by Boliden Tara Mines.

Tara Mines is located 2km northwest of the town of Navan in Co. Meath Ireland and 50 km northwest of Dublin. The mine has a production capacity of 2.6mt per year and is the largest zinc mine in Europe. The newly discovered deposit, termed 'Tara Deep' is located approximately 1km southeast of the main mine and is currently a major focus for exploration and development.

In 2019, the mine produced some 2.46mt of mineralised material grading at 5.24% Zn, and 1.03% Pb, and with a development distance of 14.1km. A summary table of the calculated 2019 Mineral Resources and Mineral Reserves is presented in Table 1 below.

Table 1. Mineral Resources and Mineral Reserves in Tara Mines 2019-12-31.

	2019			2018		
	Mt	Zn	Pb	Mt	Zn	Pb
Classification		%	%		%	%
Mineral Reserves						
Proved	**1.1**	**5.3**	**2.5**	1.6	6.7	1.8
Probable	**16.3**	**6.1**	**1.5**	17.4	5.6	1.5
Total	17.4	6.0	1.6	19.0	5.7	1.5
Mineral Resources						
Measured	**0.0**	**5.0**	**1.0**	0.0	0.0	0.0
Indicated	**2.5**	**5.4**	**1.4**	2.2	6.2	1.6
Total M&I	2.6	5.4	1.4	2.2	6.2	1.6
Inferred	**27.8**	**7.3**	**1.6**	20.8	7.4	1.7

* Please note that the areas with zero tonnage but with grades assigned are a product of rounding to the nearest 100,000t.

2 GENERAL INTRODUCTION

This report is issued annually to inform the public (shareholders and potential investors) of the mineral assets held by Boliden Tara Mines. The report is a summary of internal / Competent Persons' Reports for Tara Mines. Boliden is changing reporting standard from Fennoscandian Review Board (FRB) to the Pan-European Reserves and Resources Reporting Committee (PERC) "PERC Reporting Standard 2017". 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.

The previously used FRB standard will no longer be maintained. The PERC standard has more clearly defined requirements on reporting and on Competent Persons. Boliden is currently in the process of updating procedures and many of the reports and estimations summarized here are compiled according to the previous standard (FRB). We consider this data accurate and reliable. The process of creating PERC compliant estimations, studies and reports for all Projects and Mines is underway.

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.

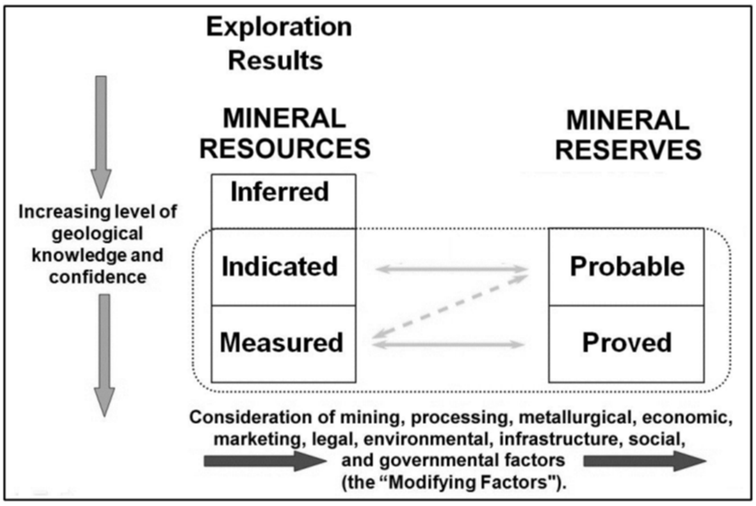

Figure 1. General relationship between Exploration Results, Mineral Resources and Mineral Reserves (PERC 2017)

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.

2.3 Competence

The 2019 Reserves and Resources were estimated and compiled by a team of geologists and engineers, outlined in Table 2 below. Gunnar Agmalm took the role of both resources and overall competent person for Tara Mines 2019. Gunnar is Boliden's Ore Reserves and Project Evaluation manager and a member of AusIMM (Australian Institute or Mining and Metallurgy) and FAMMP (Fennoscandian Association for Metals and Minerals Professional).

Borja Arias took the role as competent person for reserves and is a Professional Member of the Institute of Materials, Minerals & Mining (IOMMM). Borja has greater than 6 years' experience globally in reserve estimation in base metal deposits, with several years based at the Navan Deposit.

Table 2. Contributors and responsible competent persons for this report

Description	Contributors	Role
Compilation of Report	Anna Matus	Chief Mine Geologist, Tara
Mineral Resources	Gunnar Agmalm	Competent Person, Boliden
Mineral Reserves	Borja Arias	Competent Person, Tara
Other contributors		
Geology	Robert Blakeman	Senior Exploration Geologist, Tara
Resource Estimation	Finn Oman	Senior Project Geologist, Tara
	Sofia Höglund	Senior Resource Geologist, Boliden
	Ian McGimpsey	Senior Resource Geologist, Boliden
Reserve Estimation	Paddy McConnell	Long term Planning Engineer, Tara
	Ana Louro	Mine Production Scheduling Engineer, Tara
Mineral Processing	George Wilkinson	Mill Manager, Tara
Mining	Nils Steen	Head of Section Mine Planning / Technical Services, Tara
	Charles Walker	Chief Mine Engineer, Tara
Environmental and legal permits	Paschal Walsh	EHS Manager

3 TARA MINE

3.1 Project Outline

Boliden Tara Mines is an underground zinc and lead mine producing 2.6 million tonnes per year. With an annual development schedule of 14km and nearly 250km of tunnels it is classed as the biggest zinc mine in Europe and also one of the largest in global comparison. Tara Mine uses room and pillar and longhole stoping as its main mining methods and has a current depth of around 1km.

The Mineral Reserve will serve for 7 years of full production. However with planned conversion of Mineral Resources it is likely that this could be extended further. Exploration will also continue to add Inferred Mineral Resources in Tara Deep with the aim to include some conversion drilling also.

3.2 Major changes

With the use of new software, financial calculation tools and more stringent classification controls the reserve and resource figures of the Tara deposit have changed. This process will continue throughout 2020 where all areas of mineralization will be thoroughly examined and its potential rescheduled in the life of mine plan.

Continuing drilling in the new Tara Deep Satellite deposit increased the resource by 4.0Mt to 22.4Mt grading 7.8% Zn and 1.55% Pb. In addition the access drift was mined ca 240m towards this area from the existing mine with a further 187m developed for drill cuddys and stockpiles.

3.3 Location

Boliden Tara Mines is located in Navan, Co. Meath Ireland, ca 50km NW of Dublin (Figure. 2).

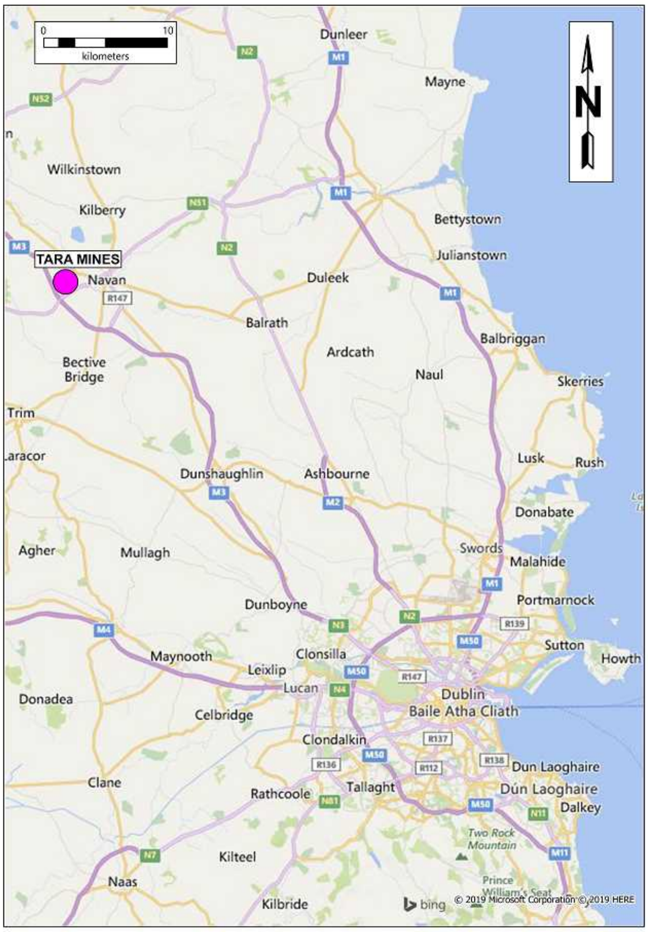

Figure 2. Map of Eastern Ireland showing Navan, the Boliden Tara mine and Dublin.

The Boliden Tara Mine is located 2km NW of the town of Navan in Co Meath Ireland and 50 km north west of Dublin (Figure. 2). The area comprises gently rolling farmland with a mild Atlantic climate. The mine is well served by motorway and rail links to Dublin airport and port. The orebody extends from near surface for ca 5km WSW to depths of nearly 1km. A satellite deposit, termed 'Tara Deep' was discovered in 2012, occurs at depths of 1-2 km below surface and is currently a major focus for exploration and development. The distribution of resources and reserves, the mined out areas and the location of Tara Deep is shown in Figure 3.

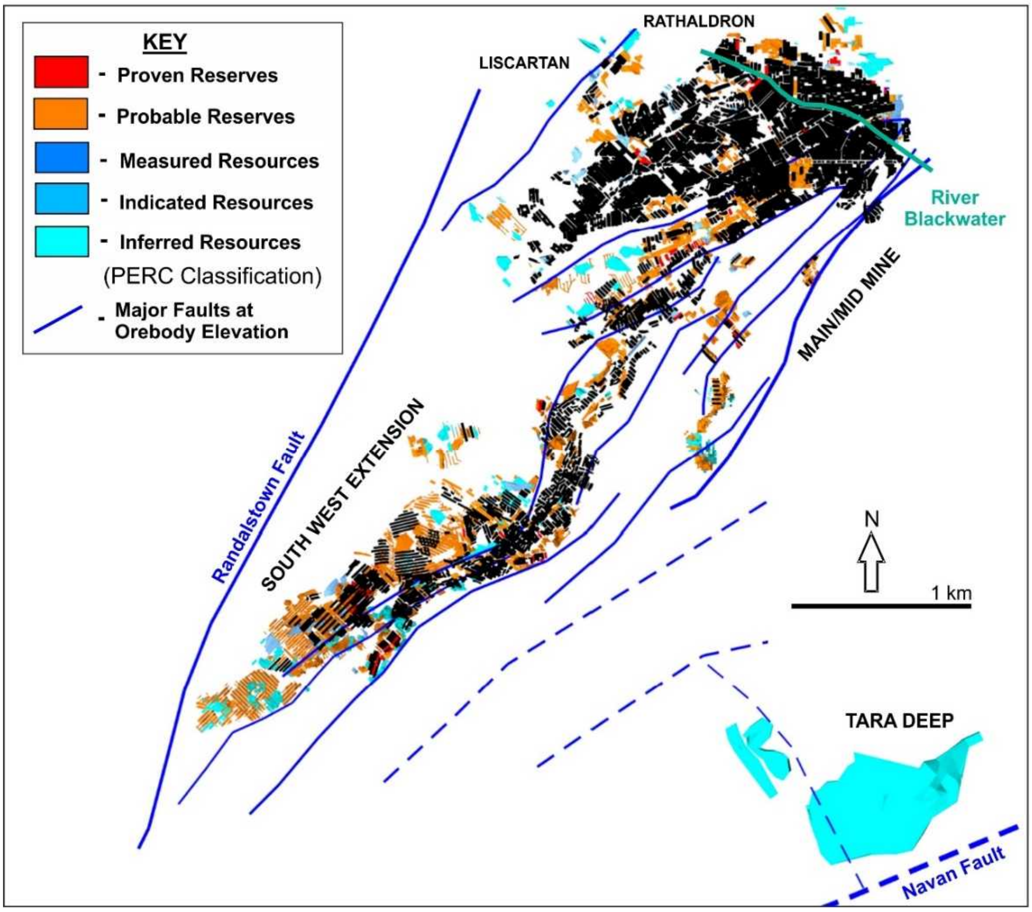

Figure 3. Resource and reserve distribution in the Navan Orebody, showing mined out areas, principal faults and the location of Tara Deep.

3.4 History

The Navan Orebody was discovered in 1970 and production started in 1977 (see timeline below). Production has been scheduled at rates up to 2.6mt per year in recent years with the preceding 11 years production shown in Table 3.

Timeline

1968	Reports by the Irish agricultural institute highlights high concentrations of Zn and Pb in stream sediments west of Navan
1969-1973	Tara Exploration and Development company acquires prospecting licenses in the area. Shallow soil surveys show Zn, Pb anomalies north of the River Blackwater. Follow up surveys show large 900m x 400m anomaly of up to 5000ppm Zn and 2000ppm Pb, field mapping finds mineralised boulders and outcrops north of the river and induced polarization and resistivity shows anomalies north and south of the river. Diamond drilling program of 355 holes show initial resources of 69.9mt @ 10.09% Zn and 2.83% Pb
1973-1977	Underground development and production begins
1986	Acquired by Outokumpu

1990s Exploration drilling discovers SWEX – south west extension raising the total pre-mining size of the ore body to 120mt +

2001 Nevinstown, east of the River Blackwater – purchased from Bula Ltd increasing holdings

2004 Acquired by Boliden

2012 Discovery of Tara Deep, SE of the main ore body following exploration drilling of a seismic anomaly.

2017 Development of Tara Deep Exploration access drift begun

	TONNAGE	GRADE			ZINC CONCENTRATE				LEAD CONCENTRATE				SILVER	
YEAR	MILLED	% Zinc	% Lead	% Iron	Tonnes	% Zinc	% Rec.	Metal	Tonnes	% Lead	% Rec.	Metal	g/t	t
2010	2,592,821	6.97	1.39	3.45	315,855	53.0	92.5	167,334	34,459	53.7	51.2	18,515	39	1.34
2011	2,486,357	7.04	1.36	3.00	307,410	53.3	93.7	163,935	33,679	58.8	58.5	19,787	27	0.92
2012	2,502,278	7.00	1.44	2.87	305,170	54.4	94.8	166,021	40,807	55.2	62.4	22,517	41	1.67
2013	2,493,240	7.05	1.46	2.74	297,944	55.9	94.7	166,462	38,604	56.1	59.5	21,672	31	1.20
2014	2,286,701	6.92	1.55	2.69	267,242	56.0	94.5	149,646	41,940	53.1	62.8	22,262	58	2.43
2015	2,196,814	6.37	1.25	2.71	242,777	54.8	95.1	133,034	34,400	50.0	62.7	17,182	37	1.27
2016	2,602,863	5.96	1.15	2.70	267,851	55.2	95.3	147,797	37,091	52.8	65.6	19,582	29	1.08
2017	2,310,634	5.92	1.14	2.71	239,038	54.6	95.4	130,580	31,258	54.7	64.9	17,083	43	1.34
2018	2,200,154	6.28	1.20	2.72	242,264	54.4	95.3	131,742	29,299	57.0	63.3	16,712	40	1.16
2019	2,461,391	5.24	1.03	2.39	222,872	54.9	94.9	122,463	29,258	54.9	63.3	16,053	54	1.58
Total	97,236,909	7.42	1.70	2.83	12,220,725	53.9	93.1	6,717,303	1,993,332	60.9	73.4	1,213,903	135	269

Table 3. Milled tonnages and grades from Boliden Tara Mines over the period 2009-2019.

3.5 Ownership and Royalties

Boliden Tara Mines DAC is wholly owned subsidiary of the Boliden Group, Sweden.

3.6 Permits

The Boliden Tara operation has a number of permits that include:

- Five Prospecting Licences granted by the Department of Communications, Climate Action and the Environment that extend outwards from the mine for several kilometers and convey exclusive rights to explore and apply for State Mining Facilities. These are renewed every six years, subject to official review and fulfillment of licence commitment expenditures on a two-yearly basis.

- State Mining Facilities comprising three Leases and five Licences granted by the Department of Communications, Climate Action and the Environment. These facilities will need renewal between 2021 and 2023. Currently terms are variable with recent facilities being granted with royalties to the Irish State varying from 3.25 to 3.75% of Net Smelter Return. Deliberation from the Department of Communications, Climate Action and the Environment is awaited regarding licences from few small un-licensed areas in the SW part of the deposit.

- An Industrial Emissions licence from the Environmental Protection Agency was granted in September 2018.

Tara Deep is covered by a Prospecting Licence and the underground exploration development is exempt from Planning Permission. Tara Deep will require planning, licence review and State Mining Facilities in due course. Boliden Tara Mines have reasonable expectations that application for new permits and renewals of existing permits will be granted by the relevant authorities.

3.7 Geology

The Navan Orebody is a world-class carbonate-hosted Zn-Pb deposit comprising complex tabular lenses within Lower Carboniferous limestones and excluding depletion, would be over 130Mt in size. Detailed descriptions of the geology are available in a number of publications of which Ashton et al., (2015) is the most recent. The discovery of the Tara Deep satellite and outline geology are summarized in Ashton et al., (2018).

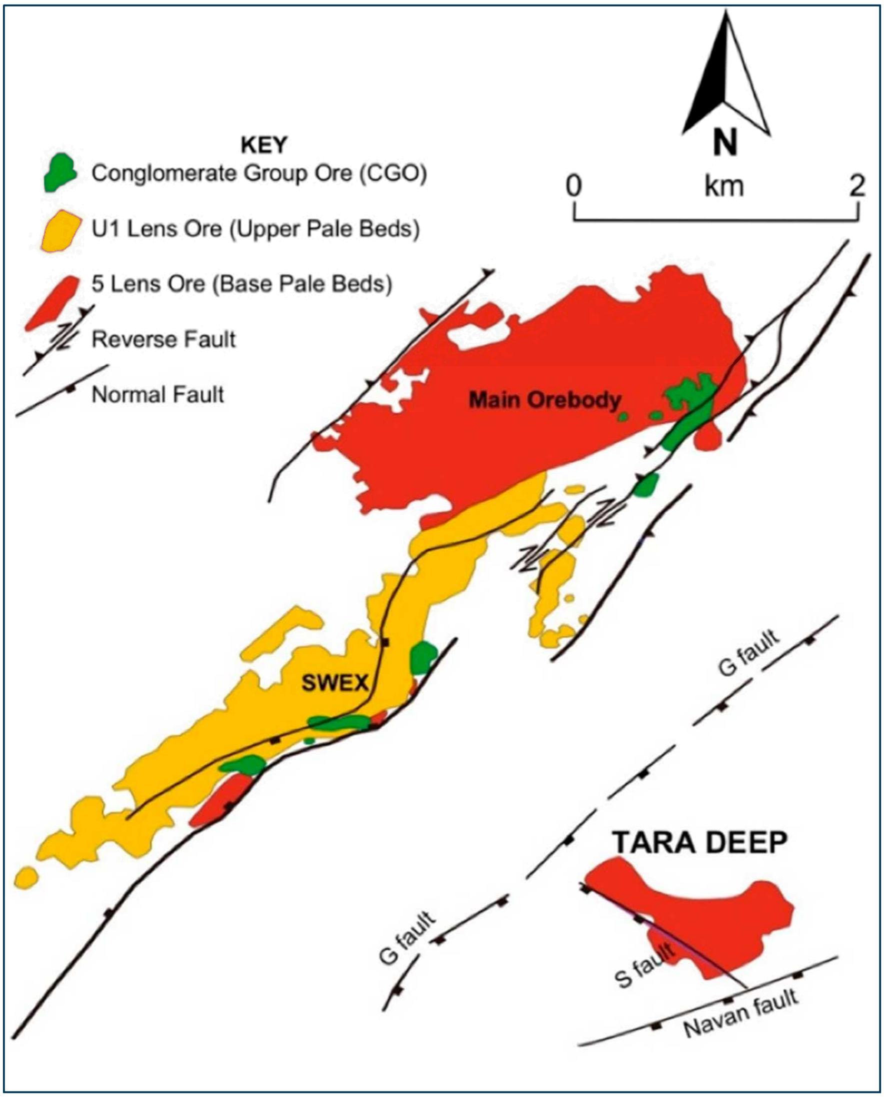

Figure 4. Geology of the Navan Orebody and position of mineralisation

3.7.1 Regional

Central Ireland comprises generally flat lying sequences of Lower Carboniferous limestones with common inliers of sedimentary Lower Palaeozoic and Devonian rocks. The limestones are cut by numerous, locally syn-depositional NW to ENE trending major normal faults and these control the location of several carbonate hosted Zn-Pb deposits, of which Navan is by far the largest.

3.7.2 Local

In eastern Ireland, the Carboniferous Limestones are part of the Dublin Basin, a significant feature that after extensional basin-margin faulting and later Hercynian inversion, exposes some large Lower Paleozoic inliers at its margins and exhibits some outliers of Namurian and later Permo-Triassic sediments.

3.7.3 Property

The Navan Orebody is located on the footwall (northern) side of a major south-dipping normal fault that constitutes a basin margin controlling feature. The orebody itself is controlled by a complex array of Lower Carboniferous normal faulting and slides on the uplifted footwall of this major fault. The orebody generally dips at about 10-15 degrees to the WSW and comprises several, locally stacked, tabular stratiform to stratabound lenses, oriented in general concordance with the host limestones (Figure 5). The mineralization ranges from a few meters to over 70m in vertical thickness. A major slide and overlying debris flow cuts the orebody obliquely and is also mineralized. The orebodies are effectively masked from the surface by a thick succession of deep-water calc-turbidites that comprise the Dublin Basin.

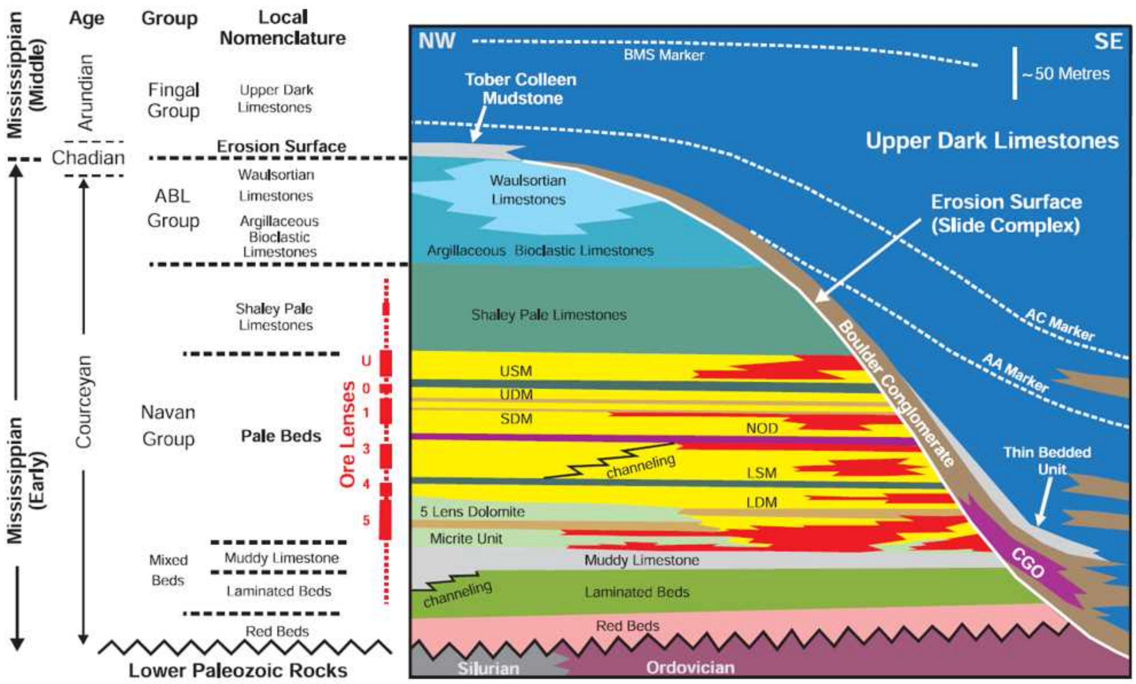

Figure 5. Geology of the Navan Orebody and position of mineralisation

3.7.4 Mineralization

Although there a number of important lenses and fault blocks at Navan, >95% of the mineralization occurs as sphalerite and galena in partly dolomitized limestones as complexly-textured replacements, veining and open-space infill where Zn:Pb ratios are typically around 4 or 5 to 1. Gangue mineralization comprises subsidiary calcite, pyrite, marcasite, dolomite and barite. The remainder of the mineralization occurs as massive pyritic lenses containing sphalerite and galena hosted by debris-flow conglomerates that overlie the deposit. This material contains often abundant fine-grained pyrite which has the potential of degrading the normally excellent metallurgy if not blended with normal run of mine ore.

3.8 Drilling procedures and data

Exploration at Navan comprises surface exploration and underground exploration. Surface exploration comprises several geochemical and geophysical techniques, and most recently, 2D seismic surveys have been extraordinarily effective in providing structural profiles through the host geology. The primary exploration tool is deep diamond drilling and this extensively uses navigational deflection drilling enabling many intersections to be drilled from a single ‘mother’ hole with resultant benefits to timing and reduced impact on the environment.

Underground diamond drilling is performed from specially mined hanging-wall drifts located 10s of meters above the orebody and subsequently used for ventilation, dewatering, geotechnical and backfill purposes. Most underground diamond drilling is for delineation for upgrading Inferred to Indicated resources. Subsequent in-stope drilling is used to upgrade Indicated to Measured Resources prior to production.

3.8.1 Drilling techniques

Drilling comprises wireline or conventional diamond drilling with NQ diameter core for surface holes and AQ or BQ core for underground core. Core recovery is typically close to 100%. All drilling is completed by contractor, currently Priority Drilling Ltd.

3.8.2 Downhole surveying

Downhole surveying is accomplished either by Contractor or Exploration staff using Reflex electronic multi-shot equipment (the host rocks at Navan are not magnetic). Production holes shorter than 25m are generally not surveyed and are frequently vertical or fairly steeply inclined.

3.8.3 Sampling

All surface (NQ diameter) core is split prior to sampling and most core is retained for possible future examination. All underground core (AQ/ ATQK diameter) is sampled whole and the remainder completely discarded. Sampling is governed by ore-waste zones, lithology contacts and mineralization styles though it is noted that the mineralization at Navan is extremely variable in its distribution and textural styles, so it is impossible to aim for strict homogeneity in material sampled. Sample length typically ranges from 0.5 to 2m and averages around 1.5m. All samples are recorded in mineral logs where textural styles and a visual estimate of Zn+Pb% is recorded. Although a very large emphasis is placed on recording the geology and grades of development faces at Navan and this material is used for interpretation, it is not currently used for resource grade estimation. Core loss is minimal at Tara however, when encountered is recorded in the core tray and in logging.

3.8.4 Logging

Logging across site is electronically entered into a Tara specific database through tablets or laptops. The geology is split into lithology, alteration and mineralization with visual estimates given for any mineralization noted in the core. Major Faults are used as domain boundaries structures and are either logged as individual intervals depending on the importance of the fault or combined into the lithology. Once the core is logged photographs are taken and stored on the network.

3.8.5 Density

Density is estimated from a set of multiple regression equations that relate density to sample Zn, Pb and Fe grades and which were created by experimental work relating measured density to assays. In general, the density of the ore is not much higher than the host rock (e.g. 2.8-3.2), unless high Pb and/or Fe grades are present and in these areas the regression curves take these variances into effect.

3.8.6 Analysis and QAQC

Samples are sent to an on-site laboratory for comminution and assay via conventional processes (crushing, milling, XRF assay etc). This laboratory is also used for environmental, mining and metallurgical work and has trained staff and full detailed QA/QC procedures, including external lab checks, standards etc. Core samples are subject to checks between estimated Zn+Pb% grades and assayed Zn+Pb% grades. In the case of disparity, samples are re-analyzed and in the case of surface drill holes the split core is re-examined to check the assay estimate. In the case of Tara Deep core, all mineralized coarse rejects from the in-house lab are independently comminuted and assayed in an external laboratory (ALS Loughrea, Co Galway).

Currently only minimal QAQC is being carried out at Tara including visual vs assay checks and assays vs geology checks.

3.9 Exploration activities and infill drilling

3.9.1 Surface Drilling

In total 63 surface holes were drilled during 2019, with 7 drilling at year end, totaling over 30km of drilling (including extensive navigational-drilling). The majority of the drilling (49 holes), some 28.15km, and by far the highest proportion of the budget was expended at Tara Deep where further good intersections were made (see Figure 6). The focus on Tara Deep was again to the detriment of other surface drilling closer to the Navan orebody where only a short program of fourteen shallow holes were drilled in Nevinstown during 2019.

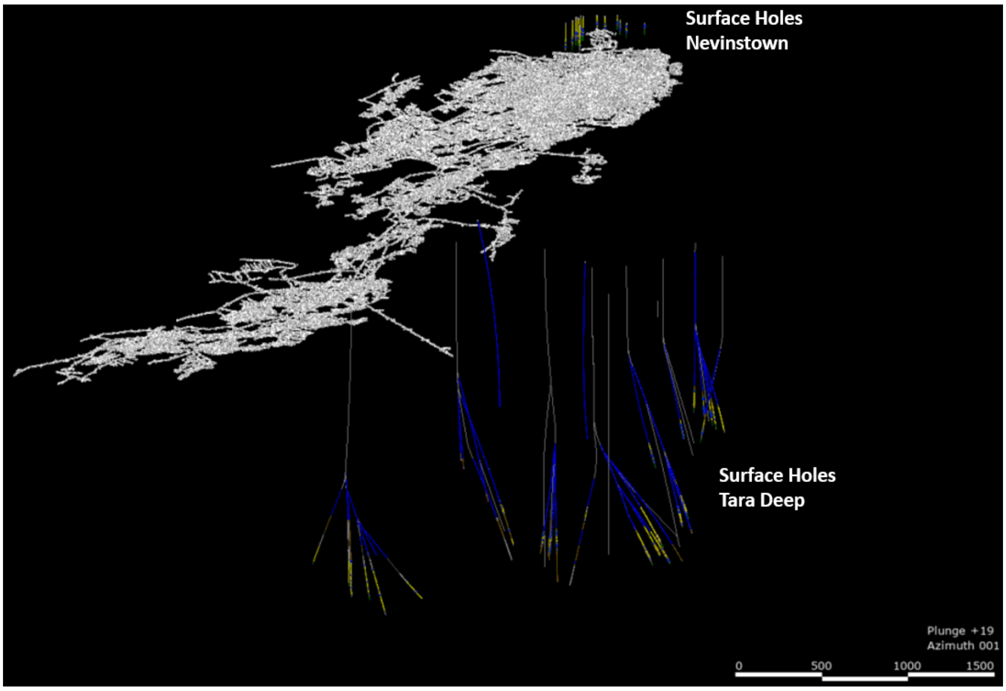

Figure 6. Surface exploration and delineation drilling Near Mine 2019

3.9.2 Underground Exploration Drilling

In 2019, a total of 12,788 meters were drilled underground. Over 50% of the budget was drilled from one of the main hanging wall drifts where approximately 25% was converting known resources to reserves and 25% delineating new targets. The remainder of the drilling found good resources in 5 Lens micrites for the SE extension along with increasing the potential in both Liscarton 5 Lens and the 31L in Lower Swex. Figure 7 below represents the drilling locations completed in 2019 across the 3 main areas of Tara Mines, including Main Mine (green), Upper Swex (yellow) and Lower Swex (blue).

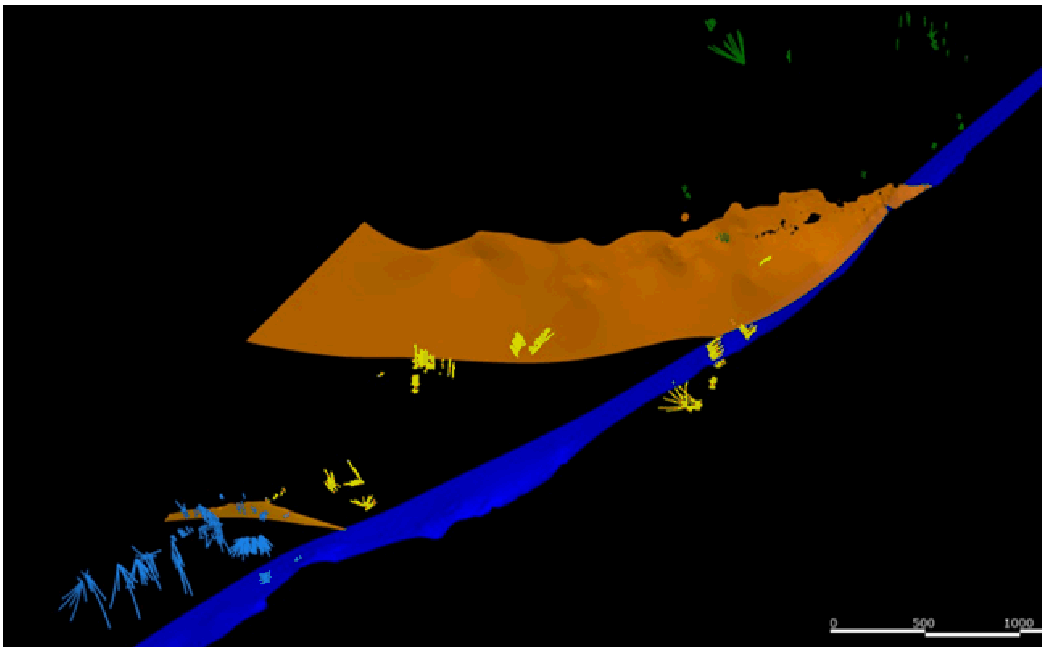

Figure 7. Underground exploration drilling 2019 – by main mine areas

3.9.3 Underground Development and Production Drilling

There was 25,547m drilled in 2019 for conversion to measured and production infill. This drilling was carried out across Upper and Lower Swex with a small portion drilled for water probe holes and service holes. Figure 8 below represents drilling completed in each blockmodel.

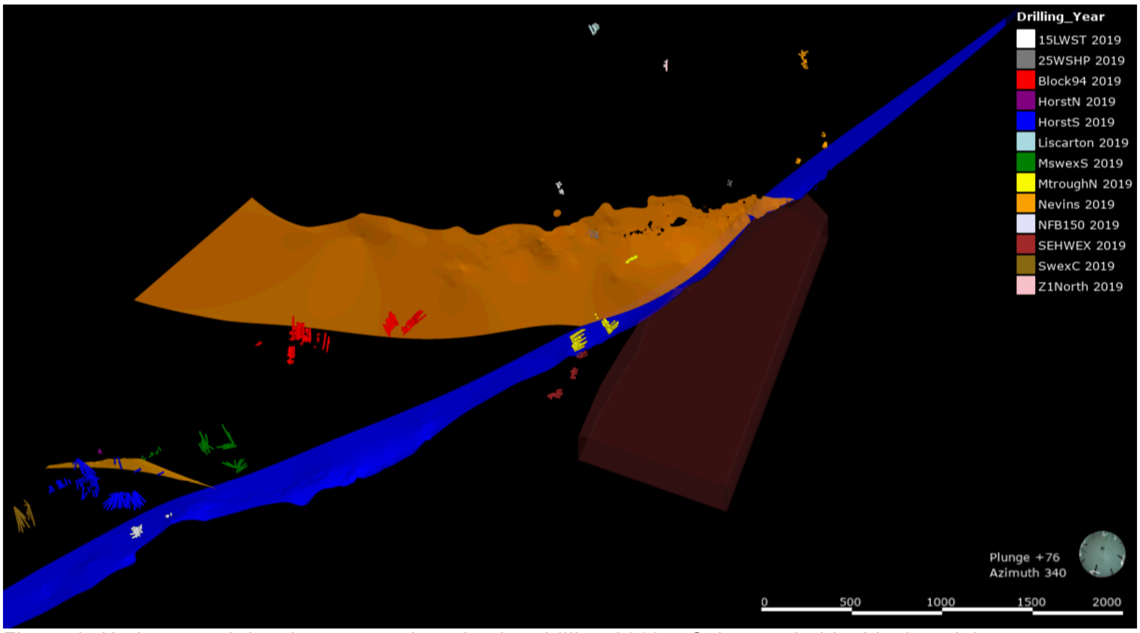

Figure 8. Underground development and production drilling 2019 – Colour coded by blockmodel

3.10 Mining methods, mineral processing and infrastructure

The Boliden Tara Mine in Navan started development in 1974 with production commencing in 1977. Over the years, the mining methods evolved from top-slice and bench to various types of open stoping. Milling is straightforward and comprises standard froth flotation to give Zn and Pb concentrates which are railed to Dublin Port and subsequently to smelters overseas. The majority of the Zn concentrate goes to Boliden smelters in Norway and Finland.

Since startup, the mine has mined and processed nearly 95Mt of ore and established much confidence in the processes running from exploration and mine geology, through planning, mining and backfill to milling operations. As the mine gets deeper, increasingly thinner areas of ore are being encountered and this requires continual focus on costs and optimal mining methods.

3.10.1 Mining methods

In most areas of the mine open-stopes are designed parallel to the strike direction of the orebody such that in-stope development is sub-horizontal, whereas in the upper-near surface sections the open stopes are along dip and may necessitate slightly more complex development. In both cases, ore thicknesses up to about 20m can be mined via a single footwall drift with blast-hole drilling drilled upwards. Thicker ore necessitates hanging-wall drifts. In both cases, development is advanced to the end of the stope, and a slot crosscut created from where a raise is blasted using longhole techniques to the orebody hanging wall. Subsequent longhole blasting opens up a slot over full stope width and subsequent long-hole blasting creates a blasted ore muck pile in the developing stope which is mostly mucked-out using remote control and increasingly tele-remote operations. Areas of weak ground, often related to faulting may occur in the back and/or sidewalls of stopes. These are secured using various cable bolts patterns. Once a stope is complete, it is backfilled with hydraulically placed cemented sand-fraction tailings and then the intervening pillars are mined employing broadly similar methods. Stopes vary from 12 to 20m in width. Areas of drift height ore are extracted by low profile open stoping and referred to as 'room and pillar' stopes.

3.10.2 Mineral processing

In the underground mining operations, the ore is crushed in the primary crushing stations before hoisting to the surface and is transferred by a conveyor system to the coarse ore storage building. Ore processing in the mill is achieved by grinding, flotation, and dewatering. These processes are automated, monitored and controlled by a process control system. The grinding circuit, including an Autogenous mill, is designed to reduce the ore particle size to a size range suitable for separation, typically in the 10 to 75 micron range, and a maximum size less than 120 microns. The finely ground ore slurry is pumped from the grinding circuit to flotation cells where lead concentrate is recovered firstly and then followed by zinc concentrate. Following flotation, concentrates are dewatered using thickening and filtration in Metso pressure filters. The final concentrates are rail transported to Dublin and then shipped to various smelters in Europe, with the bulk of the Zn concentrate going to Boliden's smelters at Kokkola (Finland) and Odda (Norway).

For new potential mining areas lab test work is carried out on both the ore and waste to distinguish best performing milling techniques for the type of mineralization that is to be mined.

3.10.3 Infrastructure

Access to underground operations is through a major decline located in the shaft pillar area, which also contains the main production hoist. Subsidiary access-drifts then enter mining blocks that contain the stopes and are then used for truck haulage of ore to several underground crushers feeding conveyors that take the ore to the base of the main production shaft and then to surface. The coarse fraction of the mill waste product is used for backfill while the remnant tailings are pumped 2km to a tailings management facility.

3.11 Prices, terms and costs

Boliden's planning prices, which are an expression of the anticipated future average prices for approximately 10 years, are presented in Table 4. Currently mining and milling costs are of the order of 70 US$/t and even material near the resource grade cutoff of 5% Zn+Pb is potentially economic.

	Planning prices, 2019
Copper	USD 6,600/tonne
Zinc	USD 2,400/tonne
Lead	USD 2,100/tonne
Gold	USD 1,200/tr.oz
Silver	USD 17/tr.oz
Molybdenum	USD 8/lb
Nickel	USD 16,000/tonne
Palladium	USD 1,000/tr.oz
Platinum	USD 1,000/tr.oz
Cobolt	USD 20/lb
Tellurium	USD 30/kg
USD/SEK	8.00
EUR/SEK	9.35
EUR/USD	1.17

Table 4. Long term planning prices currently used in the Tara Mine. Including exchange rates.

3.12 Mineral Resources

Mineral Resources are defined by mineralization defining intersections of at least 5% Zn+Pb at thicknesses of 4m or more. Breakdown of resources into confidence intervals is largely based on diamond drill hole spacing but also based on the experience of the geologist. In brief, the confidence levels are defined as follows:

Inferred Resources: Usually defined by surface drilling: centers ranging from 40-120m.
Indicated Resources: Defined by surface and underground drilling: centers 40-15m
Measured Resources: Defined by surface and underground drilling: centers 15m or less.

3.13 Mineral Reserves

Mineral Reserves are the scheduled, diluted recoverable resources selected by the planning engineer for mining so that Measured Resources would be classified as Proven Reserves and Indicated Resources would be classified as Probable Reserves. In practical terms the Probable Reserves, having been drilled-off from hanging-wall drift drilling would need an additional program of in-stope drilling to be classified as Proven Reserves. Dilution and recovery factors are applied to resources during conversion to reserves. These factors vary depending on the unit being mined, its size, ore thickness, location etc. Tables 5 & 6 illustrates resources and reserves figures comparing 2019 and 2018.

For the 2019 resource and reserve run all blockmodels calculated across Tara and Tara Deep have been combined into four main areas - Main Mine, Upper Swex, Lower Swex and Tara Deep. Figure 9 below shows the spatial location of these four areas.

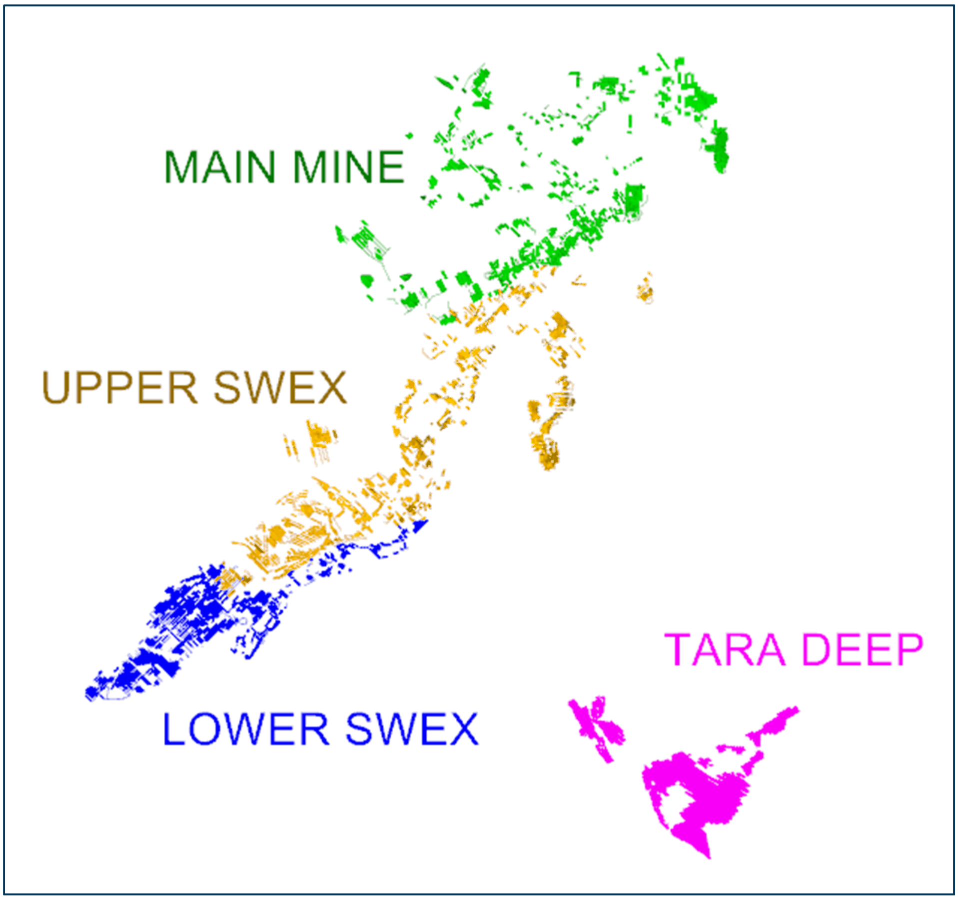

Figure 9. Mineral Resources and Reserves split by area

2019 MINERAL RESOURCES AND ORE RESERVES

	Mineral Resources	MAIN MINE Tonnes (mt)	Zn %	Pb %	Ore Reserves	MAIN MINE Tonnes (mt)	Zn %	Pb %
MAIN MINE 2019	Measured	0.0	5.0	1.0	Proven	0.9	5.2	2.7
	Indicated	1.3	5.1	1.7	Probable	5.7	6.1	2.0
	Inferred	2.6	5.0	2.3				
	Resources	3.9	5.0	2.1	Reserves	6.6	6.0	2.1
					Additional Scheduled	0.8	3.4	3.2

	Mineral Resources	Upper SWEX Tonnes (mt)	Zn %	Pb %	Ore Reserves	Upper SWEX Tonnes (mt)	Zn %	Pb %
Upper SWEX 2019	Measured	0.0	0.0	0.0	Proven	0.1	5.6	1.1
	Indicated	0.4	5.5	1.1	Probable	6.4	5.6	1.1
	Inferred	1.4	5.5	1.1				
	Resources	1.8	5.5	1.1	Reserves	6.6	5.6	1.1
					Additional Scheduled	0.5	4.3	0.8

	Mineral Resources	Lower SWEX Tonnes (mt)	Zn %	Pb %	Ore Reserves	Lower SWEX Tonnes (mt)	Zn %	Pb %
Lower SWEX 2019	Measured	0.0	0.0	0.0	Proven	0.0	7.1	1.3
	Indicated	0.8	5.7	1.1	Probable	4.2	6.7	1.3
	Inferred	1.4	6.4	1.3				
	Resources	2.2	6.1	1.3	Reserves	4.3	6.7	1.3
					Additional Scheduled	1.1	6.5	1.4

	Mineral Resources	TARA DEEP Tonnes (mt)	Zn %	Pb %	Ore Reserves	TARA DEEP Tonnes (mt)	Zn %	Pb %
TARA DEEP 2019	Measured	0.0	0.0	0.0	Proven	0	0.0	0.0
	Indicated	0.0	0.0	0.0	Probable	0	0.0	0.0
	Inferred	22.4	7.8	1.6				
	Resources	22.4	7.8	1.6	Reserves	0.0	0.0	0.0
					Additional Scheduled	0	0.0	0.0

	Mineral Resources	GRAND TOTAL Tonnes (mt)	Zn %	Pb %	Ore Reserves	GRAND TOTAL Tonnes (mt)	Zn %	Pb %
ALL 2019	Measured	0.0	5.0	1.0	Proven	1.1	5.3	2.5
	Indicated	2.5	5.4	1.4	Probable	16.3	6.1	1.5
	Inferred	27.8	7.3	1.6				
	Resources	30.4	7.2	1.6	Reserves	17.4	6.0	1.6
					Additional Scheduled*	2.4	5.0	1.9
					Total Scheduled	19.8	5.9	1.6

* Includes Scheduled Inferred Resources

Table 5. Mineral Resources and Mineral Reserves Tara Mine 2019-12-31. Please note that the areas with zero tonnage but with grades assigned are a product of rounding to the nearest 100,000t.

Classification	Mt 2019	Zn % 2019	Pb % 2019	Mt 2018	Zn % 2018	Pb % 2018
Mineral Reserves						
Proved	**1.1**	**5.3**	**2.5**	1.6	6.7	1.8
Probable	**16.3**	**6.1**	**1.5**	17.4	5.6	1.5
Total	17.4	6.0	1.6	19.0	5.7	1.5
Mineral Resources						
Measured	**0.0**	**5.0**	**1.0**	0.0	0.0	0.0
Indicated	**2.5**	**5.4**	**1.4**	2.2	6.2	1.6
Total M&I	2.6	5.4	1.4	2.2	6.2	1.6
Inferred	**27.8**	**7.3**	**1.6**	20.8	7.4	1.7

Table 6. Mineral Resources and Mineral Reserves Tara Mine 2019-12-31. Please note that the areas with zero tonnage but with grades assigned are a product of rounding to the nearest 100,000t.

3.14 Comparison with previous year/estimation

The changes between 2019 and 2018 resources and reserves are outlined in Figures 10 and 11 below. For reserves the major areas of difference were from a combination of new methodology, the use of new financial tools and the impact from reclassification of reserves. These changes as well as exploration drilling were also a major part of the increase in tonnes calculated for resources in 2019.

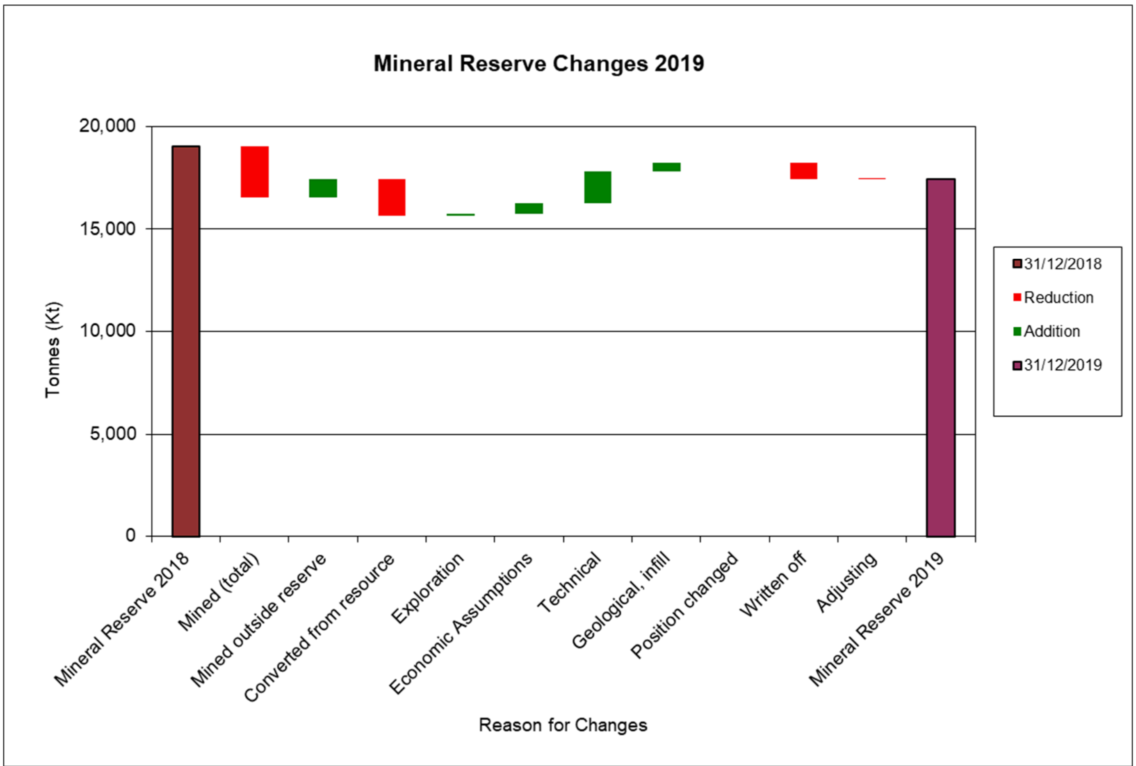

Figure 10. Changes to mineral reserve

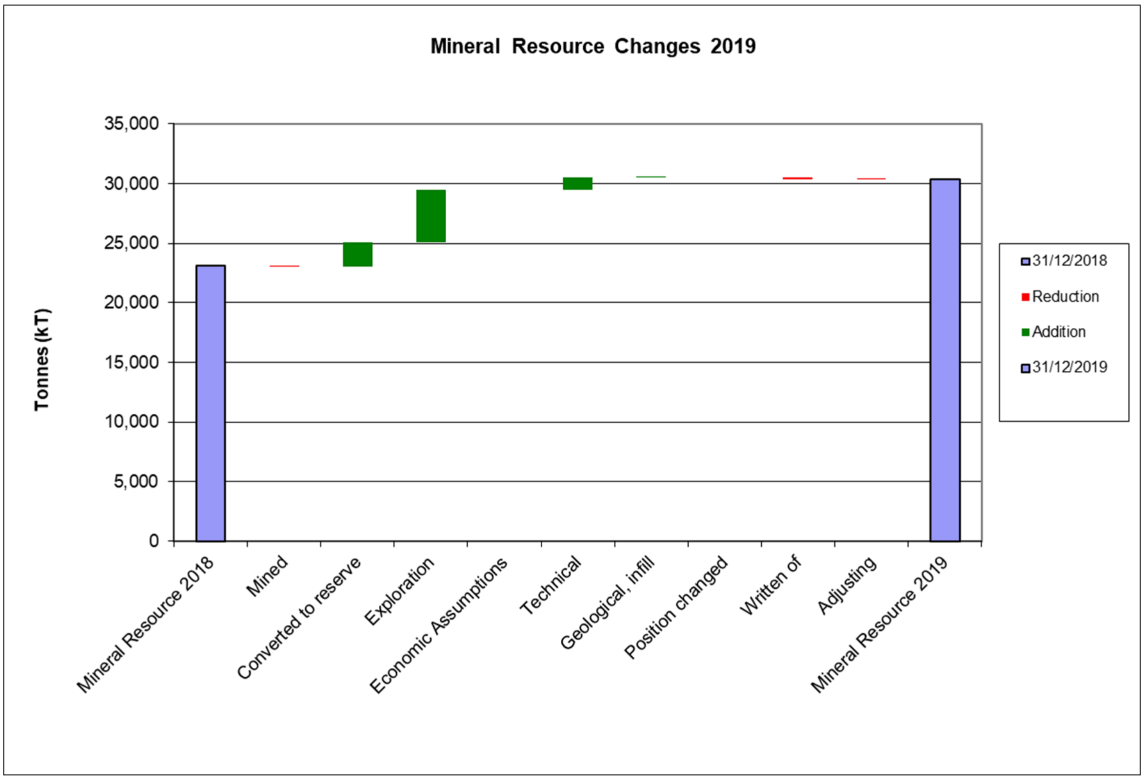

Figure 11. Changes to mineral resource

3.15 Reconciliation

A comparison between mine and mill Zn and Pb grades is shown in Figures 7 & 8. In general, the match between mine and mill grades is excellent, showing minimal differences.

	Mined according to grade models			Mill output			
	ton	Zn	Pb	ton	Zn	Pb	NSR
Month	t	%	%	t	%	%	kr/t
Jan	200,005	5.69	0.95	201,556	5.70	0.94	105.8
Feb	187,084	5.56	1.16	186,395	5.49	1.15	107.2
Mar	215,033	5.87	1.27	213,796	5.91	1.20	110.3
Apr	181,314	4.38	0.81	180,425	4.42	0.81	78.9
May	216,026	4.23	0.67	206,833	4.21	0.68	66.9
June	197,829	4.59	0.94	208,147	4.57	0.93	64.1
July	230,390	5.78	1.21	219,742	5.74	1.20	92.2
Aug	211,843	5.37	0.98	165,799	5.42	1.02	65.6
Sep	212,554	5.04	1.16	224,923	5.00	1.14	80.4
Oct	208,022	4.38	0.80	230,640	4.68	0.85	74.4
Nov	195,723	5.33	1.00	221,018	5.19	0.97	81.6
Dec	224,195	6.49	1.40	202,117	6.62	1.46	93.0
2019	**2,480,018**	**5.24**	**1.05**	**2,461,391**	**5.24**	**1.03**	**85.1**

Table 7. 2019 monthly reconciliation of mine production and mill output

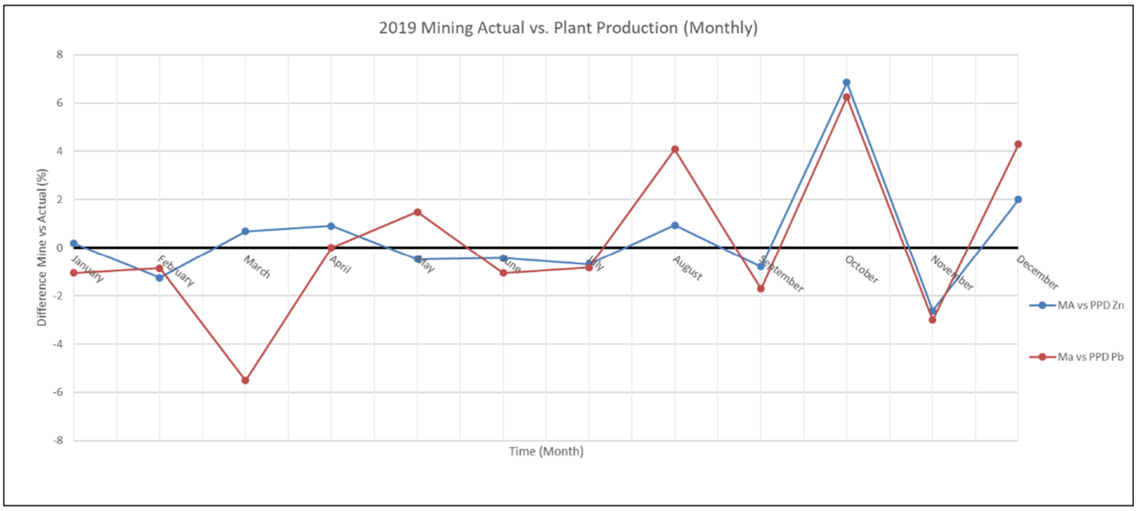

Figure 12. Monthly reconciliation of mine production and mill output for 2019

	Mined according to grade models			Mill output			
	ton	Zn	Pb	ton	Zn	Pb	NSR
Year	t	%	%	t	%	%	kr/t
2010	2,580,987	7.00	1.39	2,592,821	6.97	1.39	73.3
2011	2,530,385	6.84	1.35	2,486,357	7.04	1.36	76.7
2012	2,430,403	6.81	1.45	2,502,278	7.00	1.44	77.4
2013	2,500,569	6.93	1.46	2,493,240	7.05	1.46	71.6
2014	2,280,391	6.99	1.55	2,286,701	6.92	1.55	80.9
2015	2,198,169	6.38	1.25	2,196,814	6.37	1.25	70.7
2016	2,603,527	5.99	1.15	2,602,863	5.96	1.15	83.7
2017	2,312,988	5.91	1.14	2,310,634	5.92	1.14	119.3
2018	2,200,120	6.29	1.20	2,200,154	6.28	1.20	120.0
2019	2,480,018	5.24	1.05	2,461,391	5.24	1.03	85.1

Table 8. Yearly reconciliation of mine production and mill output.

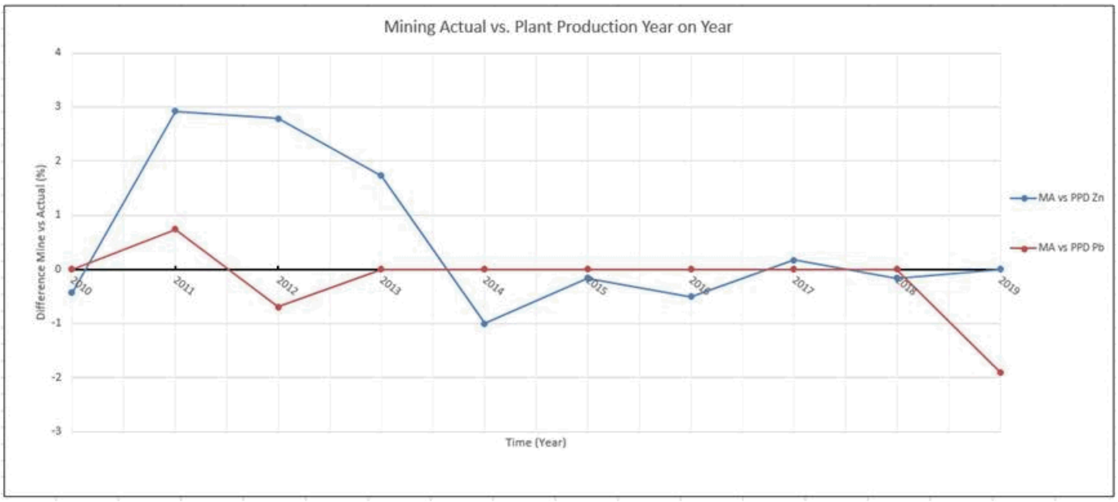

Figure 13. Yearly reconciliation of mine production and mill output

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