KUMBA IRON ORE LIMITED
ORE RESERVES AND MINERAL RESOURCES REPORT 2017

BUILDING ON FIRM FOUNDATIONS DELIVERING A SUSTAINABLE FUTURE
RESPONSIBLE RESOURCE UTILISATION

AngloAmerican

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OUR APPROACH TO REPORTING

RESPONSIBLE RESOURCE UTILISATION

Front cover
1. Ruan Rowan, an operator conducting a pre-shift inspection on the reclaimer at Kolomela mine.
2. Deon Dmitri Yonklyk, scribe; Meshack Molate, assistant; Vusi Kubheka, operator and Neal Basson, scribe working at the Klipbankfontein drilling exploration for Kolomela mine.
3. Louis le Grange, a geologist doing an inspection at the Welgevonden farm house situated near Kolomela mine.

Back cover
4. Hugo Schreuder conducting a visible felt leadership (VFL) exercise with Sishen mine employees, Tumelo Letodi, Tim McAnda , Caroline Neels and Simon Mokonyone at the life-of-mine truck workshop.
5. Riaan Badenhorst, production overseer sharing his knowledge about safety procedures of taking belt cut samples with Phetla Maefo, a professional in training (PIT) at Sishen mine's Jig plant.
6. Wayne Oerson, a perway officer inspecting the rail at Sishen mine's distribution plant.

For more information see www.angloamericankumba.com

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Image: Wayne Oerson, perway officer; Phodiso Bafhaping, loco driver and Johan De Lange, train assistant conducting a pre-trip inspection on a locomotive and the rail at Sishen mine.

INTRODUCTION AND SCOPE

The 2017 Kumba Iron Ore (Kumba) online Ore Reserve and Mineral Resource Statement is a condensed version of the full 2017 in-house *Kumba Ore Reserve and Mineral Resource Statement and Audit Committee Report*, derived from a comprehensive amount of information compiled in the form of site-specific Reserve and Resource Statements; the latter structured to address all aspects listed in the Checklist of Reporting and Assessment Criteria Table of the SAMREC Code (2016 edition).

This Reserve and Resource Statement is therefore considered to be reported in accordance with 'The South African Code for the Reporting of Exploration Results, Mineral Resources and Mineral Reserves (SAMREC Code – 2016 edition)', incorporated in the company's business processes via a Reserve and Resource Reporting policy (website: http://www.angloamericankumba.com/sd_policies.php). The policy is supported by reporting procedures and templates, which channel the reporting requirements down to a site-specific level, to ensure that Kumba meets the necessary Johannesburg Stock Exchange listing requirements.

The Ore Reserves (and Saleable Product) and Mineral Resource figures are stated on a 100% basis, irrespective of attributable shareholding. Kumba's attributable ownership in operations and projects is, however, separately indicated per site in the Ore Reserves (and Saleable Product) and Mineral Resources tables.

It is not an inventory of all mineral occurrences identified, but is an estimate of those, which under assumed and justifiable technical, environmental, legal and social conditions, may be economically extractable at current (Ore Reserves) and has reasonable prospects for eventual economic extraction (Mineral Resources).

The term 'Ore Reserves' in the context of this report has the same meaning as 'Mineral Reserves', as defined by the SAMREC Code. In the case of Kumba, the term 'Ore Reserves' is preferred as it emphasises the difference between these and Mineral Resources.

A long-term price line (Platts 62% index) and exchange rate, adjusted with Kumba-based forecasts of lump and Fe premiums, deleterious element specifications and freight tariffs form the basis of Ore Reserves and Mineral Resources presented in this document. This price is applied to site-specific mining block models, in combination with a forward extrapolation of current site-specific budgeted cost figures, to derive a set of pit shells for each site during the annual pit optimisation process. A so-called optimal (revenue factor ~1) shell is chosen for each site and engineered into a pit design or layout, which spatially constrains the currently economically mineable Ore Reserves.

INTRODUCTION AND SCOPE

INTRODUCTION AND SCOPE continued

The Ore Reserves are furthermore derived from the *in situ* Measured and Indicated Mineral Resource portion within the pit layout only, through the modification thereof into run-of-mine ore or material, to account for site-specific mining efficiencies and other design, technical, environmental, legal and social aspects. The resultant Proved and Probable Ore Reserves are further modified into Saleable Product, considering site-specific beneficiation efficiencies. Cut-off grades are also assigned to ensure site-specific run-of-mine or Ore Reserve schedules that ensure the sustainable delivery of Saleable Product that complies with Client product specifications. Mineral Resources are declared exclusive of (in addition to) Ore Reserves.

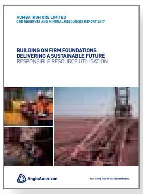
Apart from cut-off grades, which consider the current and at least concept approved foreseen beneficiation processes, Kumba spatially distinguishes Mineral Resources from other mineral occurrences by applying a resource shell (site-specific 1.6 x revenue factor[1] shell derived during annual pit optimisation process) to the latest site-specific three-dimensional geological models[2], with the Mineral Resource portion considered to have reasonable prospects for eventual economic extraction.

Inferred Mineral Resources considered in life-of-mine plans are separately indicated in the Exclusive Mineral Resource Statement, with the extrapolated Inferred portion and long-term stockpile portion of the Mineral Resources outside the life-of-mine plans quoted in the footnotes of the Exclusive Mineral Resource Statement.

1 Kumba adopted a more conservative approach in defining reasonable prospects for eventual economic extraction to spatially constrain its Mineral Resources in 2017, implementing a 1.6 revenue factor instead of a 2.0 revenue factor as in 2016. This change resulted in the decrease in the reserve life of both the Kolomela and Sishen operations. **It must be noted that Kumba erroneously referenced the 2016 Sishen resource shell as a 2.0 revenue factor resource shell, whereas in fact it was a 1.2 revenue factor resource shell. The 2016 – 2017 year-on-year impact of the 2016 1.2 revenue factor shell vs the 2017 1.6 revenue factor shell is not material (7% or 31.6 Mt, excluding 120.1 Mt of newly declared low grade mineral resources). The error was detected after the pit optimisation update was conducted in 2017 and has subsequently been verified by independent external consultants.**

2 Geological models are three-dimensional spatial unitised block models that define the iron ore bodies in relation to the host rock and waste in terms of estimated volumes and associated *in situ* grades and relative densities, all of the latter spatially classified into Measured, Indicated and Inferred categories to demonstrate geological confidence.

Navigating our 2017 reports



ORE RESERVES AND MINERAL RESOURCES REPORT (ORMR)
Reported in accordance with the South African Code for the Reporting of Exploration Results, Mineral Resources and Mineral Reserves (SAMREC Code – 2016 edition).

INTEGRATED REPORT (IR)
A succinct review of our strategy and business model, operating context, governance and operational performance, targeted primarily at current and prospective investors.

SUSTAINABILITY REPORT (SR)
Reviews our approach to managing our significant economic, social and environmental impacts, and to addressing those sustainability issues of interest to a broad range of stakeholders.

ANNUAL FINANCIAL STATEMENTS (AFS)
Detailed analysis of our financial results, with audited financial statements, prepared in accordance with International Financial Reporting Standards (IFRS).

SALIENT FEATURES

The 2017 Kumba Ore Reserves and Mineral Resources reflect the company's strategy of optimising its business, through productivity improvements, continued cost reduction and price maximisation through delivering niche products. This strategic direction was adopted in 2017 to safeguard business profit margins, following a cost-cutting phase in 2015 and 2016 to re-align to low iron ore market conditions.

As a result of a planned increase in annual Saleable Product output due to productivity improvements built into the updated life-of-mine plan, Sishen's reserve life has reduced from 17 years in 2016 to 13 years in 2017. A more stringent resource-to-reserve conversion approach was adopted at Kolomela to ensure that the direct shipping ore operation continues to deliver a niche high-grade product that will maintain Kumba's realised price. This is now similar to the approach applied at Sishen mine and resulted in Kolomela's reserve life reducing from 18 years in 2016, to 14 years in 2017.

- Kolomela mine's Ore Reserves decreased by 8% year-on-year, primarily due to a lower resource-to-reserve conversion rate as well as the accelerated 2017 production.
- Sishen mine's Ore Reserves decreased 9% year-on-year, mainly attributable to the annual accelerated production as well as more stringent resource-to-reserve modifications.

Kumba has continued to invest in on-lease exploration and as a result has realised a significant reduction in Inferred Mineral Resources considered for life-of-mine plans. At Kolomela the modified Inferred Mineral Resources considered for the life-of-mine plan has materially reduced from 22% in 2016 to 8% in 2017, while for Sishen mine the figure reduced from 7% in 2016 to 5% in 2017.

- The Kolomela exclusive Mineral Resources decreased by 15% from 2016, predominantly due to the upgrade of Inferred to Indicated and Measured Mineral Resources, available for conversion to Ore Reserves.
- The Sishen exclusive Mineral Resource increased by 29% from 2016. The substantial year-on-year increase is primarily the result of the addition of low-grade resources outside the pit layout but inside the resource shell after the Sishen +43%Fe project (DMS conversion to UHDMS) pre-feasibility A study was approved by the relevant Anglo and Kumba Investment Committees late in 2016.

On 25 June 2017, Sishen Iron Ore Company (Pty) Ltd (SIOC), in which Kumba has a 76.3% attributable shareholding, was granted consent in terms of section 102 of the Mineral and Petroleum Resources Development Act (MPRDA) to extend its Sishen mine's mining right through the inclusion of the adjacent prospecting right properties. Notarial execution of the amendment of the Sishen mining right and registration thereto in the Mineral and Petroleum Titles Registration Office is still pending.

PURPOSE

It is the objective of this statement to declare the 2017 Kumba Ore Reserves (and Saleable Product) and exclusive Mineral Resources as at 31 December 2017 and compare it to the corresponding 31 December 2016 figures. In addition it aims to provide all of the relevant detail in support of the statement to explain how the Ore Reserve and Mineral Resource estimates were derived and what aspects thereto may be material for investment decisions.

It must be noted that the Mineral Resource and Ore Reserve figures presented in this statement are estimates, and although derived using the best practice and expert knowledge of the Competent Persons it is inherently subject to some level of uncertainty and inaccuracy. The respective Competent Persons, however, take full responsibility for the Mineral Resource and Ore Reserve declarations.

LOCATION

FIGURE 1: **GEOGRAPHIC LOCATIONS OF KUMBA OPERATIONS AND PROJECTS FOR WHICH ORE RESERVES AND MINERAL RESOURCES HAVE BEEN DECLARED.**

Reserves and Resources
1. Kolomela mine
2. Sishen mine
3. Zandrivierspoort project

WHERE WE OPERATE

All the Kumba sites for which Ore Reserves and/or Mineral Resources were declared in 2017 are located within the Republic of South Africa. As is the case with all mineral companies, the location of operations and explorations projects are dictated by geology.

The Kumba operations (Kolomela Mine and Sishen Mine) are located in the Northern Cape Province. The Zandrivierspoort Exploration Project is located in the Limpopo Province. The geographical footprint of the relevant Kumba Iron Ore operations and projects are shown in **Figure 1**.

The WGS84 latitude/longitude geographical coordinate map references of the Kumba entities for which Ore Reserves and/or Mineral Resources have been declared in 2016 (and/or 2015), are listed below:

KOLOMELA MINE (1)

– Kolomela mine in the Northern Cape Province near the town of Postmasburg

(28°23'30.05" S and 22°58'46.88" E)

SISHEN MINE (2)

– Sishen mine in the Northern Cape near the town of Kathu, which accounts for the bulk of Kumba's production

(27°44'02.29" S and 23°00'39.95" E)

ZANDRIVIERSPOORT PROJECT (3)

– The Zandrivierspoort project, approximately 25km northeast of Polokwane in Limpopo Province

(23°40'17.65" S and 29°35'41.08" E)

Image: Ruan Rowan, an operator doing a pre-shift inspection on Kolomela mine's reclaimer.

Image: Loading and hauling operations in the G80 pit at Sishen mine.

Image: General view of the Zandrivierspoort project in Limpopo.

ATTRIBUTABLE REPORTING

For this statement, all Ore Reserve (and Saleable Product) and exclusive Mineral Resource tonnage and associated average Fe-grade estimates, whether Kumba's attributable economic interest in the specific mineral asset is less than 100% or not, are reported as 100% in **Table 5**, **Table 6** and **Table 7** respectively; with the percentage economic interest attributable to Kumba Iron Ore indicated separately per site in the relevant tables. The overall economic interest attributable to Sishen Iron Ore Company (SIOC), Kumba Iron Ore (KIO) and Anglo American (AA plc) is also summarised in **Table 1**.

TABLE 1: **KUMBA IRON ORE AND ANGLO AMERICAN PLC ATTRIBUTABLE ECONOMIC INTEREST PERCENTAGES FOR MINERAL ASSETS HELD BY SISHEN IRON ORE COMPANY**

	% owned by SIOC		% owned by Kumba		% owned by other		% owned by AA plc via Kumba[1]	
Mineral asset	**2017**	2016	**2017**	2016	**2017**	2016	**2017**	2016
Kolomela mine	**100.00**	100.0	**76.3**	76.3	**23.7**	23.7	**53.2**	53.2
Sishen mine	**100.00**	100.0	**76.3**	76.3	**23.7**	23.7	**53.2**	53.2
Zandrivierspoort project[2]	**50.00**	50.0	**38.2**	38.2	**61.8**	61.8	**26.6**	26.6

1 The holding company Sishen Iron Ore Company (SIOC) is 76.3% owned by Kumba Iron Ore, and in turn Kumba Iron Ore is 69.7% owned by Anglo American plc (as at 31 December 2017).
2 Zandrivierspoort is a 50:50 joint venture between ArcelorMittal South Africa and SIOC in a company called Polokwane Iron Ore Company.

COMPETENCE

The information on Ore Reserves and Mineral Resources was prepared by or under the supervision of Competent Persons as defined in the SAMREC Code (2016 edition). All Competent Persons have sufficient experience relevant to the style of mineralisation and type of deposit under consideration and to the activity which they are undertaking. All the Competent Persons consent to the inclusion in this statement of the information in the form and context in which it appears. All Competent Persons informing the 2017 Kumba Iron Ore Reserve and Resource Statement assumed responsibility by means of signing a Competent Person appointment letter, kept by the company's principal – Mineral Resources & Geometallurgy, at Kumba's Centurion Gate Office in Pretoria, South Africa.

TABLE 2: **CORPORATE RESPONSIBILITY – LEAD COMPETENT PERSONS**

Republic of South Africa – Kumba corporate office

Business unit	Field	Name	Title	Employed by	Professional organisation	Registration number	Years relevant experience
Kumba Iron Ore	Mineral Resources	Jean Britz	Principal Mineral Resources & Geometallurgy	Sishen Iron Ore Company (Pty) Ltd	SACNASP Professional Natural Scientist	400423/04	13
	Ore Reserves	Theunis Otto	Head Mining Engineering	Sishen Iron Ore Company (Pty) Ltd	ECSA Professional Engineer	990072	13

COMPETENCE CONTINUED

TABLE 3: MINING OPERATION RESPONSIBILITY

Republic of South Africa – Kumba Iron Ore operations

Operations	Field	Name	Title	Employed by	Professional organisation	Registration number	Years relevant experience
Kolomela mine	Mineral Resources	Hannes Viljoen	Section Manager, Exploration and Resource Geology	Sishen Iron Ore Company (Pty) Ltd	SACNASP Professional Natural Scientist	400245/10	10
	Ore Reserves	Grant Crawley	Senior Mining Engineer	School of Rock	ECSA Professional Engineer	20130120	7
Sishen mine	Mineral Resources	Michael van den Heever	Section Manager, Production Geology	Sishen Iron Ore Company (Pty) Ltd	SACNASP Professional Natural Scientist	400100/12	8
	Ore Reserves	Terence Jordaan	Principal Mining Engineer	Anglo American Technical Services	ECSA Professional Engineer	20110246	13

TABLE 4: PROJECT RESPONSIBILITY

Republic of South Africa – Kumba Iron Ore projects

Projects	Field	Name	Title	Employed by	Professional organisation	Registration number	Years relevant experience
Zandrivierspoort project	Mineral Resources	Stuart J Mac Gregor	Head of Geosciences	Sishen Iron Ore Company (Pty) Ltd	SACNASP Professional Natural Scientist	400029/09	11
	No Ore Reserve declared in 2017						

The Lead Competent Persons for Mineral Resources and Ore Reserves as appointed in 2017 can without any qualifications state that:

- The Mineral Resource and Ore Reserve figures presented in this statement are considered to be a true reflection of the Mineral Resource and Ore Reserve estimates as at 31 December 2017 for Kumba and that public reporting is based on site-specific Resource and Reserve Statements that have been carried out in accordance with the minimum standards and guidelines of the SAMREC Code (2016 edition), to the best of the knowledge of the Competent Persons.
- The Mineral Resource and Ore Reserve figures quoted in this statement have been reviewed by a panel of peers, including technical specialists from Anglo American.
- The Lead Competent Persons have not been unduly influenced by Kumba Iron Ore or any person commissioning the Mineral Resource and Ore Reserve Statement, and are of the opinion that all assumptions are documented; and adequate disclosure is made of all material aspects that the informed reader may require, to make a reasonable and balanced judgement of the Mineral Resource and Ore Reserve figures.
- The Lead Competent Persons have sufficient experience relevant to the style and type of mineral deposit under consideration and to the activity which is being undertaken to qualify as a Competent Person as defined in the SAMREC Code (2016 edition).
- The Lead Competent Persons consent to the inclusion in the Kumba Iron Annual Integrated Report as well as in the AA plc R&R Report and R&R Summary section of the AA plc Annual Report, of the public R&R information (as defined in the Kumba R&R Policy and Reporting Procedure Documents) in the form and context in which it appears in this report.

GOVERNANCE

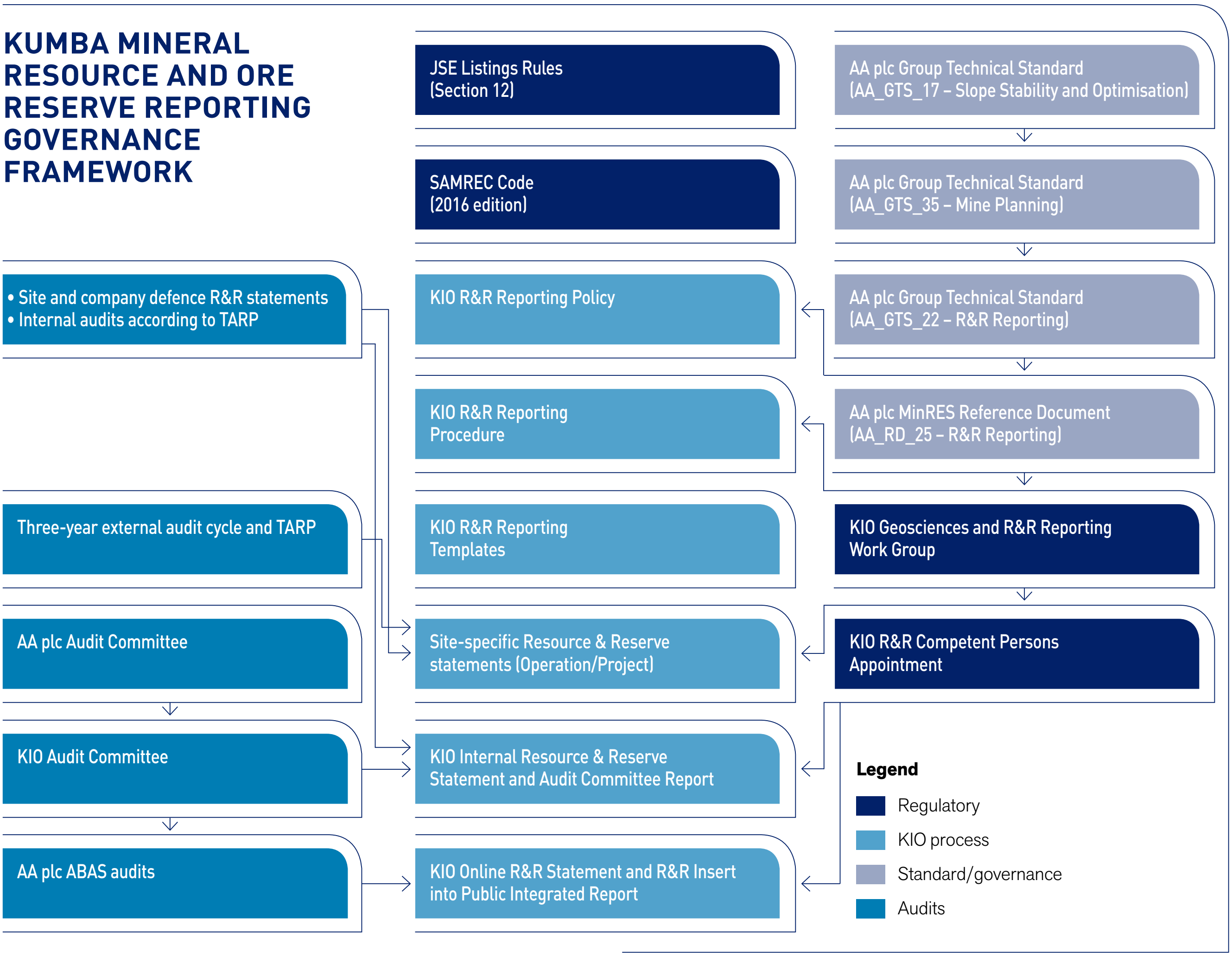
APPLICABLE CODES AND POLICIES

Applicable codes and policies are uniformly applied throughout Anglo American plc (AA plc) via a governance document, ie the AA plc group technical standard (AA_GTS_22), which holistically governs Resource and Reserve reporting for all the AA plc business units, of which Kumba Iron Ore forms part.

Kumba internalised the SAMREC Code and its policy and the relevant AA plc group standards by deriving a reporting procedure (Kumba Iron Ore Mineral Resource and Ore Reserve Reporting Procedure) applicable to iron ore as a commodity and the opencast mining thereof, that stipulates adherence to the former. The procedure is revised annually, with refinements proposed by an official Resource and Reserve Reporting Work Group, with changes annually communicated to the Executive Management of Kumba.

The Kumba Reserve and Resource Reporting governance framework is summarised in **Figure 2**.

FIGURE 2: **KUMBA IRON ORE MINERAL RESOURCE AND ORE RESERVE REPORTING FRAMEWORK**



ASSURANCE AND RISK

ASSURANCE

Apart from the annual in-house peer review of site-specific Ore Reserve and Mineral Resource Statements, Kumba is subject to a comprehensive programme of reviews aimed at providing assurance in respect of Ore Reserve and Mineral Resource estimates. The reviews are conducted by suitably qualified competent persons from within the Anglo American Group, or by independent consultants.

The frequency and depth of the reviews is a function of the perceived risks and/or uncertainties associated with a particular Ore Reserve and/or Mineral Resource.

Two independent external due diligence audits (including week site visits) were conducted in 2017 whereby Golder Associates Africa were contracted to audit:

- the 2016 Sishen mine Mineral Resources and associated Mineral Resource estimation processes and the 2016 Ore Reserve estimates and associated life-of-mine planning processes, as well as
- the Sishen Low-grade Project pre-feasibility A study Mineral Resources.

The audits did not identify any high or significant risks associated with the 2016 Sishen Mineral Resources and Ore Reserves, nor with the Mineral Resources front-end loading the Sishen Low-grade Project pre-feasibility B study.

The next independent external due diligence audit of Ore Reserves and Mineral Resources is planned for Kolomela mine in 2018.

RISK

The 2017 Ore Reserve and Mineral Resource estimates are subject to the following risks:

- Legal:
  - Significant uncertainty remains around the Mining Charter III implementation which may impact future empowerment of mining companies.
    The Chamber of Mines is engaging the South African government's Department of Minerals following an intervention by the office of the President of the Republic of South Africa. The Chamber of Mines and the DMR have agreed to postpone the commencement of the review application to afford all parties an opportunity to revisit the Mining Charter.
- Planning:
  - Based on Kumba's drive to reduce cost through increasing productivities, an aggressive ramp-up of equipment performance targets had been included in the respective Kumba life-of-mine plans.
    Achievement of increased equipment performance targets will be managed through structured initiative programmes and strictly monitored.
  - Relocation of final households of the Dingleton community (located south-west of Sishen mine) – should the remainder of the Dingleton community relocation not be effected by July 2018, the mining of ~61 Mt of Ore Reserves (@ Stripping Ratio of 1:4.0) in the 2017 Sishen life-of-mine plan will be delayed, as waste stripping in the Dingleton area is required to access these Ore Reserves within the current mining right area. The consequence is a decrease in annual Saleable Product output which varies between 5 Mtpa and 18 Mtpa from 2020 to 2025.
    Alternative mining areas will be considered (albeit at a higher stripping ratio and increased mining cost, to recover annual Saleable Product output to planned levels, although at a later stage in the LoM Plan).

SECURITY OF TENURE

All Ore Reserves and Mineral Resources (in addition to Ore Reserves) quoted in this document are held under notarially executed mining and prospecting rights granted to Sishen Iron Ore Company (Pty) Ltd (SIOC) in terms of the Mineral and Petroleum Resources Development Act 28 of 2002 (MPRDA).

STATUS OF MINING RIGHTS

SIOC is the holder of mining rights for both its operations and the rights are of sufficient duration to enable the complete execution of the life-of-mine plans from which the Ore Reserves and Saleable Product have been derived. In terms of the MPRDA, SIOC also has the exclusive right to extend the period of these mining rights if so required.

The status of the mining rights are as follows:

- Kolomela mine was granted a mining right for iron ore on 18 September 2008 for a 30-year mining period. An application to amend the supporting mining work programme (MWP) was lodged in 2015 and a further amendment application to cater for the inter alia the increase in production levels as per the 2016 LoM Plan, was lodged on 31 January 2017, which application was subsequently approved on 7 July 2017. This approval made the application lodged in 2015 (see above) redundant.
- Sishen mine was granted a mining right for iron ore and quartzite on 11 November 2009 for a 30-year mining period. The mining right area was extended in 2014, following a section 102 application to incorporate the old Transnet railway properties transecting the mining area from north to south, granted by the DMR on 28 February 2014. As stated above the outstanding 21.4% undivided share in the mining right was also granted to SIOC in 2016, making it the sole owner of the right to mine iron ore and quartzite within the mining right area.

The Sishen complex (including adjacent prospecting rights) section 22 new mining right application submitted in 2011 has not yet been granted by the DMR. To gain traction in this regard, as the execution of the 2016 Sishen LoM Plan is dependent on the Sishen complex application being granted, SIOC has engaged in talks with the DMR and subsequently, on 1 July 2016, submitted a section 102 application to incorporate the Sishen mine complex within the existing Sishen mining right. This application was granted on 25 June 2017 although the notarial amendment of the mining right to cater for the grant of this right, is still outstanding. It is expected to be finalised early next year.

Outstanding mining right amendment applications include:

- 2014 – Section 102 application to amend clause 8 of the Kolomela mining right to cater for ArcelorMittal SA transaction. Clause 8 of the mining right requires of the holder of a mining right to dispose of the mineral it mines at "arm's length" prices. The domestic ArcelorMittal SA contract requires of SIOC to dispose of iron ore at a set price which is not necessarily market related. Subsequently in order to cover for this, SIOC applied for clause 8 to be amended accordingly to cater for the ArcelorMittal SA transaction.
- 2015 – Section 102 application to amend the Kolomela mining right to substitute the Regulation 42 plan with an approved SG Diagram.

STATUS OF PROSPECTING RIGHTS

KIO has declared Mineral Resources on two prospecting rights:

- The Dingleton prospecting right area (included in Sishen mine complex section 102 mining right amendment application) located immediately adjacent to the Sishen mine's mining right area, which comprises 1.9% and 0.2% respectively of Sishen mine's exclusive Mineral Resource and Ore Reserves. The prospecting right has been renewed for a three-year period and the renewal expires on 1 December 2018.
- The Zandrivierspoort exploration project, which comprises 39% of SIOC's total exclusive Mineral Resource. The prospecting right for Zandrivierspoort (50:50 joint venture with ArcelorMittal SA) initially expired on 17 November 2011 but a renewal for the period 22 March 2017 to 21 March 2020 was granted.

ORE RESERVES (AND SALEABLE PRODUCT)

ESTIMATION

The *in situ* Mineral Resource tonnages and grades as estimated and classified within the geological block models are initially discounted by converting the geological block models into mining block models, considering aspects such as the smallest mining unit and open pit bench definitions. From the mining block model, planned modifying factors such as dilution and mining losses are realised while other factors such as geological losses, design and mining recovery efficiencies, determined via value chain and mine-to-design reconciliations, are applied.

The resultant mining block model is then constrained via pit optimisation to spatially distinguish between ore material which is currently and eventually economically extractable. The long-term price is adjusted to convert it from a market figure to a site-specific figure used to define current and eventual economic extractability:

- The first adjustment made to the price is the sea freight adjustment and is done to reflect the long-term price at Saldanha (Kumba's export harbour) in US$/t Free-On-Board (FOB) terms at a 62% Fe grade.
- Higher Fe content, as well as lump ore, gains a premium in the market. This is the second adjustment, considering site-specific planned lump-fine ratios and average Fe contents, ie prices are derived for the lump and fine products from each of the processing streams (for example the dense media separation and Jig processing streams at Sishen mine or direct shipping ore at Kolomela mine). Thereafter price averaging is applied based on a mass weighted average calculation.
- Once the average product prices are calculated in US$/t FOB terms, the long-term real exchange rate is applied to convert the price to a Rand/t FOB Saldanha base.
- To calculate the Rand/t Free-On-Rail (FOR) price for the products, the long-term rail cost is subtracted for each of the sites. The rail cost includes related logistics and marketing costs.
- As a final adjustment, contractual obligations are considered. This completes the long-term adjustment process.

Site-specific long-term price and current budget costs extrapolated over time (representing the mining value chain) are then used to derive an optimal pit and resource shell.

The optimal pit shell is engineered or designed into a safe practical pit layout, considering geotechnical slope stability parameters, that envelopes the current economically extractable ore volume, and forms the basis for the life-of-mine scheduling and resultant Ore Reserve and Saleable Product estimates.

The SAMREC Code approach is adopted for Ore Reserve classification, whereby Measured Mineral Resources occurring within the optimised pit are converted to either Proved or Probable Ore Reserves and Indicated Mineral Resources are converted to Probable Ore Reserves. The Competent Person may reclassify the Ore Reserves and even re-allocate Ore Reserves back to Mineral Resources should certain mining-related, legal, environmental, governmental and social aspects warrant it.

The run-of-mine derived from such a schedule represents the Ore Reserves. The product derived via the application of metallurgical factors (in the form of beneficiation algorithms defining the relationship between yield and product qualities with the mining block model grades) in the mining model and subsequent scheduling represents what is referred to as 'Saleable Product'.

Inferred Mineral Resources occurring within the life-of-mine plan (LoMP) are reported as 'Mineral Resources considered for LoMP' in the Exclusive Mineral Resource table **(Table 7)** and not as Ore Reserves and are the unmodified version of the modified Inferred run-of-mine.

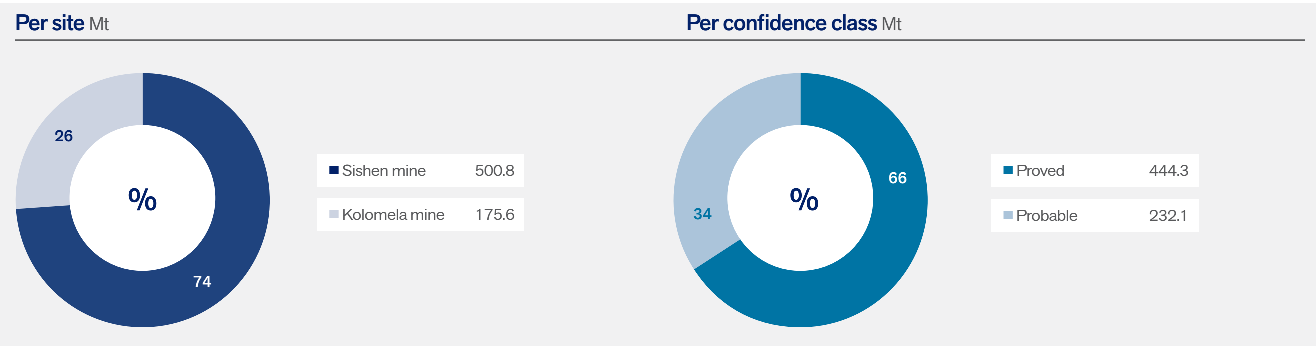
ORE RESERVES (AND SALEABLE PRODUCT) CONTINUED

2017 VS 2016 ORE RESERVES

As of 31 December 2017, Kumba Iron Ore, from a 100% ownership reporting perspective, had access to an estimated Haematite Ore Reserve of 676 million tonnes (**Figure 3**) at an average unbeneficiated or feed grade of 59.6% Fe from its two mining operations:

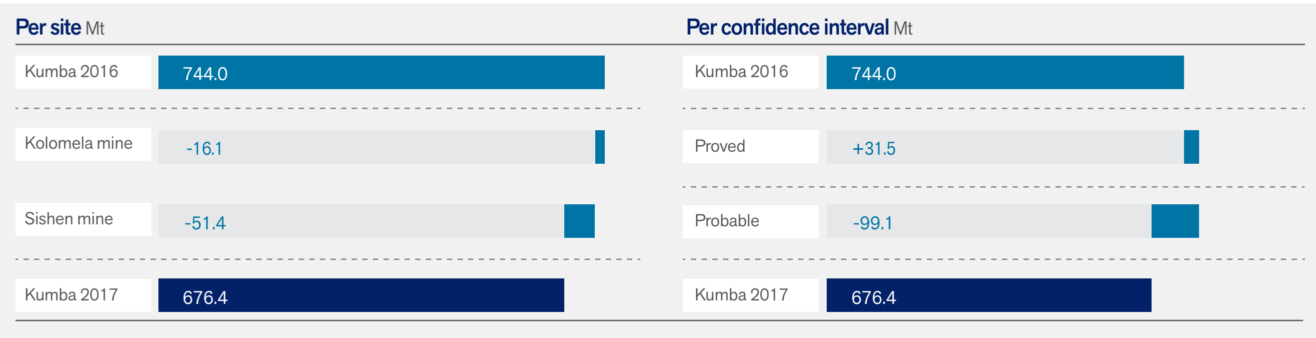
- Kolomela 175.6 Mt @ 64.4% Fe (against a 50% Fe cut-off grade), showing a year-on-year decrease of 8%; and
- Sishen 500.8 Mt @ 58.0% Fe (against a 40% Fe cut-off grade), showing a year-on-year decrease of 9%.

FIGURE 3: **2017 KUMBA ORE RESERVE PORTFOLIO – REPORTED AS 100%** (per site and per confidence class)



A 9% net decrease of 67.6 Mt is noted for the total Kumba Ore Reserve compared to 2016. The Ore Reserve movements per operation and per confidence class is summarised in **Figure 4** and detailed in the footnotes of **Table 5**.

FIGURE 4: **KUMBA 2017 ORE RESERVES RECONCILED AGAINST 2016** (per site and per confidence class)



The increase in the Proved to Probable Ore Reserve ratio from 55:45 in 2016 to 66:34 in 2017 is the result of an increase in the geological confidence and the upgrading of Inferred Mineral Resources to Indicated and Measured Mineral Resources, following a focused on-lease exploration drilling campaign to reduce the geological risk associated with the operational life-of-mine plans.

Subsequently, Kumba replenished its Ore Reserves in 2016 by 7% (49.0 Mt), through the conversion of Inferred Mineral Resources to Ore Reserves, after its geological confidence status had improved to an Indicated and/or Measured level, as well as with an overall increase in the Sishen pit layout year-on-year based on the latest economic assumptions.

ORE RESERVES (AND SALEABLE PRODUCT) CONTINUED

Table 5 provides a referenced account of the 2017 vs 2016 Kumba Ore Reserves.

TABLE 5: **KUMBA'S ORE RESERVE STATEMENT FOR 2017** (referenced against 2016)

						Ore reserves							
						2017				2016			
Operation/project	Operation status	Mining method	Ore type	% owned by Kumba	Reserve category	**Tonnage (Mt)**	**Grade (% Fe) Average**	**Grade (% Fe) Cut-off***	**Reserve Life** Years**	Tonnage (Mt)	Grade (% Fe) Average	Grade (% Fe) Cut-off	Reserve Life Years
Mining operations													
Kolomela mine[1]	Steady-state	Open Cut	Haematite	76.3	Proved	92.2	64.3	50.0	14	59.0	64.4	50.0	18
					Probable	83.4	64.4			132.8	64.4		
					Sub-total	**175.6**	**64.4**			**191.8**	**64.4**		
Sishen mine[2]	Steady-state	Open Cut	Haematite	76.3	Proved	352.1	58.3	40.0	13	353.8	59.8	40.0	17
					Probable	148.7	57.1			198.4	54.8		
					Sub-total	**500.8**	**58.0**			**552.2**	**58.0**		
Kumba Iron Ore					Proved	444.3	59.6			412.8	60.5		
– mining operations					Probable	232.1	59.8			331.2	58.6		
					Total	**676.4**	**59.6**			**744.0**	**59.7**		
Company													
Kumba Iron Ore					Proved	444.3	59.6			412.8	60.5		
– total ore reserves					Probable	232.1	59.8			331.2	58.6		
					Total	**676.4**	**59.6**			**744.0**	**59.7**		

Footnotes to the Ore Reserve table (Table 5)

- The tonnages are quoted in dry metric tonnes and million tonnes is abbreviated as Mt.
- Rounding of figures may cause computational discrepancies.
- Ore Reserve figures are reported at 100% irrespective of percentage attributable ownership to Kumba Iron Ore.
- Ore Reserves are spatially constrained via a pit layout, enveloping iron ore considered to be currently economically viable for mining.

* The cut-off grade assigned to Ore Reserves is variable and is dependent on the beneficiability and/or blending capacity of the modified ore scheduled as run-of-mine, which is iteratively determined during life-of-mine plan scheduling to achieve a scheduling grade target that is set to meet the client product specifications. The % Fe cut-off illustrated is therefore the lowest of a range of variable cut-offs for the various mining areas. It includes dilution material and can therefore, in certain cases, be less than the Mineral Resource cut-off grade.

** Reserve Life represents the period in years in the approved life-of-mine plan for scheduled extraction of Proved and Probable Reserves. The Reserve Life is limited to the period during which the Ore Reserves can be economically exploited. Where the scheduled Ore Reserves fall below 25% of the average annual production rate, the period beyond this is excluded from the Reserve Life, implying for example that the period beyond and including a year where the run-of-mine of an operation is made up of 24% Proved and Probable Ore Reserves and 76% Inferred Mineral Resources does not count towards Reserve Life.

- For Kolomela mine the 2017 LoM Plan delivered a 14 year remaining reserve life, which includes 8% modified Inferred run-of-mine ore. The 2016 LoM Plan quoted the same average annual Saleable Product output, but 22% thereof was modified Inferred run-of-mine ore. The year-on-year decrease in the modified Inferred considered in the LoM Plan is the result of a continued on-mine exploration focus to minimise the Inferred ore in order to de-risk the Kolomela LoM Plan. The reserve life decreased with four years from 2016, primarily as a result of the implementation of more stringent modifying factors to safeguard the production of high-grade ore.

  To define the risk of having low confidence modified Inferred Mineral Resources in the LoM Plan, Kolomela mine valuated a long-term mine plan scheduling scenario excluding Inferred Mineral Resources which remained economically viable, although at a 24% lower net present value at 8% real).

- For Sishen mine, a 13 year reserve life has been quoted in 2017; which includes 5% modified Inferred run-of-mine ore, compared to a 17 year reserve life in 2016 including 7% modified Inferred run-of-mine ore. The primary reason for the four-year decrease in reserve life is due to the ramp-up of planned annual production.

  To define the risk of having low confidence modified Inferred Mineral Resources in the LoM Plan, Sishen mine valuated a long-term mine plan scheduling scenario excluding Inferred Mineral Resources which remained economically viable, although at a 22% lower net present value (at 8% real).

Footnotes to Table 5 explaining annual Ore Reserve differences:

1 **Kolomela mine's Ore Reserves decreased by 16.1 Mt (-8%) from 2016 to 2017**

The two primary aspects that resulted in a year-on-year decrease of the Kolomela Ore Reserves are:

- a more diligent approach in terms of resource-to-reserve conversion followed in 2017 compared to 2016 with the introduction of value-chain reconciliation derived modifying factors, resulting in 28.1 Mt less Mineral Resources being converted to Ore Reserves in order to safeguard the production of high-grade Saleable Product
- run-of-mine production of 14.8 Mt Ore Reserves (excluding modified Inferred run-of-mine ore).

The reduction in Ore Reserves as explained above was offset by a 29.0 Mt upgrade of Inferred Mineral Resources into Indicated and Measured Mineral Resources and the subsequent conversion thereof into Ore Reserves. In the case of the Kolomela mining operation the Ore Reserve reference point is the point where the planned run-of-mine is delivered to either the small scale dense media separation (DMS) plant or the crushing and screening plant.

2 **Sishen mine's Ore Reserves decreased by 51.4 Mt (-9%) year-on-year**

An annual Ore Reserve production of 31.9 Mt (excluding modified Inferred run-of-mine ore) of 31.9 Mt as well as a 32.7 Mt decrease in the year-on-year resource-to-reserve conversion because of the implementation of an improved mine-to-design process, are the main factors that contributed to the overall decrease in Ore Reserves from 2016. In the case of the Sishen mining operation the Ore Reserve reference point is the point where the planned run-of-mine is delivered to either the dense media separation (DMS) plant or the Jig (+ small scale ultra high media separation – UHDMS) plant.

ORE RESERVES (AND SALEABLE PRODUCT) CONTINUED

2017 VS 2016 SALEABLE PRODUCT

Saleable Product has been derived through the application of densimetric yield algorithms (simulating the various on-site beneficiation processes) at Sishen mine and empirically estimated yield performances at Kolomela mine, applied to the Ore Reserve, while ensuring that the resultant product is suitable for off-take in current market conditions.

The 2017 life-of-mine plans, considering current contract and client supply agreement conditions, deliver a total Saleable Product of 538.6 Mt at an average 64.5% Fe over the reserve life years for the two mining operations **(Table 6)**.

TABLE 6: KUMBA'S SALEABLE PRODUCT FOR 2017 (referenced against 2016)

Operation/project	Operation status	Mining method	Ore type	% owned by Kumba	Saleable Product category	2017 Metal-lurgical yield (%)	2016 Metal-lurgical yield (%)	Saleable Product 2017 Tonnage (Mt)	Saleable Product 2017 Grade (% Fe) Average	Saleable Product 2016 Tonnage (Mt)	Saleable Product 2016 Grade (% Fe) Average
Mining operations											
Kolomela mine[1]	Steady-state	Open Cut	Haematite	76.3	Proved			88.3	64.3	57.3	65.0
					Probable			80.0	64.4	129.3	64.9
					Sub-total	**95.8**	97.3	**168.3**	**64.3**	**186.6**	**65.0**
Sishen mine[2]	Ramp-up	Open Cut	Haematite	76.3	Proved			261.3	64.7	272.8	65.6
					Probable			109.1	64.4	139.6	63.5
					Sub-total	**74.0**	74.7	**370.4**	**64.6**	**412.4**	**64.9**
Kumba Iron Ore – mining operations					Proved			349.6	64.6	330.2	65.5
					Probable			189.0	64.4	268.9	64.2
					Sub-total	**79.6**	80.5	**538.6**	**64.5**	**599.0**	**64.9**
Company											
Kumba Total ore reserves					Proved			**349.6**	**64.6**	**330.2**	**65.5**
					Probable			**189.0**	**64.4**	**268.9**	**64.2**
					Total	**79.6**	80.5	**538.6**	**64.5**	**599.0**	**64.9**

1 Kolomela mine is primarily a direct shipping ore operation where Ore Reserves are crushed and screened to deliver Saleable Product at the required top sizes. The mine commissioned a small-scale modular dense media separation (DMS) plant in 2016 to treat lower Fe-grade ore; scheduled throughput through this DMS plant has been increased in the 2017 LoM Plan, resulting in a lowering of the overall average yield.

2 Sishen mine beneficiates its high-grade Ore Reserves by means of a dense media separation plant and its medium grade Ore Reserves by means of a Jig facility to produce Saleable Product according to required client specifications. The mine furthermore commissioned a small-scale dense media separation plant in 2016 to treat a portion of the Jig plant discard and produce Saleable Product. The overall average yield decreased by 0.9% year-on-year, due to the implementation of a higher resolution geological block model which resulted in a better definition of dilution and subsequent estimation of Saleable Product.

EXCLUSIVE MINERAL RESOURCES

ESTIMATION

Kumba only derives Mineral Resource estimates from geological models that spatially (three-dimensionally) define the iron ore deposits, ie if an ore body is not spatially modelled no Mineral Resources can be declared for that ore body.

The initial step involves the compilation of tectono-stratigraphic solids models that domain the various iron ore types of each deposit as it is hosted within surrounding non-mineralised material, ie in relation to the non-economic or waste materials. In the case of Kumba Iron Ore it is mainly the geological logging of borehole samples that is used to conduct geological (stratigraphical) interpretations, in combination with structural mapping to derive final tectono-stratigraphic domain boundaries.

Within the solids model, the ore body is divided into different zones or domains that reflect areas of common grade, metallurgical characteristics where available, or other relevant characteristics so that appropriate interpolation functions can be applied to distinct ore domains within the deposit.

The validated borehole sample assay data intersecting the three-dimensionally defined domains are then composited, validated to verify correct assignment and to identify possible outliers, and used to interpolate critical *in situ* grades (Fe, SiO_2, Al_2O_3, K_2O and P as a minimum) and other parameters, including as a minimum requirement relative density, using a number of techniques, eg various types of Kriging for ore domains (dependent on sample support and sample density, etc) and Inverse Distance Squared for waste domains into pre-defined blocks. The models containing this blocked information is referred to as geological block models.

Where sample data is sparse, a global estimate is used, ie arithmetic mean of the grade data available in the domain. The interpolation method applied relies on geostatistical analyses of the ore domain grades to determine its site-specific relationship in space per domain.

The blocks making up the geological block model that intersects the solids model, are specifically sized and designed through quantitative Kriging neighbourhood analysis to manage the volume-variance effect and accommodate the smallest selective mining unit. These blocks, referred to as parent cells, are sub-blocked into smaller cells to honour, as closely as practically possible, domain boundaries.

The interpolated grades and tonnages assigned to the blocks within the geological block models are then used to estimate the grades and tonnages of the iron ore under consideration.

The Mineral Resource portion of the iron ore is spatially constrained or distinguished from other iron ore occurrences by a resource shell (2 x revenue factor pit shell derived during pit optimisation) and a % Fe cut-off grade, to make a clear distinction between ore considered to have reasonable prospects for eventual economic extraction and ore that does not.

Estimated Mineral Resource tonnages and grades are reconciled at each mining operation by comparing the estimates with tonnages and grades captured in grade control/production geology models which are compiled using infill drilling and/or blast hole sampling data.

In agreement with the SAMREC Code, Mineral Resources are classified according to the degree of confidence in the estimates (tonnes and grades), where this confidence is established as a function of several geological and grade continuity measurements. Kumba's Geosciences Department compiled a guideline for geological confidence classification, and where applicable, Mineral Resource classification which promotes a RD scorecard approach (with competent person override). This guideline is the preferred approach to Mineral Resource classification within the company but not a standard as the company acknowledges the autonomy of its Competent Persons (CP) and technical specialists in defining Mineral Resource confidence levels. The guideline recommends parameters deemed critical for grade and geological continuity of the ore body.

These parameters are then quantified and spatially estimated, ie each parameter is captured in every parent cell of the geological block model that intersects ore. The CP is then expected to weight each parameter in terms of its importance (as per the CP's experience and understanding of the deposit under investigation) in relation to the ore deposit grade or geological estimate. The weighting is applied to determine a normalised 'Grade Confidence Index' and a 'Geometry Confidence Index'.

The two indices are then in turn weighted and combined into a 'Geological Classification Index (GCI)'. The CP is to assign cut-offs on the normalised GCI index figures contained in each parent cell in the geological block model to distinguish between Measured Indicated and Inferred Mineral Resources. The last step required from the CP is to review the overall confidence classification and downgrade areas known by the CP to be geologically complex.

Inferred Mineral Resources are further subdivided into interpolated and extrapolated Inferred Mineral Resources as required by the SAMREC Code. Distinction is also made between *in situ* Mineral Resources, and Mineral Resources contained on long-term stockpiles.

EXCLUSIVE MINERAL RESOURCES CONTINUED

2017 VS 2016 EXCLUSIVE MINERAL RESOURCES

From a 100% attributable reporting perspective, Kumba has a remaining exclusive (in addition to Ore Reserves) Mineral Resource base estimated at 1.2 billion tonnes, of which 733.0 Mt, at an average *in situ* grade of 54.6% Fe can be assigned to the Kumba mining operations and associated on-lease projects. The Zandrivierspoort (prospecting right) magnetite deposit, contributes 476.1 Mt @ 34.5% Fe to the Kumba Resource base. The details of the respective ore bodies are listed below and are depicted in **Figure 5**.

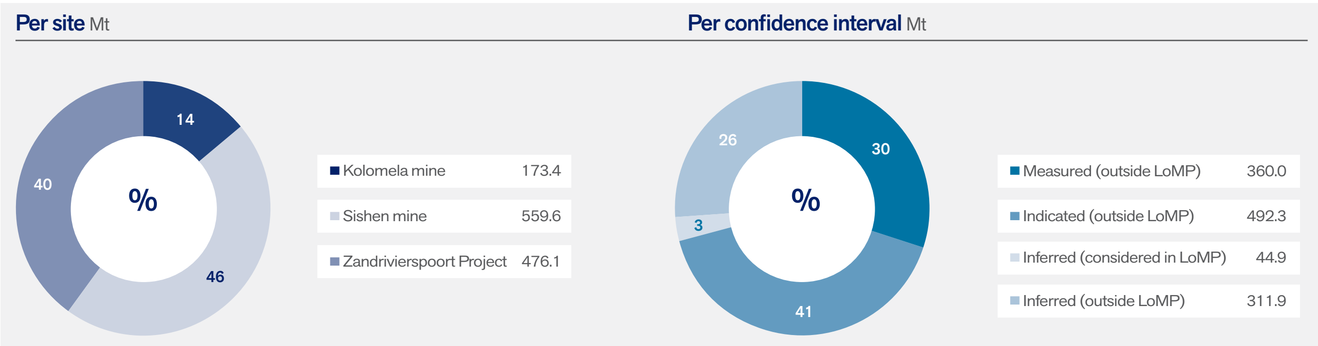
Haematite ore bodies:

– Operation: Kolomela (173.4 Mt at 62.8% Fe), year-on-year decrease of 15%.
– Operation: Sishen (559.6 Mt at 52.0% Fe), year-on-year increase of 29%.

Magnetite ore bodies:

– Project: Zandrivierspoort (476.1 Mt at 34.5% Fe and 40.8% Magnetite), remained unchanged from 2016.

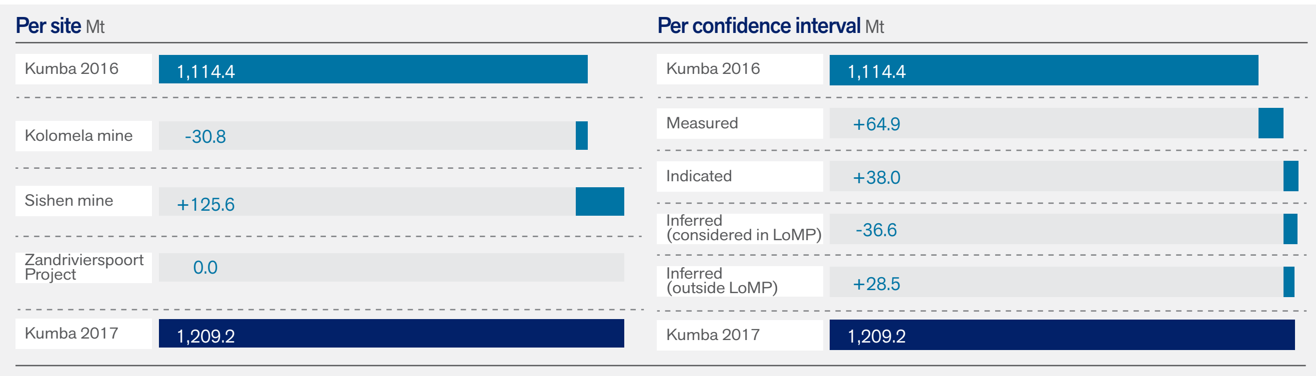
FIGURE 5: **2017 KUMBA MINERAL RESOURCE PORTFOLIO – SHOWN AS 100%** (per site and per confidence class)



The year-on-year increase in the total exclusive Mineral Resource base of 94.8 Mt (+9%) can mainly be attributed to a substantial 29% increase in the Sishen Mineral Resources, which in turn is primarily the direct result of the addition of low-grade Mineral Resources to the mine's portfolio after the approval of the Sishen Low-grade Project pre-feasibility A study late in 2016.

The year-on-year increase is further summarised in **Figure 6** and detailed in the footnotes of **Table 7**.

FIGURE 6: **KUMBA'S 2017 EXCLUSIVE MINERAL RESOURCES RECONCILED AGAINST 2016** (per site and per confidence class)



It must be categorically stated that Kumba Iron Ore's 2017 exclusive Mineral Resource is not an inventory of all mineral occurrences drilled or sampled regardless of cut-off grade, likely dimensions, location, depth or continuity. Instead they are a realistic record of those, which under assumed and justifiable technical, legal and economic conditions, show reasonable prospects for eventual economic extraction.

The Kumba exclusive Mineral Resources for 2017 are detailed in **Table 7**.

EXCLUSIVE MINERAL RESOURCES CONTINUED

TABLE 7: KUMBA'S EXCLUSIVE MINERAL RESOURCES FOR 2017 (referenced against 2016)

Operation/project	Ore type	% owned by Kumba	Resource category	2017 Tonnage (Mt)	2017 Average % Fe	2017 Average % Fe_3O_4*	2017 % Fe Cut-off**	2016 Tonnage (Mt)	2016 Average % Fe	2016 Average % Fe_3O_4*	2016 % Fe Cut-off**
Mining operations											
Kolomela mine[1]	Haematite	76.3	Measured (outside LoMP)	36.2	63.1	Not applicable	50.0	27.5	63.7	Not applicable	50.0
■ mineral resources in addition to ore reserves			Indicated (outside LoMP)	57.5	62.8			67.4	62.6		
			Measured & Indicated (outside LoMP)	93.8	62.9			94.9	62.9		
			Inferred (considered in LoMP)	19.4	60.9			52.7	65.2		
			Inferred (outside LoMP)	60.2	63.3			56.6	62.9		
			Total Inferred	**79.6**	**62.7**			**109.3**	**64.0**		
			Sub-total	**173.4**	**62.8**			**204.2**	**63.5**		
Sishen mine[2]	Haematite	76.3	Measured (outside LoMP)	216.8	55.7		40.0	160.6	57.2		40.0
■ mineral resources in addition to ore reserves			Indicated (outside LoMP)	228.4	49.0			180.5	47.1		
			Measured & Indicated (outside LoMP)	445.1	52.3			341.1	51.9		
			Inferred (considered in LoMP)	25.5	57.5			28.7	58.1		
			Inferred (outside LoMP)	89.0	49.0			64.2	48.2		
			Total Inferred	**114.5**	**50.9**			**92.9**	**51.3**		
			Sub-total	**559.6**	**52.0**			**434.0**	**51.7**		
Kumba Iron ore – mining operations											
■ mineral resources in addition to ore reserves			Measured (outside LoMP)	253.0	56.8			188.1	58.2		
			Indicated (outside LoMP)	285.9	51.8			247.9	51.3		
			Measured & Indicated (outside LoMP)	538.9	54.2			436.0	54.3		
			Inferred (considered in LoMP)	44.9	59.0			81.4	62.7		
			Inferred (outside LoMP)	149.2	54.8			120.8	55.1		
			Total Inferred	**194.1**	**55.8**			**202.2**	**58.1**		
			Total	**733.0**	**54.6**			**638.2**	**55.5**		
Projects											
Zandrivierspoort[3]	Magnetite and Haematite	38.2	Measured (outside LoMP)	107.0	34.7	41.5	21.7	107.0	34.7	41.5	21.7
■ mineral resources in addition to ore reserves			Indicated (outside LoMP)	206.4	34.4	42.5		206.4	34.4	42.5	
			Measured & Indicated (outside LoMP)	313.4	34.5	42.2		313.4	34.5	42.2	
			Inferred (considered in LoMP)	0.0	0.0	0.0		0.0	0.0	0.0	
			Inferred (outside LoMP)	162.7	34.5	38.1		162.7	34.5	38.1	
			Total Inferred	**162.7**	**34.5**	**38.1**		**162.7**	**34.5**	**38.1**	
			Total	**476.1**	**34.5**	**40.8**		**476.1**	**34.5**	**40.8**	
Kumba Iron Ore – projects											
■ mineral resources in addition to ore reserves			Measured (outside LoMP)	107.0	34.7	41.5		107.0	34.7	41.5	
			Indicated (outside LoMP)	206.4	34.4	42.5		206.4	34.4	42.5	
			Measured & Indicated (outside LoMP)	313.4	34.5	42.2		313.4	34.5	42.2	
			Inferred (considered in LoMP)	0.0	0.0	0.0		0.0	0.0	0.0	
			Inferred (outside LoMP)	162.7	34.5	38.1		162.7	34.5	38.1	
			Total Inferred	**162.7**	**34.5**	**38.1**		**162.7**	**34.5**	**38.1**	
			Grand total	**476.1**	**34.5**	**40.8**		**476.1**	**34.5**	**40.8**	

EXCLUSIVE MINERAL RESOURCES CONTINUED

TABLE 7: **KUMBA'S EXCLUSIVE MINERAL RESOURCES FOR 2017** (referenced against 2016) continued

Operation/project	Ore type	% owned by Kumba	Resource category	2017 Tonnage (Mt)	2017 Average % Fe	2017 Average % Fe_3O_4*	2017 % Fe Cut-off**	2016 Tonnage (Mt)	2016 Average % Fe	2016 Average % Fe_3O_4*	2016 % Fe Cut-off**
Company											
Kumba Iron Ore			Measured (outside LoMP)	360.0	50.2	Not applicable		295.1	49.7	Not applicable	
■ mineral resources in addition to ore reserves			Indicated (outside LoMP)	492.3	44.5			454.3	43.6		
			Measured & Indicated (outside LoMP)	852.4	46.9			749.5	46.0		
			Inferred (considered in LoMP)	44.9	59.0			81.4	62.7		
			Inferred (outside LoMP)	311.9	44.2			283.5	43.3		
			Total Inferred	**356.8**	**46.1**						
			Grand total	**1,209.2**	**46.7**			**1,114.4**	**46.5**		

- The tonnages are quoted in dry metric tonnes and million tonnes is abbreviated as Mt.
- Rounding of figures may cause computational discrepancies.
- Mineral Resource figures are reported at 100% irrespective of percentage attributable Kumba Iron Ore ownership.
- The term Inferred Mineral Resource (outside LoMP) refers to that portion of the Mineral Resources not utilised in the life-of-mine plan (LoMP) of the specific mining operation or project.
- The term Inferred Mineral Resource (considered for LoMP) refers to that portion of the Mineral Resources utilised in the life-of-mine plan (LoMP) of the specific mining operation; reported without having any modifying factors applied – therefore the term 'considered for LoMP' instead of 'inside LoMP'.
- Due to the uncertainty that may be attached to some Inferred Mineral Resources, it cannot be assumed that all or part of an Inferred Mineral Resource will necessarily be upgraded to an Indicated or Measured Resource after continued exploration.

* Fe_3O_4 – Magnetite

** The cut-off grade quoted for all the Kumba sites except the Zandrivierspoort Project, is a fixed grade cut-off grade. In the case of Zandrivierspoort, the 21.7% Fe cut-off grade is a minimum value, with the cut-off grade being spatially dynamic. A minimum yield of 34.3% is required to define eventual economic extractability. This yield has been empirically derived considering the total *in situ* % Fe as well as the *in situ* Magnetite:Haematite ratio and a break-even cost.

Footnotes to exclusive Mineral Resource table (Table 7) explaining year-on-year Mineral Resource differences:

1 **Kolomela mine quotes a 30.8 Mt (-15%) decrease in exclusive Mineral Resources from 2016 to 2017**

The overall decrease is primarily the result of:
- Geological model updates based on new borehole information and the subsequent upgrade of Inferred Mineral Resources to Indicated and Measured Mineral Resources, in turn being converted to Ore Reserves (-17.2 Mt).
- Further geological model refinements whereby the geological block model resolution was increased to define waste and ore volumes more accurately on a local scale (-10.4 Mt).
- Constraining the Mineral Resources with a 1.6 revenue factor resource shell in 2017 compared to a 2.0 revenue factor resource shell in 2016 (-6.9 Mt). The decision to reduce the resource shell size was taken to align resource estimates with the reduced reserve life, assuming a more conservative outlook in terms of reasonable prospects for eventual economic extraction.

Of the 60.2 Mt Inferred Mineral Resources (outside the LoM Plan), 13.2 Mt is extrapolated.

Of the total 173.4 Mt exclusive Mineral Resource, 0.8 Mt (at 55.6% Fe) Indicated Mineral Resources are located on long-term stockpiles and are not *in situ*.

2 **The Sishen Mine exclusive Mineral Resources showed a substantial 29% increase of 125.6 Mt year-on-year**

The substantial year-on-year increase is primarily the result of the addition of 120.7 Mt of low-grade resources outside the pit layout but inside the 1.6 revenue factor resource shell after the Sishen low-grade project pre-feasibility A study has been approved by the relevant Anglo and Kumba Investment Committees late in 2016.

The other major contributing factor is an increase in the resource shell size from a 1.2 revenue factor in 2016 **(incorrectly reported as a 2.0 revenue factor in 2016[3])** to a 1.6 revenue factor in 2017, resulting in the inclusion of an additional 31.6 Mt Mineral Resources in the Sishen 2017 resource portfolio.

Of the 89.0 Mt Inferred Mineral Resources (outside the LoM Plan), 6.4 Mt is extrapolated.

Of the total 559.6 Mt exclusive Mineral Resource, 13.8 Mt (at 48.1% Fe) Indicated Mineral Resources are located on long-term stockpiles and are not *in situ*.

3 **The Zandrivierspoort Project Mineral Resources remained unchanged from 2016**

The reasonable prospects for eventual economic extraction of the Mineral Resource were re-affirmed in 2017 with the latest applicable business case evaluation.

3 It must be noted that Kumba incorrectly referenced the 2016 Sishen resource shell as a 2.0 revenue factor resource shell, whereas in fact it was a 1.2 revenue factor resource shell. The error has been detected after the pit optimisation update was conducted in 2017 and has subsequently been verified by independent external consultants. The 2016 – 2017 year-on-year impact of the 2016 1.2 revenue factor shell vs the 2017 1.6 revenue factor shell is not material (7% or 31.6 Mt).

ANCILLARY RESERVE AND RESOURCE INFORMATION PER OPERATION AND PROJECT

All the production-related figures quoted in this section are estimated (9 + 3) as the site Resource and Reserve Statements from which this summary Resource and Reserve Statement was compiled for Kumba, were started in the beginning of October 2017.

KOLOMELA MINE

GEOLOGICAL OUTLINE

Regional geology

The Transvaal Supergroup (Eriksson et al, 1993; 1995), or Griqualand West Supergroup as it is referred to where it occurs in the Northern Cape, is host to all of the iron ore occurrences in the region. The Supergroup was deposited in fault-controlled basins on a basement of Archaean granite gneisses and greenstones and/or lavas of the Ventersdorp Supergroup (Beukes, 1983). In the Kathu-Postmasburg region (**Figure 9**), the oldest rocks of the approximately 8km thick Griqualand West Supergroup (Beukes, 1980) are the ~1.6km thick carbonate platform sediments (dolomites with minor limestone, chert and shale) of the Campbellrand Subgroup of the Ghaap Group (Beukes, 1983; Altermann and Wotherspoon, 1995; Beukes, 1986).

Conformably overlying the carbonates is the banded iron formation unit, the Asbestos Hills Subgroup (Beukes, 1980), which can be up to 500m thick. Locally the upper portion of the banded iron formation (Kuruman Iron Formation) has been enriched to ore grade, ie Fe>60%, and the ores found within this unit comprise the bulk of the high-grade iron ores in the region. The Kuruman Iron Formation is conformably overlain by the Griquatown Iron Formation. The two iron formations differ in that the Griquatown Iron Formation, comprising mainly allochemical sediments, was deposited in a shallow-water, storm-dominated epeiric sea (Beukes,1984), whereas the Kuruman Iron Formation, comprising orthochemical iron formations, was developed in the basin (Beukes, 1980). However, in the Maremane dome area, the Griquatown Iron Formation has been almost entirely removed by erosion along an unconformity separating the banded iron formations from the overlying clastic sediments of the Gamagara Formation.

During uplift and erosion solution and karstification of the upper dolomitic units of the lower Ghaap Group occurred and a 10 to 20m thick, residual solution breccia, referred to as the 'Manganese Marker', 'Wolhaarkop Breccia' (van Wyk, 1980; van Schalkwyk and Beukes, 1986) or Wolhaarkop Formation, developed between the basal dolomites and overlying banded iron formation. Locally, deep sinkholes developed in the dolomites, into which the overlying iron formation collapsed (Beukes, 1983).

A thick sequence of younger clastic sediments (shales, quartzites and conglomerates) of the Gamagara Formation unconformably overly the Ghaap Group rocks and some of the conglomerates, comprised almost entirely of haematite, constitute lower-grade iron ore. The Gamagara Formation, interpreted as the base of the Palaeoproterozoic (~2.1 1.83Ga) Olifantshoek Supergroup (**Figure 9**) is overlain by the Palaeoproterozoic (~2.35-2.1Ga) Postmasburg Group along an interpreted thrust contact in the study area (van Schalkwyk and Beukes, 1986; Friese and Alchin, 2007). The thrust fault has been folded during subsequent deformation.

Image: General view of the plant and load out station at Sishen mine.

ANCILLARY RESERVE AND RESOURCE INFORMATION PER OPERATION AND PROJECT CONTINUED

An altered gabbroic sill in the Kolomela area typically separates the iron ore from the underlying host banded iron formation, or is intrusive in the banded iron formation at Kolomela (Carney and Mienie, 2002). It is interpreted to have intruded into the Griqualand West Supergroup in late Proterozoic times (Friese and Alchin, 2007). The localised unit is prominent in the Leeuwfontein and Klipbankfontein orebodies but absent in other areas.

Diamictite of the Makganyene Formation (de Villiers and Visser, 1977) and lava of the Ongeluk Formation (Postmasburg Group) have been thrust over the Gamagara Formation sediments in the vicinity of Postmasburg, which are now preserved only within the larger synclinal basins (Schütte, 1992).

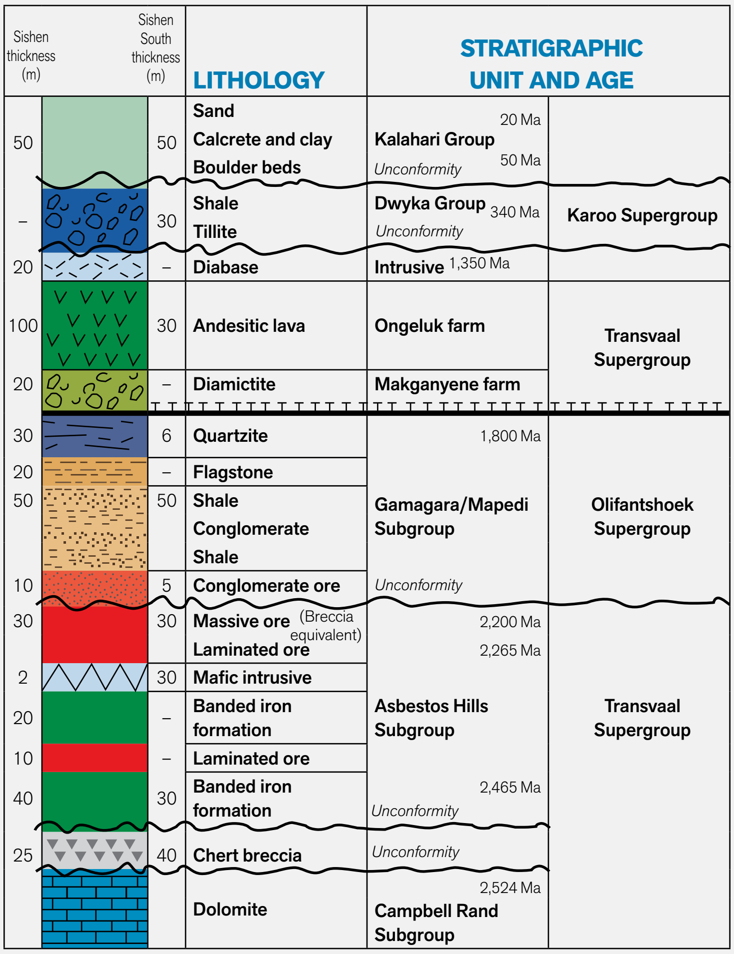
The Makganyene diamictites comprise massive to poorly-bedded diamictite, pebbly sandstone and siltstone, shale and mudstone up to100m thick, which are interpreted as piedmont glacial and glaciofluvial assemblages (Beukes, 1983, Visser 1971). A second facies within the Makganyene contains mainly stacked cycles of graded bedded diamictite-greywacke-siderite bandlutite, which have been interpreted as glaciomarine deposits (Beukes, 1983). The Ongeluk lavas (600m thick; Schütte, 1992) were extruded under water in a marginal basin within the continental setting of the Kaapvaal craton (Schütte, 1992), and comprise essentially tholeiitic basaltic andesites.

The lavas have been dated at 2240 ± 57 Ma (Walraven et al, 1982), 2239 ±90 Ma (Armstrong, 1987) and 2222 ± 13 Ma (Cornell et al, 1996). A considerable portion of the upper parts of the stratigraphy was eroded during Dwyka glaciation and re-deposited as tillite (Visser, 1971) during the Cretaceous era. The entire, folded sequence was later truncated by Tertiary erosion and a thick blanket of calcrete, dolocrete, clays and pebble layers of the Kalahari Group were deposited unconformably over older lithologies.

Stratigraphy

Iron ore at Kolomela mine is associated with the chemical and clastic sediments of the Proterozoic Transvaal Supergroup. These sediments define the western margin of the Kaapvaal Craton in the Northern Cape Province. The stratigraphy has been deformed by thrusting from the west and has undergone extensive karstification. The thrusting has produced a series of open, north-south plunging anticlines, synclines and grabens and karstification has been responsible for the development of deep sinkholes. The iron ore at Kolomela has been preserved from erosion within these geological structures. These structures are therefore important exploration targets. The Kolomela local stratigraphy is illustrated in **Figure 7**.

FIGURE 7: **SIMPLIFIED STRATIGRAPHIC COLUMN DEPICTING THE KOLOMELA LOCAL GEOLOGY**



The Transvaal Supergroup lithologies were deposited on a basement of Archaean granite gneisses and greenstones, and/or lavas of the Ventersdorp Supergroup. In the Sishen – Postmasburg region, the oldest rocks of the Transvaal Supergroup form a carbonate platform sequence (dolomites with minor limestone, chert and shale) known as the Campbell Rand Subgroup. The upper part of the Transvaal Supergroup comprises a banded iron formation unit, the Asbestos Hills Subgroup, which has been conformably deposited on the carbonates. In places, the upper portion of the banded iron formation has been supergene-enriched to Fe ≥ 60%. The iron ore/banded iron formation zone is referred to as the Kuruman Formation. The ores found within this formation comprise the bulk of the higher-grade iron ores in the region.

Iron ore at Kolomela mine is associated with the chemical and clastic sediments of the Proterozoic Griqualand West Supergroup. These sediments define the western margin of the Kaapvaal Craton in the Northern Cape Province.

ANCILLARY RESERVE AND RESOURCE INFORMATION PER OPERATION AND PROJECT CONTINUED

The stratigraphy has been deformed by thrusting from the west and has undergone extensive karstification. The thrusting has produced a series of open, north-south plunging anticlines, synclines and grabens and karstification has been responsible for the development of deep sinkholes. The iron ore at Kolomela has been preserved from erosion within these geological structures. These structures are therefore important exploration targets.

The Griqualand West Supergroup lithologies were deposited on a basement of Achaean granite gneisses and greenstones, and/or lavas of the Ventersdorp Supergroup. In the Sishen – Postmasburg region, the oldest rocks of the Griqualand West Supergroup form a carbonate platform sequence (dolomites with minor limestone, chert and shale) known as the Campbell Rand Subgroup.

The upper part of the Griqualand West Supergroup comprises a banded iron formation unit, the Asbestos Hills Subgroup, which has been conformably deposited on the carbonates. In places, the upper portion of the banded iron formation has been supergene-enriched to Fe ≥ 60%. The iron ore/banded iron formation zone is referred to as the Kuruman Formation. The ores found within this formation comprise the bulk of the higher-grade iron ores in the region.

An altered mafic intrusive sill (originally of gabbroic composition) usually separates the iron ore deposits from the underlying host iron formation. It is believed to have intruded the Griqualand West Supergroup in late Proterozoic times.

A thick sequence of younger clastic sediments (shales, quartzites and conglomerates) belonging to the Gamagara Subgroup unconformably overlies the banded iron formations. Some of the conglomerates comprise predominantly of haematite and are of lower-grade ore quality. The unconformity separating the iron formations from the overlying clastic sediments represents a period of folding, uplift and erosion.

During this time, dissolution and karstification took place in the upper dolomitic units. This resulted in the formation of residual solution breccias, referred to as the 'Manganese Marker' or 'Wolhaarkop Breccia', between the dolomites and overlying banded iron formations. In places, deep sinkholes developed in the dolomites, into which the overlying iron formation and iron ore deposits collapsed.

Diamictite of the Makganyene Formation and lava of the Ongeluk Formation have been thrusted over the Gamagara sediments in the Kolomela region. These are preserved only within larger synclinal structures.

A considerable portion of the upper parts of the stratigraphy were eroded and re-deposited as tillite during Dwyka glaciation.

The entire folded sequence was then eroded during Tertiary times. A thick blanket of calcrete, dolocrete, clays and pebble layers (Kalahari Group) was deposited unconformably over the older lithologies.

Evidence of karst formation after the development of the calcretes of the Edin and Boudin Formation can be seen in the current Leeuwfontein pit.

Tectonic setting

Structurally, Kolomela mine lies on the western margin of the Kaapvaal Craton, and has been affected by Kheis Orogeny. The deformation intensity increases from east to west and the area is dominated by a regional-scale synforms and antiforms – the so-called Welgevonden Basin and Wolhaarkop antiform.

The area west of the Wolhaarkop antiform (including the western limb of the antiform), is characterised by tight overturned fold structures that verge towards the east. The overturned limbs of the fold structures are locally disrupted, which has produced thrusts with limited displacement. East of the antiform (Kolomela area), the folds are upright, tight to open structures that have variable inter-limb angles. All of the fold structures west of the antiform are the product of east-west crustal contraction during the Kheis Orogeny, which produced eastward-directed thrusting.

Thrust faults that were intersected in drill core in the Welgevonden north area caused duplication of the stratigraphy. The high degree of associated deformation is clearly illustrated in drill core from the Welgevonden area and duplication or elimination of iron ore may occur.

The Wolhaarkop area is structurally more intensely deformed than the Kapstevel and the Welgevonden areas. The folds are tight to isoclinal, over-folded with an eastwards vergence. With subsequent deformation the fold structures became disrupted, resulting in thrust structures with eastwards directed movement.

The high-strain zones (thrusts) are locally characterised by a high degree of ferruginisation of extensively brecciated BIF. In some places, the ore is preserved as narrow, tightly folded lenses within the high-strain zones.

Local geology

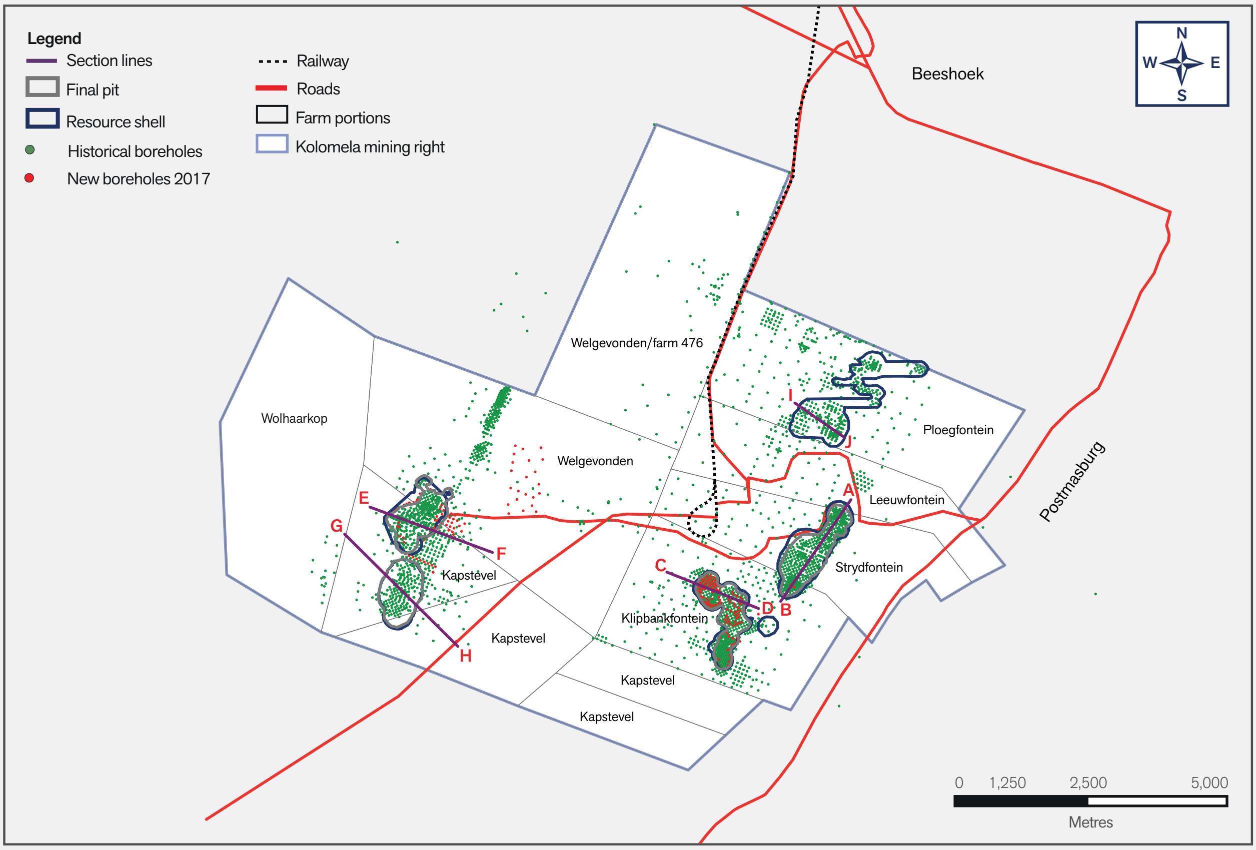
Four distinct iron ore types have been described at Kolomela mine. Their chemical properties do, however, differ slightly. At Kolomela mine the iron ore comprises high quality, clastic-textured (28.8% of total), laminated (52.9% of total), collapse breccia (9.8% of total) and conglomeratic (8.6% of total) ores. The iron ore has been preserved as a number of discontinuous bodies within synclinal, graben and sinkhole structures, which were later influenced by thrusting from the west.

ANCILLARY RESERVE AND RESOURCE INFORMATION PER OPERATION AND PROJECT CONTINUED

Each geological environment contains a unique combination of ore types and associated waste lithologies, but there are relatively few, lower-grade, conglomeratic and collapse breccia ores. The overall quality of the iron ore at Kolomela mine makes it acceptable as a high-grade metallurgical iron ore.

Geological interpretations have been derived from a borehole database comprising 2,648 boreholes. Boreholes drilled in 2017 are depicted in red in **Figure 8**.

FIGURE 8: **BOREHOLES SUNK IN 2017 (RED DOTS) WITHIN THE KOLOMELA MINING RIGHT AREA AS PART OF THE MINE'S ONGOING EXPLORATION PROGRAMME**



The geometry of the different ore bodies are depicted via cross-sections taken through the three-dimensional solids models of the various orebodies:

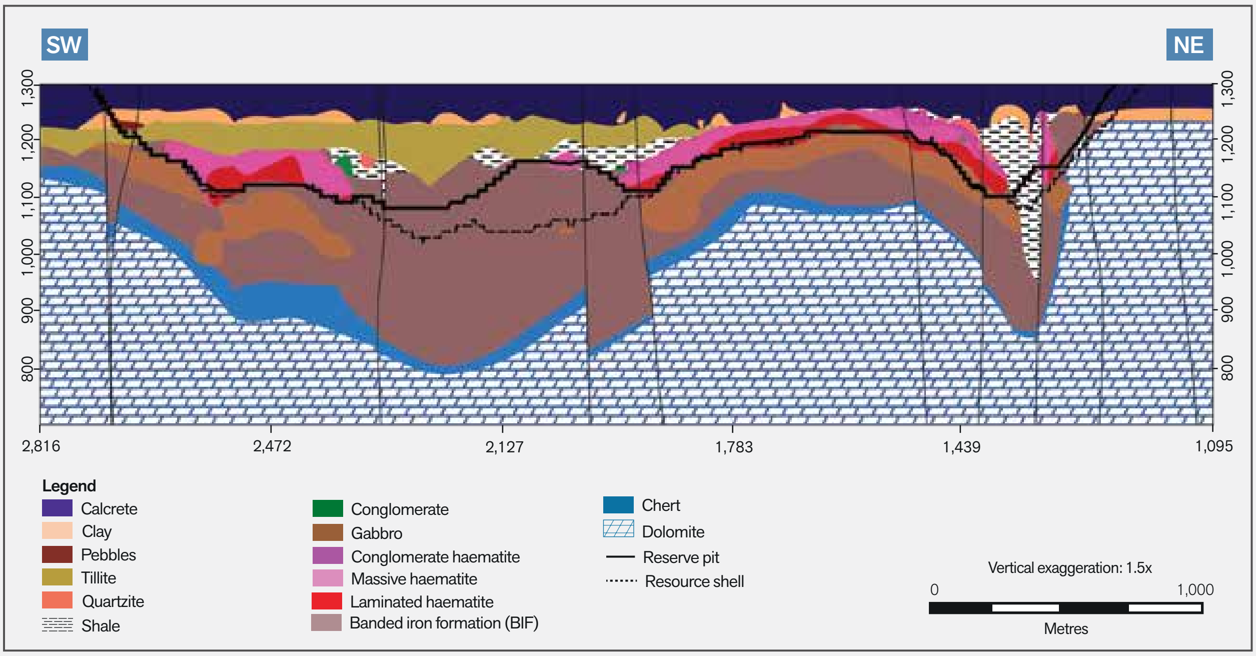
- Cross-section AB **(Figure 9)** as referenced in plan **(Figure 8)** – North-east to south-west cross section through the Leeuwfontein Ore body.
- Cross-section CD **(Figure 10)** as referenced in plan **(Figure 8)** – West-north-west to east-south-east cross section through the Klipbankfontein Ore body.
- Cross-section EF **(Figure 11)** as referenced in plan **(Figure 8)** – West-north-west to east-south-east cross section through the Kapstevel North Ore body.
- Cross-section GH **(Figure 12)** as referenced in plan **(Figure 8)** – North-west to south-east cross section through the Kapstevel South Ore body.
- Cross-section IJ **(Figure 13)** as referenced in plan **(Figure 8)** – West-north-west to east-south-east cross section through the Ploegfontein Ore body.

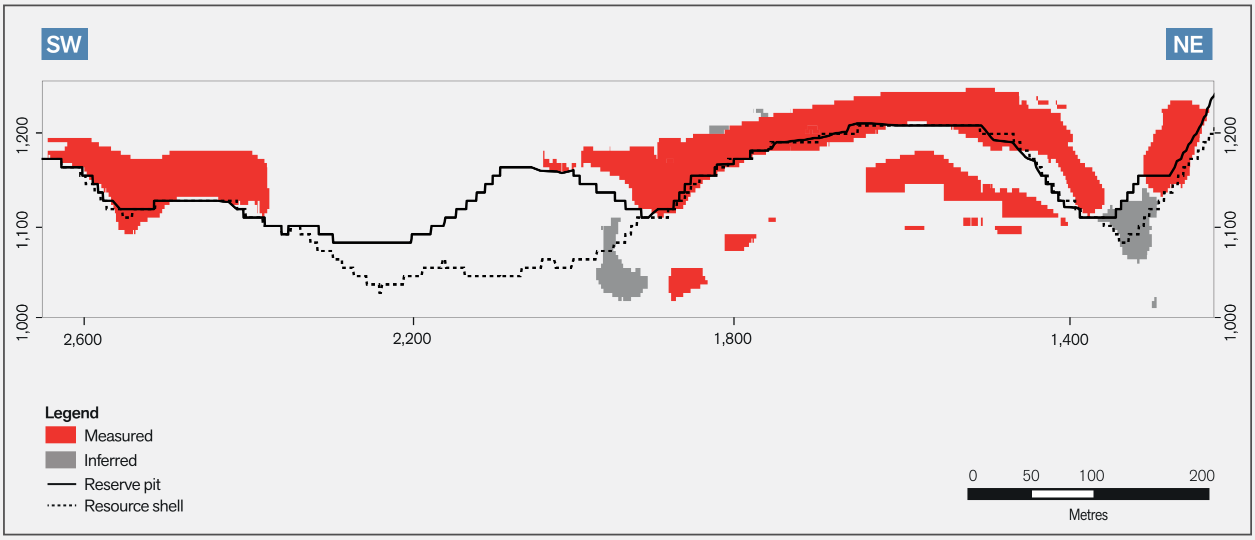
ANCILLARY RESERVE AND RESOURCE INFORMATION PER OPERATION AND PROJECT CONTINUED

It can be noticed in some of these figures that the pit layout boundaries in some instances exceed the resource shell in size. This is possible where during pit optimisation ore geology is the limiting factor and not economic viability, and when the pit shell is engineered into a safe pit layout or design, the layout boundaries in some areas exceed the resource shell.

Also, the vertical scale has been exaggerated in all the cross sections, for better illustrative purposes, resulting in ore body dip angles appearing steeper than actual.

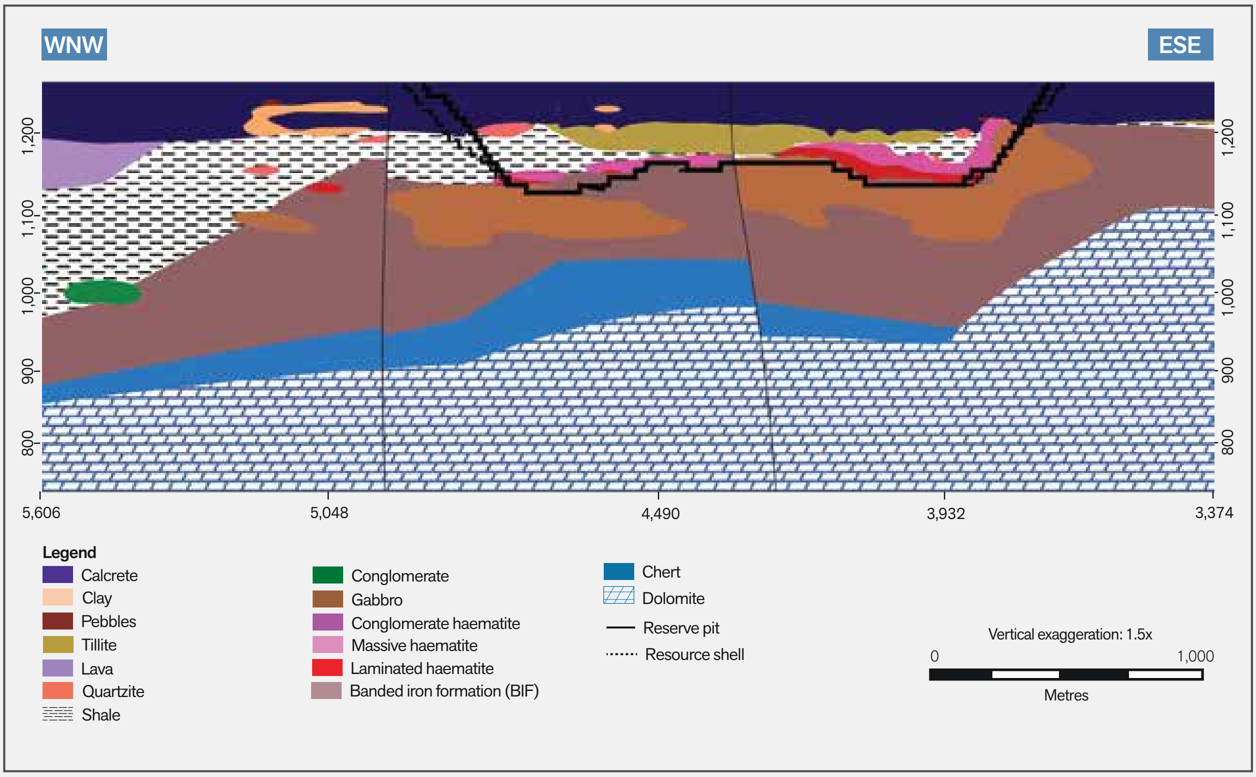
FIGURE 9: **NE-SW CROSS-SECTION THROUGH THE LEEUWFONTEIN ORE BODY (TOP) WITH GEOLOGICAL CONFIDENCE CLASSIFICATION (BOTTOM)**

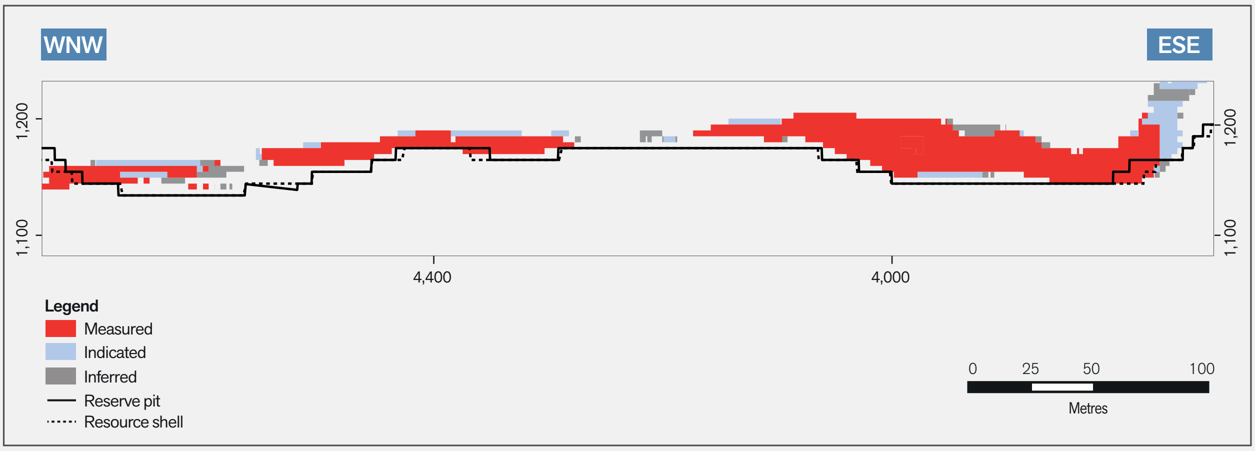




ANCILLARY RESERVE AND RESOURCE INFORMATION PER OPERATION AND PROJECT CONTINUED

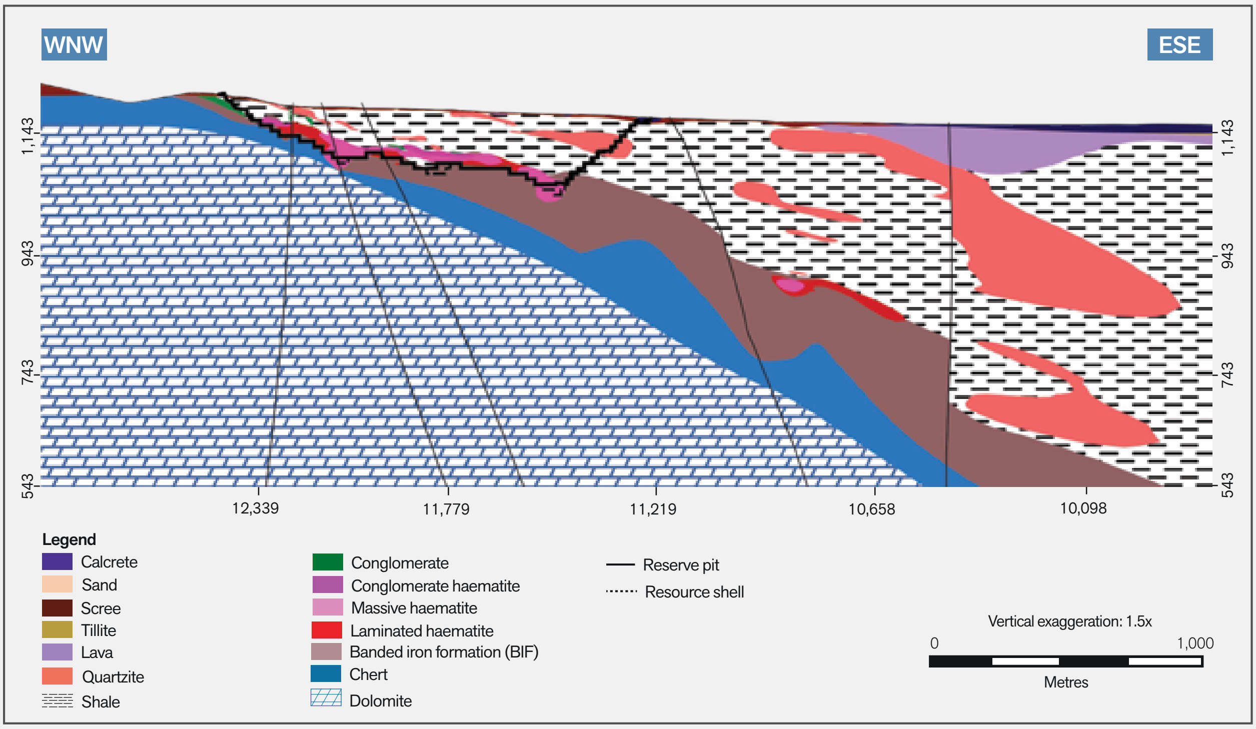
FIGURE 10: **WNW-ESE CROSS-SECTION THROUGH THE KLIPBANKFONTEIN ORE BODY (TOP) WITH GEOLOGICAL CONFIDENCE CLASSIFICATION (BOTTOM)**

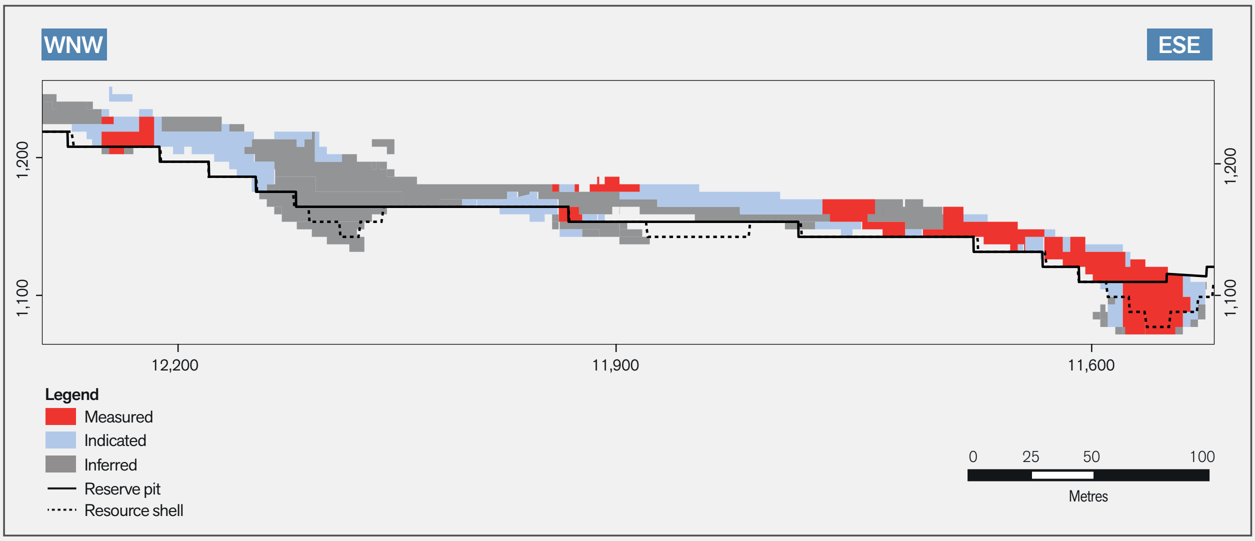




ANCILLARY RESERVE AND RESOURCE INFORMATION PER OPERATION AND PROJECT CONTINUED

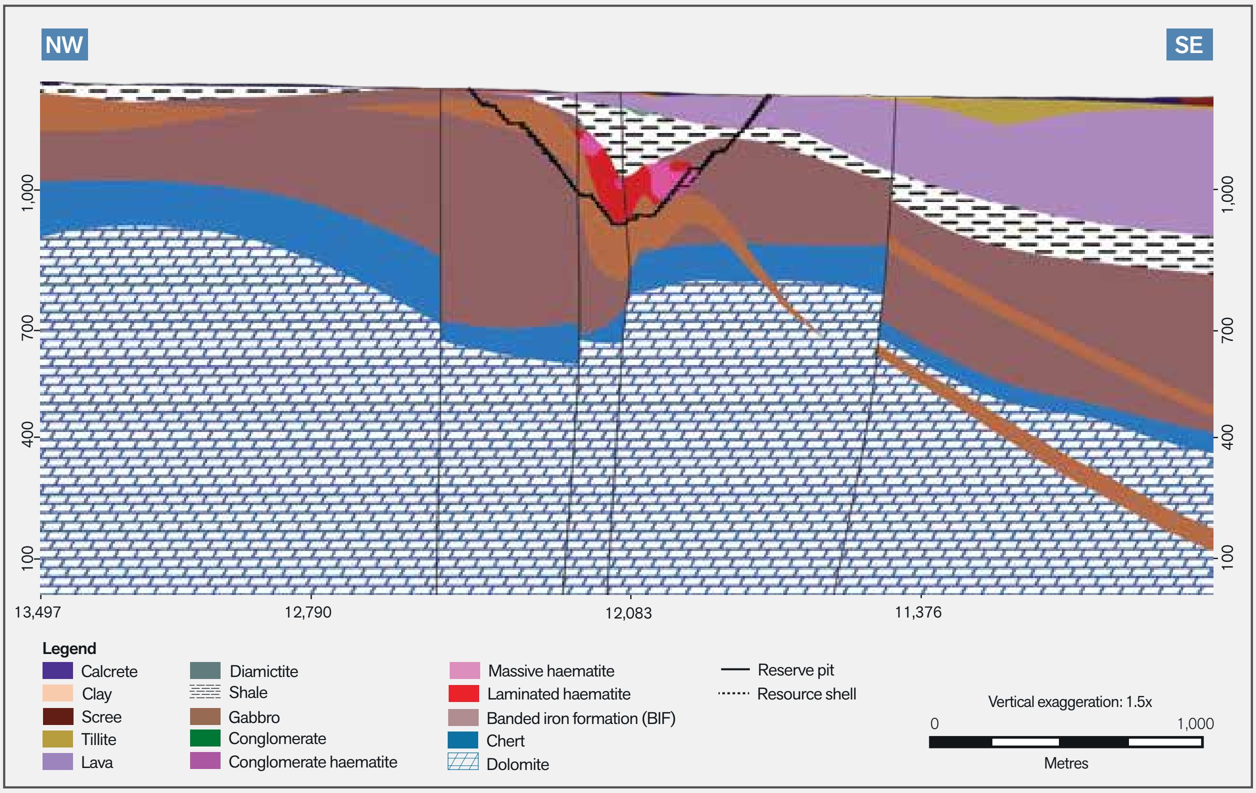
FIGURE 11: WNW-ESE CROSS-SECTION THROUGH THE KAPSTEVEL NORTH ORE BODY (TOP) WITH GEOLOGICAL CONFIDENCE CLASSIFICATION (BOTTOM)

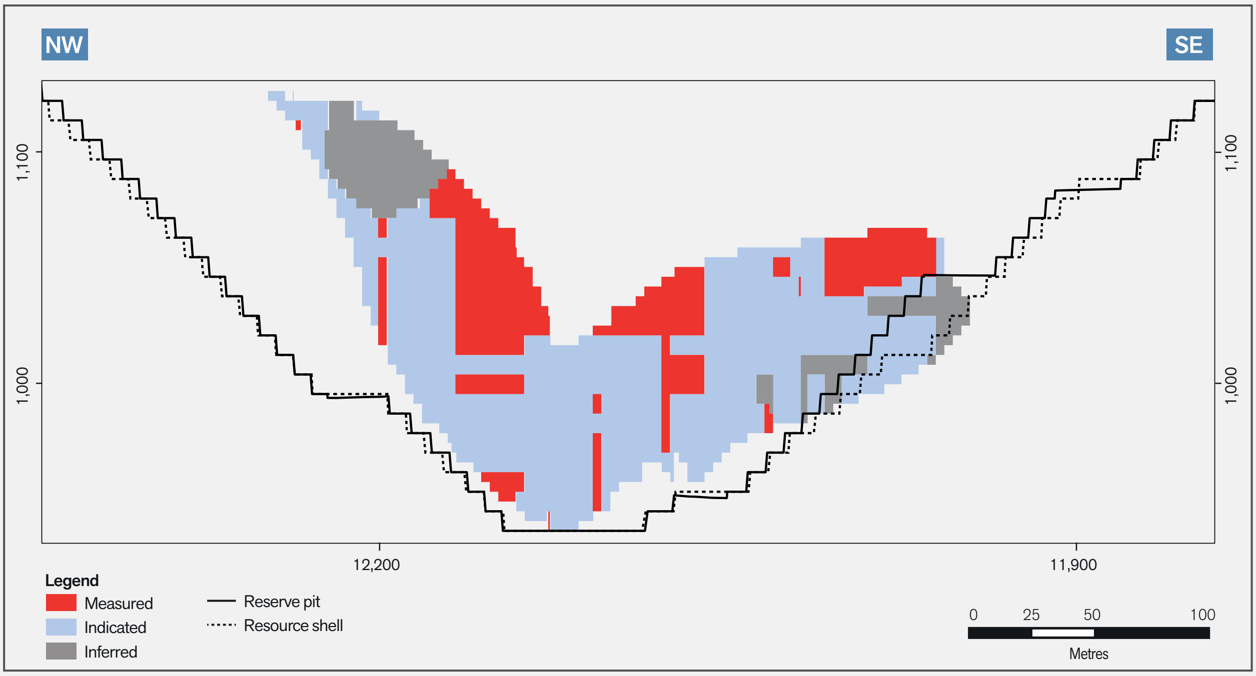




ANCILLARY RESERVE AND RESOURCE INFORMATION PER OPERATION AND PROJECT CONTINUED

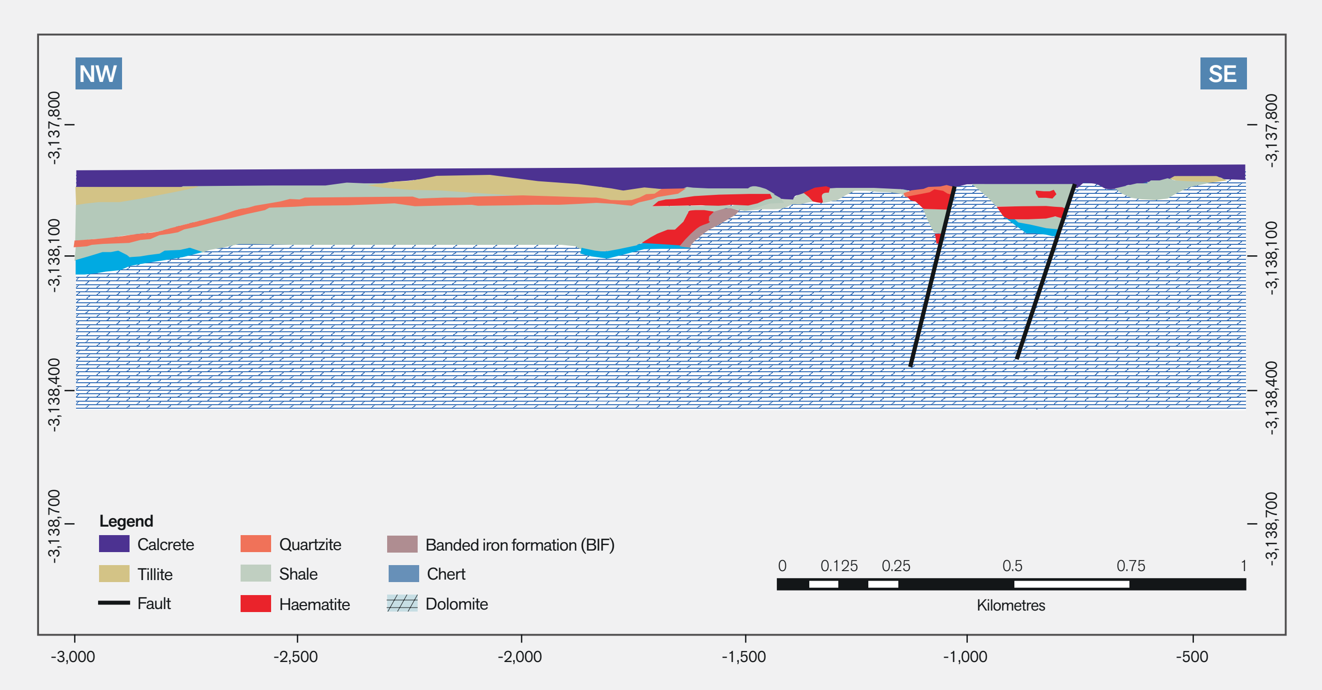
FIGURE 12: **WNW-ESE CROSS-SECTION THROUGH THE KAPSTEVEL SOUTH ORE BODY (TOP) WITH GEOLOGICAL CONFIDENCE CLASSIFICATION (BOTTOM)**





ANCILLARY RESERVE AND RESOURCE INFORMATION PER OPERATION AND PROJECT CONTINUED

FIGURE 13: **NW-SE CROSS-SECTION THROUGH THE PLOEGFONTEIN ORE BODY**



Kolomela mine has been designed as a direct shipping ore operation, where conventional open pit drilling and blasting; shovel-and-truck loading and hauling mining processes are applied to generate plant feed. Currently the Leeuwfontein, Klipbankfontein and Kapstevel North ore bodies are mined, but the 2017 LoM Plan also includes future mining of the Kapstevel South ore body.

The iron ore is loaded according to blend (grade) requirements and transported to designated finger stockpiles dependent on the Fe grade and contaminant grade of the load. The primary crushing and screening plant is fed from the finger stockpiles in blend ratios ensuring that the lump and fine product is suitable for client uptake (considering subsequent blending with Sishen mine product). A modular small-scale dense media separation (DMS) plant was commissioned in 2016 and will in future contribute 5% to the Saleable Product output of Kolomela mine, through the treatment of previously stockpiled lower-grade material.

The iron ore product is railed to the Saldanha export harbour via the OREX iron ore export line. The product is marketed to SIOC's current overseas customer base as part of the SIOC marketing strategy and is blended with Sishen mine's product. Kolomela mine produces lump and fine ore, with the physical properties of the lump ore of such a high standard that it meets niche demand.

Kolomela mine's key operational parameters are summarised in **Table 8**.

ANCILLARY RESERVE AND RESOURCE INFORMATION PER OPERATION AND PROJECT CONTINUED

TABLE 8: **KOLOMELA MINE OPERATIONAL OUTLINE SUMMARY**

Key details	
Ownership (AA plc)	53.2%
Ownership (KIO)	76.3%
Commodity	Iron Ore
Country	Republic of South Africa
Mining method	Open pit – Conventional
Reserve Life* years	14.0
Estimated Saleable Product Lump:Fine ratio	57:43
Saleable Product design capacity	15.0 Mtpa
Estimated 2017 run-of-mine production	14.0 Mt
Estimated 2017 Saleable Product	13.9 Mt
Estimated 2017 waste production	53.5 Mt
Overall planned stripping ratio (2017 LoM Plan)	4.5
Estimated product sold in 2017	13.7 Mt
Product types	Lump and Fine
Mining right expiry date	17 September 2038

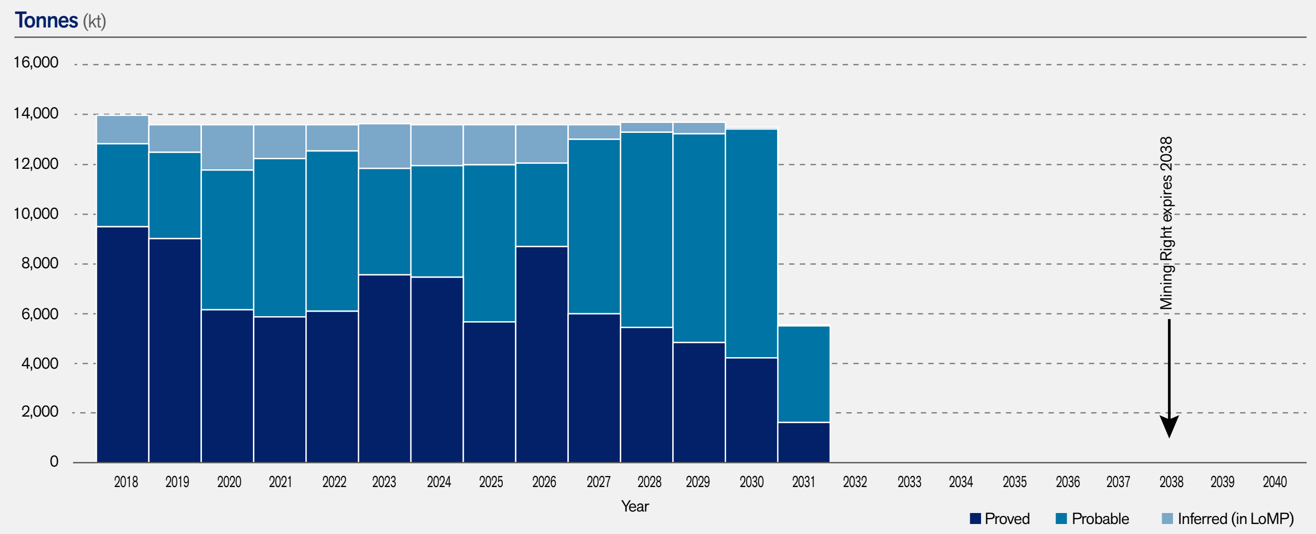
* Reserve Life includes all consecutive years in the life-of-mine plan where the Proved and Probable Ore Reserves makes up >25% of the year's run-of-mine.

The total tonnes extracted from three pits (Leeuwfontein, Klipbankfontein and Kapstevel North) at Kolomela mine increased by 8% from 64.0 Mt (in 2016) to an estimated 69.1 Mt in 2017. The 2017 mining performance (as estimated at the time of reporting) comprises 53.5 Mt of ex-pit waste and 15.6 Mt of ex-pit ore, the latter comprising 14.0 Mt of run-of-mine (including 0.8 Mt of Inferred Mineral Resources) delivered to the DSO and DMS plants and a year-on-year run-of-mine stockpile growth of 1.6 Mt.

In total, 13.9 Mt of Saleable Product should be produced on-site from the run-of-mine delivered to the crushing & screening and DMS plants in 2017, compared to 12.7 Mt in 2016. In total 13.7 Mt is expected to be railed to the Saldanha Port for export in 2017.

The 2017 life-of-mine Plan Saleable Product profile is depicted in **Figure 14**.

FIGURE 14: **KOLOMELA MINE'S 2017 LIFE-OF-MINE PLAN ANNUAL SALEABLE PRODUCT PROFILE** (including modified Inferred Mineral Resources)



Ore Reserve ancillary information

The Kolomela mine Ore Reserve ancillary information is summarised in **Table 9a** (background information) and **Table 9b** (Leeuwfontein Ore Reserve estimation parameters – as an example).

ANCILLARY RESERVE AND RESOURCE INFORMATION PER OPERATION AND PROJECT CONTINUED

TABLE 9A: KOLOMELA MINE'S 2017 VS 2016 ORE RESERVE BACKGROUND INFORMATION

KOLOMELA MINE	2017	2016
LOCATION		
Country	Republic of South Africa	Republic of South Africa
Province	Northern Cape	Northern Cape
OWNERSHIP		
Sishen Iron Ore Company (Pty) Ltd	100%	100%
Kumba Iron Ore Limited	76.3%	73.9%
AA plc	53.2%	51.5%
OPERATIONAL STATUS		
Operation status	Steady-state	Steady-state
Mining method	Open cast (conventional drilling and blasting and truck and shovel operation)	Open cast (conventional drilling and blasting and truck and shovel operation)
Beneficiation method	Direct shipping ore (only crushing and screening of high grade RoM) as well as Dense Media Separation plant for B-grade material	Direct shipping ore (only crushing and screening of high grade RoM) as well as Dense Media Separation plant for B-grade material
Annual Saleable Product (Mtpa)	13.6	13.6
Annual supply to domestic market (Mtpa)	0.0	0.0
Annual supply to export market (Mtpa)	13.6	13.6
Number of products	2 product types (Lump and Fine)	2 product types (Lump and Fine)
GOVERNANCE		
Code	THE SAMREC CODE – 2016 EDITION	THE SAMREC CODE – 2007 EDITION (as amended July 2009)
AA plc group technical standard	AA_GTS_22 (Reporting of Exploration Results, Mineral Resources and Ore Reserves in Anglo American)	
KIO reporting policy	http://www.angloamericankumba.com/sd_policies.php	http://www.angloamericankumba.com/sd_policies.php
KIO reporting protocols	KIOReportingProcedure(2015)	KIOReportingProcedure(2015)
	KIO Reserve Classification Guideline (version 1)	KIO Reserve Classification Guideline (version 1)
KIO reporting template	Ore Reserve (and Saleable Product) Reporting Template (2017)	KIO_R&R_Reporting_Template_082015
REPORTING METHOD		
Approach	Ore Reserves are those derived from Measured and Indicated Mineral Resources only (through application of modifying factors) and do not include Inferred Mineral Resources. In the case of Kumba Iron Ore all Ore Reserves are constrained by practical pit layouts, mining engineered from pit shells that define 'current economically mineable'. The geological block model(s) is converted into a mining block model considering a site-specific practical mineable smallest mining unit. Furthermore protocols ensure that Kumba Iron Ore's operations/projects consider expected long-term revenues versus the operating and production costs associated with mining and beneficiation as well as legislative, environmental and social costs, in determining whether or not a Mineral Resource could be economically extracted and converted to an Ore Reserve. This is performed by applying a Lerchs-Grosmann algorithm to the mining model to derive an optimised pit shell. This optimised pit shell is then iteratively converted to a practical layout by applying geotechnical slope stability parameters and haul road and ramp designs, legal restrictions etc, with safety being one of the most considered parameters. Once a practical pit layout has been established the material within the pit is scheduled over time to achieve client specifications and thus a LoM schedule is produced. The average % Fe grade and metric tonnage estimates of 'Saleable Product' are also reported to demonstrate that beneficiation losses have been taken into account.	

ANCILLARY RESERVE AND RESOURCE INFORMATION PER OPERATION AND PROJECT CONTINUED

TABLE 9A: **KOLOMELA MINE'S 2017 VS 2016 ORE RESERVE BACKGROUND INFORMATION** continued

KOLOMELA MINE	2017	2016
REPORTING METHOD continued		
Scheduled run-of-mine metric tonnes (dry/wet)	Dry	Dry
Tonnage calculation	Tonnages are calculated from the life-of-mine schedule, originating from the mining block models, and are modified tonnages considering geological losses. The effect of dilution, mining losses, mining recovery efficiencies and design recovery efficiencies to derive the run-of-mine tonnages delivered to the crushing and screening plant.	Tonnages are calculated from the life-of-mine schedule, originating from the mining block models, and are modified tonnages considering geological losses. The effect of dilution, mining losses, mining recovery efficiencies and design recovery efficiencies to derive the run-of-mine tonnages delivered to the crushing and screening plant.
Fe grade	Ore Reserve % Fe grades reported, represent the weighted average grade of the 'plant feed' or 'run-of-mine' (RoM) material and take into account all applicable modifying factors.	Ore Reserve % Fe grades reported, represent the weighted average grade of the 'plant feed' or 'run-of-mine' (RoM) material and take into account all applicable modifying factors.
Cut-off grade (Fe)	50% Fe (includes diluting material)	50% Fe (includes diluting material)
Ore type	Haematite Ore	Haematite Ore
Saleable Product selling unit	Iron Ore – Fe (US$/tonne)	Iron Ore – Fe (US$/tonne)
Life-of-mine scheduling		
Software	OPMS	OPMS
Method	Product tonnage and grade target driven to achieve required client product specifications	Product tonnage and grade target driven to achieve required client product specifications
Stripping strategy	Deferred waste stripping strategy	Deferred waste stripping strategy
Reserve Life years	14	18
LoM Plan run-of-mine tonnes (including modified Inferred) (expressed in million tonnes)	190.9	245.3
Overall average stripping ratio (including Inferred Mineral Resources)	1.0 : 4.5	1.0 : 3.8
Production data cut-off date (date whereafter short-term plan instead of actual figures are used to estimate the annual run-of-mine and Saleable Product production for the mine until 31 December of year of reporting)	31 July 2017	30 September 2016
Topography and pit progression assigned	31 December 2017	31 December 2016
Reserve schedule ID (Schedule file name + extension)	2017 LoM Base Case Optimised Report.xlsx	2016 LoM V1
Reserve schedule completion date	30 September 2017	25 July 2016

ANCILLARY RESERVE AND RESOURCE INFORMATION PER OPERATION AND PROJECT CONTINUED

TABLE 9B: **KOLOMELA MINE'S 2017 VS 2016 LEEUWFONTEIN ORE RESERVE ESTIMATION PARAMETERS** (as an example)

	2017	2016
ESTIMATION		
Leeuwfontein		
Mining block model name	lf_10_10_10_smu_rotated.mdl	lf_2016_10_10_10.mdl
Smallest mining unit	10m(X) x 10m(Y) x 10m(Z)	10m(X) x 10m(Y) x 10m(Z)
Practical mining parameters		
Bench height	10m	10m
Ramp gradient	8% to 10.0% (1 in 8 to 1 in 10)	8% to 10.0% (1 in 8 to 1 in 10)
Road width	35m	35m
Minimum mining width	80m (hydraulic shovel and truck mining)	80m (hydraulic shovel and truck mining)
Geohydrology	Groundwater level maintained 20m below pit floor	Groundwater level maintained 20m below pit floor
Pit slopes	Designed according to a defendable risk matrix, guided by an appropriate factor of safety of 1.3 and a probability of failure of 10%	Designed according to a defendable risk matrix, guided by an appropriate factor of safety of 1.3 and a probability of failure of 10%
Pit optimisation		
Software	Whittle 4X	Whittle 4X
Method	Lerchs-Grosmann (marginal cost cut-off analysis)	Lerchs-Grosmann (marginal cost cut-off analysis)
Modification		
Modifying factors		
– Geological loss (%)	0.0	0.0
– Dilution (%)	0.1	2.5
– Mining loss (%)	-3.3	0.0
– Mining recovery efficiency (%)	93.3	100.0
– Design recovery efficiency (%)	99.7	100.0
– Ore Reserves re-allocated to Mineral Resources (%)	-6.2	-3.9
– Metallurgical Yield (%) to convert to Saleable Product	95.8	97.3
Estimator		
Reserve estimator	Grant Crawley	Angelique Stoker
Reserve estimator status	Competent Person	Internal technical specialist
Estimator employer	RPMGlobal	Sishen Iron Ore Company (Pty) Ltd

ANCILLARY RESERVE AND RESOURCE INFORMATION PER OPERATION AND PROJECT CONTINUED

Mineral Resource ancillary information

The Kolomela mine Mineral Resource ancillary information is summarised in **Table 10a** (background information) and **Table 10b** (Leeuwfontein Mineral Resource estimation parameters – as an example).

TABLE 10A: **KOLOMELA MINE'S 2017 VS 2016 MINERAL RESOURCE BACKGROUND INFORMATION**

KOLOMELA MINE	2017	2016
LOCATION		
Country	Republic of South Africa	Republic of South Africa
Province	Northern Cape	Northern Cape
OWNERSHIP		
Sishen Iron Ore Company (Pty) Ltd	100	100
Kumba Iron Ore Limited	76.3	76.3
Anglo American plc	53.2	53.2
SECURITY OF TENURE		
Number of applicable mining rights	1	1
Mining right status	Registered	Registered
Mining right expiry date(s)	17 September 2038	17 September 2038
EXPLORATION STATUS		
Exploration type	Geological Confidence (in mine)	Geological Confidence (in mine)
Exploration phase	In Execution	In Execution
GOVERNANCE		
Code	THE SAMREC CODE – 2016 EDITION	THE SAMREC CODE – 2007 EDITION (as amended July 2009)
AA plc group technical standard	AA_GTS_22 (Reporting of Exploration Results, Mineral Resources and Ore Reserves in Anglo American)	
KIO reporting policy	http://www.angloamericankumba.com/sd_policies.php	http://www.angloamericankumba.com/sd_policies.php
KIO reporting protocols	KIOReportingProcedure(2015)	KIOReportingProcedure(2015)
	KIO Resource Classification Guideline (version 2)	KIO Resource Classification Guideline (version 2)
KIO reporting template	Mineral Resource (and Mineral Inventory) Reporting Template (2017)	KIO_R&R_Reporting_Template_082015
REPORTING METHOD		
Approach	Mineral Resources are reported exclusive of Ore Reserves and not factoring in attributable ownership and only if: (1) spatially modelled; (2) spatially classified; (3) spatially constrained in terms of reasonable and realistic prospects for eventual economic extraction (occurring within an RRPEEE defined envelope, in other words not all mineral occurrences are declared as Mineral Resources); (4) declared within (never outside) executed tenement boundaries.	
In situ metric tonnes (dry/wet)	Dry	Dry
Tonnage calculation	Tonnages are added from cells in geological block model of which the centroids intersect the relevant geological ore domains in the solids models which occur inside the resource shell. The volume of each ore cell is multiplied with the estimated relative density of the same cell).	Tonnages are added from cells in geological block model of which the centroids intersect the relevant geological ore domains in the solids models which occur inside the resource shell. The volume of each ore cell is multiplied with the estimated relative density of the same cell).
Fe grade	Weighted average above cut-off grade	Weighted average above cut-off grade
Fe calculation	Tonnage-weighted mean of the estimated *in situ* Mineral Resource Fe grades contained within geological block models, constrained by the relevant Resource geological ore domains and RRPEEE resource shell.	Tonnage-weighted mean of the estimated *in situ* Mineral Resource Fe grades contained within geological block models, constrained by the relevant Resource geological ore domains and RRPEEE resource shell.
Cut-off grade	50% Fe	50% Fe
Ore type	Haematite Ore	Haematite Ore

ANCILLARY RESERVE AND RESOURCE INFORMATION PER OPERATION AND PROJECT CONTINUED

TABLE 10B: **KOLOMELA MINE'S 2017 VS 2016 LEEUWFONTEIN MINERAL RESOURCE ESTIMATION PARAMETERS**
(as an example)

	2017	2016
ESTIMATION		
Leeuwfontein geological model		
Input data		
Borehole type	Core and Percussion borehole lithological logs and associated chemical analyses	
Relative density measurement	Picnometer analyses on pulp samples	Picnometer analyses on pulp samples
KIO QA/QC protocol	KIO QC Protocol for Exploration Drilling Sampling and Sub-sampling (version 7)	
Primary laboratory	ANGLO AMERICAN RESEARCH Division of Anglo Operations Limited CHEMISTRY LABORATORY (Co reg no: 1921/006730/07)	ANGLO AMERICAN RESEARCH Division of Anglo Operations Limited CHEMISTRY LABORATORY (Co reg no: 1921/006730/07)
Accreditation	Accredited under International Standard ISO/IEC 17025:2005 by the South African National Accreditation System (SANAS) under the Facility Accreditation Number T0051 (valid from 1 May 2016 to 30 April 2021)	Accredited under International Standard ISO/IEC 17025:2005 by the South African National Accreditation System (SANAS) under the Facility Accreditation Number T0051 (valid from 1 May 2011 to 30 April 2016)
Borehole database software	acQuire	acQuire
Borehole database update cut-off date	30 April 2016	30 April 2014
Database validation conducted	Yes	Yes
Segmentation conducted	Yes. To allow for simplification of logged lithologies for spatial correlation purposes	
STATISTICAL AND GEOSTATISTICAL EVALUATION		
Data compositing interval	1m	1m
Data compositing method	Length weighted average per lithology	Length weighted average per lithology
Grade parameters evaluated	% Fe, % SiO_2, % Al_2O_3, % K_2O, % S and % P as well as Relative Density	% Fe, % SiO_2, % Al_2O_3, % K_2O, % S and % P as well as Relative Density
Variography updated in current year	Yes	Yes
Search parameters updated in current year	Yes	Yes
SOLIDS MODELLING		
Solids modelling software	Leapfrog	Leapfrog
Input	Previous 3D explicit solids model	Previous 3D explicit solids model
Method	Implicit modelling for all domains	Implicit modelling for all domains
Domaining	Yes, by lithology and structural controls	Yes, by lithology and structural controls
Topography and pit progression assigned	31 December 2017 (planned pit boundary)	31 December 2016 (planned pit boundary)
Validation conducted	Yes (for gaps and overlaps by software queries as well as honouring of borehole contacts)	Yes (for gaps and overlaps by software queries as well as honouring of borehole contacts)

ANCILLARY RESERVE AND RESOURCE INFORMATION PER OPERATION AND PROJECT CONTINUED

TABLE 10B: **KOLOMELA MINE'S 2017 VS 2016 LEEUWFONTEIN MINERAL RESOURCE ESTIMATION PARAMETERS** (as an example) continued

	2017	2016
GRADE ESTIMATION METHODOLOGY		
Ore segments	Ordinary (Co-) Kriging	Ordinary (Co-) Kriging
Waste segments	Global estimate	Global estimate
GEOLOGICAL BLOCK MODELLING		
Block modelling software	Surpac	Surpac
Model type	Centroid Model	Centroid Model
Parent cell size	40m x40m x 10m (Kriging neighbourhood analyses)	40m x40m x 10m (Kriging neighbourhood analyses)
Minimum sub-block cell size	5m(X) x 5m(Y) x 5m(Z)	10m(X) x 10m(Y) x 5m(Z)
Cell population method		
Tonnage	Volume of lithology intersected by cell centroid and constrained by cell limits, multiplied with relative density estimate of the same lithology at same unique cell centroid position in space.	Volume of lithology intersected by cell centroid and constrained by cell limits, multiplied with relative density estimate of the same lithology at same unique cell centroid position in space.
Grade	Estimate of grade at unique cell centroid position in space applicable to total volume or tonnage constrained by the cell.	Estimate of grade at unique cell centroid position in space applicable to total volume or tonnage constrained by the cell.
Updated geological block model ID (file name + extension)	lf022017_v5a	lf022016c.mdl
Update completion date	17 February 2017	28 February 2016
ESTIMATOR		
Resource estimator (name and surname)	Fanie Nel	Fanie Nel
Resource estimator status (internal Competent Person/internal technical specialist/external Competent Person/ external technical specialist)	Internal technical specialist	Internal technical specialist
Estimator employer	Sishen Iron Ore Company (Pty) Ltd	Sishen Iron Ore Company (Pty) Ltd

ANCILLARY RESERVE AND RESOURCE INFORMATION PER OPERATION AND PROJECT CONTINUED

SISHEN MINE

GEOLOGICAL OUTLINE

Regional geology

Please see Kolomela mine "Regional geology" section.

Stratigraphy

The carbonates of the Campbell Rand Subgroup are separated from the overlying Banded Iron Formation (BIF) of the Asbestos Hills Subgroup by a siliceous, residual breccia. This breccia is known locally as the Wolhaarkop Breccia and is developed on an irregular, karst surface.

The BIFs of the Asbestos Hills Subgroup are characteristically fractured and brecciated, especially near the contact with the Wolhaarkop Breccia. Both upper and lower contacts are erosion surfaces and together with the lack of easily identifiable marker horizons, make correlation of individual beds virtually impossible.

A highly altered, slickensided, intrusive sill is commonly found separating the BIF from the overlying laminated ore. At Sishen mine it is generally less than 2m thick. The sill is invariably folded into the basinal geometry and only rarely crosscuts (intrudes) the ore bodies.

At the Sishen deposit, the upper parts of the Asbestos Hills Subgroup have been ferruginised to ore grade. These stratiform, laminated and massive ores constitute the bulk of the resource. The laminated and massive ores are commonly folded and faulted into basinal and pseudo-graben structures.

Deep palaeo-sinkholes, filled with brecciated ore and Gamagara sedimentary rocks, are found on the southern parts of the Sishen properties. The sinkholes are restricted to antiformal structures close to the Maremane Dome on the southern portions of the mine. They are an important mechanism for preserving collapse breccia ore.

They are unconformably overlain by a thick package of sedimentary rocks (conglomerates, shales, flagstone and quartzite) termed the Gamagara Subgroup (S.A.C.S., 1995). Many researchers including Beukes and Smit (1987) and Moore (pers. comm.) have correlated this unit with the Mapedi Formation, which constitutes the lowermost unit of the Olifantshoek Supergroup. The Olifantshoek Supergroup is the oldest recognised red-bed sequence in the region. It is some 400Ma younger than the Transvaal Supergroup.

Conglomerates of ore-grade with well-rounded clasts and fine-grained, well-sorted, gritty ores are common at Sishen mine. Partly ferruginised shales, interbedded with ore conglomerates and thick flagstones are also a feature of the Gamagara Subgroup.

Along the western margin of Sishen mine, diamictite of the Makganyene Formation and lavas of the Ongeluk Formation have been thrust over the sedimentary rocks of the Gamagara Subgroup. The diamictite and lava have been eroded by later events. Tillite of the Dwyka Group and pebble beds, clay and calcrete of the Kalahari Group, have been deposited on these erosional unconformities.

A few thin, diabase dykes with north-south and northeast-southwest orientations, have intruded the stratigraphic sequence. They form impervious barriers and compartmentalise the groundwater.

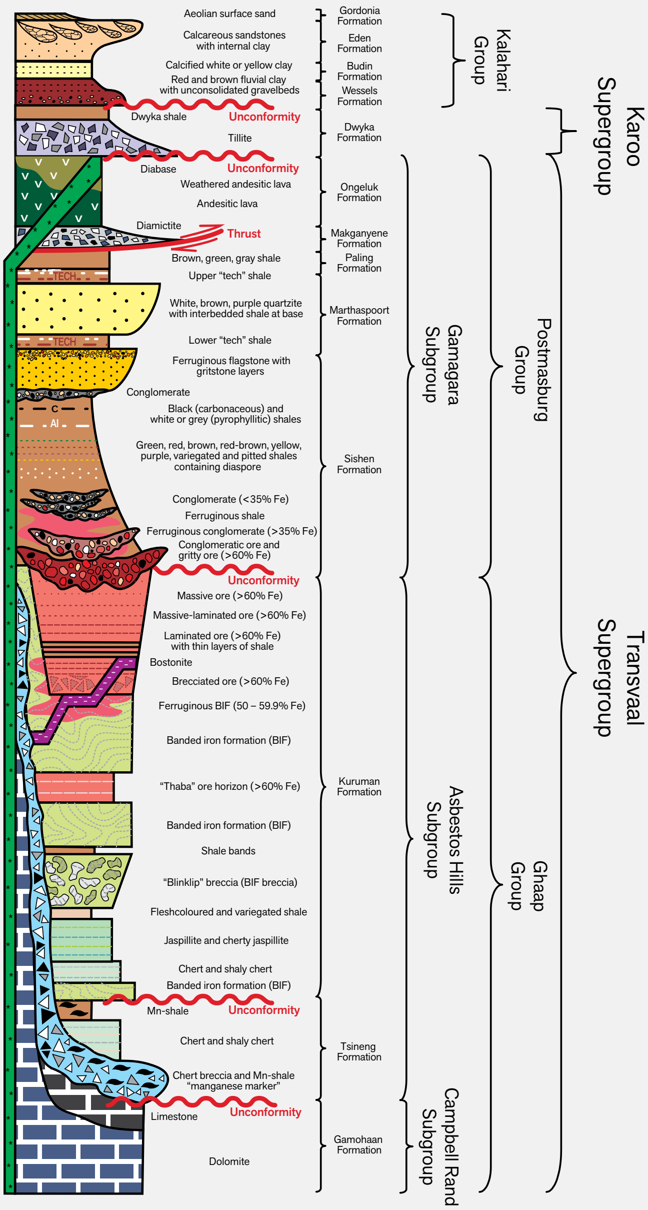
A buried glacial valley, filled with Dwyka tillite and mudstones has been identified with reconnaissance drilling. The valley is located between the mine and Kathu. It has a north-south orientation that changes to northwest-southeast between Dibeng and the mine. The valley does not fall within the planned open pit.

The Kalahari Group comprises boulder beds, clays, calcrete, dolocrete and windblown sands. The Kalahari Group is developed to a maximum thickness of 60m. The clay beds at Sishen can attain a thickness of up to 30m on the northern parts of the deposit. The Kalahari beds of calcrete, limestone and clay and Quaternary sand and detritus, blanket more than 90% of the Sishen mining area.

A generalised version of the Sishen mine stratigraphy is depicted in **Figure 15**.

ANCILLARY RESERVE AND RESOURCE INFORMATION PER OPERATION AND PROJECT CONTINUED

FIGURE 15: **DETAILED STRATIGRAPHIC COLUMN DEPICTING THE SISHEN LOCAL GEOLOGY**



Citation: Venter, L.J., Deacon, J. (2017) Sishen detailed stratigraphic succession, internal company presentation, Kumba Iron Ore.

Tectonic setting

Structural studies by Stowe (1986), Altermann and Hälbich (1991) and Hälbich et al (1993) concluded that the lower Transvaal Supergroup exhibits at least three major phases of compressional tectonism at the western edge of the Kaapvaal Craton. The overall number of events may be significantly higher; for example, Altermann and Hälbich (1991) suggested that there were seven events. The development of this part of the Kaapvaal Craton is summarised below, in chronological order and using current azimuths, from Stowe (1986), Altermann and Hälbich (1991), Hälbich et al (1993), Friese (2007a, b) and Friese and Alchin (2007):

– ~2.78 to 2.64Ga: Ventersdorp rift basin development. NE-SW-trending faults, which formed graben boundaries, developed due to basin initiation and subsidence;
– ~2.64 to 2.6Ga: Extrusion and deposition of the volcano sedimentary Vryburg Formation and Ventersdorp lavas;
– ~2.60 to 2.52Ga: Development of a carbonate platform, during widespread marine transgression; consequent conformable deposition of the Schmidtsdrif and Campbell Rand Subgroup dolomites;
– ~2.52 to 2.46Ga: Off-craton/oceanic rifting to the west, accompanied by hydrothermal deposition of manganiferous chert of the Wolhaarkop Formation. This was followed by deposition of the Asbestos Hill Subgroup (banded iron formation/ Kuruman Formation);
– ~2.46 to 2.35Ga: Incipient break-up and rifting, along a set of N-S-trending, W-dipping normal faults in the Kaapvaal Craton during a "second extensional stage" (Friese and Alchin, 2007). According to Dalstra and Rosière (2008), "E1" or their first extensional event occurred immediately before the "Kalahari Orogeny";
– ~2.35 to 2.25Ga: The first phase of folding (F1) resulted from the E-verging "Kalahari Orogeny". Altermann and Hälbich (1991) cite the >2.24Ga or pre-Makganyene development of the Uitkomst cataclasite as part of this event, which they attribute to a bedding-parallel thrust. F1 folds were predominantly N-S-trending; therefore the main axis of the Maremane Dome is effectively a 2.35 to 2.25Ga F1 anticline or an F2-tightened F1 anticline. Pre-existing, predominantly rift-related normal faults were inverted and underwent a component of strike-slip reactivation, concomitant with this eastwards tectonic vergence; their adjacent, uplifted blocks were eroded. An additional feature of this event appears to be the formation of conjugate NE- and SE-trending

ANCILLARY RESERVE AND RESOURCE INFORMATION PER OPERATION AND PROJECT CONTINUED

strike-slip faults which are radially distributed around the eastern curve of the Maremane Dome. This orogeny also caused uplift and erosion of underlying units, including the Ghaap Group, to form the Postmasburg Unconformity, which is pivotal in regional ore development and/or preservation. The deposition of the Makganyene Formation of the Lower Postmasburg Group, which has a minimum age of 2.22Ga, probably resulted from this event;

- ~2.24 to 1.83Ga: Reactivation of faults related to both the N-S-trending passive margin rift and the Ventersdorp Rift, causing deposition of the fault-controlled or fault-bounded, volcano-sedimentary/volcanoclastic Upper Postmasburg Group. Ongeluk lavas signify the peak of mafic lava extrusion at c. ~2.22Ga, via feeder dykes that exploited reactivated NNE- to NE-trending faults (Friese and Alchin, 2007; **Figure 1**). Dalstra and Rosière (2008) correctly inferred that dykes locally recrystallised ores. Within this interval, deposition of clastic sediments in the form of conglomerate, "grit", quartzite and shale of the lower Olifantshoek Supergroup took place at ~2.05 to 1.93Ga, thereby forming and terminating the deposition of the Gamagara/Mapedi Formation, which formed within a shallow-water rift environment (Beukes, 1983). The second extensional event or "E2" of Dalstra and Rosière (2008) occurred during or shortly after this period, as reactivated normal faults displaced or offset the lower Olifantshoek Group, although such structures tend to pre-date the Kheis Orogeny (see below). Apparently overlapping in age with this extensional event is the formation of south-verging folds and thrusts, which, according to Altermann and Hälbich (1991), are the oldest post-Matsap event at 2.07 to 1.88Ga;
- ~1.83 to 1.73Ga; The Kheis Orogeny or tectono-metamorphic event, like the Kalahari Orogeny, showed eastward tectonic vergence that was accompanied by thrusting and folding (Stowe, 1986; Beukes and Smit, 1987; Altermann and Hälbich, 1991; Hälbich et al, 1993). The Kheis Orogeny is more precisely dated at ~1780 Ma, using a 39Ar to 40Ar metamorphic age derived from the Groblershoek Schist Formation of the Olifantshoek Supergroup (Schlegel, 1988). Rift structures of the Postmasburg Group and Olifantshoek Supergroup depositional settings were reactivated while F2 folding and thin-skinned thrusting occurred along major unconformities and lithological contacts. In some areas, F1 folds were tightened co-axially during F2 folding. In the Sishen area, thrusting was concentrated at the shale-dominated, tectonised margins of a quartzite member within the upper Olifantshoek Group; these horizons are termed "tectonised shale" in drill core, although this sequence appears to be very poorly developed at the Heuningkranz prospect. Friese (2007a, b) and Friese and Alchin (2007) have termed these and other low-angle thrusts "principal décollements", and
- ~1.15 to 1.0Ga: The NNW-directed Lomanian (Namaqua-Natal) Orogeny caused deformation along the southern margin of the Kaapvaal Craton. The effects of this were manifold: reactivation and buckling of N-S-trending normal and inverted normal faults, reactivation of the 2.35 to 2.24Ga NE- and SE-trending conjugate strike-slip faults, usually with upthrow to the SE and SW, respectively, the development of ENE-trending F3 folds, which may have contributed to broad F2/F3 fold interference patterns (q.v. Mortimer, 1994, 1995). This may also have contributed to the geometry of the Maremane Dome, which is effectively a large-scale "Ramsay style" interference fold with a radial set of fractures/faults, in which conjugate relationships may still be observed **(Figure 1)**. The Dimoten and Ongeluk-Witwater Synclines, wherein the Postmasburg Group is preserved, are situated towards the eastern foreland of the Maremane Dome.

It has been suggested that the interference or intersection of F2 synclines and F3 synclines has resulted in deep, steep-sided, circular or ovoid depressions in which ore (and banded iron formation) is notably thicker (eg Mortimer, 1994; 1995). This must be weighed against other models which suggest that areas of very thick, deep ore occupy palaeo-sinkholes, ie occur within palaeokarst topography within the Campbell Rand Subgroup (Beukes et al, 2002).

A third model is that of Dalstra and Rosière (2008), which advocates a close association between structures and mineralisation and/or between structures and the preservation of mineralisation. Due to the complex structural and stratigraphic evolution of the area, it is entirely possible that there is a component of all three mechanisms present in a given deposit, albeit substantially complicated by variable preservation.

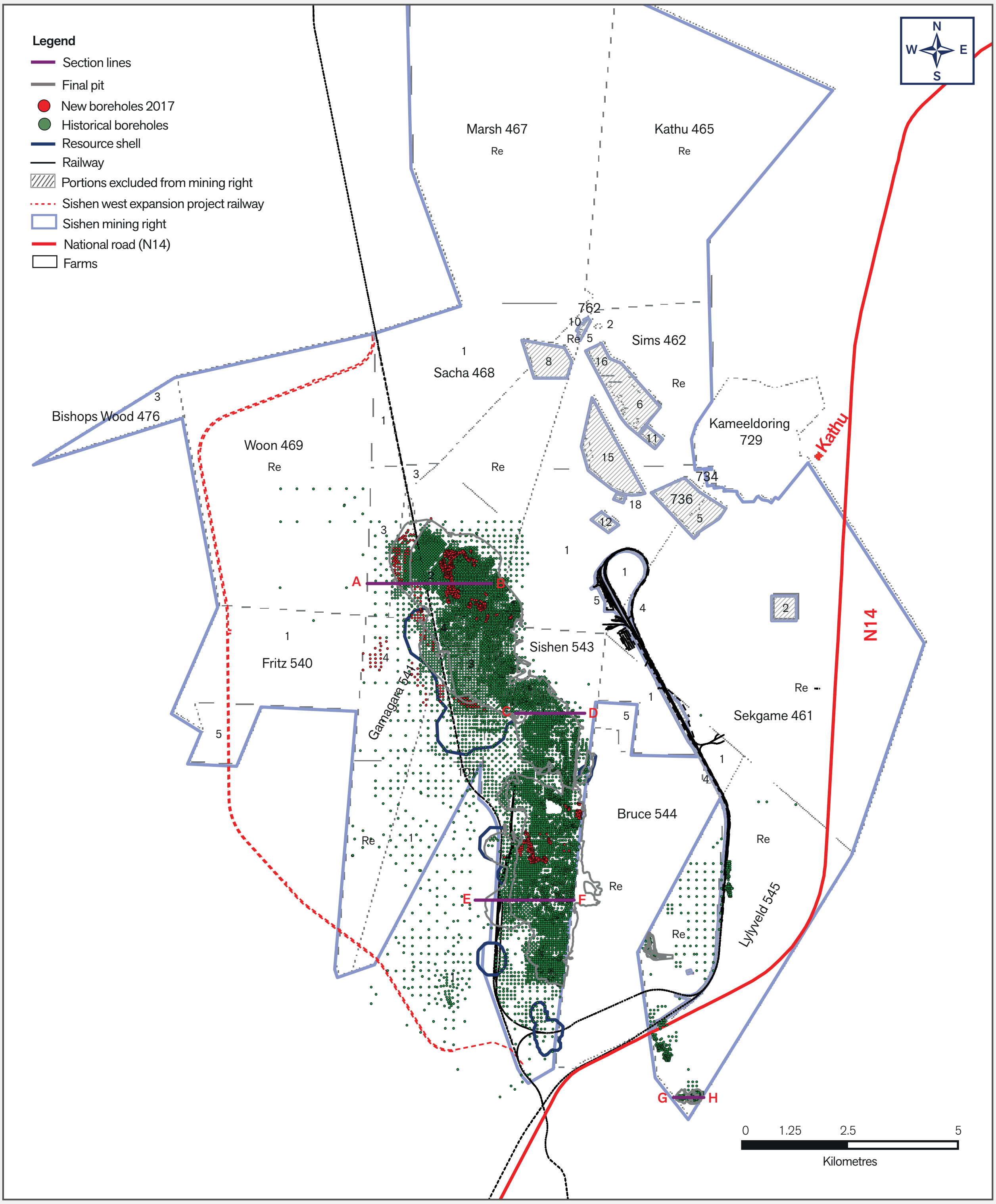
Subsequent tectonism, including the breakup of Gondwana and Pan-African reworking, had only a minor effect on the modelled volume. Regionally, Bushveld-age gabbroic rocks intruded into the Ghaap and Postmasburg Groups within a clearly-defined NE-trending graben, essentially accommodated by the reactivation of Ventersdorp faults (Friese and Alchin, 2007).

Local geology

A total of 15,682 core, reverse-circulation and percussion exploration drill holes (approximately 1,600,000m) have been drilled at the operation, resulting in a highly developed understanding of the mineral asset **(Figure 16)**.

ANCILLARY RESERVE AND RESOURCE INFORMATION PER OPERATION AND PROJECT CONTINUED

FIGURE 16: **SISHEN MINING RIGHT AREA NEAR THE TOWN OF KATHU IN THE NORTHERN CAPE PROVINCE (BOREHOLES SUNK IN 2017 INDICATED IN RED DOTS)**



ANCILLARY RESERVE AND RESOURCE INFORMATION PER OPERATION AND PROJECT CONTINUED

Sishen mine is situated on the northern extremity of the Maremane anticline. At this location the lithologies strike north-south and plunge from the centre of the anticline in a northerly direction. The bulk of the resource comprises high-grade, laminated and massive ores belonging to the Asbestos Hills Subgroup.

The ore bodies are intensely folded and faulted. Dips vary according to local structures, but at Sishen, a regional dip of 11° in a westerly direction prevails.

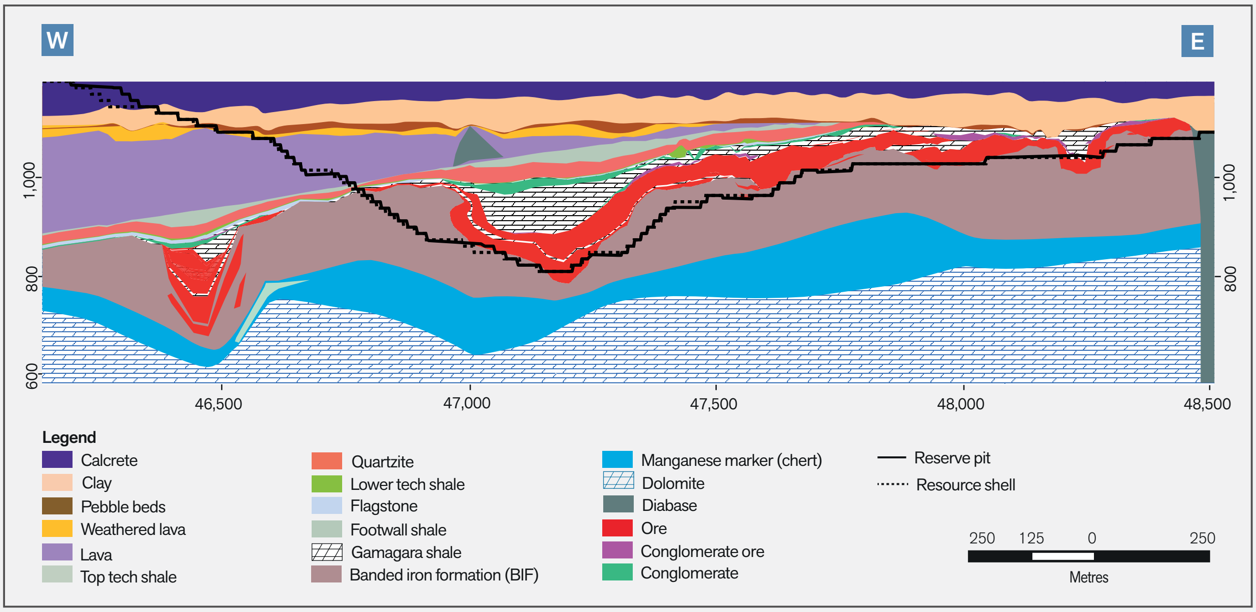
The geometry of the lithologies are depicted via cross-sections (referenced in **Figure 16**) taken through the latest three-dimensional Sishen geological model:

- **Figure 17** is a west-east section through the Sishen north mine area, while **Figure 18** depicts the spatial geological confidence classification of the ferruginised portions of the lithology for the same cross-section.
- **Figure 19** is a west-east section through the Sishen middle mine area, while **Figure 20** depicts the spatial geological confidence classification of the ferruginised portions of the lithology for the same cross-section.
- **Figure 21** is a west-east section through the Sishen south mine area, while **Figure 22** depicts the spatial geological confidence classification of the ferruginised portions of the lithology for the same cross-section.
- **Figure 23** is a west-east section through the Lylyveld satellite mine area, while **Figure 24** depicts the spatial geological confidence classification of the ferruginised portions of the lithology for the same cross-section.

It can be noticed in some of these figures that the pit layout boundaries in some instances exceeds the resource shell in size. This is possible where during pit optimisation ore geology is the limiting factor and not economic viability, and when the pit shell is engineered into a safe pit layout or design, the layout boundaries in some areas exceed the resource shell.

Also, the vertical scale has been exaggerated in all the cross sections, for better illustrative purposes, resulting in ore body dip angles appearing steeper than actual.

FIGURE 17: **WEST-EAST CROSS-SECTION (RED LINE IN FIGURE 16) DEPICTING THE LOCAL GEOLOGY THROUGH THE SISHEN NORTH MINE AREA**



ANCILLARY RESERVE AND RESOURCE INFORMATION PER OPERATION AND PROJECT CONTINUED

FIGURE 18: **WEST-EAST CROSS-SECTION DEPICTING THE GEOLOGICAL CONFIDENCE CLASSIFICATION ASSOCIATED WITH THE GRADE ESTIMATES AND GEOLOGICAL CONTINUITY INTERPRETATIONS OF THE VARIOUS ORE BODIES (EXCLUDING WASTE) THROUGH THE SISHEN NORTH MINE AREA**

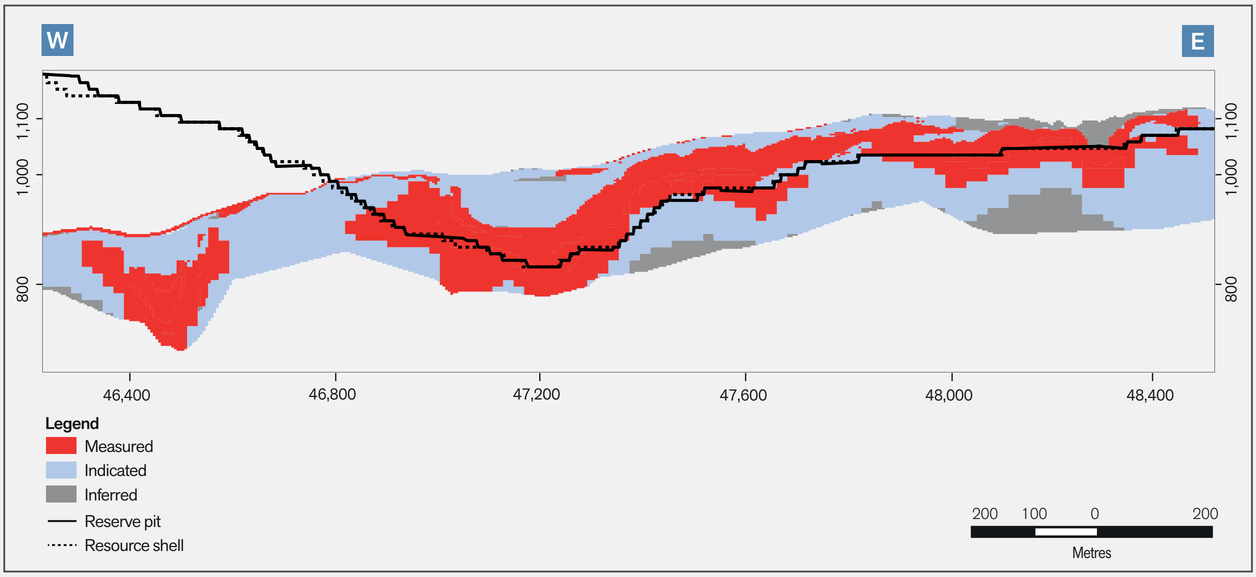
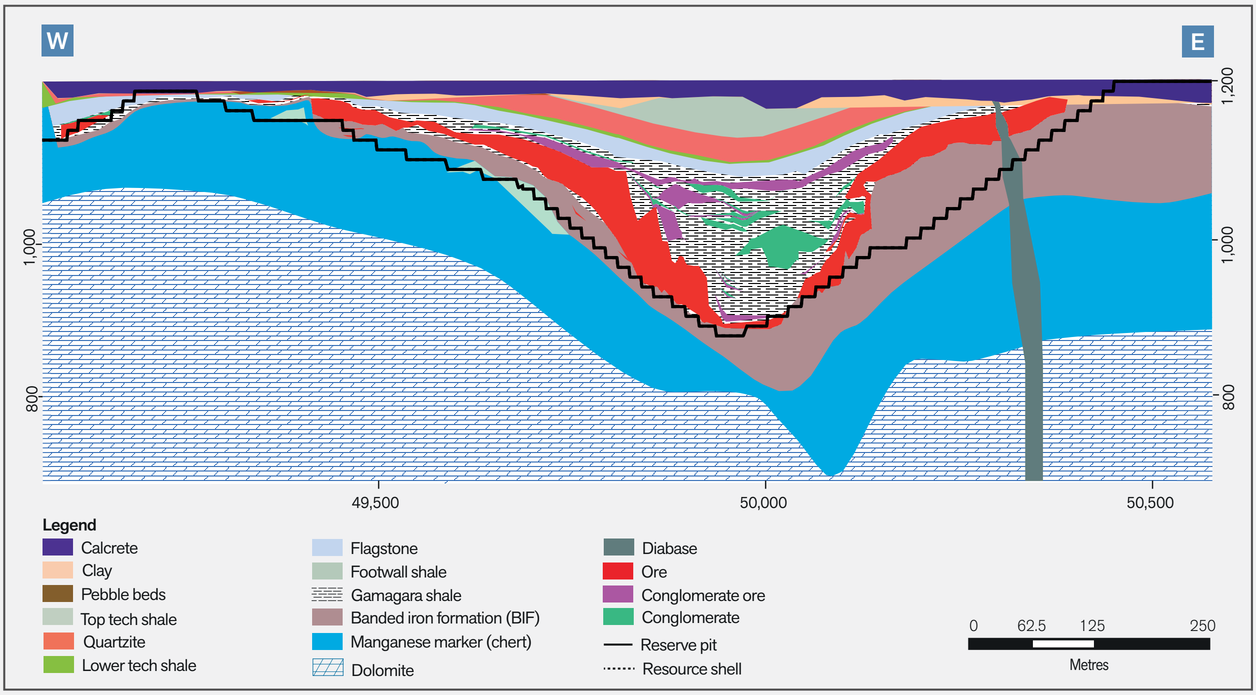


FIGURE 19: **WEST-EAST PROFILE (PURPLE LINE IN FIGURE 16) DEPICTING THE LOCAL GEOLOGY THROUGH THE SISHEN MIDDLE MINE AREA**



ANCILLARY RESERVE AND RESOURCE INFORMATION PER OPERATION AND PROJECT CONTINUED

FIGURE 20: **WEST-EAST PROFILE DEPICTING THE GEOLOGICAL CONFIDENCE CLASSIFICATION ASSOCIATED WITH THE GRADE ESTIMATES AND GEOLOGICAL CONTINUITY INTERPRETATIONS OF THE VARIOUS ORE BODIES (EXCLUDING WASTE) THROUGH THE SISHEN MIDDLE MINE AREA**

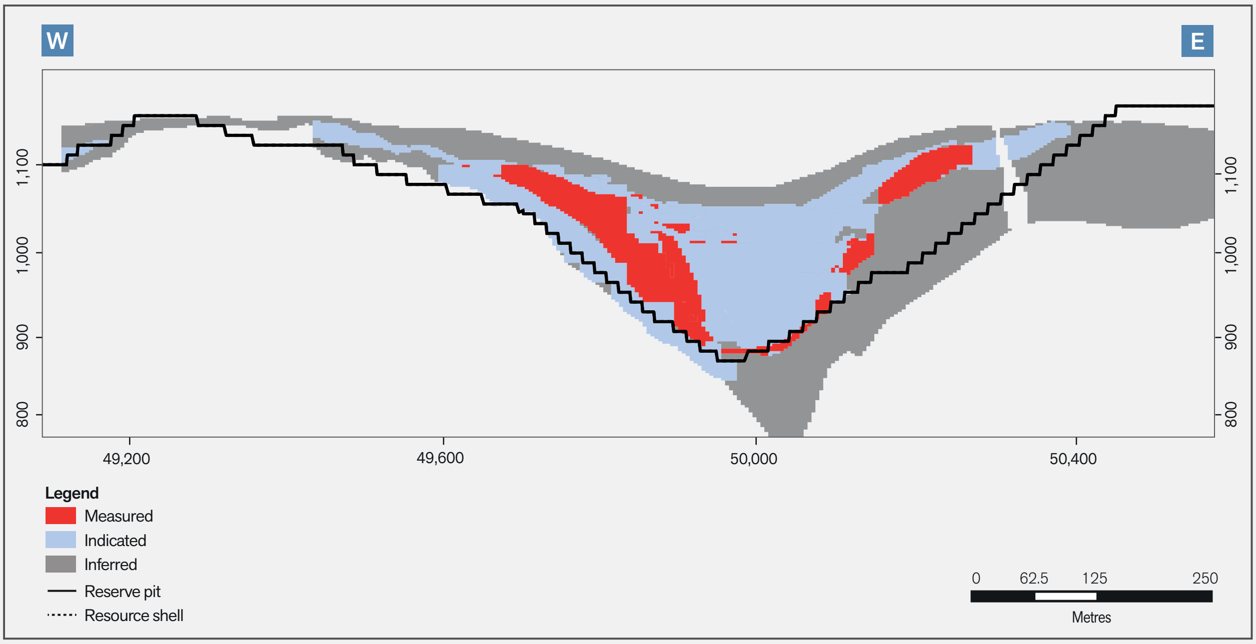
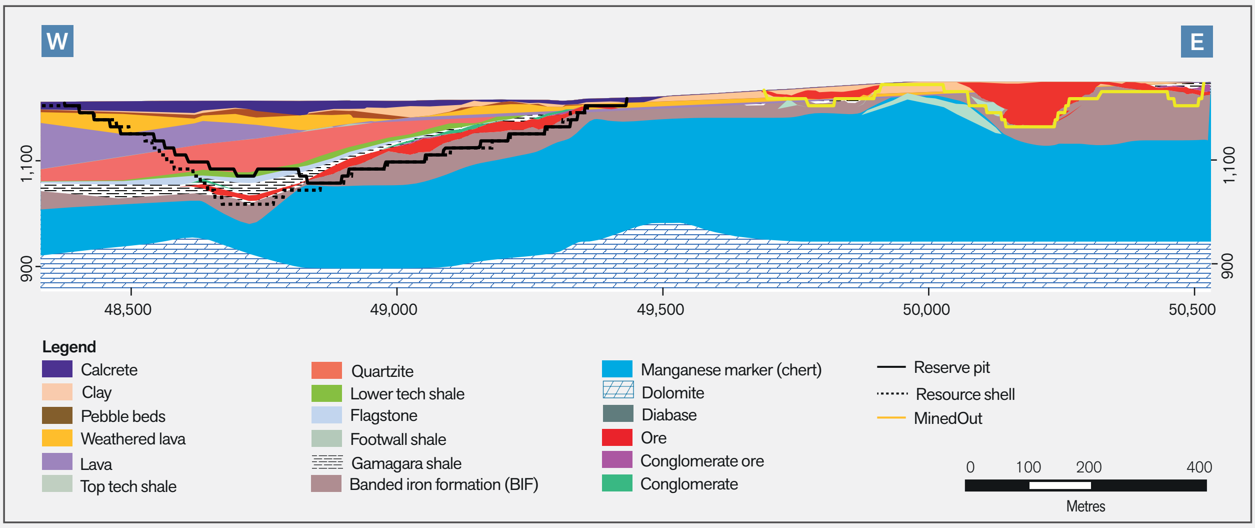


FIGURE 21: **WEST-EAST PROFILE (BLUE LINE IN FIGURE 16) DEPICTING THE LOCAL GEOLOGY THROUGH THE SISHEN SOUTH MINE AREA**



ANCILLARY RESERVE AND RESOURCE INFORMATION PER OPERATION AND PROJECT CONTINUED

FIGURE 22: **WEST-EAST PROFILE DEPICTING THE GEOLOGICAL CONFIDENCE CLASSIFICATION ASSOCIATED WITH THE GRADE ESTIMATES AND GEOLOGICAL CONTINUITY INTERPRETATIONS OF THE VARIOUS ORE BODIES (EXCLUDING WASTE) THROUGH THE SISHEN SOUTH MINE AREA**

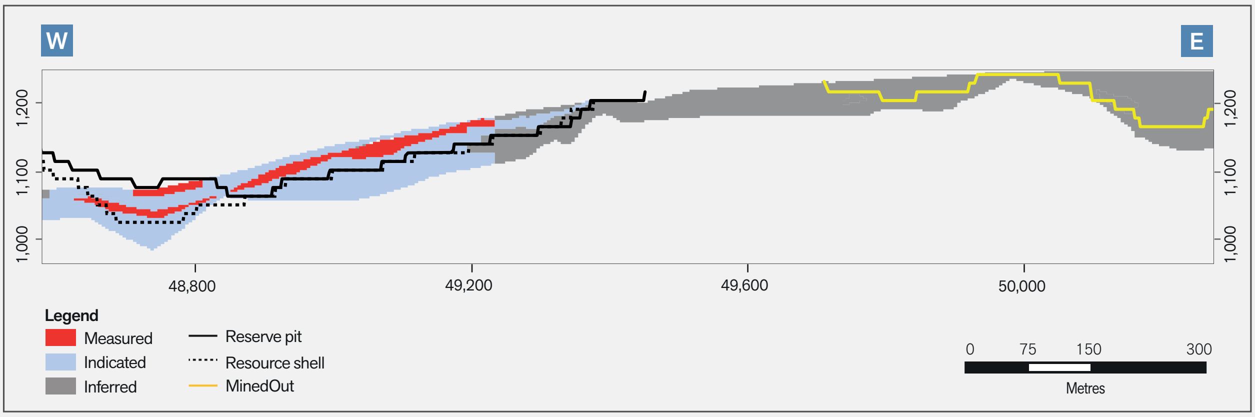
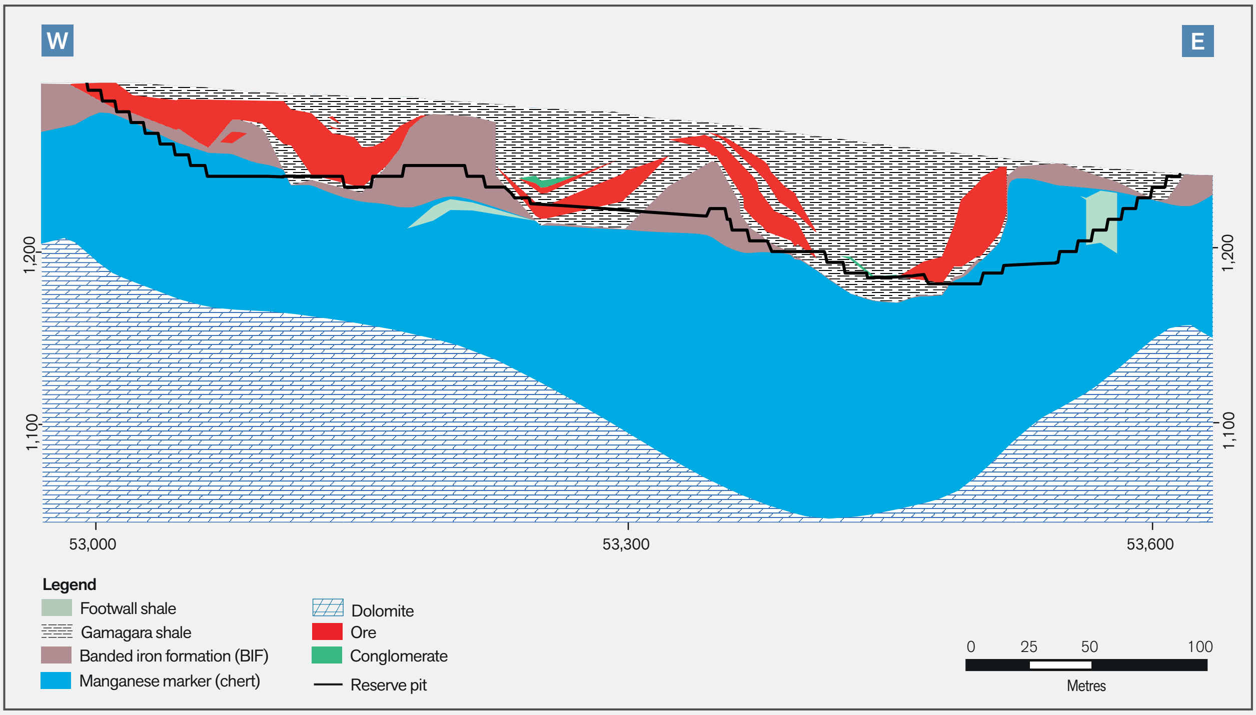
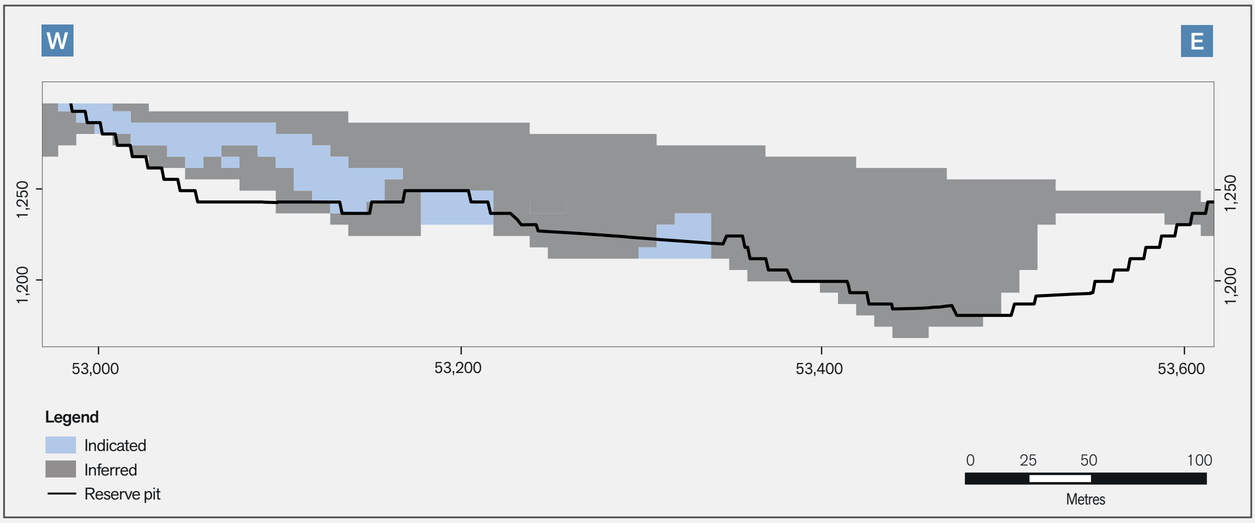


FIGURE 23: **WEST-EAST PROFILE (YELLOW LINE IN FIGURE 16) DEPICTING THE LOCAL GEOLOGY THROUGH THE LYLYVELD SATELLITE MINE AREA**



ANCILLARY RESERVE AND RESOURCE INFORMATION PER OPERATION AND PROJECT CONTINUED

FIGURE 24: **WEST-EAST PROFILE DEPICTING THE GEOLOGICAL CONFIDENCE CLASSIFICATION ASSOCIATED WITH THE GRADE ESTIMATES AND GEOLOGICAL CONTINUITY INTERPRETATIONS OF THE VARIOUS ORE BODIES (EXCLUDING WASTE) THROUGH THE LYLYVELD SATELLITE MINE AREA**



Operational outline

Sishen mine currently comprises a conventional truck and shovel open-pit operation, processing run-of-mine (RoM) material through two processing facilities: A dense media separation (DMS) plant and a Jig plant that includes a modular ultra-high dense medium separation (UHDMS) facility on a portion of the Jig plant discard stream. The combined RoM capacity of the processing facilities is currently 47 Mtpa (26 Mtpa for the DMS plant and 21 Mtpa for the Jig plant), which relates to a 34.6 Mtpa Saleable Product output design capacity.

The current mining process entails topsoil removal and stockpiling for later use during the waste dump rehabilitation process, followed by drilling and blasting of waste and ore. The waste material is in-pit dumped where such areas are available, or hauled to waste rock dumps. The iron ore is loaded according to blend (grade) requirements and transported to the beneficiation plants, where it is crushed, screened and beneficiated. The screened ore size fractions are beneficiated using ferrosilicon (DMS or UHDMS) or through a jigging process before being stockpiled on the product beds. Plant slimes are not beneficiated and are pumped to evaporation dams while the DMS, Jig and UHDMS discard material is stacked on a plant discard dump.

Seven iron ore products (conforming to different chemical and physical specifications) are produced. The ores are reclaimed from the product beds and loaded into trains, to be transported to local steel mills and Saldanha Bay for export to international markets. Kumba has an agreement with ArcelorMittal to supply them domestically with a maximum of 6.25 Mtpa of Saleable Product of which a maximum of 1.8 Mtpa is to be delivered to Saldanha Steel. The remainder of the production is exported via the Saldanha Port to various international steel markets.

Sishen mine's key operational parameters are summarised in **Table 11**.

ANCILLARY RESERVE AND RESOURCE INFORMATION PER OPERATION AND PROJECT CONTINUED

TABLE 11: **SISHEN MINE OPERATIONAL OUTLINE SUMMARY**

	Key details
Ownership (AA plc)	53.2%
Ownership (KIO)	76.3%
Commodity	Iron Ore
Country	Republic of South Africa
Mining method	Open pit – Conventional
Reserve Life*	13 years
Estimated Saleable Product Lump:Fine Ratio	69:31
Saleable Product design capacity	34.7 Mt
Estimated 2017 run-of-mine production	44.1 Mt
Estimated 2017 Saleable Product	31.6 Mt
Estimated 2017 waste production	162.0 Mt
Overall planned stripping ratio	1:3.89
Estimated product sold in 2017	31.0 Mt
Product types	Primarily lump – 69% of products (63.2 – 65.2% Fe), fines (63.2 – 64.4% Fe). In total seven Lump and Fine Product Types of varying grade is produced
Mining right expiry date	10 November 2039

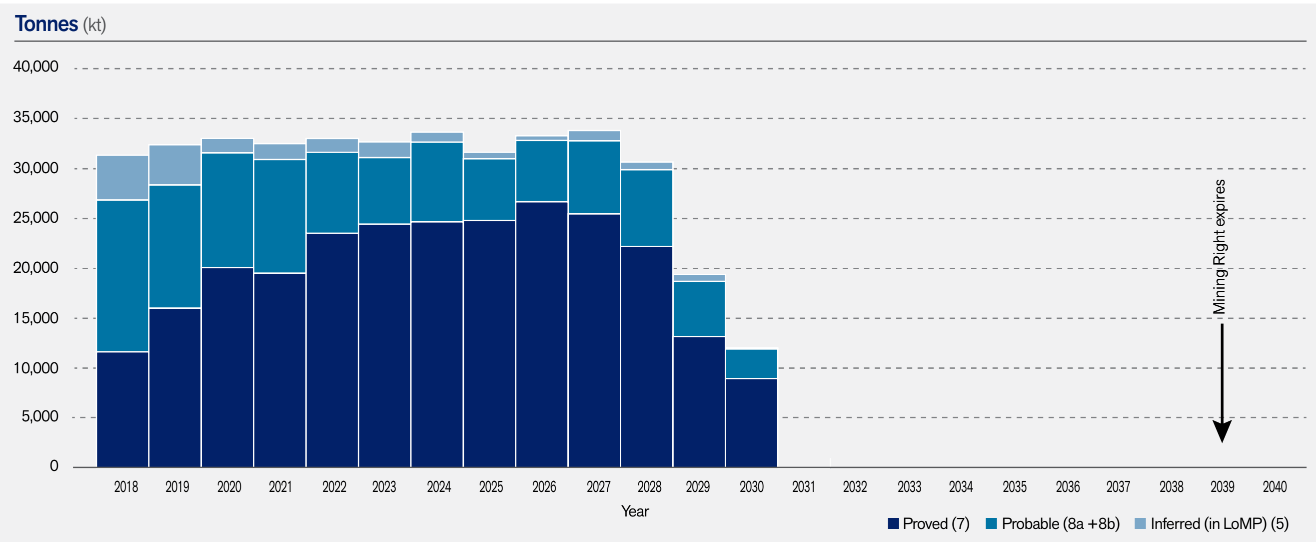
* Reserve Life includes all consecutive years in the life-of-mine plan where the Proved and Probable Ore Reserves makes up >25% of the year's run-of-mine.

The total tonnes extracted from the pit at Sishen mine increased by 12% from 178.3 Mt in 2016 to 198.9 Mt in 2017, of which ex-pit waste mined in 2017 equates to 162.0 Mt, with ex-pit ore equating to 36.9 Mt, as estimated at the time of reporting. Total run-of-mine production at Sishen mine has increased by 11% from 38.1 Mt in 2016 to an estimated 44.1 Mt (including 5.0 Mt Inferred Mineral Resources as well as 7.3 Mt of Ore Reserves from buffer stockpiles). The resulting Saleable Product is estimated at 31.6 Mt at an average annual yield of 71.6%.

The forecast sales for 2017 are 31.0 Mt.

The Sishen mine 2017 life-of-mine plan Saleable Product profile is depicted in **Figure 25**.

FIGURE 25: **SISHEN MINE'S 2017 LIFE-OF-MINE PLAN ANNUAL SALEABLE PRODUCT PROFILE** (including modified Inferred Mineral Resources)



Ore Reserve ancillary information

The Sishen mine Ore Reserve ancillary information is summarised in **Table 12a** (background information) and **Table 12b** (Main Pit Ore Reserve estimation parameters – as an example).

ANCILLARY RESERVE AND RESOURCE INFORMATION PER OPERATION AND PROJECT CONTINUED

TABLE 12A: **SISHEN MINE'S 2017 VS 2016 MINERAL RESOURCE BACKGROUND INFORMATION**

SISHEN MINE	**2017**	2016
LOCATION		
Country	Republic of South Africa	Republic of South Africa
Province	Northern Cape	Northern Cape
OWNERSHIP		
Sishen Iron Ore Company (Pty) Ltd	100%	100%
Kumba Iron Ore Limited	76.3%	76.3%
AA plc	53.2%	53.2%
OPERATIONAL STATUS		
Operation status		
(Ramp-up, steady-state, ramp-down, care and maintenance, dormant)	Ramp-up	Steady-state
Mining method		
(Opencast, underground)	Opencast (conventional drilling and blasting and truck and shovel operation)	Opencast (conventional drilling and blasting and truck and shovel operation)
Beneficiation method	Dense media separation, jig beneficiation and ultra high dense media separation	Dense media separation and jig beneficiation
Annual Saleable Product (Mtpa)	32.0	26.8
Annual supply to domestic market (Mtpa)	4.0	4.0
Annual supply to export market (Mtpa)	28.0	22.83
Number of products	7 product types varying in size and chemical specification according to client requirements	7 product types varying in size and chemical specification according to client requirements
GOVERNANCE		
Code	THE SAMREC CODE – 2016 EDITION	THE SAMREC CODE – 2007 EDITION (as amended July 2009)
AA plc group technical standard	AA_GTS_22 (Reporting of Exploration Results, Mineral Resources and Ore Reserves in Anglo American)	
KIO reporting policy	http://www.angloamericankumba.com/sd_policies.php	http://www.angloamericankumba.com/sd_policies.php
KIO reporting protocols	KIOReportingProcedure(2015)	KIOReportingProcedure(2015)
	KIO Reserve Classification Guideline (version 1)	KIO Reserve Classification Guideline (version 1)
KIO reporting template	Ore Reserve (and Saleable Product) Reporting Template (2017)	Ore Reserve (and Saleable Product) Reporting Template (2016)
REPORTING METHOD		
Approach	Ore Reserves are those derived from Measured and Indicated Mineral Resources only (through application of modifying factors) and do not include Inferred Mineral Resources. In the case of Kumba Iron Ore all Ore Reserves are constrained by practical pit layouts, mining engineered from pit shells that define 'current economically mineable'. The geological block model(s) is converted into a mining block model considering a site-specific practical mineable smallest mining unit. Furthermore protocols ensure that Kumba Iron Ore's operations/projects consider expected long-term revenues versus the operating and production costs associated with mining and beneficiation as well as legislative, environmental and social costs, in determining whether or not a Mineral Resource could be economically extracted and converted to an Ore Reserve. This is performed by applying a Lerchs-Grosmann algorithm to the mining model to derive an optimised pit shell. This optimised pit shell is then iteratively converted to a practical layout by applying geotechnical slope stability parameters and haul road and ramp designs, legal restrictions etc, with safety being one of the most considered parameters. Once a practical pit layout has been established the material within the pit is scheduled over time to achieve client specifications and thus a LoM schedule is produced. The average % Fe grade and metric tonnage estimates of 'saleable product' are also reported to demonstrate that beneficiation losses have been taken into account.	

ANCILLARY RESERVE AND RESOURCE INFORMATION PER OPERATION AND PROJECT CONTINUED

TABLE 12A: **SISHEN MINE'S 2017 VS 2016 MINERAL RESOURCE BACKGROUND INFORMATION CONTINUED**

SISHEN MINE	**2017**	2016
REPORTING METHOD continued		
Scheduled run-of-mine metric tonnes (dry wet)	Dry	Dry
Tonnage calculation	Tonnages are calculated from the life-of-mine schedule, originating from the mining block models, and are modified tonnages considering geological losses. The effect of dilution, mining losses, mining recovery efficiencies and design recovery efficiencies to derive the run-of-mine tonnages delivered to the beneficiation plants.	Tonnages are calculated from the life-of-mine schedule, originating from the mining block models, and are modified tonnages considering geological losses. The effect of dilution, mining losses, mining recovery efficiencies and design recovery efficiencies to derive the run-of-mine tonnages delivered to the beneficiation plants.
Fe grade	Ore Reserve % Fe grades reported, represent the weighted average grade of the 'plant feed' or 'run-of-mine' (RoM) material and take into account all applicable modifying factors.	Ore Reserve % Fe grades reported, represent the weighted average grade of the 'plant feed' or 'run-of-mine' (RoM) material and take into account all applicable modifying factors.
Cut-off grade (Fe)	40.0%	40.0%
Ore type	Haematite Ore	Haematite Ore
Saleable Product selling unit	Iron Ore – Fe (US$/tonne)	Iron Ore – Fe (US$/tonne)
Life-of-mine scheduling		
Software	OPMS	OPMS
Method	Product tonnage and grade target driven to achieve required client product specifications	Product tonnage and grade target driven to achieve required client product specifications
Stripping strategy	A stripping strategy that follows a constant annual tonnage target, which remains between the minimum and maximum stripping limits, were chosen for the LoM scheduling. A deferred waste stripping strategy was applied to save costs in the medium term.	A stripping strategy that follows a constant annual tonnage target, which remains between the minimum and maximum stripping limits, were chosen for the LoM scheduling. A deferred waste stripping strategy was applied to save costs in the medium term.
Reserve Life years	13	17
LoM Plan run-of-mine tonnes (including modified Inferred) (expressed in million tonnes)	526.7	593.9
Overall average stripping ratio (including Inferred Mineral Resources)	1.0 : 3.9	1.0 : 3.9
Production data cut-off date (date whereafter short-term plan instead of actual figures are used to estimate the annual run-of-mine and Saleable Product production for the mine until 31 December of year of reporting)	30 September 2017	30 September 2016
Topography and pit progression assigned	31 December 2017	31 December 2016 (Planned)
Reserve schedule ID (Schedule file name + extension)	Sishen_2017_LOM_Base_Case	Sishen_2016_LOM_160_clay_bf_June_dms19_lyly.opme
Reserve schedule completion date	31 August 2017	8 July 2016

ANCILLARY RESERVE AND RESOURCE INFORMATION PER OPERATION AND PROJECT CONTINUED

TABLE 12B: **SISHEN MINE'S 2017 VS 2016 MAIN PIT ORE RESERVE ESTIMATION PARAMETERS (AS AN EXAMPLE)**

	2017	2016
ESTIMATION		
Sishen Pit		
Mining block model name	north_2017.mdl; south_2017.mdl; lvds.mdl; lvdn.mdl	opt_pit_north_psd2016_3.mdl; opt_pit_south_psd2016_3.mdl
Smallest mining unit	20m(X) x 20m(Y) x 12.5m(Z)	20m(X) x 20m(Y) x 12.5m(Z)
Practical mining parameters		
Bench height	12.5m	12.5m
Ramp gradient	8% (1 in 12.5)	8% (1 in 12.5)
Road width	30m to 56m	30m to 56m
Minimum mining width	80m (rope shovel and truck mining)	80m (rope shovel and truck mining)
Geohydrology	Groundwater level maintained 12.5m below pit floor	Groundwater level maintained 12.5m below pit floor
Pit slopes	Designed according to a defendable risk matrix, guided by an appropriate factor of safety of 1.3 and a probability of failure of 10%	Designed according to a defendable risk matrix, guided by an appropriate factor of safety of 1.3 and a probability of failure of 10%
Pit optimisation		
Software	Whittle 4X	Whittle 4X
Method	Lerchs-Grosmann (primary LoM maximisation, secondary NPV maximation)	Lerchs-Grosmann (primary LoM maximisation, secondary NPV maximation)
Modification		
Modifying factors		
– Geological loss (%)	0.0	-5.1
– Dilution (%)	16.3	20.7
– Mining loss (%)	-3.4	-4.4
– Mining recovery efficiency (%)	91.6	93.6
– Design recovery efficiency (%)	98.0	105.5
– Ore Reserves re-allocated to Mineral Resources (%)	-0.9	-2.4
– Metallurgical yield (%) to convert to Saleable Product	74.0	74.7
Estimator		
Reserve estimator	Alfred April and Terence Jordaan	Alfred April
Reserve estimator status	Technical specialists	Internal technical specialist
Estimator employer	Sishen Iron Ore Company (Pty) Ltd/ Anglo American (Pty) Ltd	Sishen Iron Ore Company (Pty) Ltd

Mineral Resource ancillary information

The Sishen Mine Mineral Resource ancillary information is summarised in **Table 13a** (background information) and **Table 13b** (NN1 Geological Model Mineral Resource estimation parameters – as an example).

ANCILLARY RESERVE AND RESOURCE INFORMATION PER OPERATION AND PROJECT CONTINUED

TABLE 13A: **SISHEN MINE'S 2017 VS 2016 MINERAL RESOURCE BACKGROUND INFORMATION**

SISHEN MINE	2017	2016
LOCATION		
Country	Republic of South Africa	Republic of South Africa
Province	Northern Cape	Northern Cape
OWNERSHIP		
Sishen Iron Ore Company (Pty) Ltd	100%	100%
Kumba Iron Ore Limited	76.3%	76.3%
AA plc	53.2%	53.2%
SECURITY OF TENURE		
Number of applicable mining rights	1	1
Mining right status	Registered	Registered
Mining right expiry date(s)	10 November 2039	10 November 2039
EXPLORATION STATUS		
Exploration type	Geological Confidence (in mine)	Geological Confidence (in mine)
Exploration phase	In execution	In execution
GOVERNANCE		
Code	THE SAMREC CODE – 2016 EDITION	THE SAMREC CODE – 2007 EDITION (as amended July 2009)
AA plc group technical standard	AA_GTS_22 (Reporting of Exploration Results, Mineral Resources and Ore Reserves in Anglo American)	
KIO reporting policy	http://www.angloamericankumba.com/sd_policies.php	http://www.angloamericankumba.com/sd_policies.php
KIO reporting protocols	KIOReportingProcedure(2015)	KIOReportingProcedure(2015)
	KIO Resource Classification Guideline (version 2)	KIO Resource Classification Guideline (version 2)
KIO reporting template	Mineral Resource (and Mineral Inventory) Reporting Template (2017)	KIO_R&R_Reporting_Template_082015
REPORTING METHOD		
Approach	Mineral Resources are reported exclusive of Ore Reserves and not factoring in attributable ownership and only if: (1) spatially modelled; (2) spatially classified; (3) spatially constrained in terms of reasonable and realistic prospects for eventual economic extraction (occurring within an RRPEEE defined envelope, in other words not all mineral occurrences are declared as Mineral Resources); (4) declared within (never outside) executed tenement boundaries.	
In situ metric tonnes (dry/wet)	Dry	Dry
Tonnage calculation	Tonnages are added from cells in geological block models of which the centroids intersect the relevant geological ore domains in the solids models which occur inside the resource shell. The volume of each ore cell is multiplied with the estimated relative density of the same cell.	Tonnages are added from cells in geological block models of which the centroids intersect the relevant geological ore domains in the solids models which occur inside the resource shell. The volume of each ore cell is multiplied with the estimated relative density of the same cell.
Fe grade	Weighted average above cut-off grade	Weighted average above cut-off grade
Fe calculation	Tonnage-weighted mean of the estimated *in situ* Mineral Resource Fe grades contained within geological block models, constrained by the relevant Resource geological ore domains and RRPEEE resource shell.	Tonnage-weighted mean of the estimated *in situ* Mineral Resource Fe grades contained within geological block models, constrained by the relevant Resource geological ore domains and RRPEEE resource shell.
Cut-off grade	40% Fe	40% Fe
Ore type	Haematite Ore	Haematite Ore

ANCILLARY RESERVE AND RESOURCE INFORMATION PER OPERATION AND PROJECT CONTINUED

TABLE 13B: SISHEN MINE'S 2017 VS 2016 NN1 GEOLOGICAL MODEL MINERAL RESOURCE ESTIMATION PARAMETERS (as an example)

	2017	2016
ESTIMATION		
nn1 (a to c) Geological Model		
Input data		
Borehole type	Core and percussion borehole lithological logs and associated chemical analyses	
Relative density measurement	Minidense (pre 2010) and Picnometer analyses on pulp samples (2010 to present)	Minidense (pre 2010) and Picnometer analyses on pulp samples (2010 to present)
KIO QA/QC protocol	KIO QC Protocol for Exploration Drilling Sampling and Sub-sampling (version 4)	
Primary laboratory	ANGLO AMERICAN RESEARCH Division of Anglo Operations Limited CHEMISTRY LABORATORY (Co reg no: 1921/006730/07)	ANGLO AMERICAN RESEARCH Division of Anglo Operations Limited CHEMISTRY LABORATORY (Co reg no: 1921/006730/07)
Accreditation	Accredited under International Standard ISO/IEC 17025:2005 by the South African National Accreditation System (SANAS) under the Facility Accreditation Number T0051 (valid from 1 May 2016 to 30 April 2021)	Accredited under International Standard ISO/IEC 17025:2005 by the South African National Accreditation System (SANAS) under the Facility Accreditation Number T0051 (valid from 1 May 2011 to 30 April 2016)
Borehole database software	acQuire	acQuire
Borehole database update cut-off date	30 September 2016	30 September 2015
Database validation conducted	Yes	Yes
Segmentation conducted	Yes. To allow for simplification of logged lithologies for spatial correlation purposes and to simplify the assay composite extractions.	
STATISTICAL AND GEOSTATISTICAL EVALUATION		
Data compositing interval	3m	3m
Data compositing method	Length multiplied with density used to weight per lithology	Length multiplied with density used to weight per lithology
Grade parameters evaluated	% Fe, % SiO_2, % Al_2O_3, % K_2O, % S and % P as well as Relative Density	% Fe, % SiO_2, % Al_2O_3, % K_2O, % S and % P as well as Relative Density
Variography updated in current year	Yes (BIF, Shale (17) and Conglomerate (10))	No
Search parameters updated in current year	Yes (BIF, Shale (17) and Conglomerate (10))	No
SOLIDS MODELLING		
Solids modelling software	Surpac	Surpac
Input	Updated solid models	Previous solids models
Method	Digital Wireframe modelling for ore segments and some waste segments (waste in contact with ore zones)	Digital Wireframe modelling for ore segments and some waste segments (waste in contact with ore zones)
	Digital terrain models for other waste segments	Digital terrain models for other waste segments
Domaining	Primary lithological domains are sub-domained based on structural discontinuities, and distinguishable variation in grade ie K_2O as well as where volumes have been informed predominantly by core or percussion borehole data ie different data populations	Primary lithological domains are sub-domained based on structural discontinuities, and distinguishable variation in grade ie K_2O as well as where volumes have been informed predominantly by core or percussion borehole data ie different data populations
Topography and pit progression assigned	31 December 2017 (planned)	31 December 2016 (planned)
Validation conducted	Yes (for gaps and overlaps by software queries as well as honouring of borehole contacts) and by standard software validation tools (open sides, self intersecting triangles)	Yes (for gaps and overlaps by software queries as well as honouring of borehole contacts) and by standard software validation tools (open sides, self intersecting triangles)

ANCILLARY RESERVE AND RESOURCE INFORMATION PER OPERATION AND PROJECT CONTINUED

TABLE 13B: **SISHEN MINE'S 2017 VS 2016 NN1 GEOLOGICAL MODEL MINERAL RESOURCE ESTIMATION PARAMETERS** (as an example) continued

	2017	2016
GRADE ESTIMATION METHODOLOGY		
Ore segments	Ordinary (Co-) Kriging	Ordinary (Co-) Kriging
Waste segments	Global estimate	Global estimate
GEOLOGICAL BLOCK MODELLING		
Block modelling software	Isatis/surpac	Isatis/surpac
Model type	Centroid model	Centroid model
Parent cell size	20m(X) x 20m(Y) x 12.5m(Z)	20m(X) x 20m(Y) x 12.5m(Z)
Minimum sub-block cell size	5m(X) x5m(Y) x 3.125m(Z)	10m(X) x 10m(Y) x 6.25m(Z)
Cell population method		
Tonnage	Volume of lithology intersected by cell centroid and constrained by cell limits, multiplied with relative density estimate of the same lithology at same unique cell centroid position in space.	Volume of lithology intersected by cell centroid and constrained by cell limits, multiplied with relative density estimate of the same lithology at same unique cell centroid position in space.
Grade	Estimate of grade at unique cell centroid position in space applicable to total volume or tonnage constrained by the cell.	Estimate of grade at unique cell centroid position in space applicable to total volume or tonnage constrained by the cell.
Updated geological block model ID (file name + extension)	nn1 (a to c).mdl	nn1 (a to c).mdl
Update completion date	28 February 2017	1 March 2016
ESTIMATOR		
Resource estimator (name and surname)	F Nel, Jacques Deacon, Marianne van den Heever, Johan van Zyl (External Competent Person)	Fanie Nel
Resource estimator status	Internal technical specialist	Internal technical specialist
Estimator employer	Sishen Iron Ore Company (Pty) Ltd, Z Star Resource Estimation Consultants	Sishen Iron Ore Company (Pty) Ltd

ANCILLARY RESERVE AND RESOURCE INFORMATION PER OPERATION AND PROJECT CONTINUED

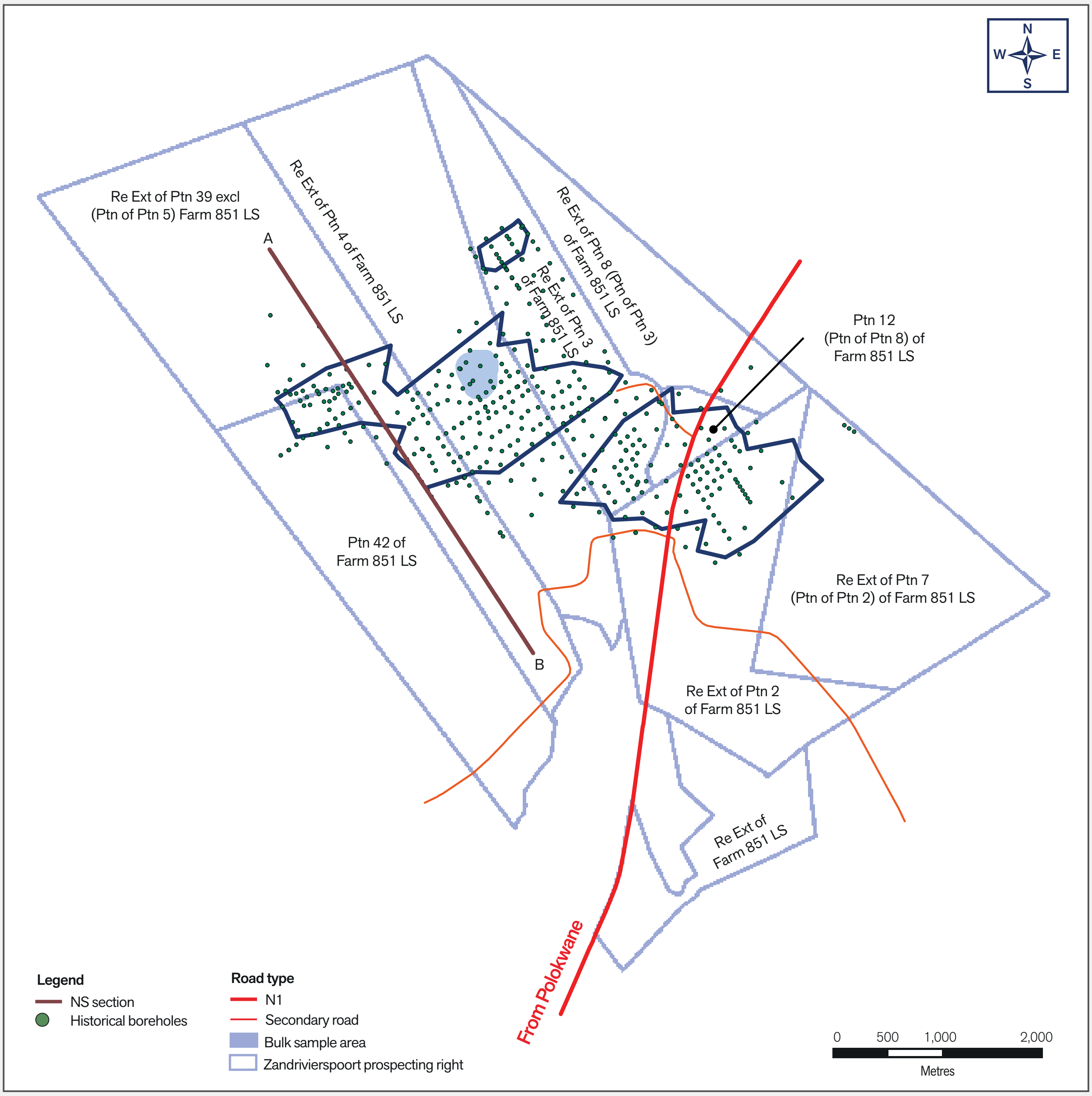
ZANDRIVIERSPOORT PROJECT

GEOLOGICAL OUTLINE

Regional geology

Zandrivierspoort is a low-grade magnetite deposit in the Palaeoproterozoic Rhenosterkoppies Greenstone Belt or Rhenosterkoppies Fragment (RF), which occurs to the northwest of the main, northeast-trending Pietersburg Greenstone Belt **(Figure 26)**.

FIGURE 26: **ZANDRIVIERSPOORT PROSPECTING RIGHT AREA NORTH OF POLOKWANE IN THE LIMPOPO PROVINCE**



ANCILLARY RESERVE AND RESOURCE INFORMATION PER OPERATION AND PROJECT CONTINUED

The Zandrivierspoort prospect occurs within the SE-trending fold hinge zone of the RF, a feature which some authors have considered to be significant in the thickening or duplication of relatively thin banded ironstone (BIS) units. Both the Pietersburg and the Rhenosterkoppies Greenstone Belts are enclosed in granites, which display the "pinched-in" or "keel-like" morphology that is typical of greenstone belts within granite-gneiss terrains of southern Africa.

The RF is unique in that it firstly, contains relatively little of the Archaean Uitkyk formation, which consists of greenschist to amphibolite facies immature sandstones, siltstones, "grits", conglomerates and breccias (Kalbskopf and Barton, 2003). Rather, it is dominated by metavolcanics – in the form of amphibolites – and relict banded ironstone units. Secondly, the RF does not trend NE, in contrast to the majority of southern African greenstone belts.

The form of underlying gneisses resulted in a certain 'compartmentalisation' of the RF in the vicinity of the Zandrivierspoort Project. Such compartmentalisation is accentuated in outcropping geology and is also defined by major lineaments, interpreted from regional aeromagnetic data. A single, large diabase dyke runs NNE across the approximate centre of the ZRP prospect.

Stratigraphy

The stratigraphic column depicting the local geology of the Zandrivierspoort Project is illustrated in **Figure 27**.

FIGURE 27: **SIMPLIFIED STRATIGRAPHIC COLUMN DEPICTING THE LOCAL ZANDRIVIERSPOORT PROJECT GEOLOGY**

	STRATIGRAPHIC COLUMN AT ZANDRIVIERSPOORT
	Overburden: scree, alluvium (sand, pebble bands), canga
	Chlorite-actinolite schist
	Calc-silicate rock with occasional thin bands of muscovite biotite, and amphibolite
	Schist (quartz, amphibolite, biotite, garnet)
	Quartzite, pyrrhotite-quartzite and calcite amphibole quartzite
	BIS (upper)
	Quartzite, pyrrhotite-quartzite and calcite amphibole quartzite
	Schist (quartz, amphibolite, biotite, garnet)
	Quartz-amphibole schist and amphibolite (massive and schistose) with subordinate schist (amphibolite, biotite, garnet)
	Schist (quartz, amphibolite, biotite, garnet)
	Quartzite, pyrrhotite-quartzite and calcite amphibole quartzite with various schist bands
	BIS (lower 1)
	Quartzite, pyrrhotite-quartzite and calcite amphibole quartzite with various schist bands
	Schist (quartz, amphibolite, biotite, garnet)
	Quartz-amphibole and amphibolite (massive and schistose) with subordinate schist (amphibolite, biotite, garnet)
	Schist (quartz, amphibolite, biotite, garnet)
	Quartzite, pyrrhotite-quartzite and calcite amphibole quartzite with various schist bands
	BIS (lower 2)
	Quartzite, pyrrhotite-quartzite and calcite amphibole quartzite with various schist bands
	Schist (quartz, amphibolite, biotite, garnet)
	Amphibolite (massive and schistose) with subordinate schist (amphibolite, biotite, garnet)
	Various lower BIS bands

Tectonic setting

It is Kumba's understanding that the geology of the Zandrivierspoort Project has been influenced by three tectonic events.

– D1 – First Ductile Deformation Event: D1 is attributed either to 'atectonic' processes, such as soft-sediment slumping during early basinal deformation (Collins, 1986), the major fold orientations of which were constrained by the local down-dip direction of the developing basin. Moore (1975), Sweby (1984), Pearce (1983) and Pearce and Pearce (1983, 1984) attribute the local thickening and duplication of BIS and surrounding units to recumbent isoclinal folding. Thickening or duplication is particularly well-developed in areas where there are stacked isoclinal fold hinge zones. Sweby (1984) also cites evidence for very low-angle, northward-verging thrusting in the NW Portion of the Project Area as being the cause of, or at least being related to, isoclinal folding. 'D1' may have been preceded by earlier deformation phases, such as southward-directed thrusting or back-thrusting, but these phases will be obscured by the dominant D1/F1 event.

  Post-D1/F1 deformation events appear to have had only a minor effect on the structural morphology.

– D2 – Second Ductile Deformation Event: There is confusion regarding D2/F2 and D3/F3. Collins (1986) proposed extensive, EW to ESE-trending F2 folds across the ZRP area (see **Figures 2 and 3**). These open or gentle folds merely re-orient the dominant S1 such that it is locally either very shallowly N- or S-dipping. A further effect of D2 is apparently the development of laterally extensive, E-W to ESE-trending faults that truncate BIS units. These faults effectively exploit the incipient fracture cleavage developed in the hinge zones of F2 faults. A fault of this type possibly occurs to the NNE of the exposed BIS mapped by Pearce and Pearce. Due to the sub-vertical drilling and the minor offset proposed by previous authors, it's not clear what effect, in terms of offset or a 'damage or contact strain' zone, these faults will have on BIS units. One possible effect, when combined with more easily-observed, NE-trending diabase dykes, is to segment the BIS units into a series of blocks along NE- and ESE-trending lines. Further data is needed to confirm or disprove this. Upright, open, NE-SW-trending, gently-plunging folds are attributed by Sweby (1984) as D2 in age, while

ANCILLARY RESERVE AND RESOURCE INFORMATION PER OPERATION AND PROJECT CONTINUED

Collins (1986) suggests that they are superimposed on the broad, open E-W to ESE-trending folds produced in his D2/F2 classification (described above), ie that they are D3 in age/sequence.

– D3 – Third Ductile Deformation Event: As detailed in the preceding paragraphs, D3 of Collins comprises NE-SW-trending, shallowly-plunging folds, with moderately-developed axial planar cleavage. This cleavage is exploited by the later intrusion of NE-SW-trending diabase dykes. The D3 event of Sweby (1984) and the D4 event of Collins (1986) bear a strong resemblance to the D2 event of Collins (1986), ie NW-SE-trending gentle refolding of 'F1' and 'F2'. Therefore, it's not clear if the gentle, flat-lying E-W to ESE-trending folds refold the NE-SW-trending upright folds, or visa versa.

In summary, the main or controlling deformation events produced early, isoclinal, recumbent folds, which were refolded by essentially co-axial, open to closed, upright folds. The combination of these events resulted in NE-SW-trending, non-cylindrical folds, ie folds which die out along strike and which appear to have very gently refolded axes.

This structural style is, moreover, suggested by Moore (1975) and Sweby (1984). Such folds appear to be largely N- or NNW-verging, according to Kalbskopf and Barton (2003) and from observations made by KIO.

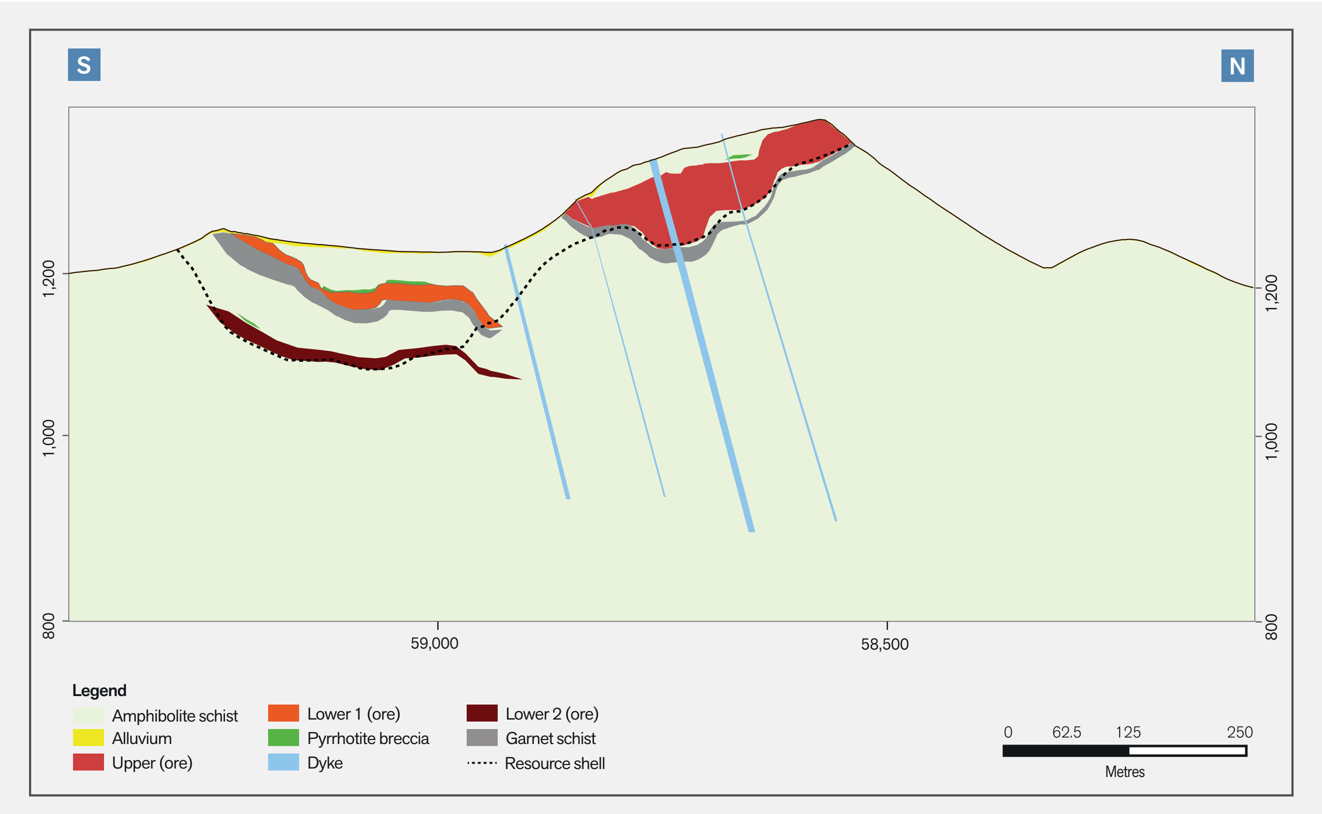
Local geology

The banded ironstone (BIS) occurs as fine to medium grained units with well banded layers of predominantly magnetite and quartz.

Three BIS units have been identified by KIO and spatially modelled as separate units ie the Upper BIS, the Lower 1 BIS and the Lower 2 BIS, with BIS units beneath the Lower 2 BIS unit ignored in the modelling because of depth and size and thickness. The top portion of the Upper BIS has been weathered into what KIO refers to as a Haematite cap and this has been sub-domained.

Figure 28 depicts a section through the three-dimensional geological wireframe model which depicts the most recent understanding or interpretation of the local geology.

FIGURE 28: **SOUTHEAST-NORTHWEST PROFILE DEPICTING THE LOCAL GEOLOGY THROUGH THE ZANDRIVIERSPOORT MAGNETITE DEPOSIT**



ANCILLARY RESERVE AND RESOURCE INFORMATION PER OPERATION AND PROJECT CONTINUED

Mineral resource estimation parameters

The Zandrivierspoort Project Mineral Resource ancillary information is summarised in **Table 14a** (background information) and **Table 14b** (Mineral Resource estimation parameters).

TABLE 14A: **ZANDRIVIERSPOORT PROJECT'S 2017 VS 2016 MINERAL RESOURCE BACKGROUND INFORMATION**

ZANDRIVIERSPOORT PROJECT	2017	2016
LOCATION		
Country	Republic of South Africa	Republic of South Africa
Province	Limpopo	Limpopo
OWNERSHIP		
Sishen Iron Ore Company (Pty) Ltd	50.0%	50.0%
Kumba Iron Ore Limited	38.2%	37.0%
AA plc group	26.6%	25.8%
SECURITY OF TENURE		
Number of applicable prospecting rights	1	1
Prospecting right status	Registered	Registered
Prospecting right expiry date(s)	Renewed	Renewal application pending
EXPLORATION STATUS		
Exploration type	Greenfields	Greenfields
Exploration phase	Pre-feasibility	Pre-feasibility
GOVERNANCE		
Code	THE SAMREC CODE – 2016 EDITION	THE SAMREC CODE – 2007 EDITION (as amended July 2009)
AA plc group technical standard	AA_GTS_22 (Reporting of Exploration Results, Mineral Resources and Ore Reserves in Anglo American)	
KIO reporting policy	http://www.angloamericankumba.com/sd_policies.php	http://www.angloamericankumba.com/sd_policies.php
KIO reporting protocols	KIOReportingProcedure(2013)	KIOReportingProcedure(2013)
	KIO Resource Classification Guideline (version 2)	KIO Resource Classification Guideline (version 2)
KIO reporting template	KIO_R&R_Reporting_Template_092013	KIO_R&R_Reporting_Template_092013
REPORTING METHOD		
Approach	Mineral Resources are reported exclusive of Ore Reserves and not factoring in attributable ownership and only if: (1) spatially modelled; (2) spatially classified; (3) spatially constrained in terms of reasonable and realistic prospects for eventual economic extraction (occurring within an RRPEEE defined envelope, in other words not all mineral occurrences are declared as Mineral Resources) and (4) declared within (never outside) executed tenement boundaries.	
In situ metric tonnes (dry/wet)	Dry	Dry
Tonnage calculation	Tonnages are added from cells in geological block model of which the centroids intersect the relevant geological ore domains in the solids models which occur inside the resource shell. The volume of each ore cell is multiplied with the estimated relative density of the same cell).	Tonnages are added from cells in geological block model of which the centroids intersect the relevant geological ore domains in the solids models which occur inside the resource shell. The volume of each ore cell is multiplied with the estimated relative density of the same cell).
Fe_3O_4 grade	Weighted average above cut-off grade	Weighted average above cut-off grade
Fe_3O_4 calculation	Tonnage-weighted mean of the estimated *in situ* Mineral Resource Fe_3O_4 grades contained within geological block models, constrained by the relevant Resource geological ore domains and RRPEEE resource shell.	Tonnage-weighted mean of the estimated *in situ* Mineral Resource Fe_3O_4 grades contained within geological block models, constrained by the relevant Resource geological ore domains and RRPEEE resource shell.
Cut-off grade	21.7% Fe	21.7% Fe
Ore type	Magnetite Ore	Magnetite Ore

ANCILLARY RESERVE AND RESOURCE INFORMATION PER OPERATION AND PROJECT CONTINUED

TABLE 14B: ZANDRIVIERSPOORT PROJECT'S 2017 VS 2016 MINERAL RESOURCE ESTIMATION PARAMETERS

	2017	2016
ESTIMATION		
Zandrivierspoort geological model		
Input data		
Borehole type	Core and Percussion borehole lithological logs and associated chemical analyses	
Relative density measurement	Picnometer analyses on pulp samples (2010 to present)	Picnometer analyses on pulp samples (2010 to present)
KIO QA/QC protocol	KIO QC Protocol for Exploration Drilling Sampling and Sub-sampling (version 2)	
Primary laboratory	ANGLO AMERICAN RESEARCH Division of Anglo Operations Limited CHEMISTRY LABORATORY (Co reg no: 1921/006730/07)	ANGLO AMERICAN RESEARCH Division of Anglo Operations Limited CHEMISTRY LABORATORY (Co reg no: 1921/006730/07)
Accreditation	Accredited under International Standard ISO/IEC 17025:2005 by the South African National Accreditation System (SANAS) under the Facility Accreditation Number T0051 (valid from 1 May 2016 to 30 April 2021)	Accredited under International Standard ISO/IEC 17025:2005 by the South African National Accreditation System (SANAS) under the Facility Accreditation Number T0051 (valid from 1 May 2011 to 30 April 2016)
Borehole database software	acQuire	acQuire
Borehole database update cut-off date	30 April 2013	30 April 2013
Database validation conducted in current year	No	No
Segmentation conducted	Yes. To allow for simplification of logged lithologies for spatial correlation purposes and to simplify the assay composite extractions.	
STATISTICAL AND GEOSTATISTICAL EVALUATION		
Data compositing interval	1 m	1 m
Data compositing method	Length used to weight per lithology	Length used to weight per lithology
Grade parameters evaluated	% Fe, % SiO_2, % Al_2O_3, % K_2O, % P, % S, % Fe_2O_3, % Fe_3O_4, Relative Density and Satmagan values for % Fe_2O_3, % Fe_3O_4	% Fe, % SiO_2, % Al_2O_3, % K_2O, % P, % S, % Fe_2O_3, % Fe_3O_4, Relative Density and Satmagan values for % Fe2O3, % Fe_3O_4
Variography updated in current year	No	No
Search parameters updated in current year	No	No
Solids modelling		
Solids modelling software	Surpac	Surpac
Input	Previous solids models	Previous solids models
Method	Digitally captured two-dimensional sections interpreted on borehole profiles.	Digitally captured two-dimensional sections interpreted on borehole profiles.
	Digital terrain models for alluvium waste types	Digital terrain models for alluvium waste types
Domaining	Domaining conducted per lithology. Segments smaller than 3m in thickness are not separately domained.	Domaining conducted per lithology. Segments smaller than 3m in thickness are not separately domained.
Topography and pit progression assigned	Surface DTM based on high resolution aerial survey.	Surface DTM based on high resolution aerial survey.
Validation conducted	Yes (for gaps and overlaps by software queries as well as honouring of borehole contacts) and by standard software validation tools (open sides, self intersecting triangles) as well as a visual peer review by exploration geologists.	Yes (for gaps and overlaps by software queries as well as honouring of borehole contacts) and by standard software validation tools (open sides, self intersecting triangles) as well as a visual peer review by exploration geologists.

ANCILLARY RESERVE AND RESOURCE INFORMATION PER OPERATION AND PROJECT CONTINUED

TABLE 14B: **ZANDRIVIERSPOORT PROJECT'S 2017 VS 2016 MINERAL RESOURCE ESTIMATION PARAMETERS** continued

	2017	2016
GRADE ESTIMATION METHODOLOGY		
Ore segments	Other (specify below)	Other (specify below)
	Ordinary Kriging with Dynamic Anisostropy	Ordinary Kriging with Dynamic Anisostropy
Waste segments	Global Estimate	Global Estimate
Geological block modelling		
Block modelling software	Surpac	Surpac
Model type	Centroid Model	Centroid Model
Parent cell size	80m(X) x 80m(Y) x 10m(Z)	80m(X) x 80m(Y) x 10m(Z)
Minimum sub-block cell size	10m(X) x 10m(Y) x 5m(Z)	10m(X) x 10m(Y) x 5m(Z)
Cell population method		
Tonnage	Volume of lithology intersected by cell centroid and constrained by cell limits, multiplied with relative density estimate of the same lithology at same unique cell centroid position in space.	Volume of lithology intersected by cell centroid and constrained by cell limits, multiplied with relative density estimate of the same lithology at same unique cell centroid position in space.
Grade	Estimate of grade at unique cell centroid position in space applicable to total volume or tonnage constrained by the cell.	Estimate of grade at unique cell centroid position in space applicable to total volume or tonnage constrained by the cell.
Updated geological block model ID (file name + extension)	ZRP_11_2013.fbm	ZRP_11_2013.fbm
Update completion date	1 November 2013	1 November 2013
ESTIMATOR		
Resource estimator (name and surname)	Pietre Smit	Pietre Smit
Resource estimator status	Internal technical specialist	Internal technical specialist
Estimator employer	Sishen Iron Ore Company (Pty) Ltd	Sishen Iron Ore Company (Pty) Ltd

Project outline

Exploration at the Zandrivierspoort Project was put on hold by the company in 2013. The Mineral Resources stated in 2013, and carried over until 2017 were, however, reviewed in 2017 in terms of reasonable prospects for eventual economic extraction (RPEEE), because of the significant changes in the fiscal parameters.

The Kumba Business Development Department reviewed the Zandrivierspoort (ZRP) business case in 2017. A standalone mine for the Project has been shown not to be economically viable. Alternative business cases were evaluated and value addition test work has shown that it is technical feasible to utilise the ZRP magnetites as a feedstock for the 'AusIron' iron making process. Using the magnetite, together with thermal coal supplied from a specific coal mine in the vicinity, as a direct charge has been demonstrated in trials at the 'AusIron' pilot plant in Australia. As a result of the use of coal as a reductant, significant off-gasses are produced which can be converted into electricity through off the shelf cogeneration technology.

A small mine concept was developed for ZRP producing 3.0 Mtpa of concentrate. This was the base on which the value addition model was developed. At a production rate of 3.0 Mtpa concentrate, 1.8 Mtpa of pig iron can be produced. The project is sensitive to the electricity price and pig iron revenue, the latter as was indicated by ArcelorMittal South Africa (Kumba's joint venture partner in the Zandrivierspoort Project). A straight line pig-iron price was used in the model with the Anglo American long-term iron ore price and exchange rate.

RPEEE is furthermore applied by assigning a yield cut-off to the resource model ie yield is modelled spatially using a beneficiation algorithm derived from SATMAGAN test-work and XRF assays, which defined a linear relationship between yield and *in situ* Magnetite content. Total Fe content and SiO_2 content. Mineral Resources are only declared for blocks having yields assigned that are greater or equal to the yield cut-off. The yield cut-off is derived from high-level cost parameters. The project was in a pre-feasibility phase of investigation (not yet completed), having received the go-ahead for further evaluation after the concept stage-gate evaluation (as funded by the *Polokwane Iron Ore Company – 50:50 joint venture between Sishen Iron Ore Company and ArcelorMittal South Africa – AMSA)*. The project outline is summarised in **Table 15**.

ANCILLARY RESERVE AND RESOURCE INFORMATION PER OPERATION AND PROJECT CONTINUED

TABLE 15: ZANDRIVIERSPOORT PROJECT OUTLINE

	Key details
Ownership (AA plc)	26.6%
Ownership (KIO)	38.2%
Commodity	Iron Ore
Country	Republic of South Africa
Prospecting right status	Applied for renewal
Exploration type	Greenfields
Exploration phase	Concept
Foreseen mining method	Open-pit Conventional Truck & Shovel
Foreseen beneficiation method	Low Intensity Magnetic Separation with downstream Rare Earth Drum Separation/ Flotation and subsequent AusIron conversion to pig-iron
Foreseen product types	Pig-iron
Foreseen market	Domestic
Prospecting right expiry date	21 March 2020

Image: General view of the DMS plant at Kolomela mine.

EXPLORATION

ANNUAL EXPENDITURE

KIO conducted on and near mine exploration in 2017 to refine existing and target possible new future Mineral Resources. Drilling activities increased 12% (10,207m) year-on-year, primarily to accommodate for more specialised sampling including geometallurgical, geotechnical and inclined drilling to support technical evaluations of the various iron ore occurrences. These drilling methods are typically also more expensive than normal exploration drilling, which impacted negatively on the average rate per metre which increased from R2,846.74 per metre in 2016 to R3,359.91 per metre in 2017.

The all-inclusive cost associated with exploration conducted on behalf of KIO in 2017 is summarised in **Table 16**. The 2017 (10 actual +2 forecast) exploration expenditure comprises 0.9% of Kumba Iron Ore's 2017 (10 actual +2 forecast) revenue.

A continued focus on exploration on and near mine resulted in the following outcomes in 2017:

- The Kolomela Mine Inferred Mineral Resources considered in the LoM Plan was reduced from 22% in 2016 to 8% in 2017.
- The Sishen Mine Inferred Mineral Resources considered in the LoM Plan was reduced from 7% in 2016 to 5% in 2017, despite an unforeseen increase in the size of the pit layout year-on-year.
- The near-mine exploration results are not discussed but are incorporated in the exploration expenditure as detailed in **Table 16**.

SAMPLE PREPARATION AND ASSAYING

All primary geological samples taken from drilled core (and in some instances RC chips) via normal exploration drilling at all the relevant KIO sites in 2017, to be used for future Mineral Resource estimation, were prepared and assayed by the Chemistry Laboratory (Co reg no: 1921/0067130/06) of the Technical Solutions (TS) Division of Anglo American plc.

All samples taken from drilled core of dedicated geometallurgical boreholes, were prepared and tested for an array of metallurgical and other physical property measurements by the Metallurgical Laboratory of the Anglo Technical Solutions (TS) Division of Anglo American plc, with subsequent assaying of these samples, where required, conducted by the AA plc Chemistry Laboratory.

The TS Chemistry Laboratory is accredited in accordance with the recognised International Standard ISO/IEC 17025:2005 by the South African National Accreditation System (SANAS) under the Facility Accreditation Number T0051 (valid from 22 July 2016 to 30 April 2021) for the preparation and assaying of iron ore samples, applying methods that comply with the requirements of Kumba Iron Ore.

Kumba Geosciences submitted 26,159 primary exploration (and some production) borehole samples in 2017 directly to the TS Chemistry Laboratory to be prepared and analysed, and 166 composite samples (3,220 primary borehole samples) directly to the TS Metallurgical Laboratory to be prepared and tested. A total of 29,379 primary samples were submitted.

Of the samples submitted, the TS Chemistry Laboratory prepared 25,985 samples (including samples from the TS Metallurgical Laboratory) and assayed 23,472 samples for the year (including samples from the TS Metallurgical Laboratory). Differences between submitted, prepared and assayed samples are influenced by laboratory turnaround times, a backlog of samples carried over from 2016 as well as additionally created QC samples (5% coarse and 5% pulp duplicates with 5% blind matrix matched certified reference materials counting as a primary sample) as required by the Kumba Geosciences QA/QC protocol.

The TS Metallurgical Laboratory prepared composited and tested all 3,220 samples submitted. All of the primary exploration samples were prepared, assayed and tested in the Republic of South Africa. A total of 5% pulp replicate QC samples generated by the TS Chemistry Laboratory were analysed by the Bureau Veritas Laboratory in Perth Australia, as part of the Kumba Geosciences Department's required external independent QA/QC validation.

The Bureau Veritas Laboratory in Perth Australia is ISO and National (Australian) Association of Testing Authorities (NATA) accredited for iron ores and a member of the ISO MN-002-02 Chemical Analysis Committee.

The 2017 (10+2 forecast) spend on sample preparation and assaying at the AA plc TS Chemistry Laboratory amounted to R27.6 million (7% of total exploration expenditure). The 2017 (10+2 forecast) spend on sample preparation and metallurgical testing at the AA plc TS Metallurgical Laboratory amounted to R21.5 million (5% of total exploration budget).

Kumba ensures sample representivity by means of applying a stringent QA/QC protocol (KIO QC PROTOCOL FOR EXPLORATION DRILLING, SAMPLING AND SUB-SAMPLING (Version 7)) that governs all stages of sampling, sub-sampling and assaying, including blind validation of the sample preparation and assaying of laboratories.

TABLE 16: **SUMMARY OF 2017 VS 2016 KUMBA IRON ORE EXPLORATION EXPENDITURE (10+2)**

	Total exploration spend (10+2) Rand million		Drilling spend (10+2) Rand million		Number of holes drilled (10+2) Rand million		Metres drilled (10+2) Rand million		Average cost per metre Rand million	
	2017	2016	**2017**	2016	**2017**	2016	**2017**	2016	**2017**	2016
Mining right areas	**233.81**	209.70	**216.82**	140.60	**385**	348	**58,747**	61,174	**3,690.72**	2,298.91
Prospecting right areas	**170.82**	131.00	**110.65**	81.10	**127**	95	**36,528**	23,894	**3,029.11**	3,394.56
Total	**404.63**	340.70	**327.47**	221.70	**512**	443	**95,275**	85,068	**3,359.91**	2,846.74

ENDORSEMENT

The persons at Kumba Iron Ore who are designated to take 'corporate responsibility' for Mineral Resources and Ore Reserves are Jean Britz and Theunis Otto. They have reviewed the Mineral Resource and Ore Reserve estimates reported for 2017 and consider it to be SAMREC compliant, and consent to the inclusion of these estimates in the form and context in which they appear in this online statement.

Jean Britz is a professional natural scientist, registered (400423/04) with the South African Council for Natural Scientific Professions. He has a BSc (Hons) in Geology and an MEng in Mining and has 25 years of experience as a mining and exploration geologist in coal and iron ore, of which 13 are specific to iron ore Mineral Resource estimation and evaluation.

Jean Britz
Principal, Mineral Resources and Geometallurgy – Kumba Iron Ore Geosciences

Theunis Otto is a professional mining engineer registered (990072) with the Engineering Council of South Africa. He has an MSc in Mining Engineering and has 22 years of experience as a mining engineer in production management and technical roles in coal and iron ore mining, of which 13 are specific to iron ore Mineral Reserve estimation and evaluation.

Theunis Otto
Head, Kumba Iron Ore Mining Engineering

Kumba Iron Ore's CEO and board member, Mr Themba Mkhwanazi, endorses the Mineral Resource and Ore Reserve estimates presented in this document, and acknowledges that the Kumba Iron Ore Policy which governs Mineral Resource and Ore Reserve reporting has been adhered to.

Themba Mkhwanazi
Chief executive officer, Kumba Iron Ore

GLOSSARY OF TERMS AND ACRONYMS

AA plc	Anglo American plc
ABAS	Anglo American's Business Assurance Services
AFS	Annual financial statements
CP	Competent Person
DMR	Department of Mineral Resources
DMS	Dense media separation
ECSA	Engineering Council of South Africa
FOB	Free on board
FOR	Free on rail
GCI	Geological Classification Index
IFRS	International Financial Reporting Standards
IR	Integrated report
JSE	Johannesburg Stock Exchange
KIO	Kumba Iron Ore
Kumba	Kumba Iron Ore Limited
LoM	Life-of-mine
LoM Plan	Life-of-mine plan
MPRDA	Mineral and Petroleum Resources Development Act No 28 of 2002
MT	Million tonnes
Mtpa	Million tonnes per annum
MWP	Mining work plan
ORMR	Ore reserves and mineral resources
Pre-feasibility A study	The objective of a pre-feasibility A study is to ensure the alternatives identified in the concept study have been adequately reviewed and to approve the recommended alternative to be studied and confirmed during the pre-feasibility B stage. The pre-feasibility A gate is an important decision point to ensure that the decision-making committee is in agreement with the investment team on the single alternative to move forward.
Pre-feasibility B study	The objective of the pre-feasibility B study is to ensure that investment details have been adequately developed for the selected alternative and further confirm the business case.
QA/QC	Quality assurance and quality control
RC	Reverse circulation drilling
RoM	Run of mine
SACNASP	South African Council for Natural Scientific Professions
SAMREC Code	The South African Code for the Reporting of Exploration Results, Mineral Resources and Mineral Reserves – SAMREC Code 2016 edition
SIOC	Sishen Iron Ore Company Proprietary Limited
SR	Sustainability report
TARP	Trigger action response plan
UHDMS	Ultra-high density media separation
ZRP	Zandrivierspoort

Bastion

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