



Mineral Resource and Mineral Reserve  
Statement **2016**

Supplement to the integrated annual report 30 June 2016



# Our values

## WE RESPECT

- all our stakeholders, including:
  - shareholders
  - employees and their representative bodies
  - communities within which we operate
  - regulatory bodies
  - suppliers and customers
  - directors and management
  - all other interested and affected parties
- the principles of the UN Global Compact
- the laws of the countries within which we operate
- Company policies and procedures
- our place and way of work
- open and honest communication
- diversity of all our stakeholders
- risk management and continuous improvement philosophies



**Our vision is to be the world's best platinum-producing company, delivering superior returns to stakeholders relative to our peers**

**Our mission is to safely mine, process, refine and market our products at the best possible cost, ensuring sustainable value creation for all our stakeholders**

## WE CARE

- for the health and safety of all our stakeholders
- for the preservation of natural resources
- for the environment in which we operate
- for the socio-economic well-being of the communities within which we operate

## WE STRIVE TO DELIVER

- positive returns to our stakeholders through an operational excellence model
- a safe, productive and conducive working environment
- on our capital projects
- a fair working environment through equitable and competitive human capital practices
- on the development of our employees
- on our commitments to all our stakeholders
- quality products that meet or exceed our customers' expectations

# Welcome to our 2016 Mineral Resource and Mineral Reserve report



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The most significant PGM deposits in the world are located in the Bushveld Complex in South Africa and the Great Dyke in Zimbabwe. These PGM deposits contribute around three-quarters of global platinum output.

Additional information regarding Implats is provided in the following reports, all of which are available at [www.implats.co.za](http://www.implats.co.za)

### Integrated report

- Strategy, risks, resource allocation, business model and materiality
- Operational information
- Summarised Reserves and Resources



### Sustainable development report

- Detail on material economic, social and environmental performance
- GRI G4 core compliance
- Internal reporting guidelines in line with the UN Global Compacts
- Independent assurance report



### Annual financial statements

- Audited Group and Company annual financial statements



### Online

- Direct access to all our reports
- Our website has detailed investor, sustainability and business information

## Feedback

We welcome your feedback to make sure we are covering the things that matter to you.

Go to [www.implats.co.za](http://www.implats.co.za) or email [investor@implats.co.za](mailto:investor@implats.co.za) for the feedback form, or scan the code below with your smartphone.



## The report

Impala Platinum Holdings Limited (Implats) is one of the world's foremost producers of platinum and associated platinum group metals (PGMs). Implats is structured around five main operations with a total of 21 underground shafts. Our operations are located within the Bushveld Complex in South Africa and the Great Dyke in Zimbabwe, the two most significant PGM-bearing ore bodies in the world.

Implats has its listing on the JSE Limited (JSE) in South Africa, and a level 1 American Depositary Receipt programme in the United States of America. Our headquarters are in Johannesburg and the five main operations are Impala, Zimplats, Marula, Mimoso and Two Rivers. The structure of our operating framework allows for each of our operations to establish and maintain close relationships with their stakeholders while operating within a Group-wide approach to managing the economic, social and environmental aspects of sustainability.

### The report

This report relates to the Mineral Resource and Mineral Reserve Statement, compiled for Implats and its subsidiaries. The report provides the status as at 30 June 2016 and an abridged version is included in the Implats integrated annual report for 2016 which is published annually and available at [www.implats.co.za](http://www.implats.co.za).

The report seeks to provide transparent and compliant details relating to the Mineral Resources and Reserves that are considered to be material to stakeholders.

### Forward looking statements

This report contains certain forward looking statements and forecasts which involve risk and uncertainty because they relate to events and depend on circumstances that occur in the future. There are a number of factors that could cause actual results or developments to differ materially from those expressed or implied by these forward looking statements.



Rehabilitated exploration drill site inspection, Impala.

## Implats Mineral Resource and Mineral Reserve Statement 2016 at a glance

The Mineral Resource and Mineral Reserve Statement as at 30 June 2016 is collated at a time when the platinum industry continues to face significant external challenges. The prevailing depressed metal price is reflected in the fact that greenfields exploration has been terminated and shaft sinking operations have been deferred at the Impala 17 Shaft and Afplats' Leeuwkop Shaft. Despite the difficult circumstances some operations continue to deliver strong production performances with a positive outlook to grow the Mineral Reserve inventory at Zimplats, Mimosa and Two Rivers.

### Group structure and operations

The Implats structure remained unchanged during the past year with operations at Impala in the Rustenburg area of the North West province, with the Refinery at Springs in the Gauteng province, the Marula Mine in the Limpopo province, Zimplats and Mimosa mines operating in Zimbabwe, the Two Rivers Mine near Burgersfort in the Limpopo province and the Afplats project near Brits in the North West province.



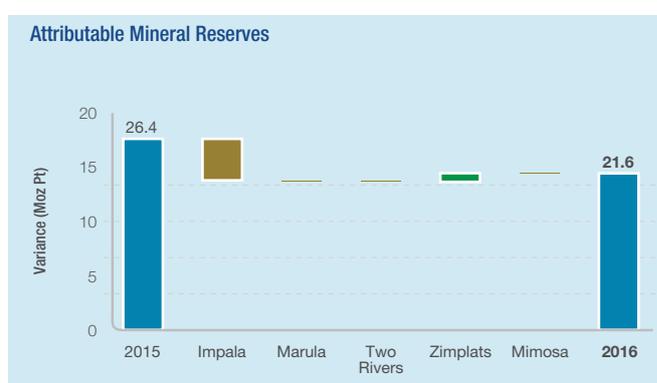
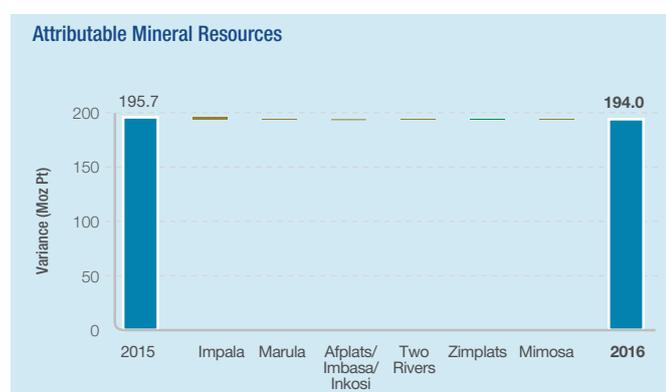
# Implats Mineral Resource and Mineral Reserve Statement 2016 at a glance

## SUMMARY STATEMENT 2016

Attributable	Moz Pt		Moz 4E	
	2016	2015	2016	2015
Mineral Resources*	<b>194.0</b>	195.7	<b>364.9</b>	367.6
Mineral Reserves	<b>21.6</b>	26.4	<b>38.9</b>	46.2

\* Mineral Resource estimate is inclusive of Mineral Reserves.

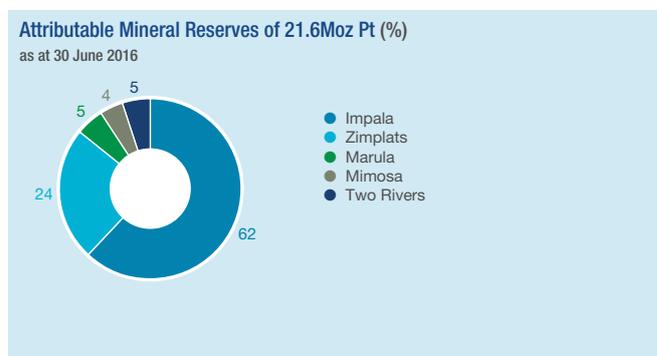
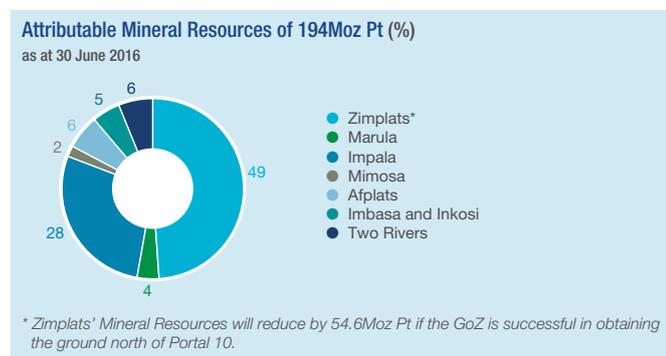
- There is no material change in the attributable Mineral Resource estimate which reduced by 1.7Moz Pt to 194Moz Pt
- The attributable Mineral Reserve estimate reduced by 18% to 21.6Moz Pt mostly due to the decision to place 17 Shaft at Impala on low cost care and maintenance and the resultant exclusion of its area from the Mineral Reserve estimate. This was offset to some extent by the increase at Zimplats where the footprint of Bimha was increased



## CONTRIBUTION BY AREA

The Mineral Resource and Mineral Reserve (Pt) contribution by operation is depicted below:

- The attributable Mineral Resource (Pt) estimate is dominated by Zimplats and Impala, with the Zimplats Mineral Resource accounting for 49% of the total
- Some 62% of the attributable Mineral Reserves (Pt) are located at Impala and a further 24% is hosted within the Main Sulphide Zone at Zimplats



# Implats Mineral Resource and Mineral Reserve Statement 2016 at a glance

## MINERAL RIGHTS (for more detail, see page 15)

All mineral rights are in good standing without any known impediments. The Zimbabwean Government (GoZ) has been pursuing greater participation in the mining sector by indigenous Zimbabweans. The Zimbabwe policy position on indigenisation was clarified in the 11 April 2016 policy statement, but there are ongoing discussions with the GoZ regarding indigenisation implementation plans (IIPs) for Zimplats and Mimosa. Depending on what position is ultimately taken by the GoZ, Implats' attributable Mineral Resources and Mineral Reserves may be reduced. During 2013, the GoZ gazetted its intention to compulsorily acquire a large tract of ground in the northern portion of the Zimplats mineral lease, containing 54.62Moz Pt. As at 30 June 2016 there has been no conclusion to this matter, as Zimplats objected and is seeking to have the matter solved amicably.

## MINERAL RESOURCE AND MINERAL RESERVE STATEMENT (for more detail, see page 34)

The Mineral Resource and Mineral Reserve Statement is compiled in accordance with guidelines and principles of the South African Code for the Reporting of Exploration Results, Mineral Resources and Mineral Reserves (SAMREC Code), the South African Code for the Reporting of Mineral Asset Valuation (SAMVAL Code) and Section 12.11 of the JSE Limited (JSE) Listings Requirements as updated from time to time. Supporting documentation includes detailed internal reports, SAMREC Table 1 reports, and regular third-party reviews. A summary list of Competent Persons who compiled this report is included in this document.

## THE SAMREC CODE (for more details, see page 9)

Implats subscribes to the principles of the SAMREC Code of transparency, materiality and competency. The overarching strategic key focus areas of Implats are:

- Maintaining prudent investment through the cycle
- Maintaining strategic optionality and positioning the Group for the future
- Improving efficiencies/profitability through operational excellence and safe production
- Conserving cash, especially while metal prices remain depressed
- Maintaining our social licence to operate

## KEY CRITERIA (for more detail, see page 25)

- Mineral Resources are reported inclusive of Mineral Reserves unless otherwise stated
- There are no Inferred Mineral Resources included in any of the Mineral Reserve estimates
- Mineral Resources are only converted to Mineral Reserves once a feasibility study has been concluded and the new project or existing mine has been budgeted for and approved by the Implats board
- The Mineral Resource Statements remain, in principle, imprecise and must not be seen as calculations. Rounding-off of figures may result in minor discrepancies
- The Mineral Resources and Mineral Reserves are estimated as at 30 June 2016 and will be affected by changes in the metal prices, exchange rates, operating parameters, cost and performance, permitting and potential changes in legislation
- No feasibility study for new mining infrastructure was completed during the past year; the study for the next Portal at Zimplats is near completion (Portal 6), a replacement for Portals 1 and 2. The new mining blocks will cover double the strike length of the existing blocks.
- The Mineral Resources and Mineral Reserves are estimated for the PGMs (excluding osmium) and gold only, while some details of the other byproducts are mentioned

## Long-term price assumptions in today's money\*\*

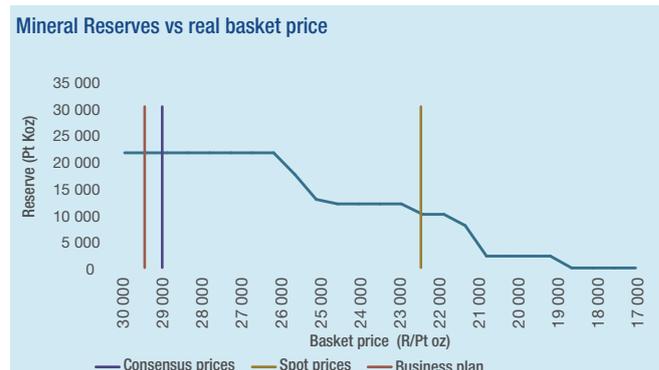
Platinum	US\$/oz	1 260
Palladium	US\$/oz	815
Rhodium	US\$/oz	1 045
Ruthenium	US\$/oz	35
Iridium	US\$/oz	460
Gold	US\$/oz	1 080
Nickel	US\$/t	13 955
Copper	US\$/t	5 730
Exchange rate	R/US\$	14.80

\*\*Supporting the Mineral Reserve estimates.

## MINERAL RESERVE SENSITIVITY

(for more detail, see page 26)

Rigorous profitability tests are conducted to test the viability of the Mineral Reserves. A summary graph showing the price sensitivity of the total Group Mineral Reserves is depicted below.



# Implats' Mineral Resource and Mineral Reserve Statement 2016 at a glance

## IMPLATS' MINERAL RESERVES IN PERSPECTIVE

The updated allocation of Implats' Mineral Reserves per shaft infrastructure as at 30 June 2016 is depicted in the accompanying graphic. The depth range below surface and quantum related to the infrastructure is shown and depicts, among others, the advantage at Zimplats in this regard.

### Platinum Mineral Reserve and depth range for individual Implats shafts



### General Implats numbers at 30 June 2016

FIFR **0.091**

TIFR **12.31**

Refined Pt production **1 438 300 oz**

Headline earnings **R83 million**

Net cash from operating activities **R2 731 million**

Capital expenditure **R3 560 million**

Attributable Mineral Resources (Pt ounces) **194Moz**

Number of employees **50 720**

# Integrated Mineral Resource Management

Implats embraces an integrated Mineral Resources Management (MRM) function. To this end, systems, procedures and practices are aligned and are continuously being improved to achieve this objective. MRM includes exploration, geology, geostatistical modelling and evaluation, mine survey, sampling, mine planning, ore accounting and reconciliation and the MRM information systems. The MRM function is the custodian of the mineral assets and specifically strives to optimise these assets – in terms of both Mineral Resources and Reserves – and to unlock value through a constant search for optimal extraction plans which yield returns in line with the corporate and business objectives.

The main objective of the MRM function is to support the strategic intent and add value to the organisation through:

- Ensuring that safe production is the first principle underpinning all Mineral Reserve estimates
- Appropriate investigation, study and understanding of the orebodies
- Accurate and reconcilable Mineral Resource and Mineral Reserve estimates
- Integrated and credible short, medium and long-term plans
- Measured and managed outputs
- Technically appropriate and proven management information systems.

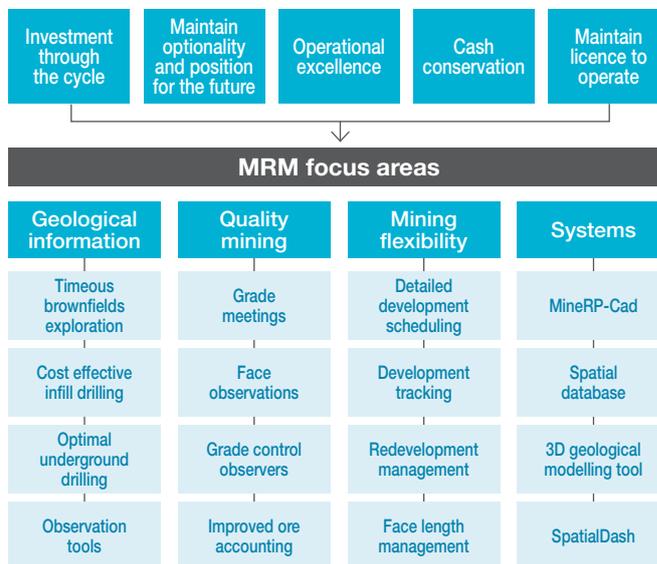
Continuous improvement has been embedded in the MRM function. Specific focus is given to standardisation, development, review and improvement of protocols to govern MRM. Implats accordingly remains committed to the following:

- Continuously improving the management of Mineral Resources and related processes, while addressing skills development and retention
- Optimal exploitation of current assets, together with growth of the Mineral Resource base by leveraging and optimising existing Implats properties, exploration and acquisitions, including alliances and equity interests with third parties and the legislative regime that governs mineral rights ownership
- The transparent, responsible and compliant disclosure of Mineral Resources and Mineral Reserves in line with the relevant prescribed codes as updated from time to time – SAMREC, SAMVAL and JORC – giving due cognisance to materiality, transparency and competency.

Present focus areas include:

- Improving the MRM information systems in cooperation with third-party vendors
- Improved Mineral Reserve flexibility, measured as mineable face length in conventional mining sections
- Improvement in the quality of mining
- Revisiting optionality of long-term planning in view of present cash constraints
- Scenario planning for LoM II and III Mineral Resources to ensure a sustainable business model.

## Group strategy: positive long-term fundamentals, expect lower-for-longer prices



Underground mapping at Marula.

## Mine planning

The main objectives of the Implats' integrated mine planning cycle have remained as follows:

- To use the full available time per year for quality planning
- To allow integration of the different levels of planning
- To ensure the planning levels are done in the correct sequence
- To populate the cycle with appropriate review processes
- To link the planning cycle to business reporting periods
- To provide continuity of plans and cycles
- To place emphasis on risk and value
- To identify departmental inputs and ensure full participation
- To ensure changes in the business environment are continuously incorporated
- To ensure top-down goals flow through to operational planning and vice versa
- To ensure the optimisation of plans
- To enhance compliance with standards, consolidation and delivery of results.

The planning cycle is now embedded to give due consideration to the sequence of planning, the duration of the business planning period and the embedding of long-term strategic planning. It commences with updating the life-of-mine (LoM) plans in October, followed by a detailed five-year development and two-year stoping scheduling phase in February and March. Through the LoM process, the previous LoM plans and performances, shaft tails and also capital requirements, the ramp-up of projects, the portfolio of assets, market demand, price projections and options are examined. This is followed by the reconciliation of the Mineral Resources and Mineral Reserves at mid-year. The reconciliation is updated at year end in May/June leading to the commencement of the next cycle starting in July/August. The main benefit of this approach is the smooth flow and transition from LoM planning to the detailed business plan. Targets for the detailed two-year plan flow from the LoM profiles. The detailed planning phase is completed as late as possible in the cycle, to allow the minimum possible period before the subsequent production year commences and to ensure proper alignment with the delivery phase of the plan, that commences in July.

Implats has defined three levels of LoM planning, these being classified as Levels III, II and I, which also illustrates a broad alignment with Mineral Resource and Mineral Reserve categories. The three levels are linked to increasing levels of confidence and the conversion of Mineral Resources to Mineral Reserves.

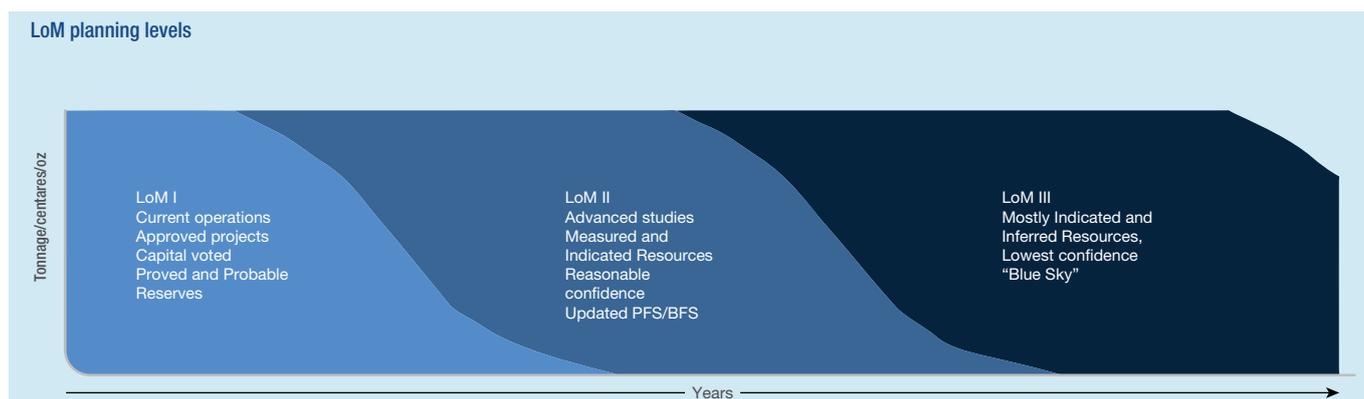
**LoM Level III** includes "Blue Sky" and scoping studies and therefore focuses mainly on Inferred Resources and exploration results. It also includes contiguous areas and opportunities outside existing lease boundaries and ownership. Valuation of these resources can only be done internally, to justify expenditure for the upgrading of the Inferred Resources.

**LoM Level II** includes planned but as yet unapproved projects, which have a reasonable chance of future board approval.

**LoM Level I** includes operational shafts and approved capital projects where a portion of Mineral Resources is converted to Mineral Reserves and sufficient confidence exists for the declaration of Mineral Reserves in a public report.

Estimation of grade block models is facilitated by geostatistical packages, based on a fit-for-purpose principle. Mine design and scheduling use 3D planning tools, the output of which supports the Mineral Reserve estimates. Grade and tonnage modifying factors are stored in electronic databases. The planning process involves the conversion of Mineral Resources to Reserves through the allocation of modifying factors to the *in situ* Mineral Resource, as well as through detailed design and scheduling work. Factors used include densities per rock type and dimensions appropriate to the mining method deployed. In some cases the mineralised channel is narrower than the minimum safe mining width and additional waste material has to be included in the mining cut. Historical dilution factors are incorporated into the plan taking into account anticipated future conditions and improvements where possible. Dilution factors used include overbreaks, underbreaks and off-reef mining. Cognisance is taken of the practicalities of hard rock mining and the limitations of the tools used. This is allocated on a mining area basis, which allows the varying conditions across the lease area to be recognised and integrated into the LoM plan. Where there is no history, factors from similar operations are used as a guideline. Planning parameters are informed in part by historic and anticipated future constraints.

The graphical plans depicting the planned layouts, designs and sequence of mining are compiled and approved by the mining and technical services management of each mining area. These profiles are further endorsed by the technical services and mining executives. Ownership of the business plans are recorded by detailed approval, acceptance and sign-off of the production schedules at various levels at the operations and by senior management.



## Compliance

The reporting of Mineral Resources and Mineral Reserves for Implats' South African Operations is undertaken in accordance with the principles and guidelines of the SAMREC Code. SAMREC was established in 1998 and modelled its code on the *Australasian Code for the Reporting of Exploration Results, Mineral Resources and Mineral Reserves* (JORC Code). The first version of the SAMREC Code was issued in March 2000 and adopted by the JSE in its Listings Requirements later in the same year; this was similarly the basis for the JSE Ongoing Reporting Requirements which were promulgated in 2005. The SAMREC Code has been under review since 2004 and was updated in the 2007 edition and amended in July 2009. The SAMREC Code has recently been updated and supersedes the previous editions of the code; this was launched on 19 May 2016 at the JSE. However, section 12.11 of the JSE Listings Requirements has not been updated and the revised SAMREC and SAMVAL Codes will only come into effect on 1 January 2017. Zimplats, as an Australian Securities Exchange (ASX) listed company, reports its Mineral Resources and Mineral Reserves in accordance with the 2012 JORC Code. Mimosa Investments Limited, a Mauritius-based company, does not fall under any regulatory reporting code but has adopted the SAMREC Code for its reporting.

The new edition of the SAMREC Code includes an updated Table 1, which provides an extended list of the main criteria that must be considered and reported when reporting on Exploration Results, Mineral Resources and Mineral Reserves. In the context of complying with the principles of the code, comments relating to the items in the relevant sections of Table 1 must be provided on an 'if not, why not' basis within the Competent Person's report. The guidelines for the compilation of Table 1 is for (i) the first-time declaration of Exploration Results, a Mineral Resource or a Mineral Reserve, and (ii) in instances where these items have materially changed from when they were last publicly reported for significant projects. Reporting on an 'if not, why not' basis ensures that it is clear to an investor or other stakeholders whether items have been considered and deemed of low consequence or are not yet addressed or resolved. Implats has adopted Table 1 as a standard to complement internal reports.

Concurrent with the evolution of the SAMREC Code, the Committee for Mineral Reserves International Reporting Standards (CRIRSCO) has, since 1994, been working to create a set of standard definitions for the reporting of Mineral Resources and Mineral Reserves. The definitions in the 2016 edition of the SAMREC Code are either identical to, or not materially different from, those existing standard definitions published in the CRIRSCO Reporting Template 2013.

Various Competent Persons (CPs), as defined by the SAMREC and JORC Codes, have contributed to the estimation and summary of the Mineral Resource and Mineral Reserve figures quoted in this report. As such, these statements reflect the estimates as compiled by teams of professional practitioners from the various operations and shafts.

Gerhard Potgieter, Group Consulting Mining Engineer, PrEng, ECSA Registration No 20030236, and a full-time employee of Implats, takes full responsibility for the Mineral Reserve estimates for the Group. The Competent Person has 31 years' relevant mining experience. The Group Executive: MRM, Seef Vermaak, PrSciNat SACNASP Registration No 400015/88, a full-time employee of Implats, assumes responsibility for the Mineral Resource estimates for the Implats Group. He also assumes responsibility for the collation of the combined Mineral Resource and Mineral Reserve Statement for the Group. The Competent Person has 30 years' experience in the exploitation of PGM-bearing deposits. Implats has written confirmation from the Lead Competent Persons that the information disclosed in terms of this document are compliant with the SAMREC Code and, where applicable, the relevant JSE section 12 and SAMREC Table 1 requirements, and that it may be published in the form, format and context in which it was intended.

The address for ECSA is:  
Engineering Council of South Africa (ECSA), Private Bag X691,  
Bruma, 2026, Gauteng Province, South Africa.

The address for SACNASP is:  
South African Council for Natural Scientific Professions  
(SACNASP), Private Bag X540, Silverton, 0127, Gauteng  
Province, South Africa.

# Compliance

The contact details of the Lead Competent Persons are as follows:

**Gerhard Potgieter**

ECSA 20030236  
 Lead Competent Person  
 Group Consulting Mining Engineer  
 Impala Platinum Limited  
 2 Fricker Road  
 Illovo, 2196  
 Private Bag X18  
 Northlands, 2116



1 September 2016

**Seef Vermaak**

SACNASP 400015/88, GSSA  
 Lead Competent Person  
 Group Executive: Mineral Resource Management  
 Impala Platinum Limited  
 2 Fricker Road  
 Illovo, 2196  
 Private Bag X18  
 Northlands, 2116



1 September 2016

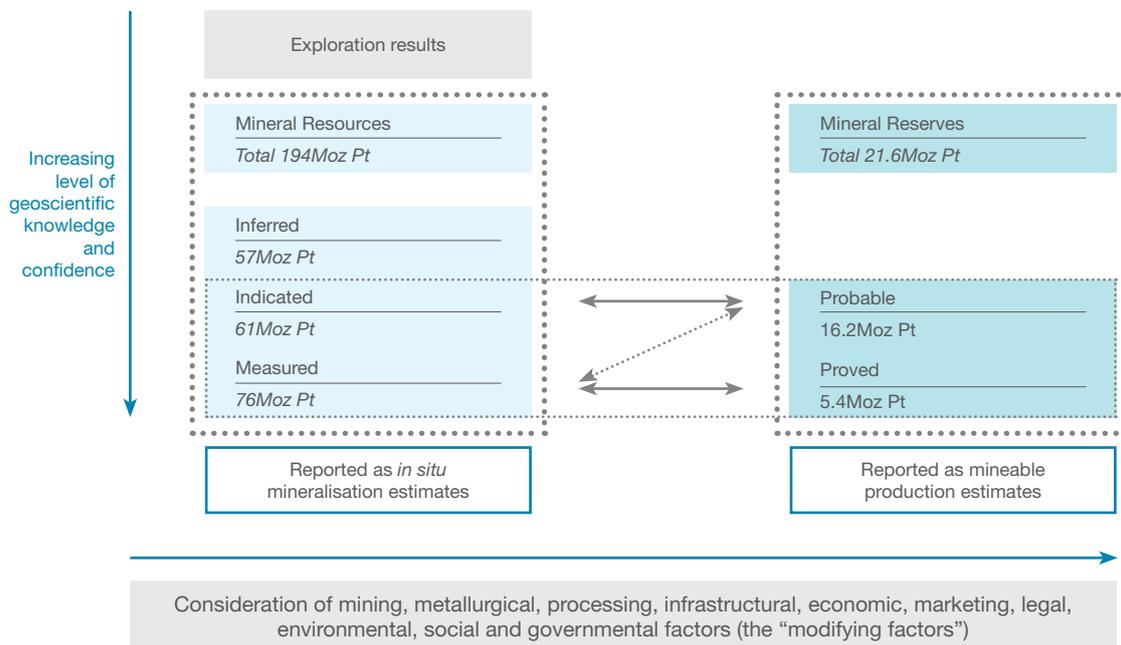
A Competent Valuator (CV) is a person who is registered with ECSA, SACNASP, or SAGC, or is a Member or Fellow of the SAIMM, the GSSA, SAICA, or a Recognised Professional Organisation (RPO) or other organisations recognised by the SSC on behalf of the JSE. A Competent Valuator is a person who possesses the necessary qualifications, ability and relevant experience in valuing mineral assets. A person called upon to act as a Competent Valuator shall be clearly satisfied in their

own mind that they are able to face their peers and demonstrate competence in the valuation undertaken.

Nico Strydom, CA(SA), ACMA, Group strategy and new business development manager, a full-time employee of Implats, takes full responsibility for the valuation of the Mineral Resources and Mineral Reserves for the Group.

The Implats Group’s attributable platinum ounces are reflected in the illustration below.

**Relationship between Exploration Results, Mineral Resources and Mineral Reserves showing Implats’ attributable Resources and Reserves as at 30 June 2016**



## Compliance

Competent Person	Appointment	Registration
Bennie Cilliers	Lead CP exploration	SACNASP, GSSA
Louise Fouché	Lead CP geostatistics and databases	SACNASP, SAIMM, GSSA
Johannes du Plessis	Lead CP audits, reconciliation	SACNASP, GSSA
David Sharpe	Lead CP mine planning	SACNASP, GSSA
Coenie Pretorius	Lead CP survey and ore accounting	PLATO
Stanley Claassen	Lead CP mine planning: standards and processes	SACNASP
Nico Strydom	Lead CV	SAICA, CIMA

Unit/Project	CP Mineral Resources	Registration	CP Mineral Reserves	Registration
Afplats/Imbasa/Inkosi	Jacolene de Klerk	SACNASP, GSSA	n/a	
Marula	Sifiso Mthethwa	SACNASP, GSSA	Gerrie le Roux	PLATO
Zimplats	Steven Duma	AusIMM	Caston Mutevhe	ECISA, SAIMM
Impala Operations	Johannes du Plessis	SACNASP, GSSA	David Sharpe	SACNASP, GSSA
Implats Exploration/Projects	Bennie Cilliers	SACNASP, GSSA	n/a	
Two Rivers	Shepherd Kadzviti	SACNASP	Mike Cowell	SACNASP
Mimosa	Dumisayi Mapundu	SACNASP	Dumisayi Mapundu	SACNASP

*Two Rivers, Mimosa and Zimplats CPs are appointed by their respective CEOs.*

In addition to the CPs listed above, the Mineral Reserve statements are fully supported by an experienced team of general managers, who approve their respective business plans and take full responsibility for their Mineral Reserve statements. The general managers are:

Name	Area of responsibility	Years' relevant experience
Bonginkosi Ngqulunga	General manager Impala 1 Shaft	19
André Fryer	General manager Impala 9 and 10 Shafts	17
Riaan Swanepoel	General manager Impala 11 Shaft	26
Zirk Fourie	General manager Impala 20 Shaft	29
Joseph Tsiloane	General manager Impala EF, 4, 6, 7A, 7 and 12 Shafts	16
Jacey Kruger	General manager Impala 14 Shaft	26
Hans Fourie	General manager Impala 16 Shaft	28
Terence Cowley	Senior mine manager Marula Mine	33
Alex Mushonhiwa	General manager Mimosa Mine	23
Simbarashe Goto	General manager Ngezi Mine	18
JJ Joubert	General manager Two Rivers Mine	25

## Auditing and risk

Implats is committed to independent third-party reviews to provide assurance regarding the Mineral Resource and Mineral Reserve estimates. Furthermore these reviews assist with the principle of continuous improvement on the set internal processes. The Mineral Corporation was contracted to review and audit the Group's Mineral Resources and Reserves for three consecutive years. The first audit was undertaken during the past year and the main focus areas of the audit was to conduct spot checks of estimates and to link this through to the Mineral Resources and Mineral Reserves, the LoM profiles and the financial valuation of LoM models. They are also tasked to provide guidance in terms of the 2016 SAMREC edition, Table 1 and improvements to the Mineral Resources and Reserves public statement.

The result of the audit indicated compliance to the Implats Code of Practice (COP for Estimation, Classification and Reporting of Mineral Resources and Reserves). Minor inconsistencies were noted but these were not material. Independent guidance was given on improved reconciliation, shaft tail management and profitability of LoM profiles, the scheduling of the Mineral Reserves and the use of spot prices versus long-term prices in the financial valuation model. A statement from The Mineral Corporation is included on page 14.

The Group's reported Mineral Reserves, and its reported Mineral Resources represent its estimate of quantities of PGMs that have the potential to be economically mined and refined under anticipated geological and economic conditions. There are numerous uncertainties inherent in estimating quantities of Mineral Resources and Mineral Reserves as well as in projecting potential future rates of mineral production, coupled with many factors beyond the Group's control. The accuracy of any Mineral Resources and Mineral Reserves estimate is a function of a number of factors, including the quality of the methodologies employed, the quality and quantity of available data, geological interpretation and judgement. It is also dependent on economic conditions that are in line with estimates.

The Group's Mineral Resources and Reserves are captured and stored in a mineral inventory repository system, which provides an approval and sign-off process, complete with a full audit trail of transaction history. Currently, only historic information has been captured. The system will be fully embedded and auditable by June 2017.

Further, estimates of different geologists and mining engineers may vary and the results of the Group's mining and production – subsequent to the date of an estimate – may lead to a revision of estimates. This can be due to fluctuations in the

market price of ores and metals, reduced recovery rates or increased production costs due to inflation or other factors, which may render Mineral Resources and Mineral Reserves containing lower grades of mineralisation uneconomic to exploit and may ultimately result in a restatement of Mineral Resources and/or Mineral Reserves, which could then adversely impact future cash flows. Mineral estimates are based on limited sampling and, consequently, are uncertain as the samples may not be representative of the entire ore body and Mineral Resource. As the understanding of the ore body improves, the estimates may also change. In addition, the Mineral Reserves the Group ultimately exploits may not conform to geological, metallurgical or other expectations and the volume and grade of ore recovered may differ from the estimated levels. It is important to note that Mineral Resources and Mineral Reserves data is not indicative of future production.

Substantial capital expenditure is required to identify and delineate Mineral Resources and Mineral Reserves through geological mapping and drilling, to identify geological features that may prevent or restrict the extraction of ore, to determine the metallurgical processes to extract the metals from the ore and, in the case of new properties, to construct mining and processing facilities.

The Mineral Resources department subscribes to a formal risk management process, which endeavours to systematically mitigate all risks relevant to the Mineral Resources and Reserves. Currently all these risks are at an acceptable level, i.e. within the set appetite and tolerance levels. It is recognised by Implats that Mineral Resource and Mineral Reserve estimations are based on projections, which may vary as new information becomes available or specifically, if assumptions, modifying factors and market conditions change materially. This approach is consistent with Group definitions of risk as per ISO 31000: 2009: "The effect of uncertainty on objectives". The assumptions, modifying factors and market conditions therefore represent areas of potential risk. In addition, security of Mineral Right tenure or corporate activity could have a material impact on the future mineral asset inventory.

The Group risk management process is described in detail in the 2016 Implats Integrated report.

The key steps in risk management are:

- Establishing the context
- Identifying the risk
- Analysing the risk
- Evaluating the risk
- Addressing the risk

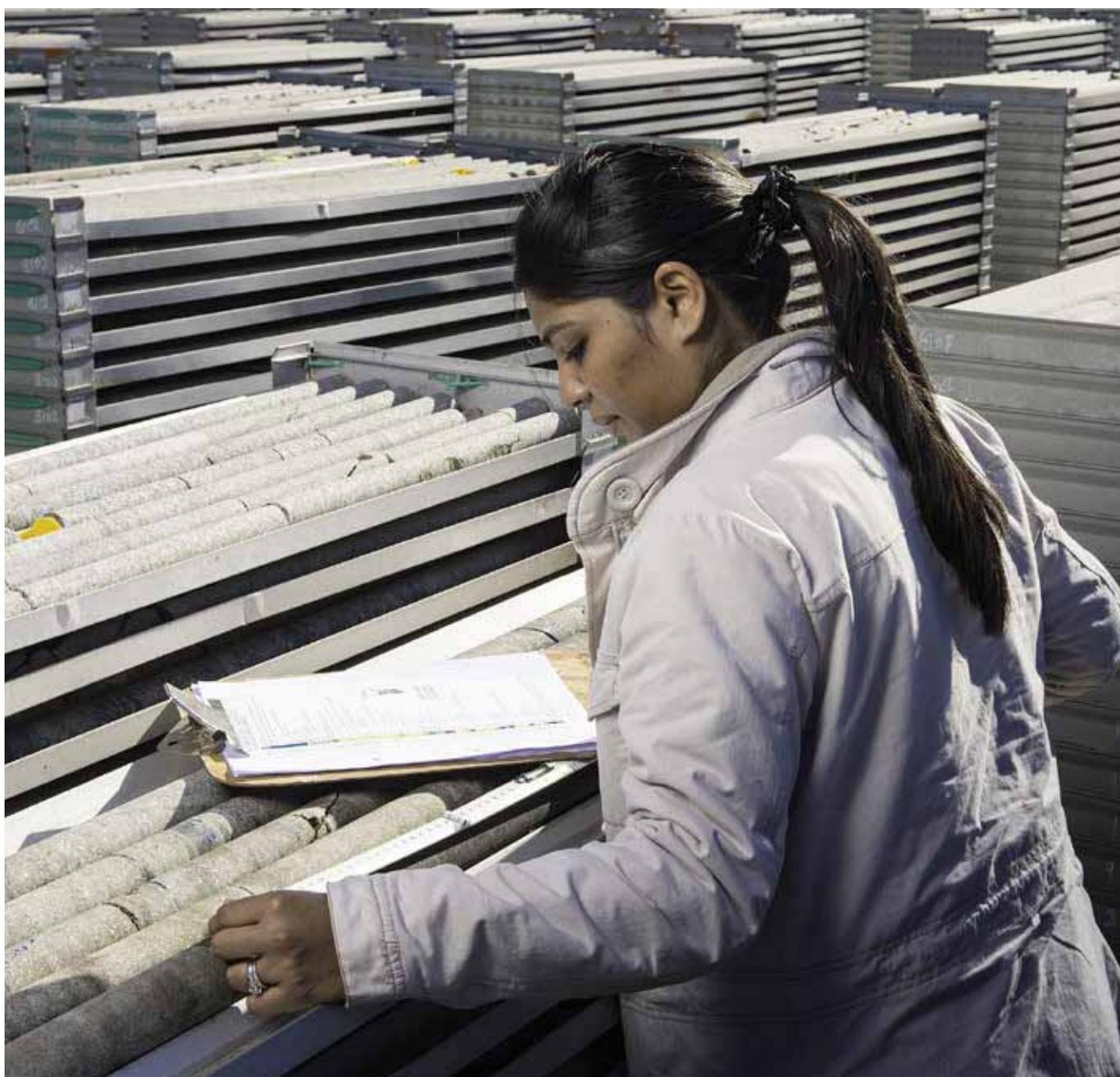
## Auditing and risk

Arising from this process we identify a set of objective-based risk assessments (ORAs) that cover the key aspects of the Implats business. Each identified risk, as well as its associated controls, has a clearly defined line management owner. This process culminates in the identification of the prioritised strategic risks. The top Group strategic risks are listed below as these directly impact the Mineral Resources and Mineral Reserves (summarised from the 2016 Implats Integrated report):

- Depressed PGM basket prices
- Non-delivery of production and productivity targets at Impala Rustenburg

- Significant deterioration in safety performance
- Revenue impact of Section 54s
- Weak balance sheet and cash flow (liquidity)
- The security of water supply in South Africa
- Employee relations climate
- Unavailability of secure and reliable power at Zimplats
- Excessive taxation at Zimbabwean Operations
- The security of electricity supply in South Africa

Similarly, operationally specific risks are listed in each of the individual operations in the Group, later in this report.



Logging exploration core, Impala.



# THE MINERAL CORPORATION

## ADVISORS TO THE MINERAL BUSINESS

Mr Seef Vermaak  
Group Executive: Mineral Resource Management  
Impala Platinum Holdings Limited  
No 2, Fricker Road, Illovo  
Johannesburg  
South Africa

29 July 2016

Dear Mr Vermaak

### RE: IMPLATS GROUP AUDIT OF MINERAL RESOURCES AND RESERVES AT 30 JUNE 2016

The Mineral Corporation has undertaken an audit of the Impala Platinum Holdings Limited (Implats) Mineral Resource and Reserve Statement, as at 30 June 2016, and as prepared by Implats.

During the Collation Phase of the audit, a review of Implats' policies and procedures with respect to the estimation and reporting of Mineral Resources and Reserves was undertaken. We then undertook audits to assess adherence to these policies and procedures, for a selected sub-set of operations (Impala 16 Shaft, Marula Driekop, and Zimplats Portal 6), as well as high-level checks of the remaining operations. The Mineral Corporation then reviewed the consolidated Mineral Resource and Reserve Statements for each operation, as well as the Consolidated Statement for Implats. In the Final Report phase, The Mineral Corporation reviewed the Group's Mineral Resource and Reserve Supplement to the Annual Report, 2016.

Implats has demonstrated to The Mineral Corporation's satisfaction that its policies and procedures, if followed, would result in the reporting of Mineral Resource and Reserve estimates which are compliant with the 2007 and 2016 Editions of the SAMREC Code, or in the case of Zimplats, the 2012 Edition of the JORC Code.

No material issues were identified in the audits of the operations selected, and hence The Mineral Corporation is of the view that Implats' policies and procedures have been followed. The Mineral Resource estimates satisfy the SAMREC Code and the JORC Code requirement for reasonable prospects for eventual economic extraction. The Mineral Reserve estimates are based on life of mine plans, with their extraction having been demonstrated to be financially viable and justifiable under a set of realistically assumed production levels, Modifying Factors and economic inputs. There were no material issues identified in the source and Consolidated Statements for each operation and for the Group in relation to summation, rounding off and presentation of the estimates.

The Mineral Corporation is satisfied that the Mineral Resource and Reserves Supplement to the Implats Annual Report reflects the Mineral Resource and Reserve estimates compiled, and that it in itself, is compliant with respect to the SAMREC Code.

This opinion does not imply that The Mineral Corporation has accepted the role of Competent Person for the purpose of the Mineral Resource and Reserves estimation. Such role resides with the nominated personnel of Implats.

Yours sincerely

**STEWART NUPEN**

**Director**

BSc (Honours), Pr.Sci.Nat (400174/07), FGSSA

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## Mineral rights status

The Mineral and Petroleum Resources Development Act, No 28 of 2002 (MPRDA), governing mineral legislation in South Africa, came into effect on 1 May 2004. The MPRDA, with its associated broad-based socio-economic empowerment charter for the mining industry and its attendant scorecard, as revised and amended from time to time, has played a significant role in the transformation of the South African mining industry. The Act effectively transferred ownership of privately held mineral rights to the state to enable any third party to apply to the Department of Mineral Resources (DMR) for new-order prospecting rights or mining rights over these previously privately held mineral rights. Implats continues to embrace the principles of transformation as a moral and strategic imperative to reinforce its position as a leading southern African mining company, making the best possible use of available Mineral Resources.

Regular compliance audits are conducted by the DMR in respect of the Implats Group's mining and prospecting rights. Implats seeks to comply with or exceed all elements of the Mining Charter. We leverage each element of the Mining Charter in terms of our business performance and therefore increase our value creation potential. Implats participated in the Mining Charter assessments conducted by the DMR in 2015 and 2016 and has been assessed as compliant. According to our submissions all three South African mining operations within the Implats Group comply or exceed the 26% BEE ownership requirement.

The DMR's online application and reporting system, SAMRAD, continues to face system functionality challenges. However, DMR accepts manual applications where SAMRAD fails to accept online applications due to system failures. To mitigate the risk of third-party applications being accepted by the DMR regional offices, Implats continues to monitor the various regional DMR notice boards for possible acceptance of third-party applications that are in conflict with Implats' rights or pending applications. If conflicting applications are identified, Implats lodges the required appeals in terms of the MPRDA against these applications to prevent third-party conflicting rights being granted.

Continued delays are still being experienced with the approval and execution of prospecting right renewal applications, which have been lodged by entities within the Implats Group over the last few years. All of the renewals have been recommended for approval. During the 2016 financial year, two prospecting right renewals relating to the Impala/Royal Bafokeng Resources Platinum (Pty) Ltd Unincorporated Joint Venture (JV) have been granted and the execution thereof is pending. Notwithstanding the delays in the finalisation of prospecting right renewal applications, exploration activities continue as the renewal applications were submitted within the required legislative timeframe. The Impala Rustenburg Operation has submitted a new Diepkuil prospecting right application in the 2016 financial year to secure this JV area, pending the section 102 and section 11 approvals to include this JV area into the adjacent Impala converted mining right area. The processing of a new prospecting right application in the Mpumalanga province that was accepted by DMR during 2012 is still pending. Also of note is that closure applications of prospecting rights that have been submitted to DMR over the last few years are also not being processed to finalisation by the DMR. The section 102 and section 11 applications as submitted in June 2013 relating to the JV prospecting rights adjacent to the Impala Rustenburg Operation and the Afplats Leeuwkop Operation are still being processed by DMR.

Both Impala and Afplats have submitted during the 2016 financial year section 52 notices in terms of the MPRDA in respect of the deferment of the Afplats Leeuwkop mining project for four years, as well as the cessation of production from 8 Shaft and a portion of 12 Shaft at the Impala Rustenburg Operations.

In 2011, Impala reached agreement with Royal Bafokeng Platinum (RBPlat) to access certain of its mining areas at Bafokeng Rasimone Platinum Mine (BRPM) from 6, 8 and 20 Shafts. This is essentially a royalty agreement which will provide mining flexibility to these shafts. The Mineral Resources and Reserves involved are not reflected in this report as the ownership has not been transferred.

Fully permitted mining tenements are not specified by the SAMREC Code as a prerequisite for the conversion of Mineral Resources to Mineral Reserves. However, Implats is cognisant that a reasonable expectation must exist that such mining rights will be obtained. Implats remains committed to South African legislative requirements to convert applicable prospecting rights to mining rights.

## Mineral rights status

There are still certain sections of the MPRDA Amendment Act, No 49 of 2008 (that was enacted into law on 7 June 2013) that have not come into effect due to critical concerns raised by the mining industry. One concern was the amendment of section 102 that did not allow for the extension of existing mining or prospecting right areas. However, as this amendment did not come into effect, the mentioned section 102 applications may continue to be processed. These sections are being revisited by the MPRDA Amendment Act 2014 (formerly the MPRDA Amendment Bill (B15-2013)). The new Minister of Mineral Resources, Mosebenzi Zwane, has confirmed at a press conference on 1 June 2016 that it is a priority to bring certainty to the mining industry in South Africa and therefore the aim is to first finalise the MPRDA Amendment Act, 2014 by November 2016, whereafter the possible split in the MPRDA between the mineral sector and oil and gas sector will be considered. Changes to the MPRDA Amendment Act, 2014 have not been made public since it was sent back to Parliament by President Zuma in January 2015 amid concerns that the MPRDA Amendment Act 2014 failed constitutionality tests, as well as possible transgression of bilateral trade agreements with important trading partners. The MPRDA Amendment Act, 2014 is currently in the National Assembly for approval, whereafter it will be returned to the National Council of Provinces for public hearings.

A draft reviewed Broad-Based Black Economic Empowerment Charter for the South African Mining and Minerals Industry was published in the Government Gazette for comments on 15 April 2016. The Implats Group has made submissions to the DMR and formed part of the Chamber of Mines of South Africa's Special Charter Reference Group in formulating industry comments to the DMR. Implats' main concern is the proposed changes to the Black Economic Empowerment Ownership

requirement that does not recognise the principle of "once empowered always empowered" in terms of which the Implats Group has obtained its new order converted mining rights and mining rights in 2008 under the requirements of the MPRDA. This changed view by the DMR is also currently being challenged in court by the Chamber of Mines and being deliberated between the Mining Industry and the DMR to reach an agreed way forward in the matter.

In Zimbabwe, the previously submitted indigenisation plans for both Zimplats and Mimosa were rejected by the Government. Implats continues to engage with the Government of Zimbabwe (GoZ) on an indigenisation implementation plan. In March 2013, the GoZ gazetted a preliminary notice of its intention to compulsorily acquire a large portion of ground (measuring 27 948 hectares) held under the Zimplats special mining lease and situated to the north of Portal 10 which amount to 54.6Moz Pt. In March 2013 Zimplats lodged a formal objection to the preliminary notice to compulsorily acquire the land. From January 2015 Zimplats was actively engaged in discussions with the Ministry of Mines and Mining Development in an endeavour to resolve the matter amicably. On 29 June 2016 Zimplats was served with an application filed in the Administrative Court of Zimbabwe in which the GoZ is seeking an order authorising the acquisition by the GoZ of the land described in the preliminary notice referred to above. Papers opposing the application were filed on behalf of Zimplats Holdings Limited and Zimplats. Zimplats will however still seek to have the matter resolved amicably. Depending on the outcome of the matter in the Administrative Court, or the outcome of any further discussions that Zimplats may have with the GoZ on the matter, the Zimplats Mineral Resources may be significantly reduced.

## Mineral rights status

South Africa	Mining right (ha)	Prospecting right (ha)	Implats' interest (%)
Impala	29 773		96
Impala RBR JV*		3 789	49
Afplats	4 602	1 065	74
Imbasa		1 673	60
Inkosi		2 584	49
Marula	5 494	223	73
Two Rivers	10 675		49

Zimbabwe	Mining leases (ha)	Implats' interest (%)
Zimplats**	48 535	87
Mimosa	6 591	50

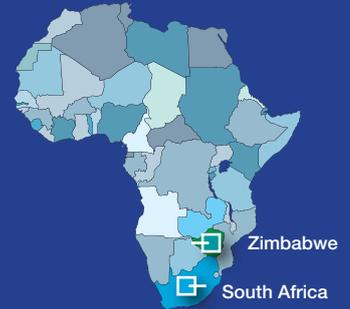
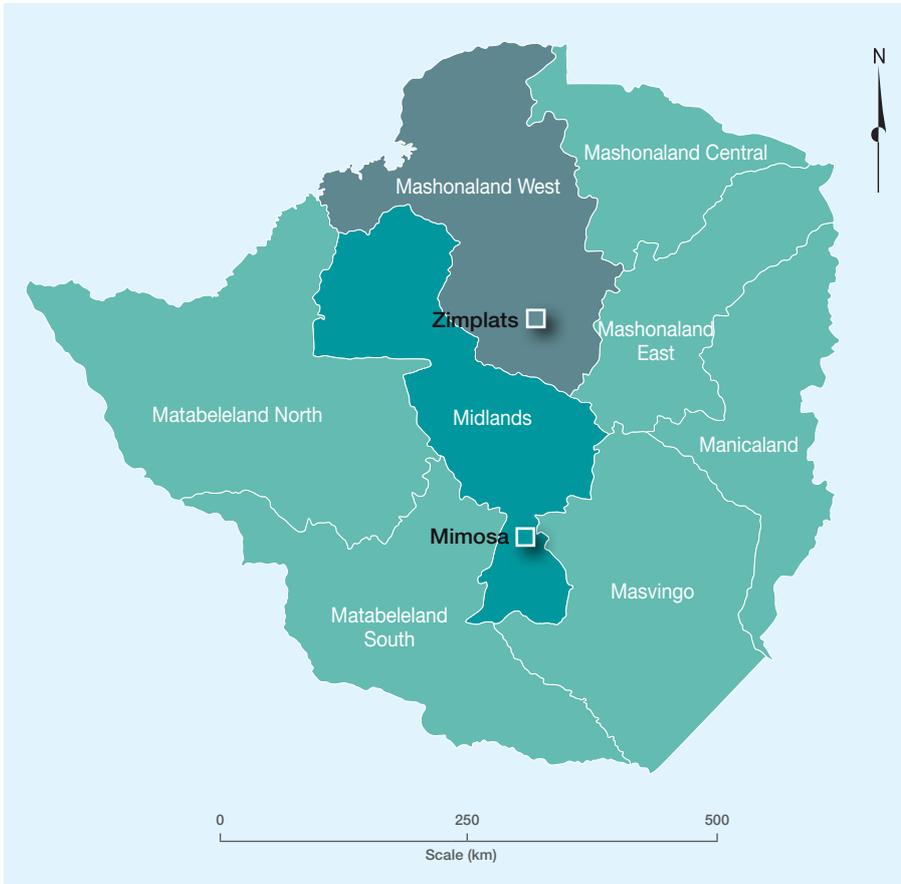
\* Prospecting joint venture with Royal Bafokeng Resources.

\*\* The area could be reduced by 27 948ha if the Zimplats objection to the Zimbabwean Government's intention to compulsorily acquire the northern section of the Zimplats' is unsuccessful. The affected area amounts to 24 954ha if the actual coordinates and chromium claims are accounted for.

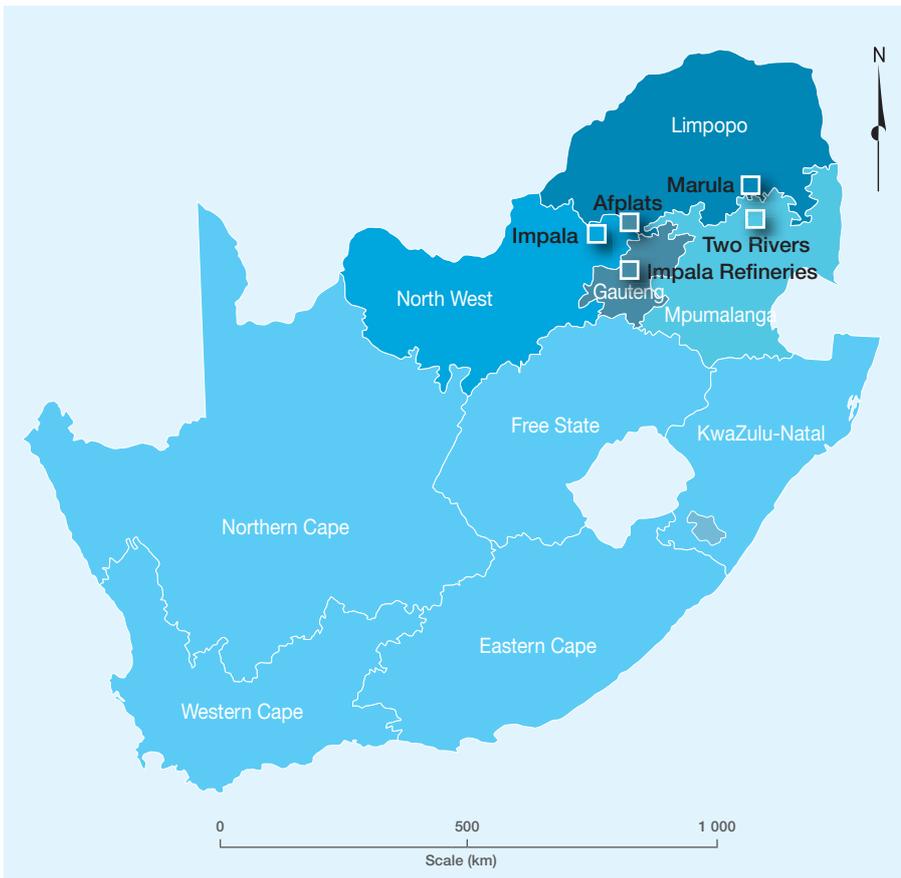


Surveying of rock dump at Mimosa.

## Regional geological settings



PGMs are a relatively rare commodity – only around 500 tonnes (excluding recycling) are produced annually, of which less than 230 tonnes are platinum – yet they play a progressively more important role in everyday life, such as in autocatalysts to control vehicle emissions, in the production of LCD glass and as hardeners in dental alloy. PGMs – primarily platinum, and the associated by-products, palladium, rhodium, ruthenium, iridium and gold usually occur in association with nickel and copper.



## Regional geological settings

Implats exploits platinumiferous horizons within the Bushveld Complex in South Africa and the Great Dyke in Zimbabwe. These two layered intrusions are unique in terms of size and geological continuity. Mining mostly takes place as underground operations focusing on relatively narrow mineralised horizons, with specific mining methods adapted to suit the local geology and morphology of the mineralised horizons.

### The Bushveld Complex

The Bushveld Complex is an extremely large (65 000km<sup>2</sup>), two billion year-old layered igneous intrusion occurring in the northern part of South Africa. Rock types range in composition from ultramafic to felsic. The complex is not only unique in size, but also in the range and economic significance of its contained mineral wealth. In addition to the PGMs and associated base metals, vast quantities of chromium, vanadium, tin, fluorine and dimension stone are also produced.

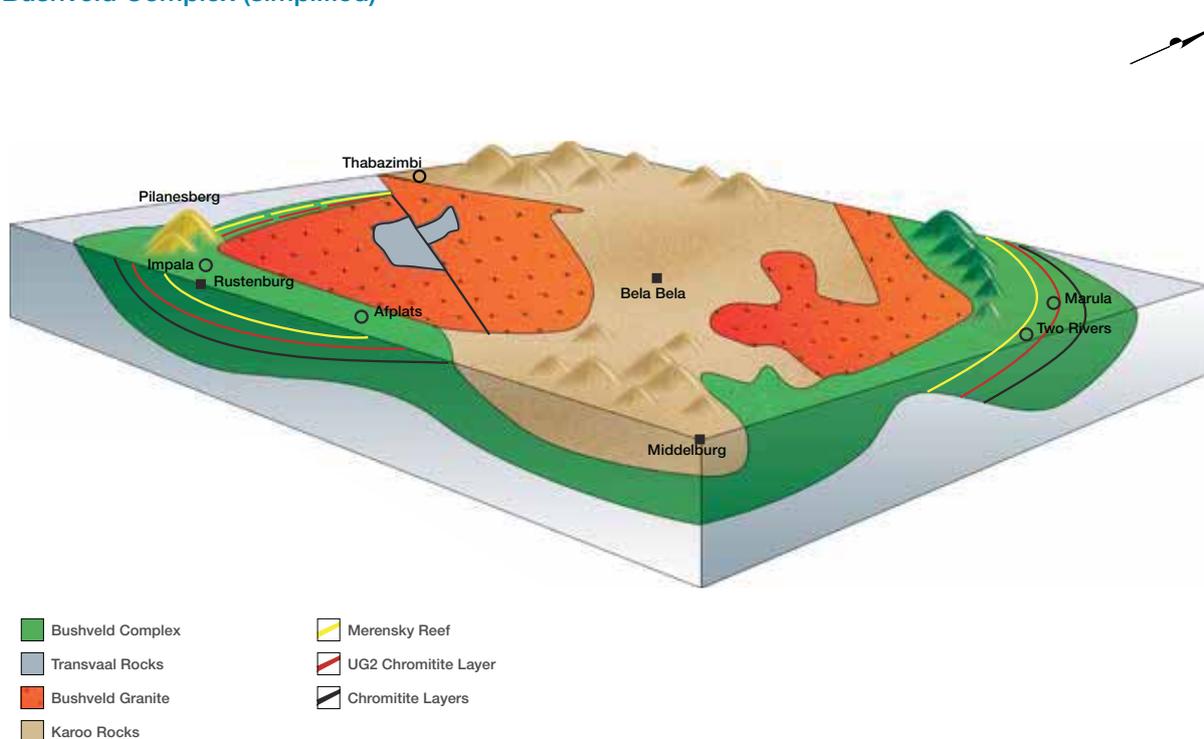
The schematic diagram below shows the extent of the Bushveld Complex. The layered sequence, the Rustenburg Layered Suite, comprises five major sub-divisions. These are,

from the bottom upwards, the marginal, lower, critical, main and upper zones. Two horizons within the critical zone, namely the Merensky Reef and the Upper Group 2 (UG2) Reef, host extensive economically exploitable quantities of PGMs. These two horizons, along with other layers, which can be traced for hundreds of kilometres around the complex, are the focus of Implats' Operations. The PGMs – platinum, palladium, rhodium, ruthenium and iridium – as well as the associated gold, copper, nickel, cobalt, chromium and other minor metals and compounds, are mined concurrently, but recovered by different processes.

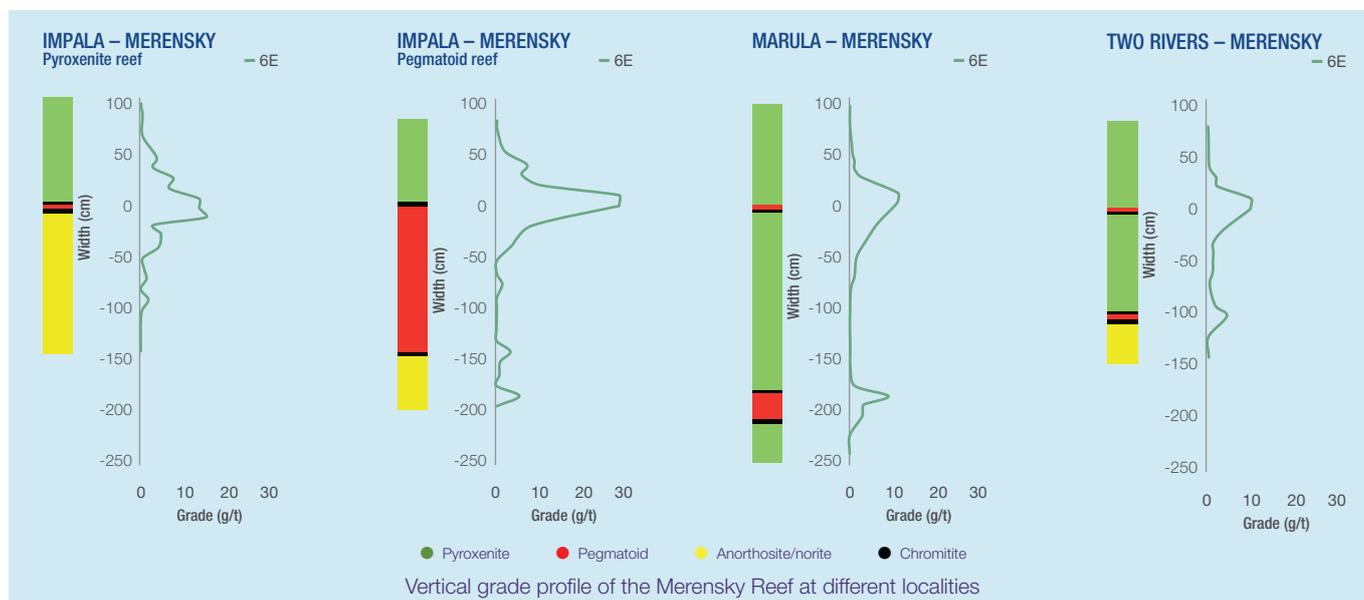
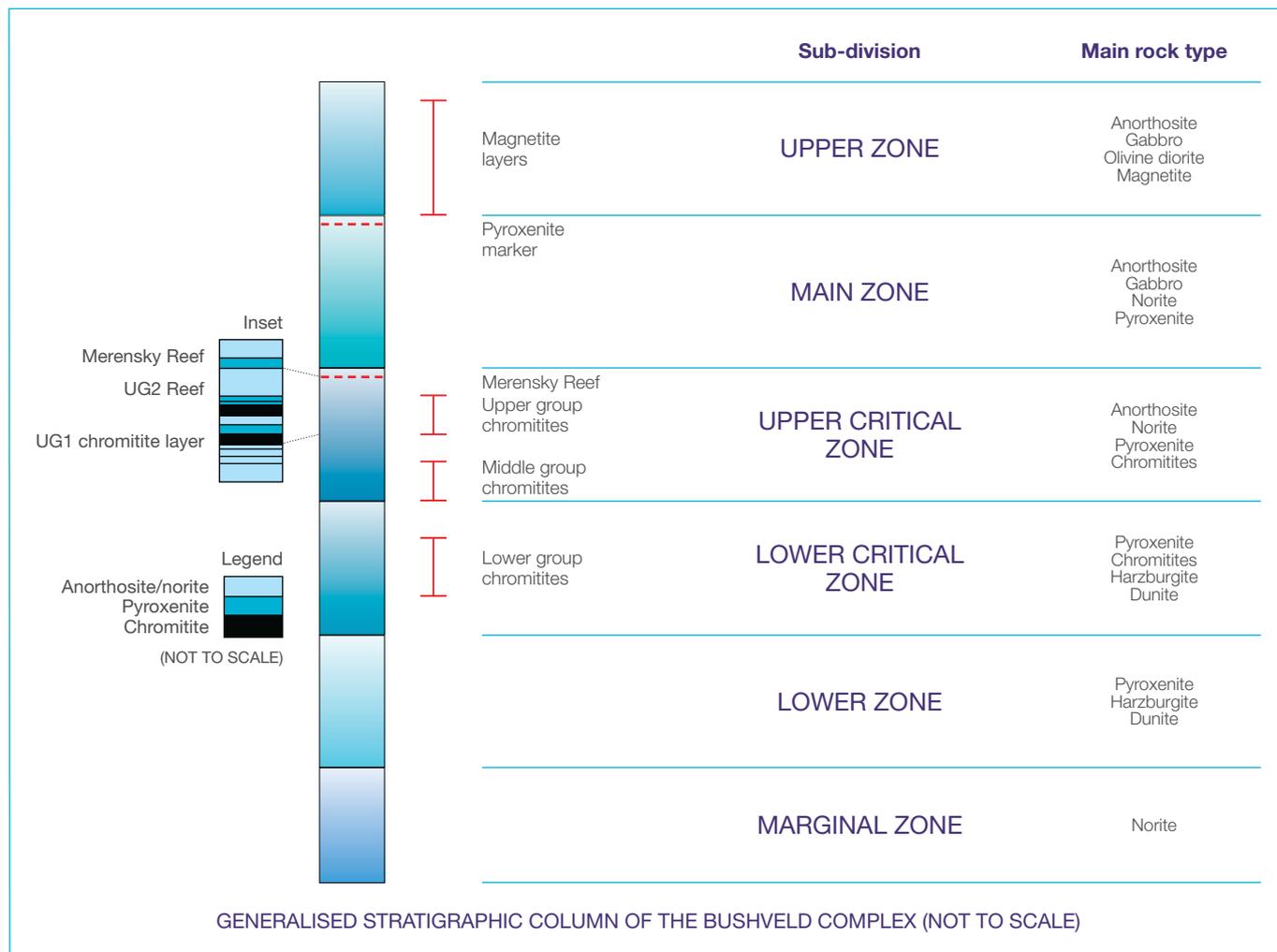
Chromitite layers present below the UG2 Reef contain little to no PGM mineralisation and are mined by other operators for their chromium content.

Implats' Operations on the Bushveld Complex comprise Impala Mine north of Rustenburg, Marula Mine north-west of Burgersfort and the Two Rivers Mine, a joint venture between Implats and African Rainbow Minerals Limited (ARM) situated south-west of Steelpoort.

The Bushveld Complex (simplified)



# Regional geological settings



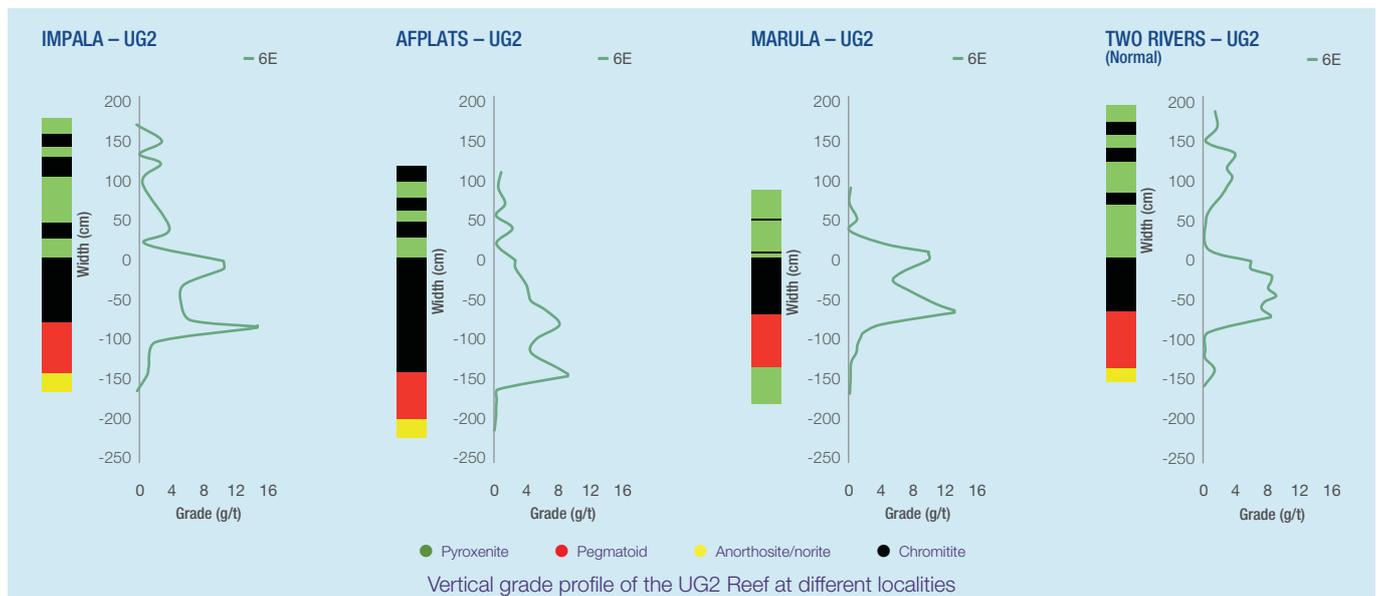
## Regional geological settings

A detailed geological description of the various reef types is provided in the relevant operational sections. Examples of different Merensky Reef vertical grade profiles are shown on the previous page. It is clear that the grade distribution varies materially from area to area. The UG2 Reef morphology and

associated vertical grade distribution also differs significantly between regions (see below), specifically in terms of the width of the main platinum bearing chromitite layer and in the number of layers. In general the grade increases if the chromitite layer width becomes thinner.



14 Shaft, Impala.



## Regional geological settings

### The Great Dyke

The Great Dyke is a 2.5 billion year-old layered mafic-ultramafic body intruded into Archaean granites and greenstone belts. It is highly elongated, slightly sinuous, 550km long, north-northeast trending with a maximum width of 12km. It bisects Zimbabwe in a north-northeasterly trend and is divided vertically into a lower ultramafic sequence, comprising cyclic repetitions of pyroxenite, harzburgite, dunite and chromitite, and an upper mafic sequence consisting mainly of norite, gabbro and olivine gabbro. A diagrammatic section is shown opposite. It is U-shaped in section with layers dipping and flattening towards the axis of the intrusion. Much of the mafic sequence has been removed by erosion and at the present plane of erosion the Dyke is exposed as a series of narrow, contiguous layered complexes or chambers. These are, from north to south, Musengezi, Hartley (comprising the Darwendele and Sebakwe sub-chambers) and a southern chamber comprising the Selukwe and Wedza sub-chambers.

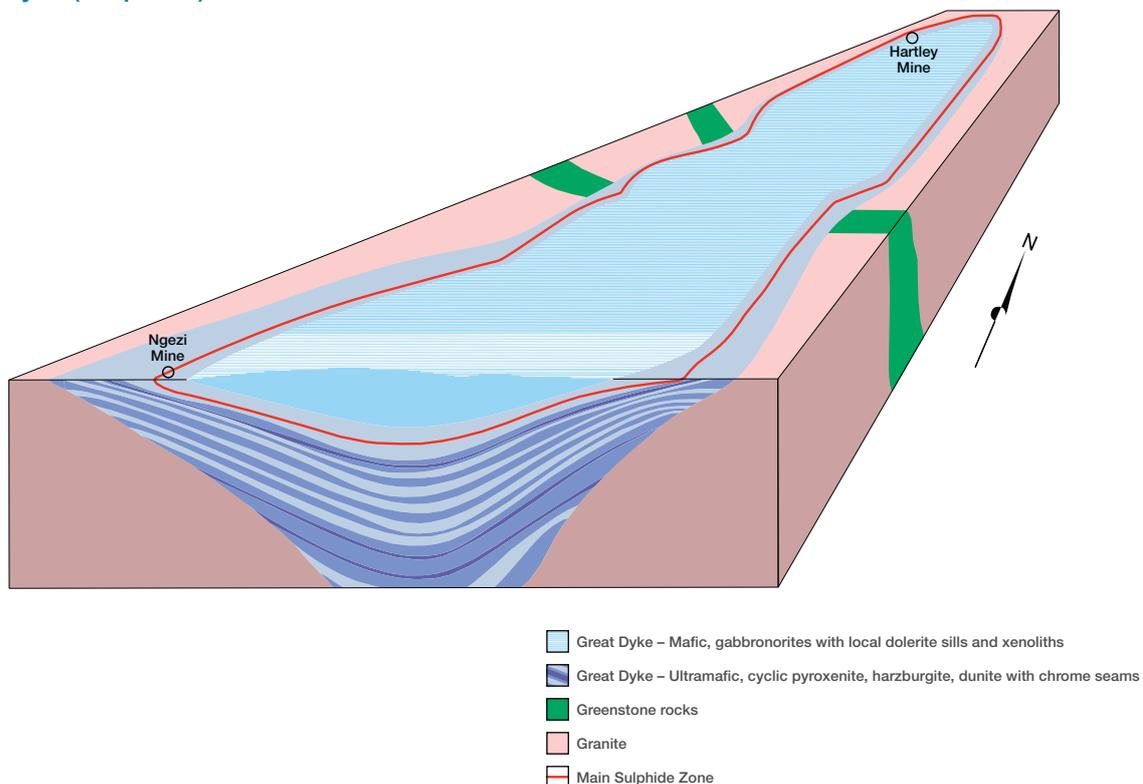
The Main Sulphide Zone (MSZ), host to economically exploitable PGMs and associated base metal mineralisation, is located 10m to 50m below the ultramafic/mafic contact in the P1 pyroxenite. The PGMs, along with gold, copper and nickel, occur in the MSZ. A detailed description of the MSZ and the value distributions is provided in the relevant operations

sections. The examples below comparing different areas indicate that the grade profiles vary between areas and that the platinum and palladium peaks are somewhat offset. Typically, the MSZ consists of a 2m to 10m-thick zone containing 2% to 8% of iron-nickel-copper sulphides disseminated in pyroxenite. The base of this nickel-copper-rich layer is straddled by a 1m to 5m-thick zone of elevated precious metals (Pt, Pd, Rh and Au). The base metal zone contains up to 5% sulphides, while the sulphide content of the PGM zone is less than 0.5%. This change in sulphide content is related to the metal distribution in a consistent manner and is used as a mining marker. It can normally be located visually in borehole core and with careful observation it can also be located underground, therefore careful monitoring supported by channel sampling is required to guide mining.

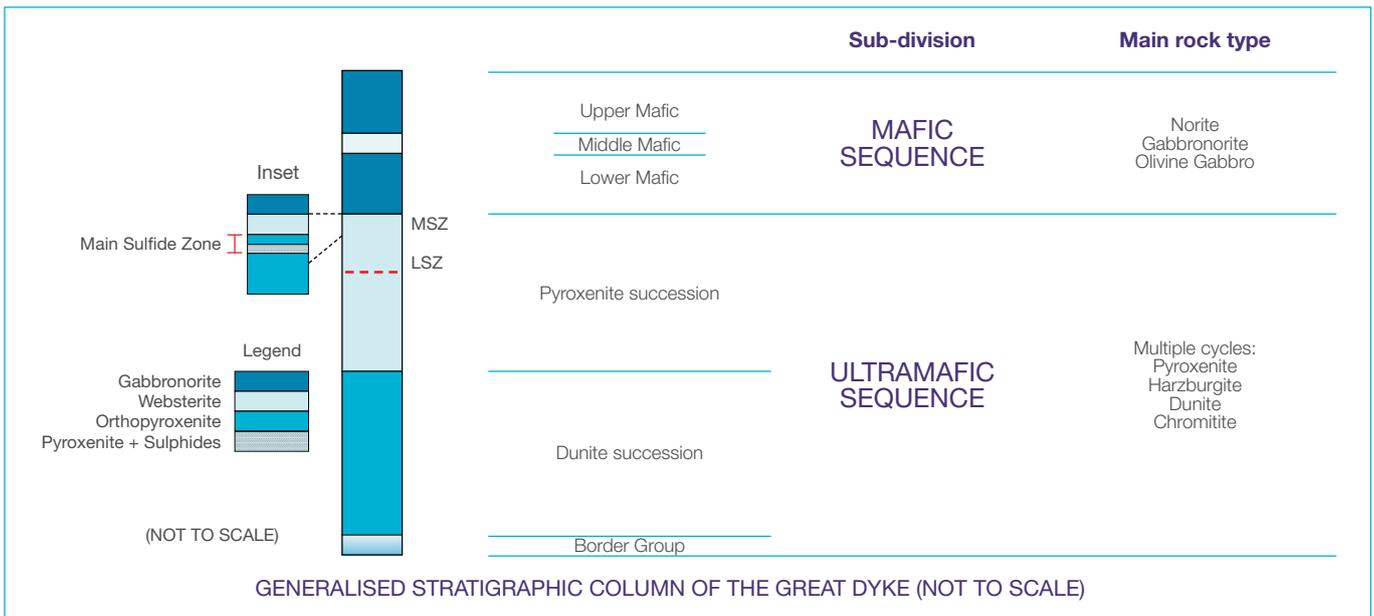
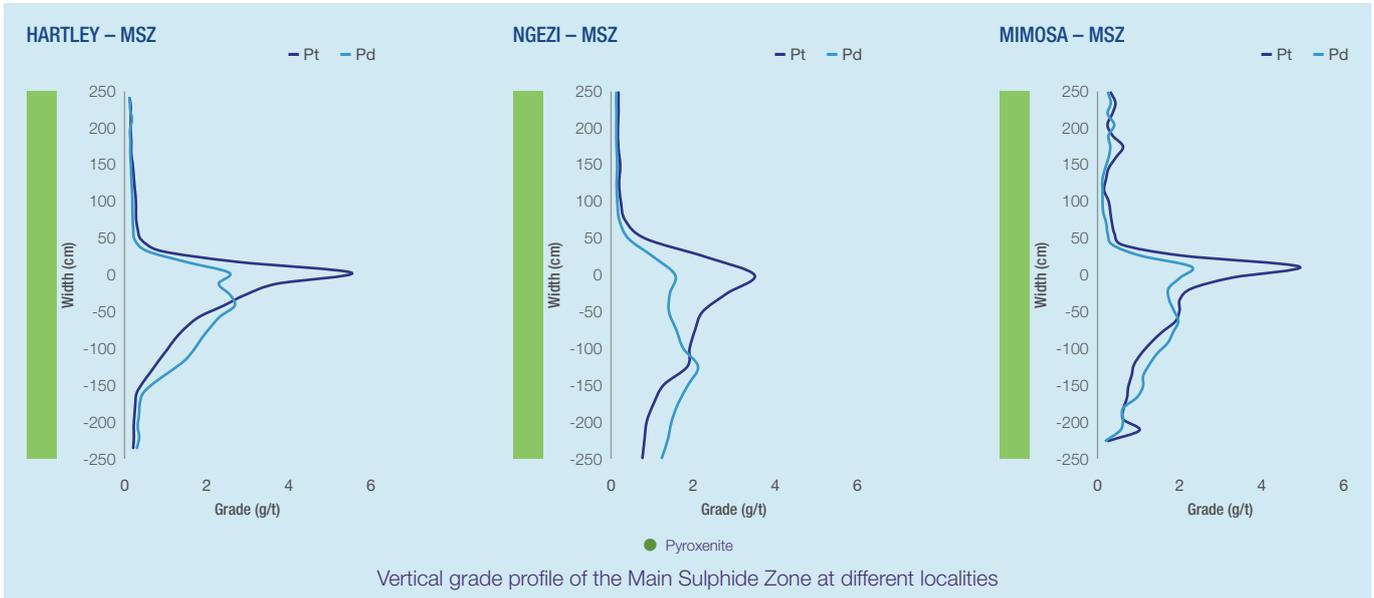
Chromitite layers present below the MSZ contain little to no PGM mineralisation and are mined by other operators for their chromium content only.

Implats' Operations on the Great Dyke comprise Zimplats' Ngezi Mine south-west of Harare and the Mimosa Mine, a joint venture between Implats and Sibanye Gold Limited situated east of Bulawayo.

The Great Dyke (simplified)



# Regional geological settings



Receiving core trays for exploration drilling, Zimplats.

## Exploration review

Given the constrained economic situation of the past few years in the platinum industry, the Company's exploration focus is being limited to current operations. The Group exploration strategy therefore remains unchanged insofar as the main focus is brownfields activities in support of ongoing mining at existing operations. In general, surface borehole spacing during feasibility studies are 500 metres or greater apart, and infill drilling is required on an ongoing basis to better define geological structures, specific local complexities, ground conditions and grade variations to inform mine planning and direct medium-term layouts. The target remains to gather information to direct the five-year Mineral Reserve development plans. As such, brownfields exploration plans are annually revisited and subjected to scrutiny at various management levels to ensure that the Group's imperative of cash conservation is honoured, but at the same time to support optimal mine layouts.

Annual Group exploration expenditure for the past year amounted to some R55 million. It is projected that 2017 will see similar levels of expenses of some R62 million.

### Bushveld Complex in South Africa

Exploration on and around the Impala mining area focused on infill drilling at 20 Shaft where 13 boreholes were completed. At Marula one borehole was completed at the Driekop Shaft. Drilling in support of ongoing mining operations was also conducted at Two Rivers, where four boreholes were completed at the North Shaft.

### Great Dyke in Zimbabwe

At Zimplats, exploration drilling during the year focused on increasing the density of geological and geotechnical data around Portals 1 to 6 in order to identify any reef displacements or bad ground conditions ahead of mining. Drilling at the South Pit area focused primarily on the evaluation of the limit of oxidation in the vicinity of the current open pit boundary. The mining blocks at Zimplats were reconfigured from a 3km to a 6km strike length to improve capital efficiency. Portal 6 is now the next Portal and Portal 5S Mineral Resources has been incorporated into Bimha (Portal 4) and Portal 6. The block model and the Mineral Resources estimated at the proposed Portal 6 were revised as part of the Portal 6 bankable feasibility

study, while the boreholes were drilled during the year specifically to upgrade areas currently in the Indicated Resource to the Measured Resource category. Geotechnical boreholes were also drilled at the site of the proposed Portal 6 box cut and along the main spine of the decline to assess ground conditions and guide the mine design.

At Mimosa, exploration work involved the geological studies based on the drilling that was carried out in the Mtshingwe Shaft area to the south of Blore Shaft and directly ahead of 14 Level South. The drilling was targeted at structural evaluation and grade continuity in the area. The drilling enabled the delineation of the faults and confirmed reef continuity ahead of 14 Level South, an area which was being investigated for possible disruption by a reef roll. A total of nine boreholes were drilled for the project.

### Offshore projects

Implats' geographic focus offshore was in Canada where it continued its successful exploration for PGM mineralisation in the Sunday Lake intrusion, 25km north of Thunder Bay, Ontario, which is a joint venture owned 75% by Implats and 25% by Transition Metals Corp. This programme has discovered PGM mineralisation with high Pt:Pd ratios, typically >1:1 within and adjacent to a 3.5km diameter circular reversely-polarised magnetic anomaly associated with a large, buried Proterozoic-aged mafic-ultramafic intrusion related to the Midcontinental Rift of North America, a feature known to host several other significant nickel-copper-PGM deposits.

From 2013 to the autumn of 2015 in Canada, the Sunday Lake joint venture has completed 14 holes totalling approximately 9 938 metres, that define an open trend of significantly elevated PGM mineralisation approximately 1 000 x 350 metres in size. Intersections range up to 3.32g/t Pt+Pd over 42.9 metres including 5.45g/t Pt+Pd over 10.1 metres, this coming from the past years' drilling. Given budget constraints, work programmes have been curtailed to property maintenance.

Implats continues to monitor PGM exploration worldwide to maintain intelligence concerning resource developments and exploration opportunities.



Exploration drilling, Impala.

## Relevant assessment and reporting criteria

The following key assumptions and parameters, unless otherwise stated, were used in the compilation of the estimates in this declaration:

- A Group-wide committee, the Implats Resource and Reserve Committee (IRRC), was constituted in 2009 with the objective of promoting standardisation, compliant and transparent reporting, continuous improvement and internal peer reviews. The committee meets quarterly with representatives from the various operations and MRM disciplines. As a result, Implats developed a Group-wide protocol for the estimation, classification and reporting of Mineral Resources and Mineral Reserves in 2010 to enhance standardisation and to facilitate consistency in auditing. This protocol is updated annually with the aim of improving and specifically guiding the classification of Mineral Resources and to ensure compliance with the SAMREC Code
- A key aspect of the Group-wide protocol determines the standards for classification of Mineral Resources. The classification standard is a matrix process and measures both geological and grade continuity between points of observation
- Implats introduced a depth cut-off in 2010 whereby mineralisation below a certain depth is excluded from the Mineral Resource estimate. This depth cut-off is applicable to the Bushveld Complex setting and is reviewed annually considering a range of assumptions, specifically the virgin rock temperature (VRT), cooling requirements, available technology, support design and other costs, prices and mining depth limits presently in the platinum industry. It is recognised that the actual depth cut-off could vary from area to area. The depth cut-off of 2 350m was applied during the 2013 Implats Mineral Resource estimates and equated to a VRT of 73° C. A depth cut-off of 2 000m below surface was introduced in 2014. In addition to the depth cut-off areas, various Mineral Resource blocks are considered on a case-by-case basis and this has resulted in areas where the eventual economic extraction is in doubt. These Mineral Resources will be reported as exploration results and are excluded from the summation of total Mineral Resources per area and the attributable Mineral Resources
- Mineral Resource tonnage and grades are estimated *in situ*. The Mineral Resources for the Merensky Reef are estimated at a minimum mining width, and may therefore include mineralisation below the selected cut-off grade. Mineral Resource estimates for the UG2 Reef reflect the main UG2 chromitite layer widths only and do not include any dilution. Implats prefers to estimate the UG2 chromitite layer separately from the low-grade or barren hangingwall and footwall units, as this approach supports improved grade control and ore accounting practices. This practice to report the UG2 chromitite layer as the Mineral Resource estimate and disclosing the actual estimated layer width is most transparent and compliant with the SAMREC Code
- Note that the main UG2 chromitite layer widths in the case of Impala and Marula are narrower than a practical minimum mining width. For further clarity a comparative summary is listed in these sections where the standard estimates are compared with estimates that include dilution up to a minimum mining width
- Mineral Resource estimates for the Main Sulphide Zone are based on optimal mining widths. Such mining widths are reviewed from time to time given varying economic and operational considerations
- Mineral Resource estimates are reported inclusive of Mineral Reserves, unless otherwise stated
- Mineral Resource estimates allow for estimated geological losses but not for anticipated pillar losses during eventual mining, except where these pillars will never be extracted, such as legal, boundary and shaft pillars
- Mineral Reserve estimates include allowances for mining dilution and are reported as tonnage and grade delivered to the mill
- Rounding-off of figures in the accompanying summary estimates may result in minor computational discrepancies. Where this occurs it is not deemed significant
- It is important to note that the Mineral Resource Statements, in principle, remain imprecise estimates and cannot be referred to as calculations. All Inferred Mineral Resources should be read as “approximations”
- Exploration samples are mainly assayed for all PGEs and Au, using the nickel sulphide fire assay collection method and determining the elements with an inductively coupled plasma mass spectrometer (ICP-MS). Base metal content is determined by an atomic absorption (AA) spectrometer using partial digestion in order to state metal in sulphide that is amenable to recovery by flotation processes. All these analyses are undertaken by Intertek Genalysis in Perth via their branch in Bapsfontein
- Underground samples are mainly assayed for Pt, Pd, Rh and Au using the lead collection method by the in-house laboratories at the respective mines. A partial digestion at the in-house laboratories is used to determine the base metal content of samples using AA
- All references to tonnage are to the metric unit
- All references to ounces (oz) are troy with the factor used being 31.10348 metric grams per ounce
- The Mineral Resources and Mineral Reserves reported for the individual operations and projects are reflected as the total estimate (100%). The corresponding estimates relating

## Relevant assessment and reporting criteria

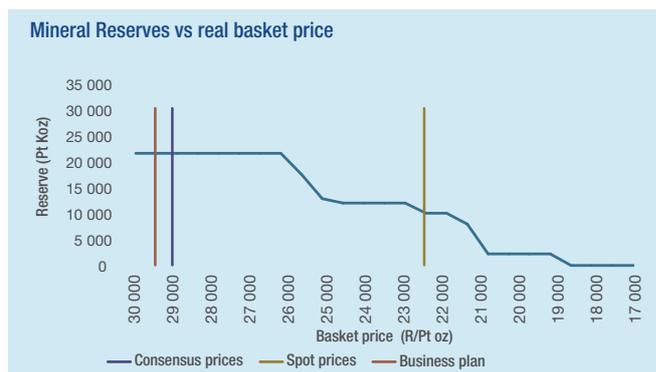
to attributable Mineral Resources and Mineral Reserves are only given as combined summary tabulations

- Mineral Reserves are that portion of the Mineral Resource which technical and economic studies have demonstrated can justify extraction at the time of disclosure. Historically, Implats has only converted Mineral Resources to Mineral Reserves on completion of a full feasibility study for a project with board approval of the full project capital and LoM I for an operating mine (as per SAMREC). The conversion of Mineral Resources to Mineral Reserves for Zimplats has been aligned to the Implats standard since 2014
- No Inferred Mineral Resources have been converted into Mineral Reserves at any of the Implats Operations reported. According to the SAMREC Code Inferred Mineral Resources may be included in mine design, mine planning and economic studies only if a mine plan exists and that the Mineral Reserve statement admits that Inferred Mineral Resources have been used. SAMREC requires that a comparison of the results with and without the Inferred Mineral Resources must be shown and the rationale behind including it must be explained
- There are only limited changes in the estimation principles and reporting style as at 30 June 2016 relative to the previous report
- The term Ore Reserve is interchangeable with the term Mineral Reserve
- Implats uses a discounted cash flow model that embodies economic, financial and production estimates in the valuation of mineral assets. Forecasts of key inputs are:
 

– Relative rates of inflation in South Africa and the United States	– Capital expenditure
– Rand/dollar exchange rate	– Operating expenditure
– Metal prices	– Production profile
	– Metal recoveries
- The outputs are net present value, the internal rate of return, annual free cash flow, project payback period and funding requirements. Metal price and exchange rate forecasts are regularly updated by the marketing department of Implats. As at 30 June 2016, a real long-term forecast for revenue per platinum ounce sold of R29 318 was used. Specific real long-term forecasts in today's money include:
 

– Platinum US\$1 260/oz	– Gold US\$1 080/oz
– Palladium US\$815/oz	– Nickel US\$13 955/t
– Rhodium US\$1 045/oz	– Copper US\$5 730/t
– Ruthenium US\$36/oz	– Exchange rate R14.80/US\$
– Iridium US\$460/oz	

- The spot basket price calculated for Implats as at 30 June 2016 was R22 600 and the equivalent real long-term consensus basket price is R29 276 per ounce
- Rigorous profitability tests are conducted to test the viability of the Mineral Reserves, references to this are listed in the sections per operation and highlight the spot price scenarios. A summary graph showing the price sensitivity of the total Group Mineral Reserves is depicted below.



A Mineral Resource, by definition, is “a concentration or occurrence of solid material of economic interest in or on the earth’s crust in such form, grade, quality and quantity that there are reasonable and realistic prospects for eventual economic extraction”. The interpretation of such “eventual economics” varies significantly. However, it implies some form of high-level view in terms of either “yard-stick comparisons” or high-level scenario models. On this basis Implats has excluded significant mineralisation (a) initially below 2 350m below surface, (b) then 2 000m below surface, and (c) selected areas based on geology and potential infrastructure (see section “Areas excluded from Mineral Resource estimates” in this document). In total some 59Moz Pt has been excluded from current statements on this basis. However, under the present price regime and outlook the bulk of Implats’ South African Mineral Resources are marginal at best and require long-term metal prices higher than current estimates. Work is under way to identify opportunities on a scenario scale to optimise these areas in terms of potential output, production costs and future capital expenses. Notably, the Zimbabwean Mineral Resources are reasonably robust in terms of “eventual economic extraction” and require a real long-term basket price in the order of R29 000 per Pt oz (US\$1 956). The deeper Rustenburg Mineral Resources require a real basket price of around R33 000 per Pt oz (US\$2 233).

## The environment

Our activities associated with the exploration, extraction and processing of Mineral Resources result in the unavoidable disturbance of land, the consumption of resources and the generation of waste and atmospheric and water pollutants. Growing regulatory and social pressure, increasing demands for limited natural resources and the changing costs of energy and water all highlight the business imperative of responsible environmental management, particularly as our underground operations become deeper and consume more energy and water. This involves taking measures to address security of resource supply (for example through efficiency, recycling and fuel-switching) and to actively minimise our impacts on natural resources and on the communities around our operations. Taking these measures has direct benefits in terms of reduced costs and liabilities, enhanced resource security and the improved security of our licence to operate.

Implats has an environmental policy that commits it to conducting its exploration, mining, processing and refining operations in an environmentally responsible manner and to ensure the well-being of its stakeholders. The policy also commits to integrating environmental management into all aspects of the business with the aim of achieving world-class environmental performance in a sustainable manner.

Our management of the environmental impacts of our operations and processes involves the following focus areas:

- Promoting responsible water stewardship by minimising water use and water pollution
- Minimising our negative impacts on air quality
- Responding to climate change risks and opportunities and promoting responsible energy management
- Managing our waste streams
- Promoting responsible land management and biodiversity practices

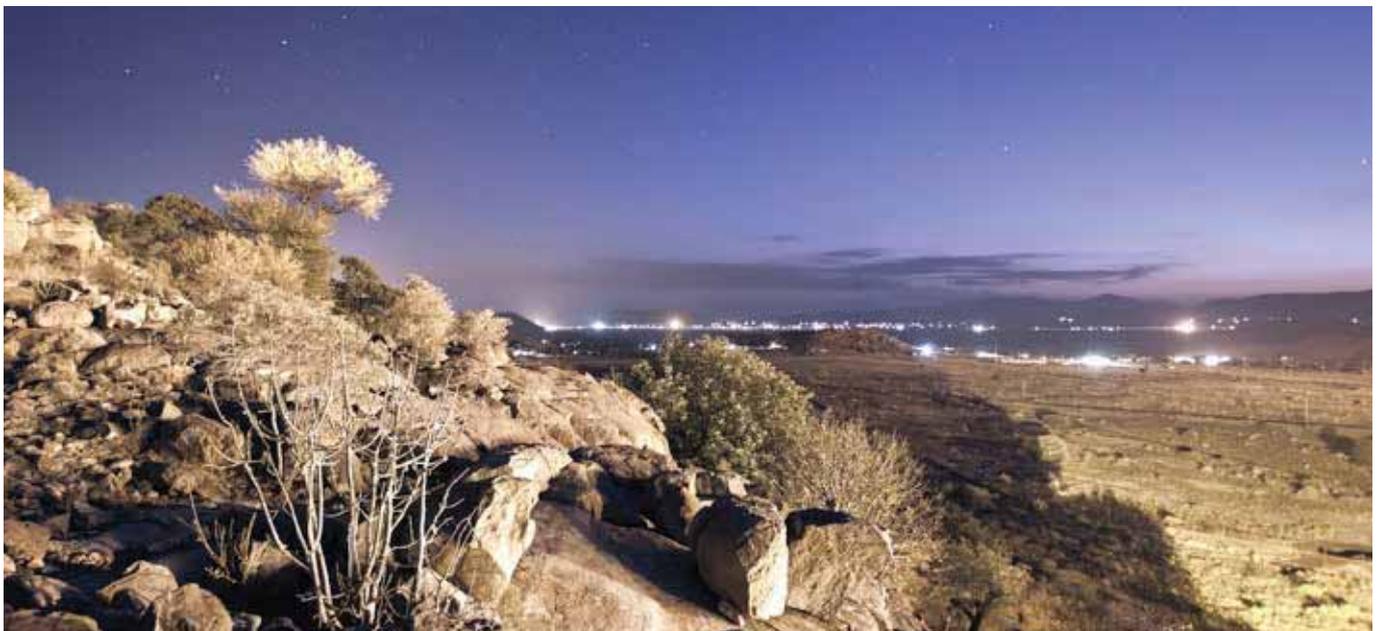
We are committed to attaining and retaining ISO 14001 certification at all our operations. All our operations are certified, other than Marula, which is undertaking its new certification process. In line with our environmental management system expectations, all operations are required to identify and report on environmental incidents. Systems are in place to investigate and determine the direct and root causes of high-severity incidents and to address and close out these incidents.

Further details relating to the materiality of environmental aspects, management processes, performance and commitments are reported in the 2016 Sustainable Development report. Rehabilitation provision is further discussed in the 2016 Implats Annual Financial Statements (refer in particular to notes 1.3.13 and note 19). These reports will be published at [www.implats.co.za](http://www.implats.co.za) in September 2016. The financial provisions for the rehabilitation can be summarised as follows:

Name	Current cost estimates R million*	Financial provision R million**
Impala	858	522
Springs	231	180
Marula	109	53
Afplats	17	9
Zimplats	557	318
<b>Totals</b>	<b>1 772</b>	<b>1 082</b>

\* The current expected cost to restore the environmental disturbances as estimated by third-party experts excluding VAT, P's & G's and contingencies  
 \*\* Future value of the current cost estimates discounted to current balance sheet date as provided in the annual financial statements of the Group.

In compliance with the DMR, the South African liabilities are secured through trust funds, insurance policies and bank guarantees.



Landscape, Afplats.

## Attributable Mineral Resources and Mineral Reserves

Implats reports a summary of total attributable platinum ounces as sourced from all categories of Mineral Resources of the Implats Group of companies and its other strategic interests on a percentage equity interest basis. The tabulation below reflects estimates for platinum, palladium, rhodium and gold (4E), based on the percentage equity interest. For clarity, both attributable

Mineral Resources, inclusive of Mineral Reserves, and attributable Mineral Resources exclusive of Mineral Reserves are shown separately. Note that these are not in addition to each other. These are summary estimates and inaccuracy is derived from rounding of numbers. Where this happens it is not deemed significant.

### Attributable Mineral Resources inclusive of Mineral Reserves

As at 30 June 2016

	Attributable Mineral Resources inclusive of Reserves					Applied Implats' share-holding %	Attributable ounces				
	Orebody	Category	Attributable tonnes Mt	4E grade g/t	6E grade g/t		Moz				
						Pt	Pd	Rh	Au	4E	
<b>Impala</b>	Merensky	Measured	135.3	6.31	7.10	96	17.3	7.7	1.54	0.97	27.5
		Indicated	66.3	6.29	7.08	96	8.4	3.7	0.75	0.47	13.4
		Inferred	22.3	6.36	7.15	96	2.9	1.3	0.26	0.16	4.6
	UG2	Measured	117.9	7.32	8.78	96	16.1	8.5	2.92	0.25	27.7
		Indicated	47.7	7.35	8.83	96	6.5	3.5	1.19	0.10	11.3
		Inferred	14.1	7.17	8.60	96	1.9	1.0	0.34	0.03	3.3
<b>Total Impala</b>			<b>403.6</b>	<b>6.76</b>	<b>7.85</b>		<b>53.1</b>	<b>25.6</b>	<b>7.00</b>	<b>1.99</b>	<b>87.7</b>
<b>Impala/RBR JV</b>	Merensky	Measured	2.6	6.72	7.56	49	0.3	0.2	0.03	0.02	0.6
		Indicated	2.6	7.17	8.06	49	0.4	0.2	0.03	0.02	0.6
		Inferred	2.5	6.75	7.60	49	0.3	0.2	0.03	0.02	0.5
	UG2	Measured	0.7	7.34	8.81	49	0.1	0.1	0.02	0.00	0.2
		Indicated	1.1	7.77	9.32	49	0.2	0.1	0.03	0.00	0.3
		Inferred	0.8	7.09	8.51	49	0.1	0.1	0.02	0.00	0.2
<b>Total Impala/RBR JV</b>			<b>10.4</b>	<b>7.03</b>	<b>8.05</b>		<b>1.4</b>	<b>0.7</b>	<b>0.16</b>	<b>0.07</b>	<b>2.3</b>
<b>Total Impala and Impala/RBR JV</b>			<b>414.0</b>	<b>6.76</b>	<b>7.85</b>		<b>54.5</b>	<b>26.3</b>	<b>7.16</b>	<b>2.06</b>	<b>90.0</b>

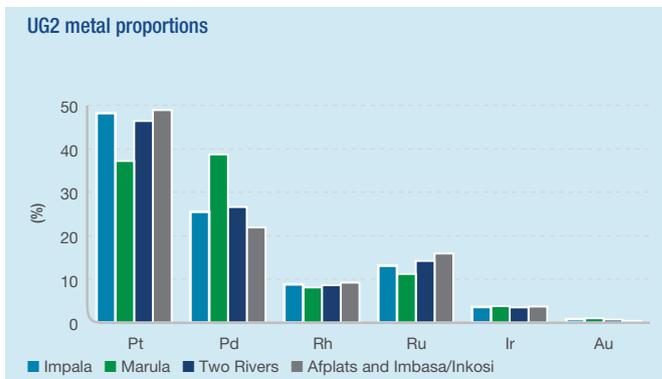
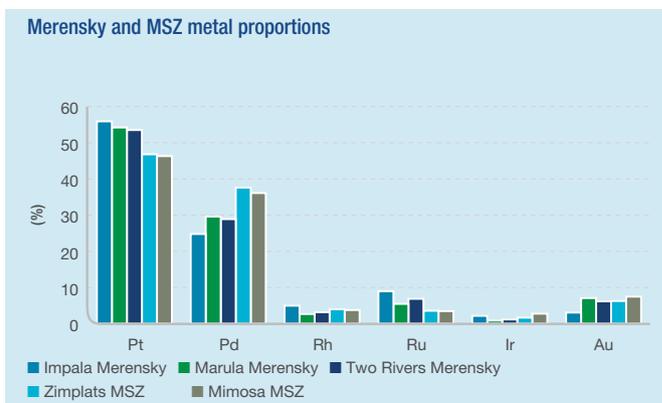
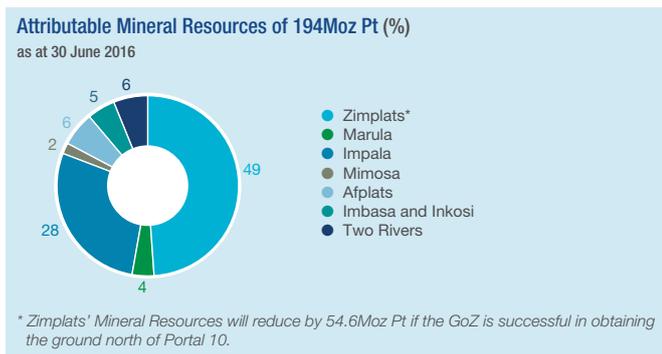
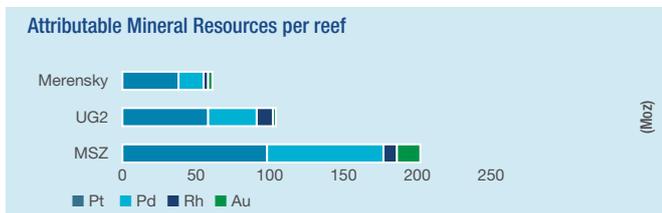
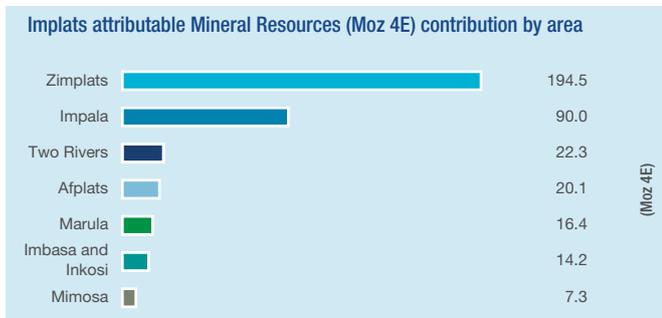
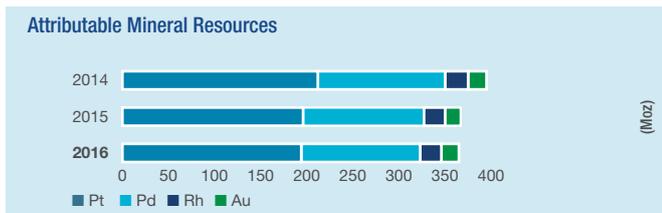
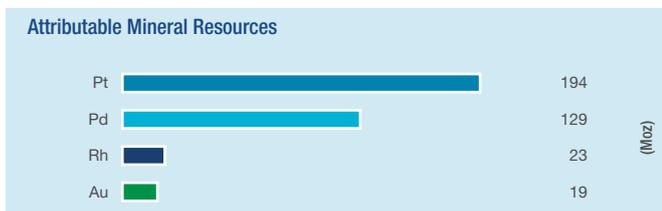
## Attributable Mineral Resources and Mineral Reserves

### Attributable Mineral Resources inclusive of Mineral Reserves continued

As at 30 June 2016

	Attributable Mineral Resources inclusive of Reserves					Applied Implats' share-holding %	Attributable ounces				
	Orebody	Category	Attributable tonnes Mt	4E grade g/t	6E grade g/t		Moz				
							Pt	Pd	Rh	Au	4E
<b>Marula</b>	Merensky	Measured	25.0	4.26	4.56	73	2.0	1.1	0.10	0.26	3.4
		Indicated	5.8	4.24	4.54	73	0.5	0.3	0.02	0.06	0.8
		Inferred	7.1	4.17	4.46	73	0.5	0.3	0.03	0.07	0.9
	UG2	Measured	24.3	8.65	10.17	73	3.0	3.1	0.65	0.08	6.8
		Indicated	9.9	8.89	10.45	73	1.2	1.3	0.27	0.03	2.8
		Inferred	5.7	9.07	10.67	73	0.7	0.8	0.16	0.02	1.6
	<b>Total</b>		<b>77.7</b>	<b>6.56</b>	<b>7.50</b>		<b>7.9</b>	<b>6.8</b>	<b>1.22</b>	<b>0.53</b>	<b>16.4</b>
<b>Afplats</b>	UG2	Measured	72.8	5.19	6.47	74	7.4	3.3	1.39	0.06	12.1
		Indicated	8.0	5.11	6.36	74	0.8	0.4	0.15	0.01	1.3
		Inferred	41.3	5.06	6.25	74	4.1	1.8	0.77	0.03	6.7
	<b>Total</b>		<b>122.2</b>	<b>5.14</b>	<b>6.39</b>		<b>12.3</b>	<b>5.5</b>	<b>2.31</b>	<b>0.09</b>	<b>20.1</b>
<b>Imbasa</b>	UG2	Indicated	16.9	4.59	5.74	60	1.5	0.7	0.29	0.01	2.5
		Inferred	24.1	4.53	5.70	60	2.2	1.0	0.41	0.02	3.6
<b>Inkosi</b>	UG2	Indicated	33.2	4.87	6.14	49	3.2	1.4	0.60	0.02	5.3
		Inferred	18.8	4.64	5.88	49	1.7	0.8	0.33	0.01	2.9
<b>Imbasa and Inkosi</b>	<b>Total</b>		<b>93.1</b>	<b>4.69</b>	<b>5.90</b>		<b>8.6</b>	<b>3.9</b>	<b>1.63</b>	<b>0.07</b>	<b>14.2</b>
<b>Two Rivers</b>	Merensky	Indicated	29.7	2.85	3.11	49	1.6	0.9	0.09	0.18	2.7
		Inferred	48.6	3.61	3.92	49	3.3	1.8	0.20	0.38	5.6
	UG2	Measured	7.3	4.54	5.52	49	0.6	0.4	0.11	0.01	1.1
		Indicated	28.4	4.17	5.03	49	2.1	1.4	0.38	0.04	3.9
		Inferred	57.7	4.86	5.75	49	4.8	3.2	0.89	0.10	9.0
<b>Total</b>		<b>171.7</b>	<b>4.03</b>	<b>4.65</b>		<b>12.3</b>	<b>7.6</b>	<b>1.66</b>	<b>0.72</b>	<b>22.3</b>	
<b>Zimplats</b>	MSZ	Measured	151.5	3.55	3.74	87	8.6	6.8	0.72	1.23	17.3
		Indicated	605.0	3.50	3.69	87	33.7	26.1	2.84	5.41	68.0
		Inferred	1 043.0	3.26	3.53	87	52.6	43.4	5.26	8.00	109.2
	<b>Total</b>		<b>1 799.5</b>	<b>3.36</b>	<b>3.60</b>		<b>94.8</b>	<b>76.3</b>	<b>8.82</b>	<b>14.63</b>	<b>194.5</b>
<b>Mimosa</b>	MSZ	Measured	33.6	3.69	3.91	50	2.0	1.6	0.17	0.29	4.0
		Indicated	15.6	3.57	3.79	50	0.9	0.7	0.08	0.14	1.8
		Inferred	13.6	3.46	3.66	50	0.8	0.6	0.06	0.11	1.5
	<b>Total</b>		<b>62.7</b>	<b>3.61</b>	<b>3.82</b>		<b>3.6</b>	<b>2.8</b>	<b>23.1</b>	<b>0.54</b>	<b>7.3</b>
<b>All</b>	<b>Total</b>		<b>2 741</b>	<b>4.14</b>	<b>4.63</b>		<b>194.0</b>	<b>129.1</b>	<b>23.1</b>	<b>18.6</b>	<b>364.9</b>

# Attributable Mineral Resources and Mineral Reserves



## Notes

- Mineral Resources are quoted inclusive of Mineral Reserves
- Mineral Resource estimates allow for estimated geological losses but not for anticipated pillar losses during eventual mining
- In addition to the depth cut-off for the reporting of Mineral Resources as previously reported, various Mineral Resource blocks are considered on a case-by-case basis and this has resulted in areas where the eventual economic extraction is in doubt. These Mineral Resources are reported as exploration targets and are excluded from the summation of total Mineral Resources per area and the attributable Mineral Resources. The areas involved occur at Impala, Afplats and Two Rivers
- Implats has chosen not to publish Merensky Reef Mineral Resource estimates for Afplats, Imbasa and Inkosi as the eventual economic extraction is presently in doubt and under review
- In 2015 Implats' shareholding increased from 45% to 49% in Two Rivers, whereby the Tamboti Mineral Resources have been transferred to Two Rivers. A further agreement with ARM was made to decrease Implats' shareholding from 49% to 46% on the incorporation of the Tamboti Platinum (Pty) Ltd RE portion of the farm Kalkfontein rights into the Two Rivers mining area. This agreement is awaiting approval of the Section 11 and 102 and the Mining rights application. As at 30 June 2016 Implats' shareholding was still at 49%.

## Attributable Mineral Resources and Mineral Reserves

- The Zimbabwean Government has been pursuing the greater participation in the mining sector by indigenous Zimbabweans. Implats is continuing to engage with the Government of Zimbabwe (GoZ) with respect to agreeing on plans for the indigenisation of Zimplats and Mimosa. During 2013, the GoZ gazetted its intention to compulsorily acquire a large tract of ground in the northern portion of the Zimplats lease containing 54.6Moz Pt. As at 30 June 2016 Zimplats is seeking to solve the matter amicably. These Mineral Resources are included in the estimates and statements shown in this report.
- 4E refers to the summation of platinum, palladium, rhodium and gold
- 6E refers to the summation of platinum, palladium, rhodium, ruthenium, iridium and gold
- Rounding of numbers may result in minor computational discrepancies. Mineral Resource estimates are inherently imprecise in nature. The results tabulated in this report must be read as estimates and not as calculations. Inferred Mineral Resources in particular are qualified as approximations

In comparison with the previous annual Mineral Resource statement there have been changes in the attributable Mineral Resources. The total declared at 30 June 2016 is 1% lower at 194Moz Pt compared with 196Moz Pt in 2015. This can mainly be ascribed to the mining depletion. The grouping of the

platinum ounces per reef shows that some 50% of the attributable Implats Mineral Resources is hosted by the Great Dyke. The Zimplats Mineral Resources make up the bulk of these (49% of the total Implats inventory). Various small movements in Mineral Resource estimates are reflected at each operation due to additional work, newly acquired data, depletion and updated estimations.

### Summary of attributable Mineral Resources

	Moz Pt				
	2012	2013	2014	2015	2016
Impala	68.9	70.3	57.6	55.0	53.1
RBR JV	3.2	3.5	1.5	1.5	1.4
Marula	7.6	7.5	7.4	8.1	7.9
Afplats	14.5	14.3	11.9	12.3	12.3
Imbasa and Inkosi	8.1	8.5	8.5	8.6	8.6
Two Rivers	3.0	2.9	2.9	12.4	12.3
Tamboi	27.1	23.2	23.2		
Zimplats*	93.4	95.5	95.1	94.2	94.8
Mimosa	3.9	3.9	3.7	3.7	3.6
<b>Total</b>	<b>229.8</b>	<b>229.7</b>	<b>211.8</b>	<b>195.7</b>	<b>194.0</b>

\* Zimplats' Mineral Resources will reduce by 54.6Moz Pt if the GoZ is successful in obtaining the ground north of Portal 10.



Mineral identification, Impala.

## Attributable Mineral Resources and Mineral Reserves

### Attributable Mineral Reserves

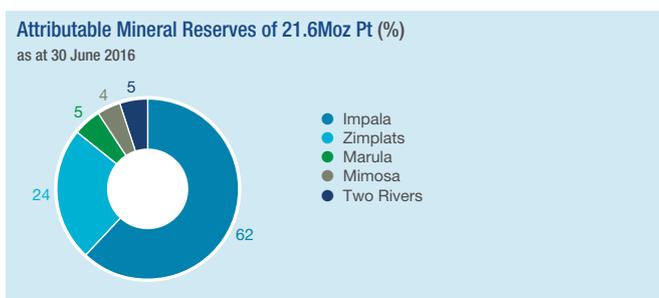
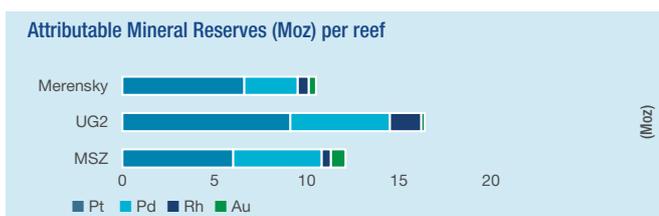
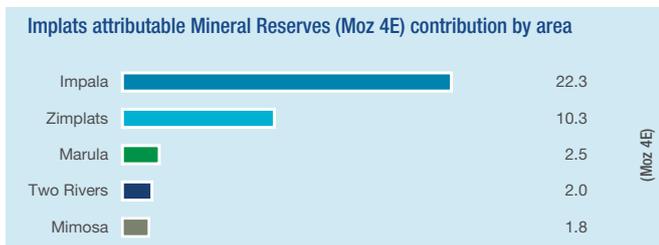
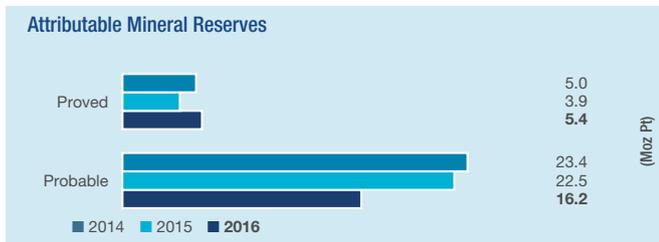
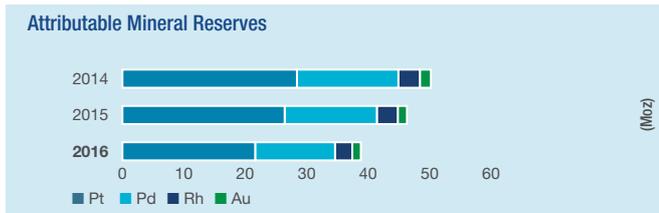
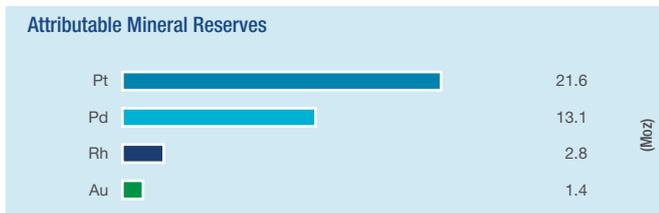
As at 30 June 2016

	Attributable Mineral Reserves					Applied Implats' share- holding %	Attributable ounces				
	Orebody	Category	Attribu- table tonnes Mt	4E grade g/t	6E grade g/t		Moz				
							Pt	Pd	Rh	Au	4E
<b>Impala</b>	Merensky	Proved	9.8	4.03	4.53	96	0.8	0.4	0.07	0.05	1.3
		Probable	68.5	4.19	4.71	96	5.8	2.6	0.52	0.33	9.2
	UG2	Proved	17.1	3.73	4.48	96	1.2	0.6	0.22	0.02	2.1
		Probable	81.0	3.76	4.52	96	5.7	3.0	1.03	0.09	9.8
	<b>Total</b>		<b>176.4</b>	<b>3.94</b>	<b>4.59</b>	<b>96</b>	<b>13.5</b>	<b>6.6</b>	<b>1.84</b>	<b>0.48</b>	<b>22.3</b>
<b>Marula</b>	UG2	Proved	3.1	4.18	4.91	73	0.2	0.2	0.04	0.01	0.4
		Probable	16.2	3.93	4.62	73	0.9	0.9	0.20	0.03	2.0
	<b>Total</b>		<b>19.3</b>	<b>3.97</b>	<b>4.67</b>	<b>73</b>	<b>1.1</b>	<b>1.1</b>	<b>0.24</b>	<b>0.03</b>	<b>2.5</b>
<b>Two Rivers</b>	UG2	Proved	5.7	3.09	3.76	49	0.3	0.2	0.06	0.00	0.6
		Probable	15.5	2.87	3.48	49	0.8	0.5	0.15	0.01	1.4
	<b>Total</b>		<b>21.2</b>	<b>2.93</b>	<b>3.56</b>	<b>49</b>	<b>1.1</b>	<b>0.6</b>	<b>0.21</b>	<b>0.02</b>	<b>2.0</b>
<b>Zimplats</b>	MSZ	Proved	44.6	3.31	3.50	87	2.3	1.9	0.20	0.32	4.8
		Probable	52.3	3.31	3.49	87	2.8	2.2	0.23	0.37	5.6
	<b>Total</b>		<b>97.0</b>	<b>3.31</b>	<b>3.50</b>	<b>87</b>	<b>5.1</b>	<b>4.1</b>	<b>0.44</b>	<b>0.69</b>	<b>10.3</b>
<b>Mimosa</b>	MSZ	Proved	9.8	3.55	3.78	50	0.6	0.4	0.04	0.09	1.1
		Probable	5.4	3.68	3.96	50	0.3	0.2	0.03	0.05	0.6
	<b>Total</b>		<b>15.2</b>	<b>3.59</b>	<b>3.85</b>	<b>50</b>	<b>0.9</b>	<b>0.7</b>	<b>0.07</b>	<b>0.14</b>	<b>1.8</b>
<b>All</b>	<b>Total</b>		<b>329.1</b>	<b>3.67</b>	<b>4.17</b>		<b>21.6</b>	<b>13.1</b>	<b>2.79</b>	<b>1.36</b>	<b>38.9</b>

### Summary of attributable Mineral Reserves

	Moz Pt				
	2012	2013	2014	2015	2016
Impala	20.8	19.8	19.8	19.2	13.5
Marula	1.1	1.1	1.1	1.2	1.1
Two Rivers	0.8	0.9	0.8	1.1	1.1
Zimplats	10.5	10.8	6.2	3.9	5.1
Mimosa	0.8	0.7	0.6	1.0	0.9
<b>Total</b>	<b>34.1</b>	<b>33.3</b>	<b>28.4</b>	<b>26.4</b>	<b>21.6</b>

# Attributable Mineral Resources and Mineral Reserves



## Notes

- The modifying factors used to convert a Mineral Resource to a Mineral Reserve are derived from historical performance while taking future anticipated conditions into account
- Mineral Reserves quoted reflect the grade delivered to the mill
- At Impala the Mineral Reserves decreased materially as 17 Shaft Merensky and UG2 and 12 Shaft North and South Decline Merensky have been excluded from the Mineral Reserve inventory
- Zimplats' Mineral Reserves increased from 2015 with the change of the northern Mineral Reserve boundary of the Bimha Mine (Portal 4) to include Portal 5 South
- The Mineral Reserves at Mimosa, Marula and Two Rivers decreased slightly
- 4E refers to the summation of platinum, palladium, rhodium and gold
- 6E refers to the summation of platinum, palladium, rhodium, ruthenium, iridium and gold
- Rounding of numbers may result in minor computational discrepancies. The results tabulated in this report must be read as estimates and not as calculations

Implats reported attributable Mineral Reserves of some 21.6Moz Pt at 30 June 2016 compared to 26.4Moz Pt in June 2015. The decrease can mostly be ascribed to the exclusion of Impala 17 Shaft and depletion. However, this is offset to some extent by increases at Zimplats. The attendant graphs compare the last few reporting periods and indicate an overall decrease in attributable Mineral Reserves in line with depletion and the aforementioned changes. The quantum of proved Merensky Reef Mineral Reserves at Impala remains lower than the same for the UG2 Reef.

The GoZ has been pursuing the greater participation in the mining sector by indigenous Zimbabweans. Implats continues to engage with the GoZ with respect to agreeing plans for the indigenisation of Zimplats and Mimosa.

## Mineral Resource summary, exclusive of Mineral Reserves

Both inclusive and exclusive methods of reporting Mineral Resources are permitted by various international reporting codes. Implats has adopted the inclusive reporting for consistency purposes and to be aligned with its strategic partners. A collation of the Mineral Resource estimates exclusive of Mineral Reserves is presented below as it allows for additional transparency. Note that this format is not adhered to by Implats' strategic partners and the corresponding estimates have been derived from details provided to Implats.

### Summary of Mineral Resource estimate, exclusive of Mineral Reserves

As at 30 June 2016

Orebody	Remarks	Category	Total estimate					Applied Implats' share-holdings %	Attributable estimate			
			Tonnes Mt	4E grade g/t	6E grade g/t	4E Moz	Pt Moz		Tonnes Mt	4E Moz	Pt Moz	
IMPALA	Merensky	Measured	64.4	6.38	7.18	13.2	8.3	96	61.8	12.7	8.0	
		Indicated	69.1	6.29	7.08	14.0	8.8	96	66.3	13.4	8.4	
		Inferred	23.3	6.36	7.15	4.8	3.0	96	22.3	4.6	2.9	
	UG2	Measured	54.6	7.08	8.49	12.4	7.2	96	52.4	11.9	6.9	
		Indicated	49.6	7.35	8.83	11.7	6.8	96	47.7	11.3	6.5	
		Inferred	14.7	7.17	8.60	3.4	2.0	96	14.1	3.3	1.9	
	Merensky	Impala/RBR JV	Measured	5.2	6.72	7.56	1.1	0.7	49	2.6	0.6	0.3
			Indicated	5.4	7.17	8.06	1.2	0.8	49	2.6	0.6	0.4
			Inferred	5.1	6.75	7.60	1.1	0.7	49	2.5	0.5	0.3
	UG2	Measured	1.5	7.34	8.81	0.4	0.2	49	0.7	0.2	0.1	
		Indicated	2.3	7.77	9.32	0.6	0.3	49	1.1	0.3	0.2	
		Inferred	1.6	7.09	8.51	0.4	0.2	49	0.8	0.2	0.1	
	<b>Total Impala</b>			<b>296.9</b>	<b>6.73</b>	<b>7.80</b>	<b>64.3</b>	<b>39.0</b>		<b>275.0</b>	<b>59.4</b>	<b>36.0</b>
	MARULA	Merensky	Measured	34.3	4.26	4.56	4.7	2.7	73	25.0	3.4	2.0
			Indicated	7.9	4.24	4.54	1.1	0.6	73	5.8	0.8	0.5
Inferred			9.7	4.17	4.46	1.3	0.7	73	7.1	0.9	0.5	
UG2		Measured	21.3	8.68	10.21	6.0	2.6	73	15.6	4.3	1.9	
		Indicated	13.6	8.89	10.45	3.9	1.7	73	9.9	2.8	1.2	
		Inferred	7.7	9.07	10.67	2.3	1.0	73	5.7	1.6	0.7	
<b>Total Marula</b>			<b>94.5</b>	<b>6.31</b>	<b>7.17</b>	<b>19.2</b>	<b>9.4</b>		<b>69.0</b>	<b>14.0</b>	<b>6.9</b>	
AFPLATS, IMBASA AND INKOSI	UG2	Afplats	Measured	98.4	5.19	6.47	16.4	10.0	74	72.8	12.1	7.4
			Indicated	10.8	5.11	6.36	1.8	1.1	74	8.0	1.3	0.8
			Inferred	55.9	5.06	6.25	9.1	5.5	74	41.3	6.7	4.1
	<b>Total Afplats</b>			<b>165.1</b>	<b>5.14</b>	<b>6.39</b>	<b>27.3</b>	<b>16.6</b>		<b>122.2</b>	<b>20.2</b>	<b>12.3</b>
	Imbasa	Indicated	28.2	4.59	5.74	4.2	2.6	60	16.9	2.5	1.5	
		Inferred	40.2	4.53	5.70	5.9	3.6	60	24.1	3.5	2.2	
	Inkosi	Indicated	67.9	4.87	6.14	10.6	6.6	49	33.2	5.2	3.2	
		Inferred	38.4	4.64	5.88	5.7	3.6	49	18.8	2.8	1.7	
	<b>Total Imbasa/Inkosi</b>			<b>174.7</b>	<b>4.70</b>	<b>5.92</b>	<b>26.4</b>	<b>16.3</b>		<b>93.1</b>	<b>14.0</b>	<b>8.6</b>

## Mineral Resource summary, exclusive of Mineral Reserves

### Summary of Mineral Resource estimate, exclusive of Mineral Reserves continued

As at 30 June 2016

	Orebody	Remarks	Category	Total estimate					Applied Implats' share-holdings %	Attributable estimate		
				Tonnes Mt	4E grade g/t	6E grade g/t	4E Moz	Pt Moz		Tonnes Mt	4E Moz	Pt Moz
TWO RIVERS	Merensky		Indicated	60.6	2.85	3.11	5.5	3.3	49	29.7	2.7	1.6
			Inferred	99.2	3.61	3.92	11.5	6.7	49	48.6	5.6	3.3
	UG2		Measured	3.8	4.81	5.81	0.6	0.4	49	1.8	0.3	0.2
			Indicated	26.4	4.49	5.38	3.8	2.1	49	12.9	1.9	1.0
			Inferred	117.8	4.86	5.75	18.4	9.6	49	57.7	9.0	4.7
	<b>Total Two Rivers</b>			<b>307.8</b>	<b>4.03</b>	<b>4.61</b>	<b>39.9</b>	<b>22.0</b>		<b>150.8</b>	<b>19.5</b>	<b>10.8</b>
ZIMPLATS	MSZ		Measured	108.4	3.61	3.82	12.6	6.2	87	94.3	11.0	5.4
			Indicated	614.4	3.51	3.71	69.3	34.3	87	534.5	60.3	29.8
			Inferred	1 198.9	3.26	3.53	125.6	60.4	87	1 043.0	109.2	52.6
		<b>Total Zimplats</b>			<b>1 921.8</b>	<b>3.36</b>	<b>3.60</b>	<b>207.5</b>	<b>100.9</b>		<b>1 671.9</b>	<b>180.5</b>
MIMOSA	MSZ		Measured	26.1	3.56	3.83	3.0	1.5	50	13.0	1.5	0.7
			Indicated	28.9	3.57	3.80	3.3	1.6	50	14.5	1.7	0.8
			Inferred	27.1	3.46	3.66	3.0	1.5	50	13.6	1.5	0.8
		<b>Total Mimosa</b>			<b>82.1</b>	<b>3.53</b>	<b>3.76</b>	<b>9.3</b>	<b>4.6</b>		<b>41.1</b>	<b>4.7</b>
<b>All Mineral Resources exclusive of Mineral Reserves</b>			Measured	418	5.23	6.04	70	40		340	58	33
			Indicated	985	4.14	4.60	131	70		783	105	56
			Inferred	1 640	3.65	4.07	192	98		1 300	150	76
		<b>Total</b>			<b>3 042.8</b>	<b>4.03</b>	<b>4.51</b>	<b>393.8</b>	<b>208.7</b>		<b>2 423.1</b>	<b>312.4</b>



Underground borehole core inspection, Impala.

# Mineral Resource summary, exclusive of Mineral Reserves

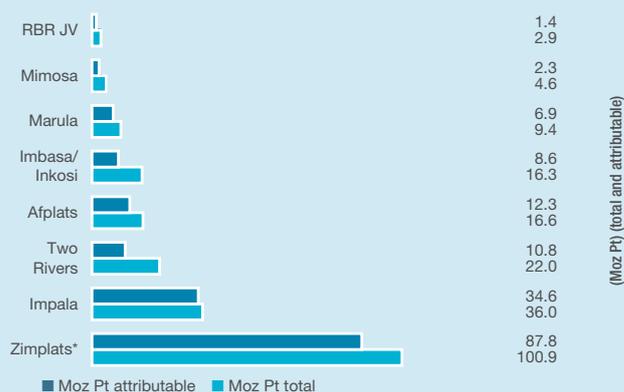
## Notes

- The figures in the accompanying table reflect those Mineral Resources that have not been converted to Mineral Reserves, ie these are the Mineral Resources exclusive of Mineral Reserves
- The tabulation should be read in conjunction with the Mineral Reserve statements in the preceding sections
- A direct comparison of tonnes and grade is not possible between inclusive and exclusive reporting, owing to the mixing of Mineral Resource figures with production estimates
- Mineral Resource estimates allow for estimated geological losses but not for anticipated pillar losses during eventual mining
- Note that similar to previous reports, certain areas have been excluded from the Mineral Resource estimates and are now reported separately as exploration results in a stand-alone section at the end of this report
- Implats has chosen not to publish Merensky Reef Mineral Resource estimates for Afplats, Imbasa and Inkosi as the eventual economic extraction is presently in doubt
- At Impala the exclusive Mineral Resources increased with the exclusion of 17 Shaft Merensky and UG2 from the Mineral Reserve inventory
- Zimplats' exclusive Mineral Resources decreased from 2015 with the change of the northern Mineral Reserve boundary of the Bimha Mine (Portal 4) to include Portal 5 South
- The year-on-year increase in exclusive Mineral Resources for the Group is mostly the result of placing 17 Shaft at Impala on low cost care and maintenance and therefore such Resources are removed from Reserves and reflected as exclusive Mineral Resources
- 4E refers to the summation of platinum, palladium, rhodium and gold
- 6E refers to the summation of platinum, palladium, rhodium, ruthenium, iridium and gold
- Rounding of numbers may result in minor computational discrepancies. Mineral Resource estimates are inherently imprecise in nature. The results tabulated in this report must be read as estimates and not as calculations. Inferred Mineral Resources in particular are qualified as approximations

## Summary of attributable Mineral Resources exclusive of Mineral Reserves

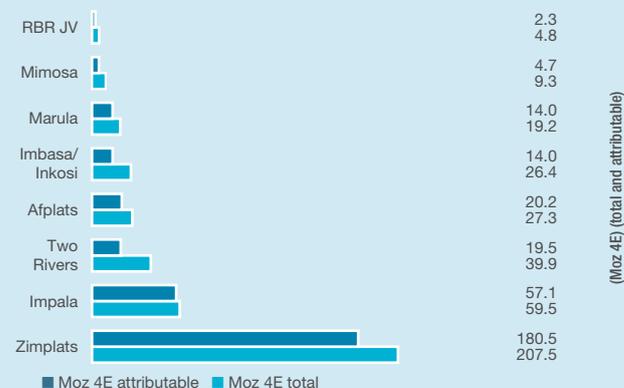
	2012	2013	Moz Pt 2014	2015	2016
Impala	38.7	40.7	28.4	27.9	34.6
RBR JV	3.2	3.5	1.5	1.5	1.4
Marula	6.2	6.3	6.3	6.7	6.9
Afplats	14.5	14.3	11.9	12.3	12.3
Imbasa and Inkosi	8.1	8.5	8.5	8.6	8.6
Two Rivers	1.6	1.7	1.7	10.7	10.8
Tamboti	27.1	23.2	23.2		
Zimplats	79.2	81.5	87.3	89.2	87.8
Mimosa	2.8	2.9	2.9	2.3	2.3
<b>Total</b>	<b>181.4</b>	<b>182.6</b>	<b>171.7</b>	<b>159.2</b>	<b>164.7</b>

### Exclusive Mineral Resources



\* Zimplats' Mineral Resources exclusive of Mineral Reserves will reduce by 54.6Moz Pt if the GoZ is successful in obtaining the ground north of Portal 10.

### Exclusive Mineral Resources



## Reconciliation

The consolidated high-level reconciliation of total Mineral Resources and Mineral Reserves for the Implats Group of companies is shown below. These high-level variances are relatively small. Particulars of these variances, in addition to depletions, are illustrated in more detail in the sections by operation. Rounding of numbers may result in computational discrepancies, specifically in these high-level comparisons.

### Total Mineral Resources tonnes (million), inclusive of Mineral Reserves

	2012	2013	2014	2015	2016	Variance	Attributable 2016
<b>Impala*</b>	592	592	458	457	<b>442</b>	(15)	414
<b>Marula</b>	103	102	100	108	<b>106</b>	(1)	78
<b>Afplats</b>	193	193	160	165	<b>165</b>	–	122
<b>Imbasa/Inkosi</b>	159	173	173	175	<b>175</b>	–	93
<b>Two Rivers</b>	106	108	105	353	<b>350</b>	(2)	172
<b>Tamboti</b>	319	337	337	–	<b>–</b>	–	–
<b>Zimplats</b>	1 904	2 070	2 066	2 060	<b>2 068</b>	8	1 800
<b>Mimosa</b>	135	133	129	128	<b>125</b>	(2)	63
<b>Totals</b>	<b>3 510</b>	<b>3 709</b>	<b>3 530</b>	<b>3 445</b>	<b>3 432</b>	<b>(12)</b>	<b>2 741</b>

\* Includes RBR JV.

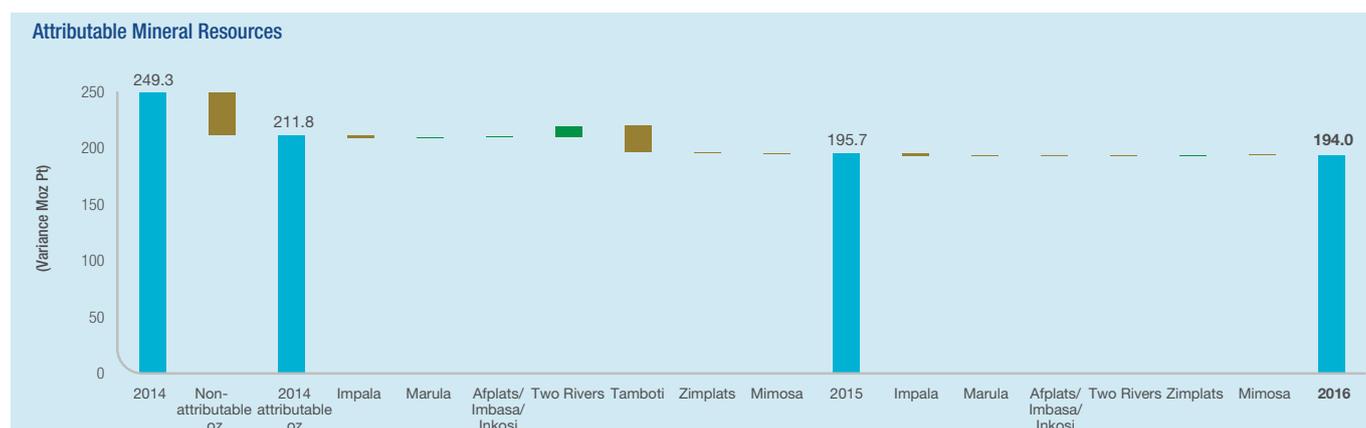
### Total Mineral Resources (Moz Pt), inclusive of Mineral Reserves

	2012	2013	2014	2015	Depletion	Gains and other changes	2016	Attributable 2016
<b>Impala*</b>	75.5	77.5	60.5	60.3	(0.8)	(1.247)	<b>58.2</b>	54.5
<b>Marula</b>	10.3	10.3	10.1	11.1	(0.1)	(0.169)	<b>10.8</b>	7.9
<b>Afplats</b>	19.6	19.3	16.1	16.6	–	–	<b>16.6</b>	12.3
<b>Imbasa/Inkosi</b>	15.2	16.0	16.1	16.3	–	–	<b>16.3</b>	8.6
<b>Two Rivers</b>	6.6	6.5	6.5	25.2	(0.2)	0.063	<b>25.1</b>	12.3
<b>Tamboti</b>	27.1	23.2	23.2	–	–	–	–	–
<b>Zimplats</b>	107.4	109.8	109.3	108.3	(0.4)	0.057	<b>109.0</b>	94.8
<b>Mimosa</b>	7.9	7.7	7.5	7.4	(0.2)	0.043	<b>7.2</b>	3.6
<b>Totals</b>	<b>269.6</b>	<b>270.3</b>	<b>249.3</b>	<b>245.1</b>	<b>(1.7)</b>	<b>(0.3)</b>	<b>243.2</b>	<b>194.0</b>

\* Includes RBR JV.

## Notes

- The Impala estimate in the above table includes the contiguous Impala/RBR JV estimate
- Depletion was adjusted by global concentrator and mine call factors
- Potential impact of pillar factors was taken into account
- The Marula estimate includes the addition of UG2 mineral rights in terms of an agreement with Modikwa
- Smaller variances are mostly due to depletion and updates to the estimation models



## Reconciliation

### Total Mineral Reserves tonnes (million)

	2012	2013	2014	2015	Depletion	Gains and other changes	2016	Attributable 2016
<b>Impala</b>	263	252	257	256	(10.4)	(61.7)	<b>184</b>	176
<b>Marula</b>	26	26	25	30	(1.7)	(1.9)	<b>26</b>	19
<b>Two Rivers</b>	42	35	30	42	(3.3)	4.7	<b>43</b>	21
<b>Zimplats</b>	227	238	133	84	(6.6)	34.4	<b>111</b>	97
<b>Mimosa</b>	29	27	23	34	(2.5)	(0.9)	<b>30</b>	15
<b>Totals</b>	<b>581</b>	<b>578</b>	<b>468</b>	<b>445</b>	<b>(24.5)</b>	<b>(25.5)</b>	<b>395</b>	<b>329</b>

### Total Mineral Reserves (Moz Pt)

	2012	2013	2014	2015	Depletion	Gains and other changes	2016	Attributable 2016
<b>Impala</b>	20.8	19.8	19.8	20.0	(0.70)	(5.3)	<b>14.0</b>	13.5
<b>Marula</b>	1.5	1.5	1.5	1.6	(0.09)	(0.1)	<b>1.5</b>	1.1
<b>Two Rivers</b>	1.9	1.9	1.7	2.3	(0.21)	0.2	<b>2.3</b>	1.1
<b>Zimplats</b>	12.1	12.5	7.1	4.5	(0.35)	1.7	<b>5.9</b>	5.1
<b>Mimosa</b>	1.7	1.5	1.2	1.9	(0.15)	(0.0)	<b>1.7</b>	0.9
<b>Totals</b>	<b>37.9</b>	<b>37.1</b>	<b>31.3</b>	<b>30.3</b>	<b>(1.50)</b>	<b>(3.4)</b>	<b>25.4</b>	<b>21.6</b>

### Notes

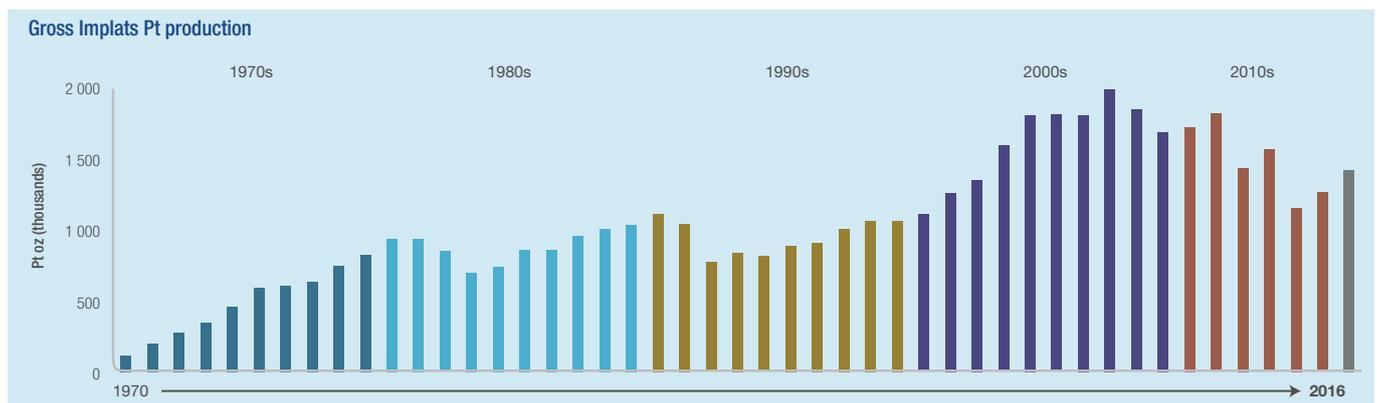
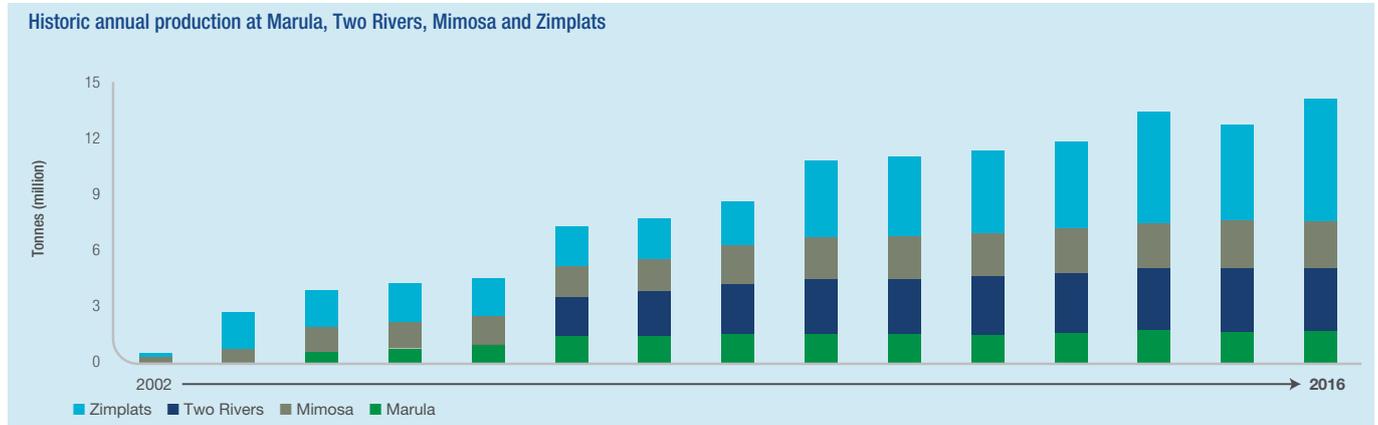
- Depletion was adjusted by global concentrator factors
- The Mineral Reserves increased at Zimplats due to an increase at Bimha Mine (Portal 4) which now includes Portal 5S Reserves on its extended northern boundary
- The Mineral Reserves decrease at Impala is due to the removal of 17 Shaft Mineral Reserves from the Mineral Reserve inventory
- Smaller changes over the past few years are mostly related to depletion

### Attributable Mineral Reserves



# Historic production

Since mining commenced in 1969 at Impala, Implats has grown the Mineral Resource portfolio and related platinum production. Summary production statistics are provided below as an overall perspective in terms of tonnage and platinum ounces.



## Historic production

### Summary production statistics

	Units	2016	2015	2014	2013	2012
<b>Tonnes milled</b>						
Impala	Kt	<b>10 316</b>	9 199	6 183	10 897	10 654
Marula	Kt	<b>1 703</b>	1 662	1 794	1 628	1 579
Two Rivers	Kt	<b>3 511</b>	3 362	3 279	3 172	3 103
Zimplats	Kt	<b>6 406</b>	5 164	5 939	4 683	4 393
Mimosa	Kt	<b>2 641</b>	2 586	2 453	2 381	2 324
<b>Mill head grade (6E)</b>						
Impala	g/t	<b>4.16</b>	4.19	4.34	4.32	4.38
Marula	g/t	<b>4.25</b>	4.19	4.19	4.19	4.18
Two Rivers	g/t	<b>4.06</b>	3.98	4.01	4.02	3.86
Zimplats	g/t	<b>3.48</b>	3.47	3.47	3.53	3.53
Mimosa	g/t	<b>3.88</b>	3.93	3.92	3.95	3.93
<b>Production ex Impala Mine</b>						
Platinum refined	Koz	<b>626.9</b>	575.2	411.0	709.2	750.1
Palladium refined	Koz	<b>299.6</b>	280.7	197.4	350.5	408.6
Rhodium refined	Koz	<b>81.1</b>	76.7	50.2	101.3	98.9
Nickel refined	t	<b>3 331</b>	3 598	1 976	4 035	4 757
PGM refined production	Koz	<b>1 219.6</b>	1 137.3	765.9	1 377.9	1 487.8
<b>Production ex Marula Mine*</b>						
Platinum in concentrate	Koz	<b>77.7</b>	73.6	78.5	71.7	69.1
Palladium in concentrate	Koz	<b>80.3</b>	75.5	80.5	73.5	71.2
Rhodium concentrate	Koz	<b>16.4</b>	15.5	16.7	15.2	14.8
Nickel in concentrate	t	<b>277</b>	253	279	245	238
PGM in concentrate	Koz	<b>204.6</b>	193.3	206.4	188.3	182.2
<b>Production ex Two Rivers Mine*</b>						
Platinum in concentrate	Koz	<b>185.9</b>	173.5	175.1	162.2	149.9
Palladium in concentrate	Koz	<b>110.9</b>	102.0	102.7	98.6	89.5
Rhodium concentrate	Koz	<b>33.1</b>	30.6	31.0	28.7	25.5
Nickel in concentrate	t	<b>648</b>	584	566	555	595
PGM in concentrate	Koz	<b>400.7</b>	372.6	374.7	350.4	320.1
<b>Production ex Zimplats Mine*</b>						
Platinum in matte	Koz	<b>289.8</b>	190.0	239.7	198.1	187.1
Palladium in matte	Koz	<b>235.8</b>	154.8	197.6	157.1	149.2
Rhodium matte	Koz	<b>27.1</b>	17.4	22.7	17.0	16.9
Nickel in matte	t	<b>5 433</b>	3 887	4 830	3 909	3 787
PGM in matte	Koz	<b>616.8</b>	406.0	515.5	416.2	396.4
<b>Production ex Mimosa Mine*</b>						
Platinum in concentrate	Koz	<b>119.7</b>	117.4	110.2	100.3	106.0
Palladium in concentrate	Koz	<b>94.0</b>	92.7	87.0	79.5	82.3
Rhodium concentrate	Koz	<b>9.9</b>	10.2	9.3	8.7	8.5
Nickel in concentrate	t	<b>3 461</b>	3 470	3 329	3 161	3 046
PGM in concentrate	Koz	<b>253.7</b>	250.1	234.6	214.8	222.8
<b>Gross margin</b>						
Impala	%	<b>(13.4)</b>	(10.9)	(18.4)	14.4	22.2
Marula	%	<b>(23.7)</b>	(13.4)	(0.7)	(15.4)	(6.7)
Two Rivers	%	<b>27.5</b>	27.7	29.5	22.1	21.8
Zimplats	%	<b>8.2</b>	10.3	34.2	34.9	43.4
Mimosa	%	<b>(3.3)</b>	22.9	19.3	24.2	37.7
<b>Gross Implats refined production**</b>						
Platinum	Koz	<b>1 438</b>	1 276	1 178	1 582	1 448
Palladium	Koz	<b>885</b>	792	711	1 020	950
Rhodium	Koz	<b>185</b>	172	157	220	210
Nickel	Kt	<b>17.0</b>	15.9	13.9	16.0	15.4

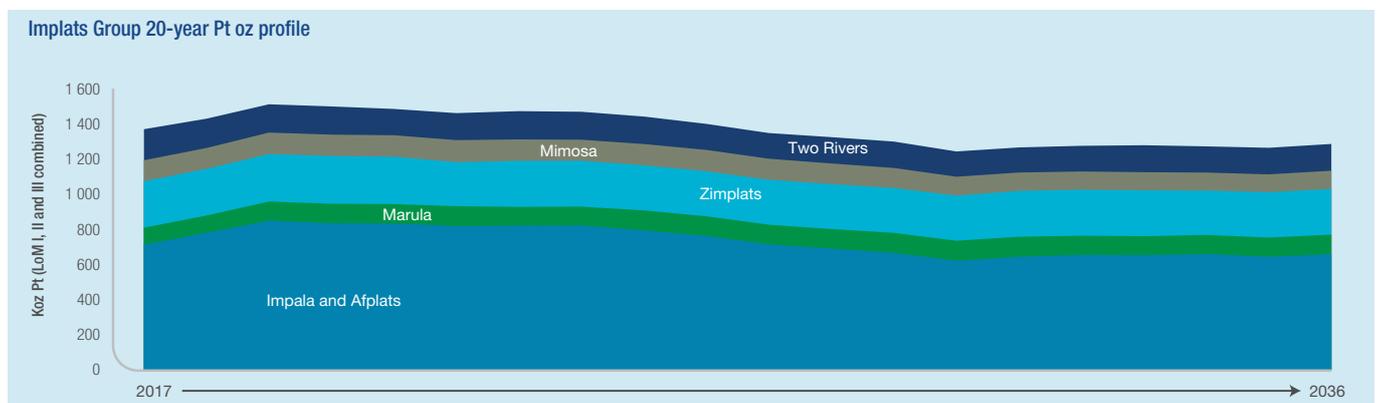
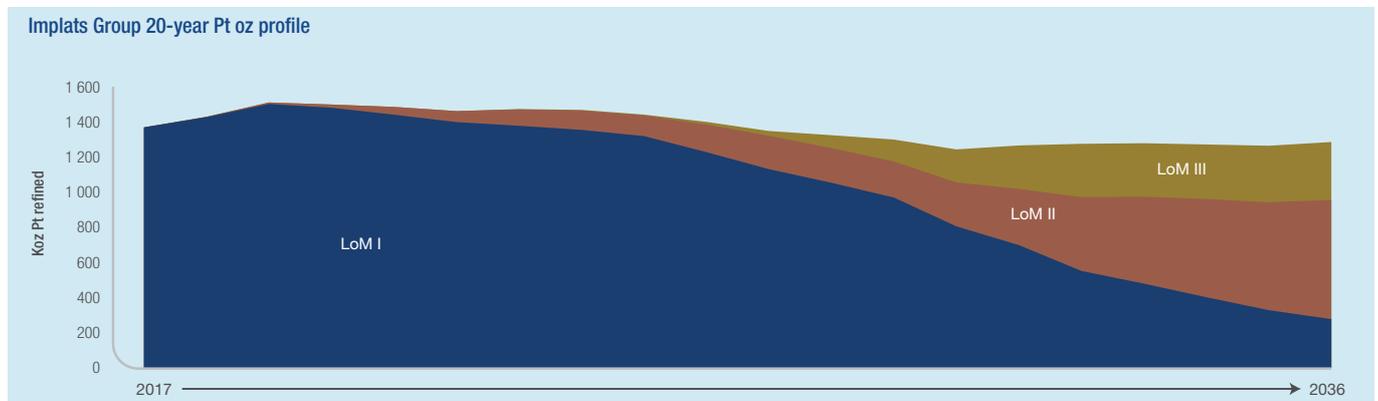
\* Numbers reflect 100% of production and not the portion attributable to Implats.

\*\*Includes IRS production from other sources.

## Life-of-mine production

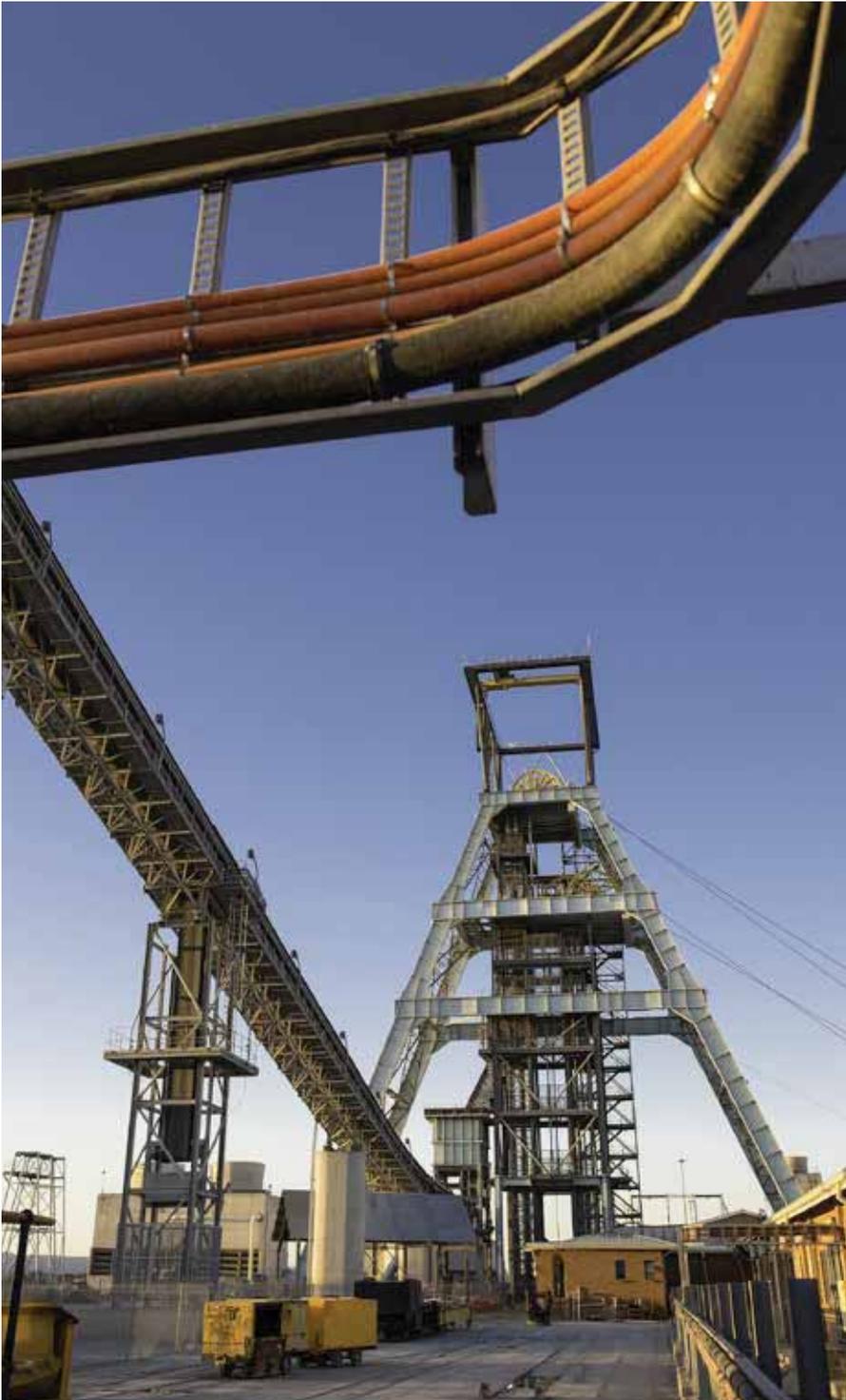
The high-level LoM (20-year) plan is depicted in the detailed sections per operation in terms of planning levels I, II and III. These graphs reflect 100% of the annual production forecasts and not the portion only attributable to Implats. These do not include all the “Blue Sky” opportunities as this is often in the scoping or pre-feasibility stage of planning – some of this potential is specifically excluded at this early stage. Caution should be exercised when considering the LoM plans as these may vary if assumptions, modifying factors, exchange rates or metals prices change materially. These LoM profiles should be read in conjunction with Mineral Resource estimates to determine the long-term potential. The graphs below show the consolidated high-level LoM plans collated from the individual

profiles per operation. The pictorial 20-year profiles are shown as a combination of levels I, II and III and also the contribution by operation. Only LoM I is based on Mineral Reserves while LoM II and III have not been converted to Mineral Reserves. Note that Afplats is the only non-producing operation included in these combined profiles to illustrate the potential impact on the Group profile. Shaft sinking operations at Afplats have been deferred for four years in terms of the strategic review during 2014. The Leeuwkop profile has been included in the LoM II for Impala. It is clear from a combined view that a large proportion of the 20-year plan is still at Levels II and III and would require further studies, funding and capital approval by the board.



## Impala

The Impala mining operation is located just to the north of Rustenburg on the western limb of the Bushveld Complex.



20 Shaft, Impala.

### History

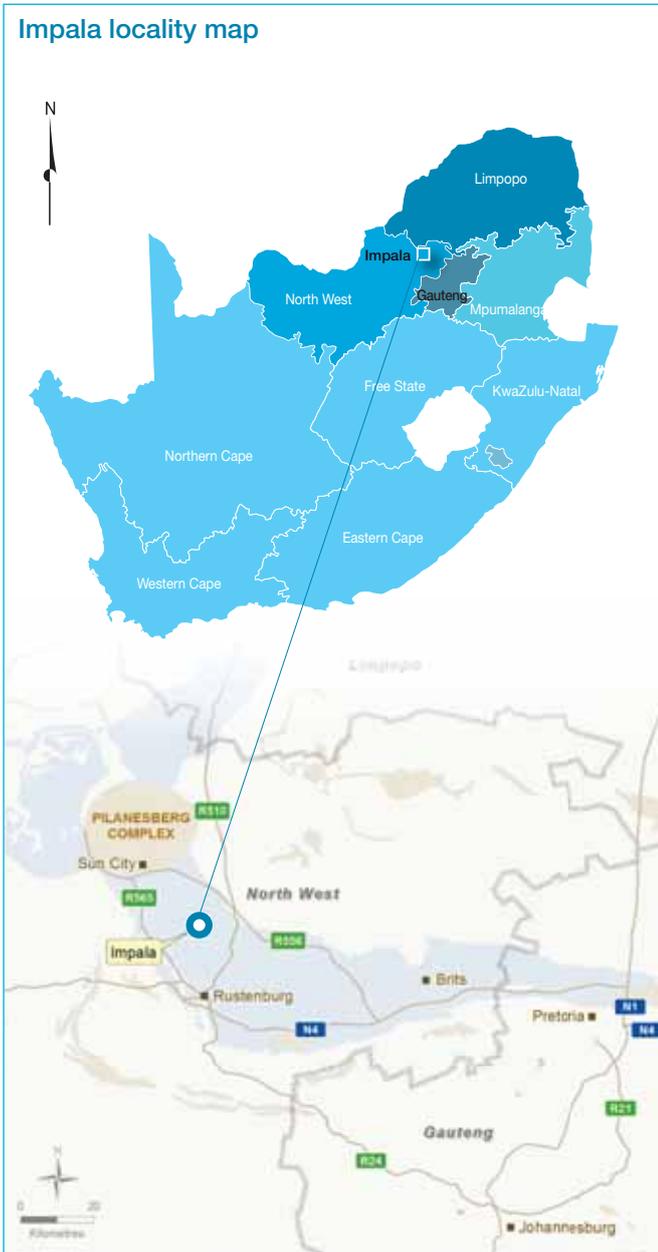
Hans Merensky first recognised platinum on the eastern limb of the Bushveld Complex in 1924. In 1925 Merensky further discovered the Merensky Reef in an arc from Brits through Rustenburg to Thabazimbi. This arc became the Western Bushveld Complex and the location of Impala Platinum.

In 1965 Union Corporation purchased a company called Impala Prospecting Company. The first six test boreholes were drilled during 1965. The first vertical shaft (62m) was developed in 1967 to obtain a bulk Merensky sample. Impala Platinum Limited was created on 26 April 1968, as a subsidiary of Union Corporation.

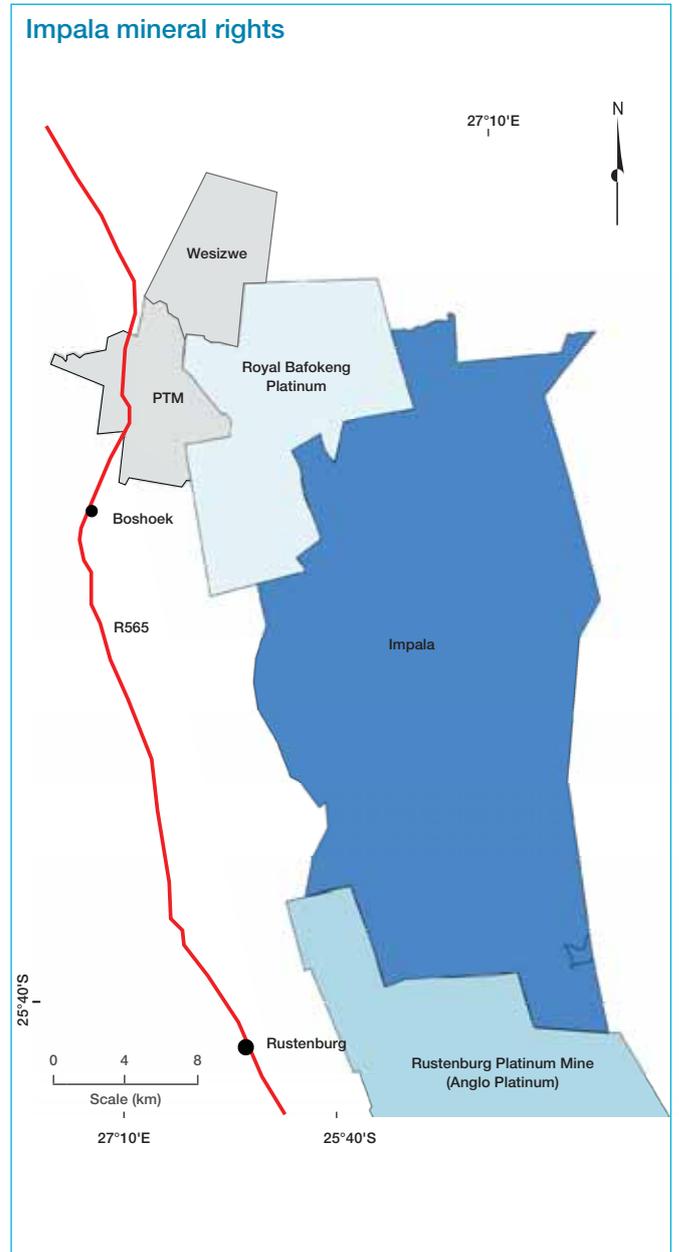
Initial production commenced on 22 July 1969 after a mining lease over land predominantly owned by the then Bafokeng Tribe (now the Royal Bafokeng Nation (RBN)) was originally granted in 1968. Initially Impala mined the Merensky Reef and the mining of the UG2 Reef only began in the early 1980s as the technology to smelt chromite ore at a higher temperature was developed. By the early 1990s, 13 vertical shafts were in operation and Impala was producing in the region of one million platinum ounces per annum. Shaft sinking at the new generation shafts (16, 17 and 20) commenced in the mid-2000s.

# Impala

Impala locality map



Impala mineral rights



## Mineral rights

A landmark agreement securing Impala’s access to these mineral rights for a period of 40 years was signed with the RBN in February 1999. In terms of this agreement, the RBN was entitled to royalties from metals mined in areas over which they held mineral rights. A new agreement, finalised in early March 2007, resulted in the royalty being converted into equity, making the RBN the Group’s largest shareholder with board representation at the time. In terms of the March 2007 agreement, Impala agreed to pay RBN all royalties due to them from 1 July 2007 onwards. This amounted to R12.5 billion. Effectively, through this transaction, Impala discharged its future obligation to pay royalties to the RBN. The RBN, through Royal Bafokeng Holdings Limited (RBH), used the R12.5 billion to

subscribe for 75.1 million Implats shares giving them a 13.2% share in the holding company at the time. During the past year the RBH sold 5% of the Implats shares and now effectively owns 6.3% of the company. In 2015, 4% of the Impala shares were issued to employees (ESOP transaction), leaving Implats with a 96% attributable interest in Impala. The mining rights at Impala were converted into new-order rights in 2008 and awarded for a 30-year period, at which time the MPRDA allows for an extension.

Impala holds contiguous mining and prospecting rights over a total area of 33 562ha across 20 farms, or portions of farms, which includes a joint venture with the Royal Bafokeng Resources (RBR) on a prospecting right area of 3 789ha.

# Impala

## Infrastructure

Impala Platinum is an established mine with infrastructure that includes tarred roads, shaft areas, buildings, offices, railway lines, powerlines, pipelines, sewage and rock and tailings dumps. The extent of the servitude area that constitutes the infrastructure, roads, rails and dumps is 46.23km<sup>2</sup>. The network of surface rail infrastructure between the various shaft heads, two concentrators and a smelter consists of about 92km of rail.

The Rustenburg Operations are supplied with electricity by Eskom primarily from its Ararat Main Transmission Sub-station (MTS). The total installed capacity at Ararat MTS amounts to 945MVA. The operations have an adequate and firm electricity supply and distribution network. At present, there are eight main intake points on Impala, all of which have adequate redundancy. These intake points are supplied by Eskom at 88kV. The voltage is then transformed to 33kV and 6.6kV for surface and underground distributions. Eskom also has dedicated transformers at some of these sub-stations to convert the voltage to 11kV to supply electricity to the neighbouring communities. An alternate source of electricity for Impala is the Marang MTS, connected to the Impala 16 Shaft, to provide electricity during emergency conditions.

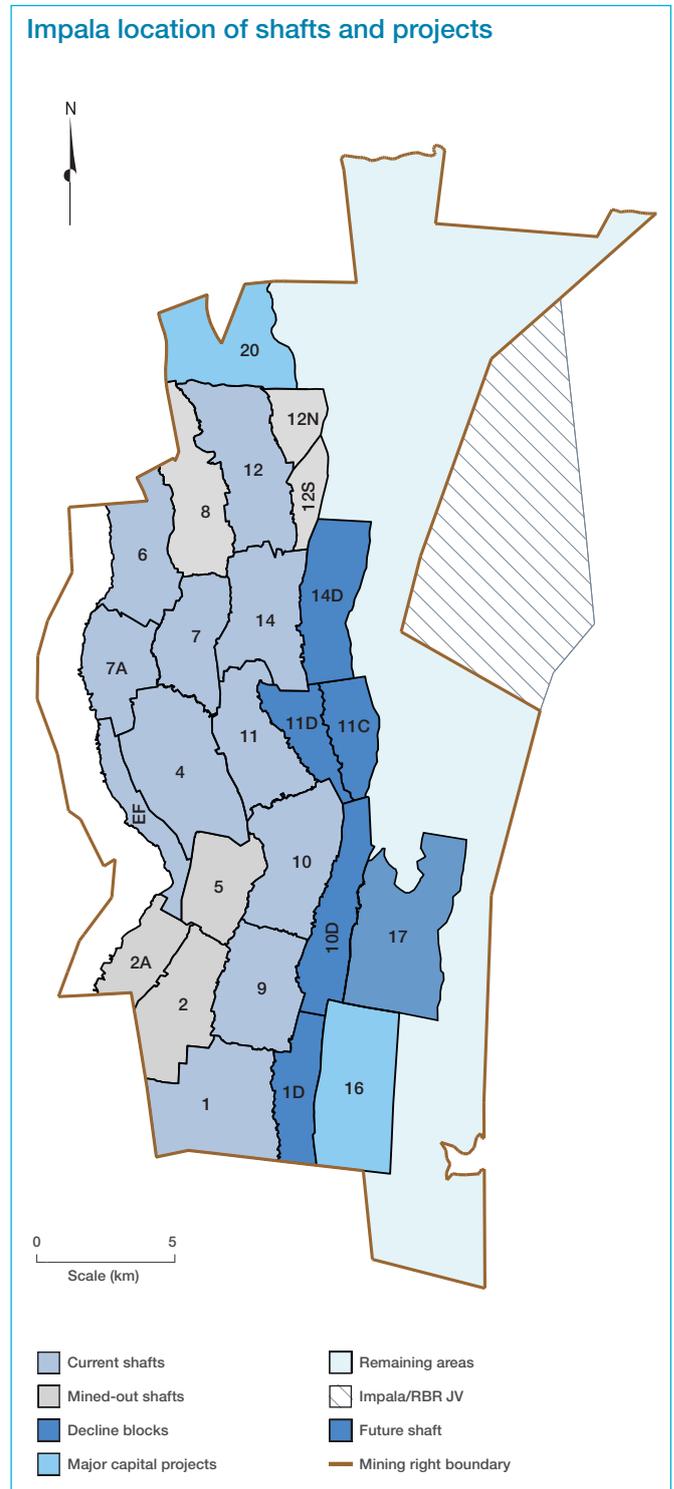
Rand Water Board supplies water to Rustenburg and Impala from the Vaal River system (Vaal Dam). The licence allocation is 32MI per day. Rand Water is also supplying 3MI water per day to Impala from the Magalies Water system. Magalies Water supplies water to Rustenburg and Impala from the Crocodile River system (Vaalkop Dam). The licence allocation is 5MI per day. The total potable water allocation to the Impala Operation is 40MI per day. The total allocation was 42MI per day but 2MI per day was allocated to the Platinum village. Impala has a contract to receive 10MI treated effluent (grey water) per day from the Rustenburg municipal water care works for the two processing plants. The three water care works at Impala also supply about 3 to 5MI of treated effluent per day to the Mineral Processes Operations. Impala does not have major reservoirs and is dependent on the direct feed from the two providers.

## Environmental

Impala is ISO 14001 certified. In line with the environmental management system expectations, all areas are required to identify and report on environmental incidents. Systems are in place to investigate and determine the direct and root causes of high-severity incidents and to address and close out these incidents.

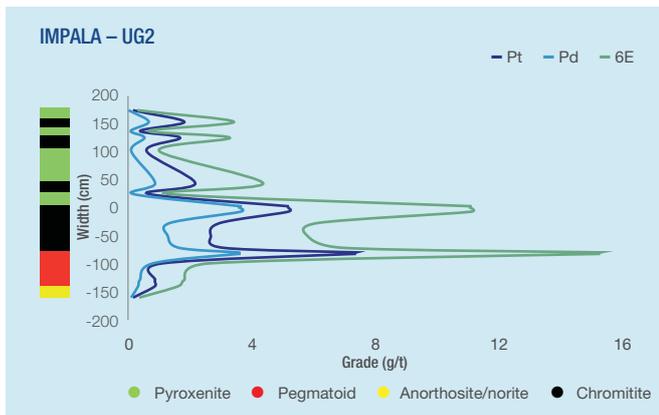
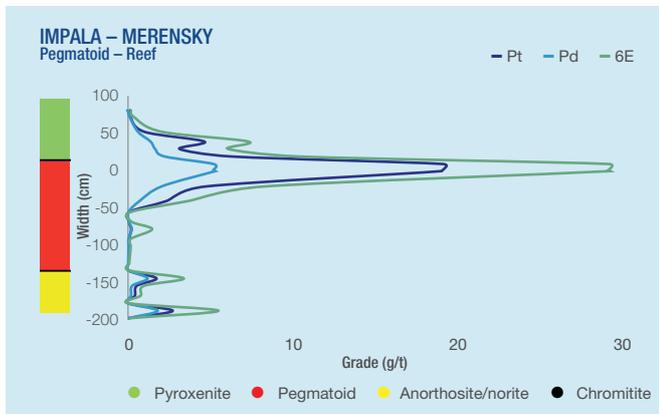
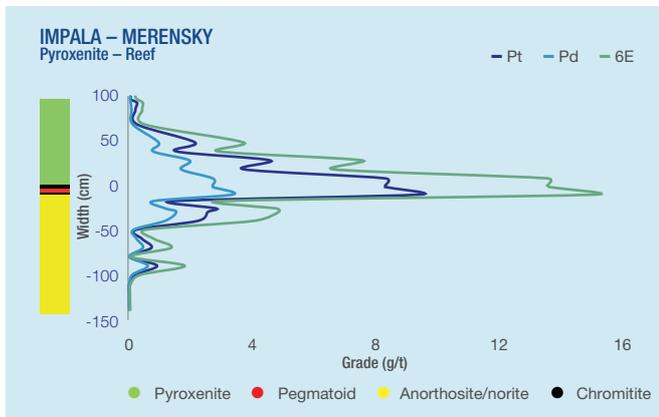
It is a business imperative to exercise responsible environmental management, particularly as the underground operations become deeper and consume more energy and water. This involves taking measures to address security of resource supply (for example through efficiency, recycling and fuel-switching) and to actively minimise the impacts on natural resources and in the communities around the operations. Taking these

Impala location of shafts and projects



measures has direct benefits in terms of reduced costs and liabilities, enhanced resource security and the improved security of the licence to operate.

# Impala



Management of the environmental impacts of the operations and processes involves the following focus areas:

- Promoting responsible water stewardship by minimising water use and water pollution
- Minimising our negative impacts on air quality
- Responding to climate change risks and opportunities and promoting responsible energy management
- Managing our waste streams
- Promoting responsible land management and biodiversity practices.

All of the tailings currently produced by the concentrator plants are deposited on the No. 4 tailings dam, which is one of the largest in South Africa with a base area of about 750 hectares. The projected life of the dam is at least another 30 years. The height of the walls varies between 40m at the lowest part to 72m at the highest. At closure, it is expected that the highest wall will reach 120m.

Water is decanted for recycling back to the concentrators via two concrete penstock towers. The towers are 5.5m in diameter and are currently 40m above the pool. They are connected to two decant pipes of 1.25m diameter that route the water to the north and south return water pump stations.

## Geology

Both the Merensky and UG2 Reefs are exploited. The Merensky Reef is generally composed of an upper feldspathic pyroxenite, overlying a thin basal chromitite stringer, followed by an anorthosite to norite footwall. Locally this is termed a “pyroxenite reef”. Occasionally a pegmatoidal pyroxenite and a second chromitite stringer may be developed between the feldspathic pyroxenite and the footwall units. This is termed a “pegmatoid reef”. As an aid to mining operations the Merensky Reef is further defined as being “A”, “B” or “C” Reef where it rests on specific footwall units – locally called Footwall 1, 2 and 3 respectively.

The UG2 Reef is defined as a main chromitite layer, with most of the PGM and base metal mineralisation confined to this unit, followed by a poorly mineralised pegmatoidal pyroxenite footwall. The hangingwall to the main chromitite layer is a feldspathic pyroxenite containing up to four thin, poorly-mineralised chromitite layers.

Both mineralised horizons dip gently away from the sub-outcrop in a north-easterly direction at 10° to 12°. The vertical separation between the Merensky and UG2 Reefs varies from about 125m in the south to 45m in the north of the mining area. The reefs may be disrupted by minor and major faults, lamprophyre, syenite and dolerite dykes, late stage ultramafic replacement pegmatoid bodies and potholes. The latter features are generally circular in shape and represent “erosion” or “slumping” into the footwall units. They vary in size from a few metres to tens of metres across and up to tens of metres in depth. All of these features are accounted for in the Mineral Resource and Mineral Reserve statements as geological losses and they contribute to dilution or absence of the mineralised horizons when converted to Mineral Reserves through the planning process.

## Modifying factors

Key modifying factors such as overbreak, underbreak, off-reef mining, development dimensions, sweepings and mine call factors are applied to the mining area (centare profile) to generate tonnage and grade profiles. The modifying factors used to convert a Mineral Resource to a Mineral Reserve are derived from historical performance while taking future anticipated conditions into account.

# Impala

## Key factors and assumptions

Merensky Reef	Factors	Long-term price assumptions in today's money**		
Geological losses	20 – 25%	Platinum	US\$/oz	1 260
Mineral Resource Area	66 million ca	Palladium	US\$/oz	815
Pillar factors	8 – 10%	Rhodium	US\$/oz	1 045
Resource dilution	9 – 12%	Ruthenium	US\$/oz	35
Mine call factor	90 – 92%	Iridium	US\$/oz	460
Relative density	3.05 – 3.25	Gold	US\$/oz	1 080
Channel width	115cm	Nickel	US\$/t	13 955
Stoping width	126cm	Copper	US\$/t	5 730
Concentrator recoveries	87 – 88%*	Exchange rate	R/US\$	14.80

\*Combined Merensky and UG2.

\*\*Supporting the Mineral Reserve estimates.

UG2 Reef	Factors	6E metal ratio (%)			
			Merensky	UG2	
Geological losses	30 – 40%	Platinum	%	55.9%	48.2%
Mineral Resource Area	75 million ca	Palladium	%	24.8%	25.5%
Pillar factors	8 – 10%	Rhodium	%	5.0%	8.8%
Resource dilution	9 – 12%	Ruthenium	%	9.0%	13.1%
Mine call factor	88 – 90%	Iridium	%	2.2%	3.6%
Relative density	3.7 – 3.8	Gold	%	3.1%	0.8%
Channel width	65cm		<b>Implats' interest</b>	<b>Mining right (ha)</b>	<b>Prospecting right (ha)</b>
Stoping width	109cm	Impala	100%	29 773	
		Impala RBR JV*	49%		3 789

## Mining methods and mine planning

The Merensky and UG2 Reefs are mined concurrently. The mining method is predominantly conventional breast mining. Stopping at the operations is carried out through conventional double-sided breast mining in accordance with Impala's best practice principles. The haulages are developed in opposite directions from cross-cuts connected to a central shaft position, following the two reef horizons on strike in the footwall and are defined as half levels. Footwall drives are developed at approximately 18m to 30m below the reef horizon with on-reef raise/winze connections being between 180m and 250m apart. Panel face lengths vary from 15m to 30m for both Merensky and UG2 Reefs, with panels being typically separated by 6m x 3m grid pillars with 2m ventilation holes. Stopping widths are approximately 1.3m and 1.1m for conventional Merensky and UG2 Reefs respectively, depending on the width of the economical reef horizon. Mechanised (trackless) bord and pillar mining occurs in selected Merensky Reef areas at 14 Shaft. The average stopping width of the mechanised panels is about 1.9m.

Mine design and scheduling of operational shafts is undertaken using CadsMine™ software, while the mine design and scheduling for project shafts are done using Mine 2-4D™ software. Geological models/ore blocks are updated and

validated using G-Blocks and boundaries in the MRM information system. Grade block models are developed using Isatis™ software. The mine design for the first two years is monthly per crew. This is extended on an annual basis for the remaining period of the LoM.

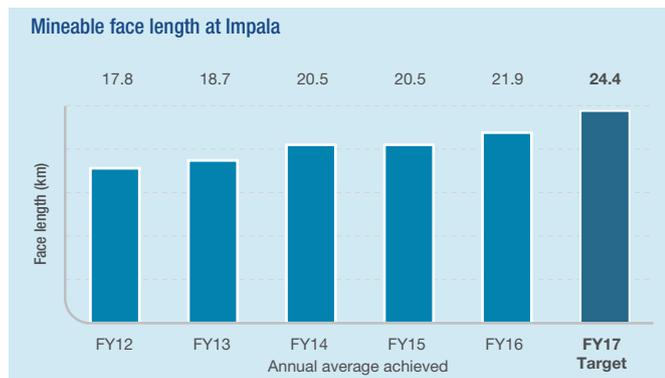
The planning sequence allows for a cycle that starts with a comprehensive review of the LoM plan followed by the detailed scheduling of a five-year development schedule and a two-year detailed month-by-month stopping schedule.

The shafts at Impala are locally divided into three groupings, the so-called Old Men (4, 6, 7, 7A, 9 and E/F), the Big 5 (1, 10, 11, 12 and 14) and the Build-up shafts (16 and 20). The distribution of the Mineral Reserves is depicted in the accompanying graph. It is clear that significant Mineral Reserves (40%) are located in the Build-up shafts.

One of the mining flexibility measures at conventional stopping sections is the mineable face length. These are stopping faces that can immediately be exploited without any further development or equipping. Progress of such flexibility is managed in detail. The minimum target is to have a flexibility of 1.5, in other words, to have three mineable panels for every two

# Impala

stopping teams. Significant progress has been made in the past five years with the total mineable face length at Impala having increased from 17.8km in 2012 to some 21.9km in 2016. Some areas remain constrained and the areas to focus on at Impala for the immediate future are 12, 14 and 20 Shafts.



The 20-year LoM profile for Impala is depicted in the graph below. LoM I comprises the profiles of 11 operating vertical shafts, four associated with declines and two approved project shafts (16 and 20) under construction and production ramp-up. The profile depicts the deferral of capital expenditure with minimum commitments in the next five years, specifically the impact of placing 17 Shaft on low cost care and maintenance. There are various options available for LoM II and III and work continues to evaluate such optionality, among others one that incorporates the Afplats Leeuwkop profile in the Impala mill plan. This is depicted in the accompanying LoM graph where Leeuwkop and 17 Shaft contribute the bulk of LoM II. No feasibility study has been completed in the past year. The profile illustrated below is based on current assumptions and may change in future. Medium-term production plans show a build-up to around 830koz Pt per annum by 2020.

An exercise was conducted to estimate the impact of LoM II and III on the viability of the tail of LoM I. Indications are that some 4% to 8% of the LoM I and the Mineral Reserve estimate will not be viable if LoM II and III does not materialise.

## Processing

Mineral Processes houses the concentrator and smelter operations and is located on the mine property in Rustenburg. Current smelting capacity is 2.6 million ounces of platinum. Refineries, located in Springs, comprises a base metal refinery (BMR) and a precious metal refinery (PMR). Current refining capacity is 2.3 million ounces of platinum at the PMR.

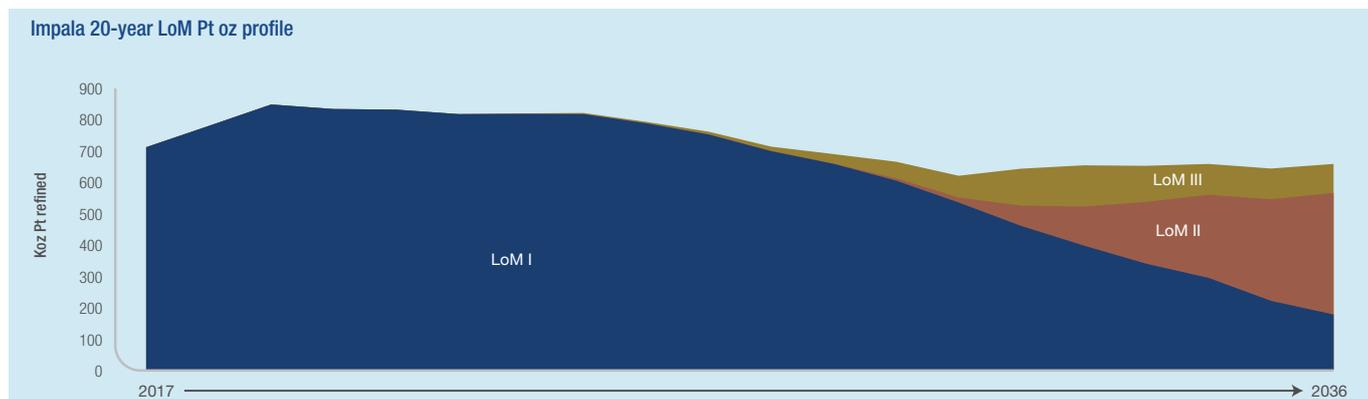
## Impala top risks

The Group risk management process is briefly described on page 13. In this context the top risks identified at Impala in order of priority are:

- Impact of Section 54 stoppages
- Mining contingency and flexibility
- Underground conveyor fire
- Fall of ground
- Flammable gas ingress
- Labour unrest
- Infrastructure – interruption to supply of water, power and compressed air
- Management of assets and critical spares
- Compliance with relevant labour and safety legislation
- Major safety incident.

## Mineral Resource and Mineral Reserve estimation and reconciliation

Mineral Resources are quoted inclusive of Mineral Reserves. Mineral Resource and Mineral Reserve grades are shown for both 4E and 6E. Mineral Resource estimates allow for estimated geological losses but not for anticipated pillar losses during eventual mining. The introduction of a depth cut-off was noted in previous reports. Effectively no Mineral Resources deeper than 2 000m below surface are reported. In addition to the depth cut-off areas, various Mineral Resource blocks are considered on a case-by-case basis and this has resulted in areas where the eventual economic extraction is in doubt. These Mineral Resources will be reported as exploration results. The UG2 Mineral Resources estimate is compared with a minimum mining cut of 95cm. This illustrates significant dilution as very little metal is added by the increase to the mining width.



# Impala

It is important to note that no Inferred Mineral Resources have been converted into Mineral Reserves. The Mineral Reserves quoted reflect the grade delivered to the mill. The Mineral Resources and Mineral Reserves involved with the royalty agreement with RBPlat are excluded in this report as ownership vests with RBPlat. This refers to the agreement with RBPlat to access certain of its mining areas at BRPM from 6 and 20 Shafts.

Rounding of numbers may result in minor computational discrepancies. Mineral Resource estimates are inherently imprecise in nature. The results tabulated in this report must be read as estimates and not as calculations. Inferred Mineral Resources in particular are qualified as approximations.

The year-on-year reconciliation of the total Impala Mineral Resources and Mineral Reserves is depicted in the accompanying maps and graphs. There has been no material change in the Mineral Resource estimate since June 2015. However, the Mineral Reserve statement shows a material reduction, which can mostly be ascribed to the exclusion of 17 Shaft from the Mineral Reserves. In addition, a summary illustration of the progression of Mineral Resources to Mineral Reserves is depicted below, showing the total Mineral Resource estimates (“inclusive” style reporting); those Mineral Resources not progressed to Mineral Reserves (“exclusive” style reporting); the proportion of Mineral Resources that is progressed to Mineral Reserves and the summary Mineral Reserves as derived after modifying factors, including dilution.



# Impala

## Impala Mineral Resources and Mineral Reserves – 100% (inclusive reporting)

as at 30 June 2016

Mineral Resources		as at 30 June 2016									as at 30 June 2015					
Orebody	Category	Tonnes Mt	Width cm	4E grade g/t	6E grade g/t	Ni %	Cu %	4E Moz	6E Moz	Pt Moz	Tonnes Mt	Width cm	4E grade g/t	6E grade g/t	4E Moz	Pt Moz
Merensky	Measured	141.0	123	6.31	7.10	0.15	0.08	28.6	32.2	18.0	148.9	125	6.27	7.01	30.0	18.8
	Indicated	69.1	108	6.29	7.08	0.18	0.09	14.0	15.7	8.8	70.2	110	6.42	7.16	14.5	9.1
	Inferred	23.3	110	6.36	7.15	0.16	0.09	4.8	5.3	3.0	22.6	106	6.35	7.10	4.6	2.9
UG2	Measured	122.8	63	7.32	8.78	0.02	0.01	28.9	34.7	16.7	129.1	63	7.32	8.78	30.4	17.6
	Indicated	49.6	62	7.35	8.83	0.03	0.01	11.7	14.1	6.8	49.3	62	7.37	8.84	11.7	6.8
	Inferred	14.7	63	7.17	8.60	0.03	0.01	3.4	4.1	2.0	14.9	64	7.22	8.66	3.5	2.0
	<b>Total</b>	<b>420.5</b>		<b>6.76</b>	<b>7.85</b>	<b>0.10</b>	<b>0.05</b>	<b>91.3</b>	<b>106.1</b>	<b>55.3</b>	<b>435.0</b>		<b>6.77</b>	<b>7.83</b>	<b>94.7</b>	<b>57.3</b>

Mineral Reserves		as at 30 June 2016									as at 30 June 2015				
Orebody	Category	Tonnes Mt	Width cm	4E grade g/t	6E grade g/t	4E Moz	6E Moz	Pt Moz	Tonnes Mt	Width cm	4E grade g/t	6E grade g/t	4E Moz	Pt Moz	
Merensky	Proved	10.3	127	4.03	4.53	1.3	1.5	0.8	9.1	138	3.86	4.31	1.1	0.7	
	Probable	71.3	132	4.19	4.71	9.6	10.8	6.0	111.2	137	4.34	4.85	15.5	9.7	
UG2	Proved	17.8	108	3.73	4.48	2.1	2.6	1.2	15.8	108	3.83	4.60	2.0	1.1	
	Probable	84.4	106	3.76	4.52	10.2	12.2	5.9	119.7	108	3.76	4.51	14.5	8.4	
	<b>Total</b>	<b>183.8</b>		<b>3.94</b>	<b>4.59</b>	<b>23.3</b>	<b>27.1</b>	<b>14.0</b>	<b>255.9</b>		<b>4.02</b>	<b>4.66</b>	<b>33.1</b>	<b>20.0</b>	

Mineral Resources		as at 30 June 2016			as at 30 June 2015		
Orebody	Category	Tonnes Mt		Pt grade g/t		Pt Moz	Pt Moz
1 & 2 Tailings Complex	Indicated	48.1		0.42		0.6	0.6

## Comparison between Mineral Resource estimate for UG2 chromitite layer and the estimate for the UG2 minimum mining width

as at 30 June 2016

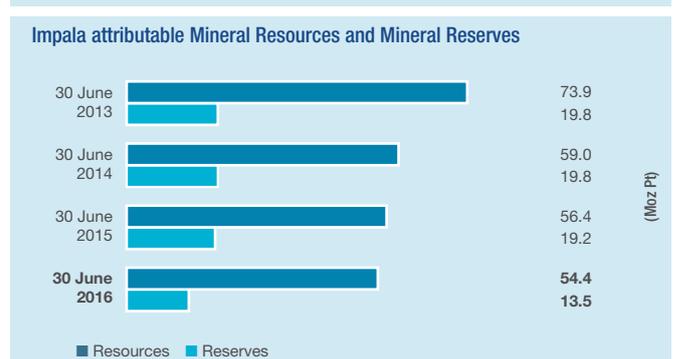
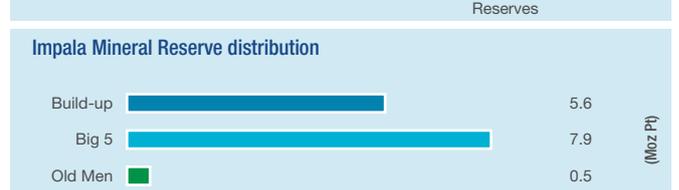
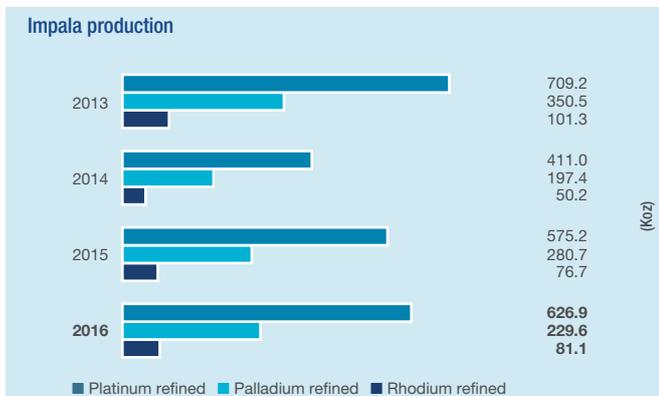
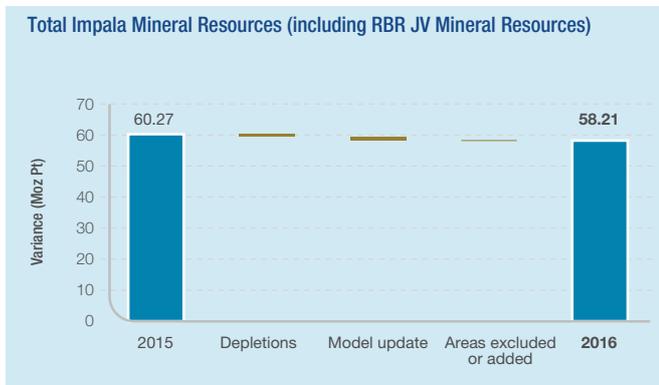
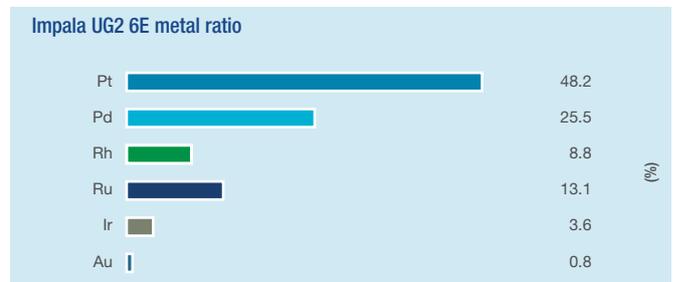
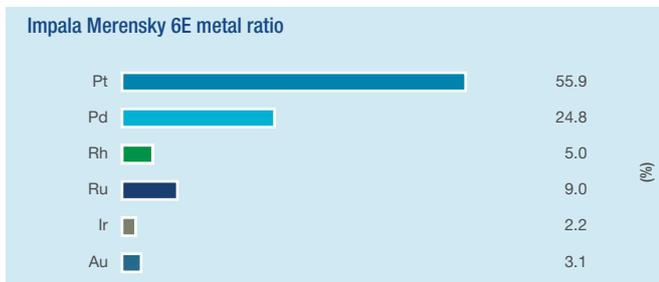
Mineral Resources		Minimum mining width as at 30 June 2016									UG2 chromitite layer as at 30 June 2016					
Orebody	Category	Tonnes Mt	Width cm	4E grade g/t	6E grade g/t	Ni %	Cu %	4E Moz	6E Moz	Pt Moz	Tonnes Mt	Width cm	4E grade g/t	6E grade g/t	4E Moz	Pt Moz
UG2	Measured	174.3	95	5.47	6.56	0.04	0.01	30.7	36.8	17.7	122.8	63	7.32	8.78	28.9	16.7
	Indicated	71.0	95	5.51	6.61	0.05	0.01	12.6	15.1	7.3	49.6	62	7.35	8.83	11.7	6.8
	Inferred	20.8	95	5.46	6.55	0.04	0.01	3.6	4.4	2.1	14.7	63	7.17	8.60	3.4	2.0
	<b>Total</b>	<b>266.1</b>		<b>5.48</b>	<b>6.57</b>	<b>0.04</b>	<b>0.01</b>	<b>46.9</b>	<b>56.2</b>	<b>27.1</b>	<b>187.2</b>		<b>7.32</b>	<b>8.78</b>	<b>44.0</b>	<b>25.5</b>

# Impala

## Impala Royal Bafokeng Resources Platinum JV Mineral Resources

as at 30 June 2016

Mineral Resources		as at 30 June 2016									as at 30 June 2015					
Orebody	Category	Tonnes Mt	Width cm	4E grade g/t	6E grade g/t	Ni %	Cu %	4E Moz	6E Moz	Pt Moz	Tonnes Mt	Width cm	4E grade g/t	6E grade g/t	4E Moz	Pt Moz
Merensky	Measured	5.2	151	6.72	7.56	0.17	0.10	1.1	1.3	0.7	5.3	151	6.72	7.50	1.1	0.7
	Indicated	5.4	151	7.17	8.06	0.16	0.10	1.2	1.4	0.8	5.4	151	7.12	7.95	1.2	0.8
	Inferred	5.1	142	6.75	7.60	0.17	0.10	1.1	1.2	0.7	5.0	140	6.69	7.48	1.1	0.7
UG2	Measured	1.5	53	7.34	8.81	0.03	0.00	0.4	0.4	0.2	1.5	52	7.47	8.97	0.4	0.2
	Indicated	2.3	57	7.77	9.32	0.03	0.00	0.6	0.7	0.3	2.5	61	7.95	9.54	0.6	0.4
	Inferred	1.6	51	7.09	8.51	0.04	0.00	0.5	0.4	0.2	2.0	63	7.26	8.71	0.5	0.3
<b>Total</b>		<b>21.2</b>		<b>7.03</b>	<b>8.05</b>	<b>0.13</b>	<b>0.07</b>	<b>4.8</b>	<b>5.5</b>	<b>2.9</b>	<b>21.6</b>		<b>7.06</b>	<b>8.06</b>	<b>4.9</b>	<b>3.0</b>



# Impala

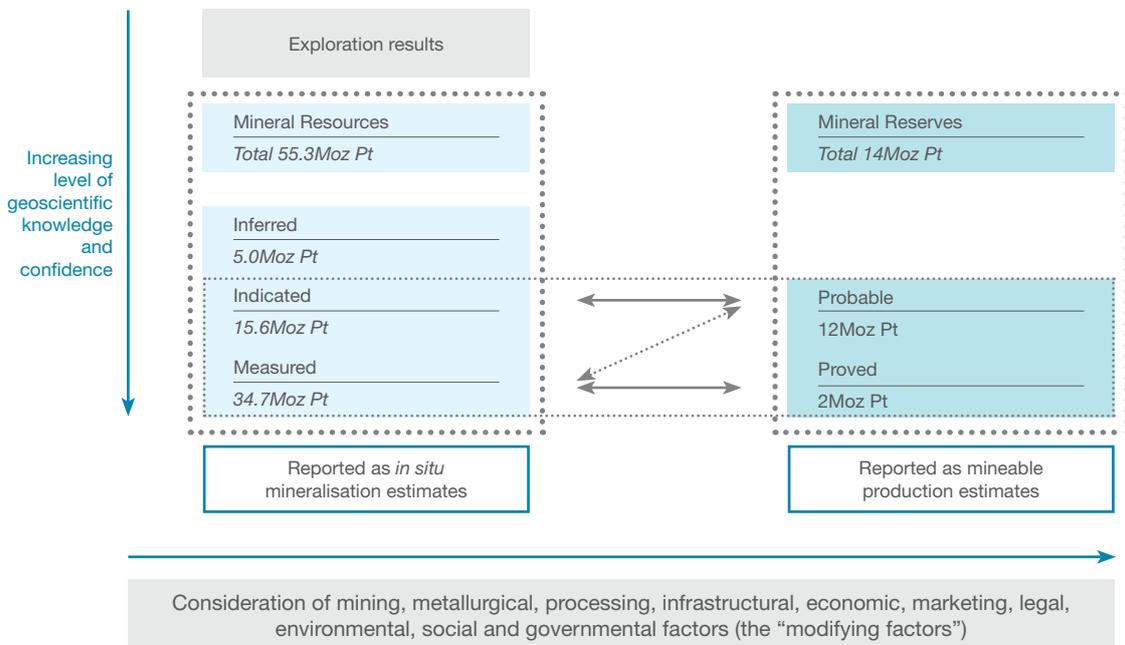
## Valuation

The economic viability of the Impala Mineral Reserves is tested by means of net present value calculations over the LoM of the Mineral Reserve, determining the lowest real rand basket price which would still render the reserve viable. This is then tested against the internal Impala estimate of the real long-term basket price, the spot price as at 30 June 2016 and a consensus view from various financial institutions. These tests indicate that the Impala Operation requires a real long-term basket price of between R20 000 and R21 000 to be economically viable. While the real spot basket price as at 30 June 2016 was R22 600 (US\$1 555), the Impala internal long-term real basket price is R29 318 (US\$1 975) and the equivalent calculated consensus price is R29 276 (US\$1 972).

## Compliance

Impala has adopted the SAMREC Code for its reporting. The Lead Competent Person for Impala is David Sharpe, a full-time employee of Impala. The Competent Person, PrSciNat SACNASP Registration No: 400018/91, has 28 years' relevant experience. The Competent Person for the Impala Mineral Resources is Johannes du Plessis, also a full time employee of Impala. The Competent Person PrSciNat SACNASP Registration No: 4000284/07, has 15 years' relevant experience. Implats has written confirmation from the Lead Competent Persons that the information disclosed in terms of these paragraphs are compliant with the SAMREC Code and, where applicable, the relevant Table 1 and JSE Section 12 requirements and that it may be published in the form, format and context in which it was intended.

## Relationship between Exploration Results, Mineral Resources and Mineral Reserves (100%)



UG2 Pegmatoid, Impala

# Impala

## Key operating statistics

		2016	2015	2014	2013	2012
<b>Production</b>						
Tonnes milled ex mine*	(000t)	<b>10 316</b>	9 199	6 183	10 897	10 654
Head grade 6E	(g/t)	<b>4.16</b>	4.19	4.34	4.32	4.38
Platinum refined	(000 oz)	<b>627</b>	575	411	709	750
PGM refined	(000 oz)	<b>1 220</b>	1 137	766	1 378	1 488
<b>Cost of sales</b>						
On-mine operations	(Rm)	<b>(10 600)</b>	(10 354)	(6 616)	(8 993)	(7 436)
Processing operations	(Rm)	<b>(2 534)</b>	(2 335)	(1 606)	(2 295)	(2 079)
Refining and Marketing	(Rm)	<b>(571)</b>	(794)	(615)	(735)	(720)
Other	(Rm)	<b>(2 801)</b>	(1 341)	(3 392)	(468)	115
<b>Total cost</b>						
	(Rm)	<b>13 879</b>	13 738	9 057	12 227	10 436
Per tonne milled*	(R/t)	<b>1 345</b>	1 493	1 465	1 122	980
	(\$/t)	<b>93</b>	131	141	127	127
Per Pt oz refined	(R/oz)	<b>22 139</b>	23 884	22 036	17 241	13 913
	(\$/oz)	<b>1 535</b>	2 092	2 125	1 955	1 797
<b>Financial ratios</b>						
Gross margin ex mine	(%)	<b>(13.4)</b>	(10.9)	(18.4)	14.4	22.2
<b>Capital expenditure</b>						
	(Rm)	<b>2 490</b>	3 047	2 848	4 411	5 205
	(\$m)	<b>173</b>	267	275	500	672

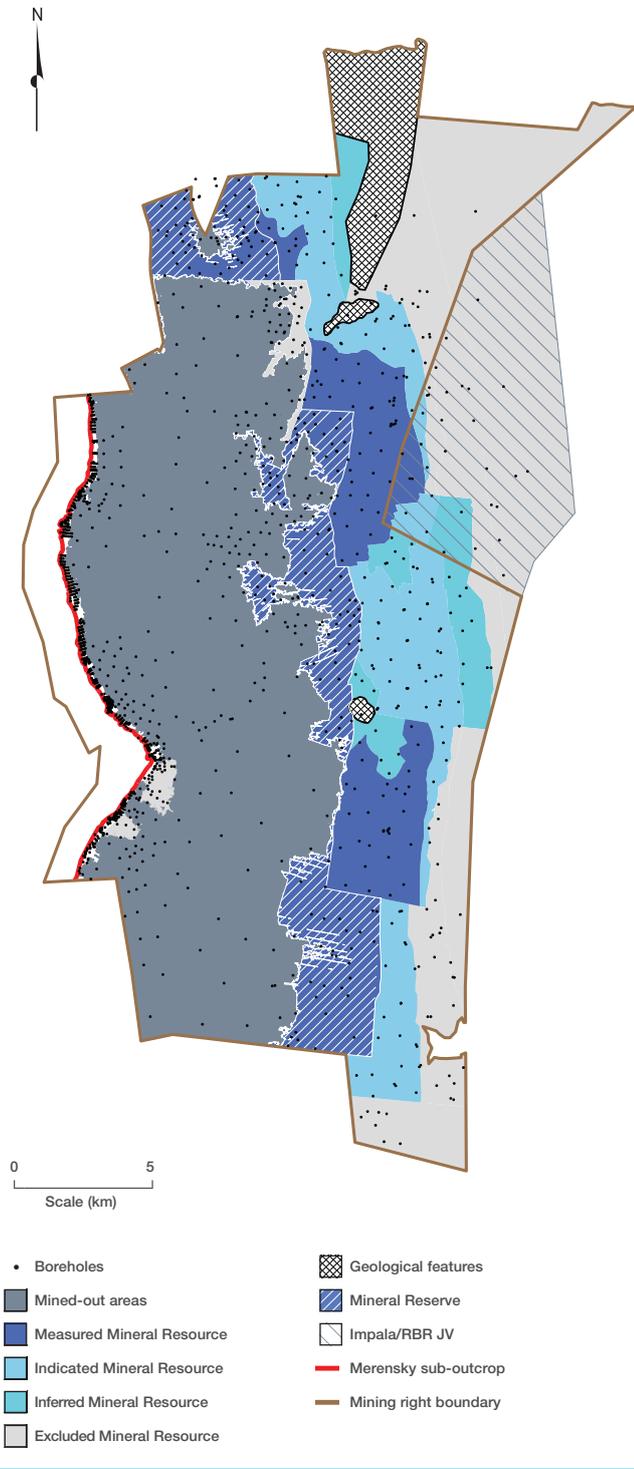
\* The mined tonnage and grade statistics above exclude the low-grade material from surface sources.



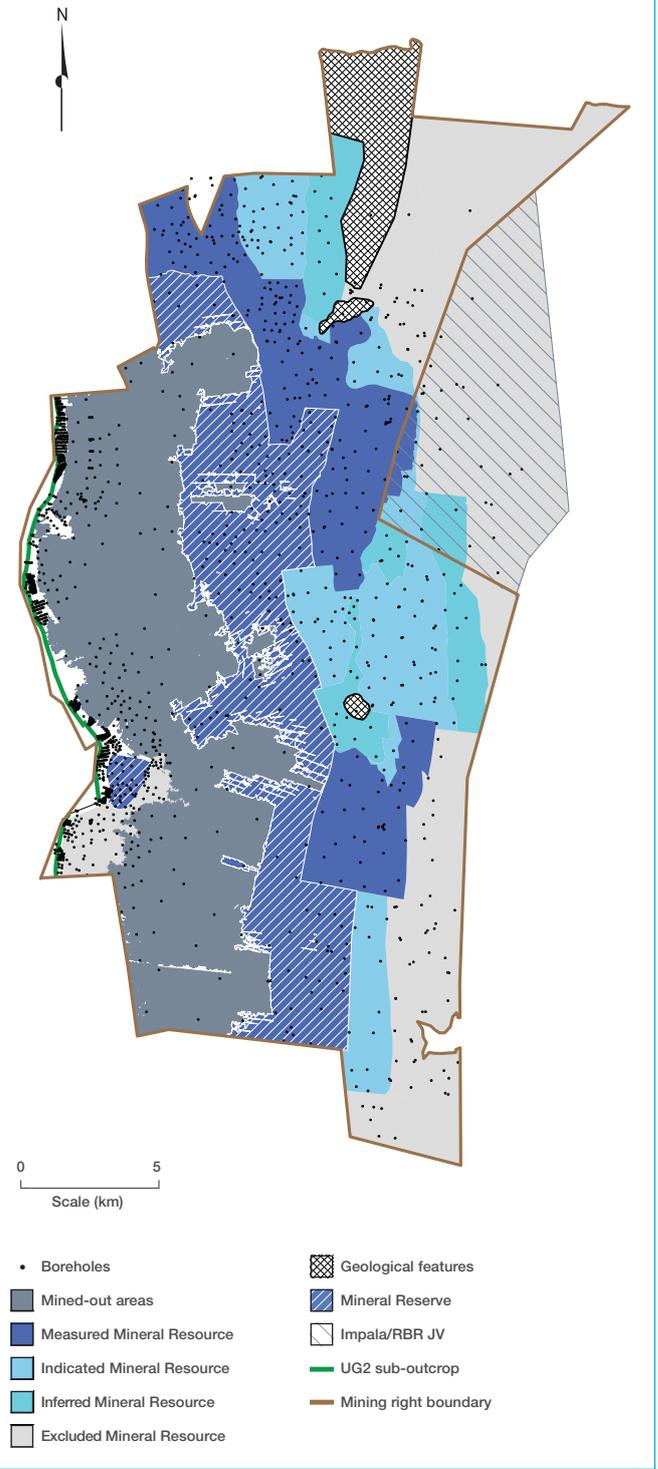
Underground mapping at Impala.

# Impala

**Impala Merensky Mineral Resources and Mineral Reserves**



**Impala UG2 Mineral Resources and Mineral Reserves**



## Marula

The Marula mining operation is located on the eastern limb of the Bushveld Complex, some 35km north-west of Burgersfort. The operation is located between the Modikwa Mine and the Twickenham Mine.



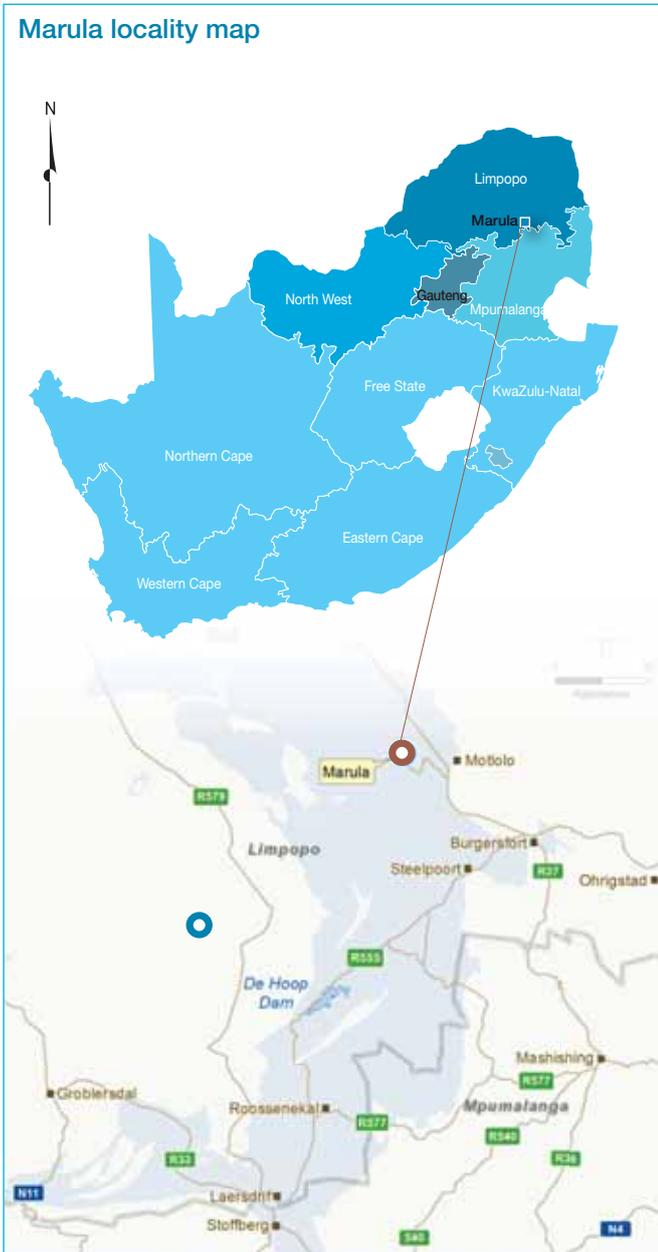
Mill at Marula.

### History

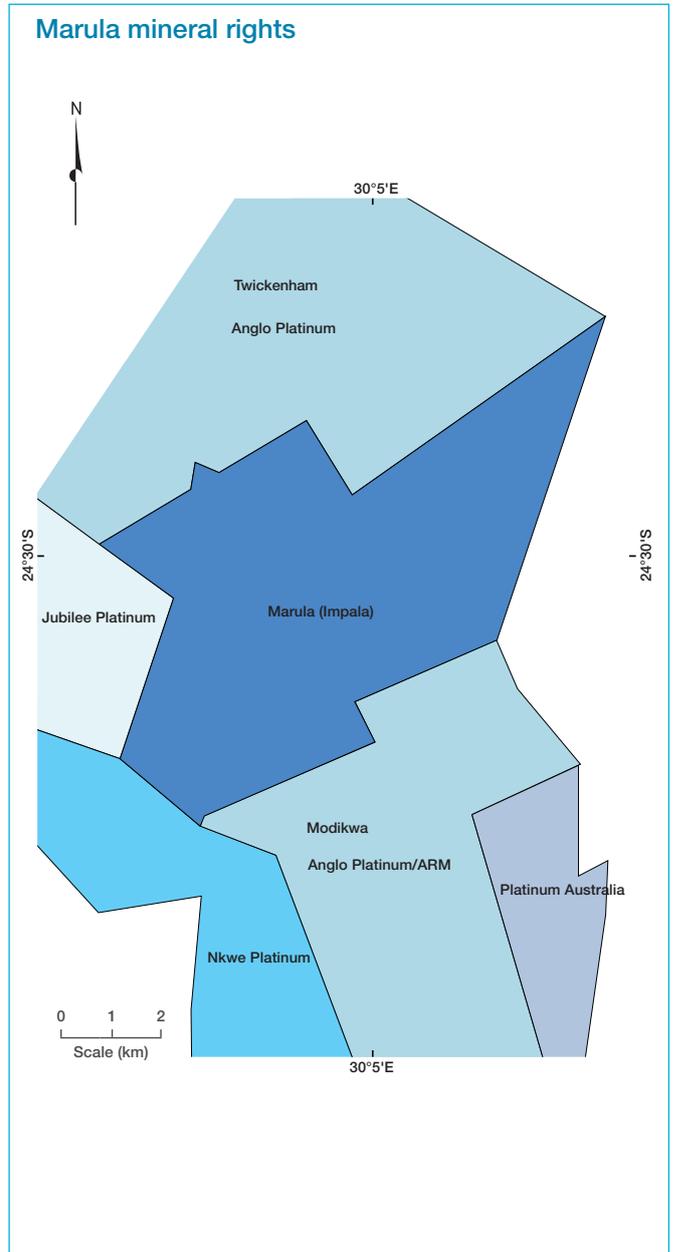
Platinum was first discovered in the area by renowned explorer Hans Merensky on the nearby farm Maandagshoek (now part of Modikwa Platinum Mine) in 1924. In June 1998 Implats entered into an arrangement to acquire the Winnaarshoek property from Platexco, a Canadian-based company. The mineral rights to portions of the adjacent farms of Clapham and Forest Hill and a sub-lease to Driekop were subsequently acquired from Anglo Platinum in exchange for Hendriksplaats (now part of Modikwa), thus consolidating the Marula Mine area. The exploration programme was expanded and some 750 additional surface boreholes were drilled. The establishment and development of the mine commenced in October 2002, requiring considerable investment from Implats in both infrastructure and environmental protection measures.

# Marula

Marula locality map



Marula mineral rights



## Mineral rights

Marula holds two contiguous mining rights and a prospecting right covering 5 494ha across the farms Winnaarshoek and Clapham, and portions of the farms Driekop, Forest Hill and Hackney. Marula also has a royalty agreement with Modikwa, which allows limited mining on an area adjacent to the Driekop Shaft. These Mineral Resources and Mineral Reserves have not been reflected in the current statement as ownership still rests with Modikwa. During 2015 an additional portion of the UG2 mineral rights on a portion of the farm Driekop has been

incorporated into the Marula mining rights. Implats has a 73% interest in Marula with each of the three empowerment groupings (Mmakau Mining, the Marula Community Trust and Tubatse Platinum) holding a 9% interest.

The new-order Mining Right was awarded for a 30-year period in 2008. In terms of the MPRDA holders of the mining rights may apply for more than one renewal period of a maximum of 30 years each as per the supporting mining work programme, 60 working days before the relevant expiry date.

# Marula

## Infrastructure

The region is well developed, partly due to other mining activities in the vicinity. The R37 tarred road from Burgersfort to Polokwane passes through the area, while a secondary tarred road, built by Marula, links the R37 to the main office and other infrastructure at Marula.

The existing mines and villages are supplied with electricity by Eskom. Marula has an adequate and firm electricity supply and distribution network. The site is supplied by two independent 132kV Eskom power lines. Two 40MVA transformers (one operating and one on standby) convert the voltage to 33kV for surface and underground distribution.

Water is provided through the Lebalelo Water Scheme from which Marula has an allocation of 13.8ML/day, which is more than adequate for planned production levels.

Mining infrastructure includes two decline shafts, offices, stores, a concentrator plant, a chromitite recovery plant, a tailings storage facility and overland ore conveyance.

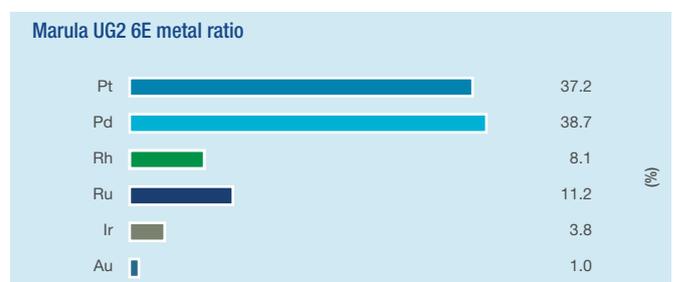
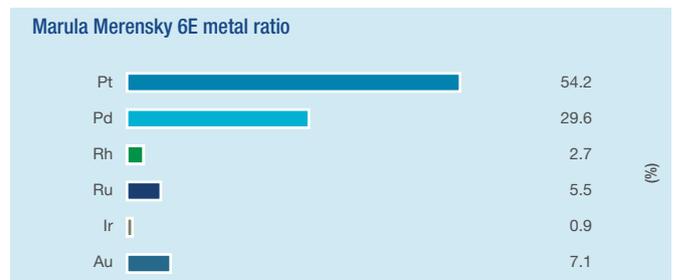
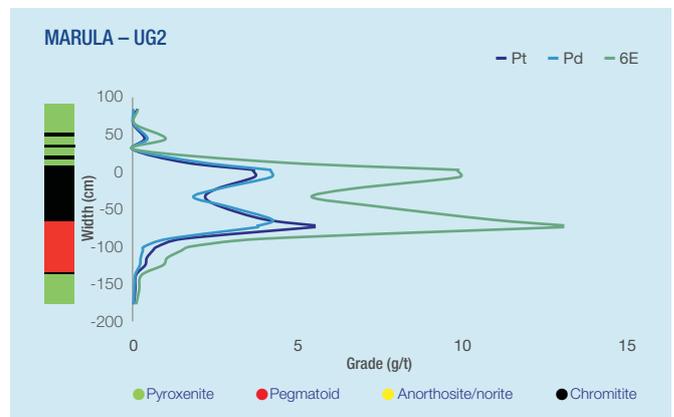
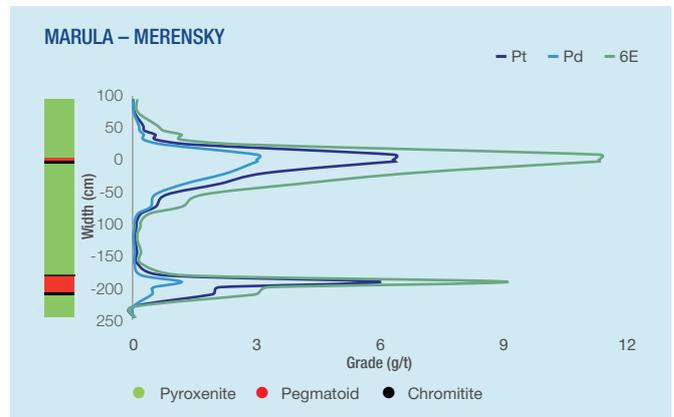
## Environmental

Marula is in the process of obtaining ISO 140001 certification. The assessment is due in September 2016. In line with our environmental management system expectations, all areas are required to identify and report on environmental incidents. Systems are in place to investigate and determine the direct and root causes of high-severity incidents and to address and close out these incidents.

The preliminary design for a new tailings storage facility is currently under way. An environmental management plan (EMP) for the new facility was approved in 2008. Confirmation that this EMP is valid was obtained from the DMR. Further licensing requirements will be done during the detailed design phase of the project.

## Geology

Both the Merensky and UG2 Reefs are present but only the UG2 is currently exploited. The geological succession is broadly similar to that of the western limb. The UG2 Reef is defined as a main chromitite layer, with most of the mineralisation confined to this unit, followed by a poorly-mineralised pegmatoidal footwall. The Merensky Reef is the upper portion of a pyroxenite layer, with a chromitite stringer close to the hangingwall contact. Mineralisation peaks over the chromitite stringer and decreases into the hangingwall and footwall. Both mineralised horizons sub-outcrop on the Marula mining rights area and dip in a west-southwest direction at 12° to 14°. The vertical separation between the Merensky and UG2 Reefs averages 400m. The reefs are relatively undisturbed by faults and dykes with one major dyke traversing the mining area. Potholes represent the



majority of the geological losses encountered underground, while a small dunite pipe also disrupts the reef horizons. These geological features are accounted for in the Mineral Resource and Mineral Reserve statements as geological losses.

## Marula

### Modifying factors

Key modifying factors, such as overbreak, underbreak, off-reef mining, development dimensions, sweepings and mine call factors, are applied to the mining area (centare profile) to generate tonnage and grade profiles. The modifying factors used to convert a Mineral Resource to a Mineral Reserve are derived from historical performance while taking future anticipated conditions into account. Key factors are tabulated below.

### Key factors and assumptions

Merensky Reef	Factors	Long-term price assumptions in today's money**		
Geological losses	25 – 35%	Platinum	US\$/oz	1 260
Mineral Resource Area	16 million ca	Palladium	US\$/oz	815
Relative density	3.2 – 3.3	Rhodium	US\$/oz	1 045
Channel width	100cm	Ruthenium	US\$/oz	35
		Iridium	US\$/oz	460
		Gold	US\$/oz	1 080
		Nickel	US\$/t	13 955
		Copper	US\$/t	5 730
		Exchange rate	R/US\$	14.80

\*\*Supporting the Mineral Reserve estimates.

UG2 Reef	Factors	6E metal ratio (%)			
				Merensky	UG2
Geological losses	15 – 20%	Platinum	%	54.2%	37.2%
Mineral Resource Area	22.5 million ca	Palladium	%	29.6%	38.7%
Pillar factors	8 – 12%	Rhodium	%	2.7%	8.1%
Resource dilution	9 – 12%	Ruthenium	%	5.5%	11.2%
Mine call factor	96 – 98%	Iridium	%	0.9%	3.8%
Relative density	3.7 – 3.8	Gold	%	7.1%	1.0%
Channel width	59cm		<b>Implats' interest</b>	<b>Mining right (ha)</b>	<b>Prospecting right (ha)</b>
Stoping width	132cm	Marula	73%	5 494	223
Concentrator recoveries	87 – 88%				

### Mining methods and mine planning

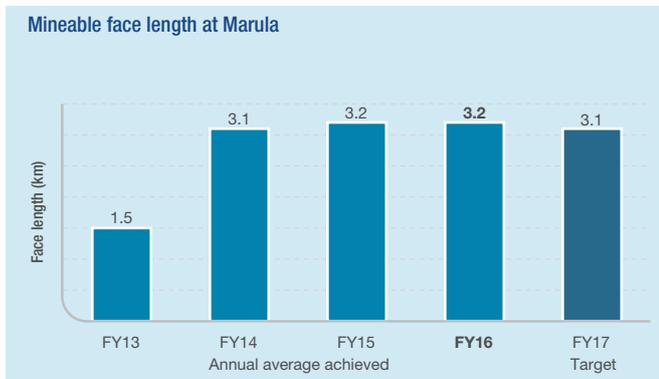
Marula Mine has two decline shaft systems. Driekop Shaft is exploiting the UG2 Reef by means of a hybrid mining method, while at Clapham Shaft, both a hybrid and conventional mining method are being used to exploit the UG2 Reef. For the two hybrid sections, all main development is done on reef and the stoping is carried out through conventional single-sided breast mining from a centre gully. Panel face lengths are approximately 16m to 24m, with panels being separated by 6m x 4m grid pillars with 2m ventilation holes. The stoping width averages 1.4m. For the conventional operation, the footwall drives are developed on strike approximately 25m below the reef horizon with cross-cut breakaways about 220m apart. This development is undertaken with drill rigs and dump trucks. Stope face drilling takes place with hand-held pneumatic rock drills with air legs.

Mine design and scheduling of the operational shafts is carried out using CadsMine™ software. Geological models and ore blocks are updated and validated using G-Blocks and boundaries in the MRM information system. Grade block models are developed using Isatis™ software. The planning process starts with the compilation of the LoM plan (August to October) followed by a detailed two-year budget plan (March to May). The spread of Mineral Reserves over the three mining sections is depicted below. The majority of the Mineral Reserves (67%) are located in the Clapham decline section.

Similar to Impala, one of the mining flexibility measures at conventional stoping sections are the mineable face length. These are stoping faces that can immediately be exploited without any further development or equipping. The progress of such flexibility is managed in detail. The minimum target is to have a flexibility of 1.5, in other words, to have three mineable panels for every two

# Marula

stopping teams. Significant progress has been made in the last four years with the total mineable face length at Marula having increased from 1.5km in 2013 to some 3.2km in 2016.



The LoM I encompasses the UG2 Reef Clapham hybrid, Clapham Conventional up to 5 Level, Driekop hybrid and Driekop Extension areas. This will take the mine to a sustainable production level of over 2Mt per annum until 2024. Maintaining the profile after 2024 is the subject of ongoing studies and will require some capital expenditure to optimise the LoM II and LoM III in the 20-year LoM profile. The comparison between the Mineral Resource statement and the 20-year LoM profile clearly illustrates its potential to expand operations in future if economically viable. Note that the indicative LoM profile is based on a range of assumptions, which could change in future.



## Processing

Marula has a concentrator plant where initial processing is conducted. Concentrate is transported by road to Impala's Mineral Processes in Rustenburg in terms of a LoM offtake agreement with IRS.

## Marula top risks

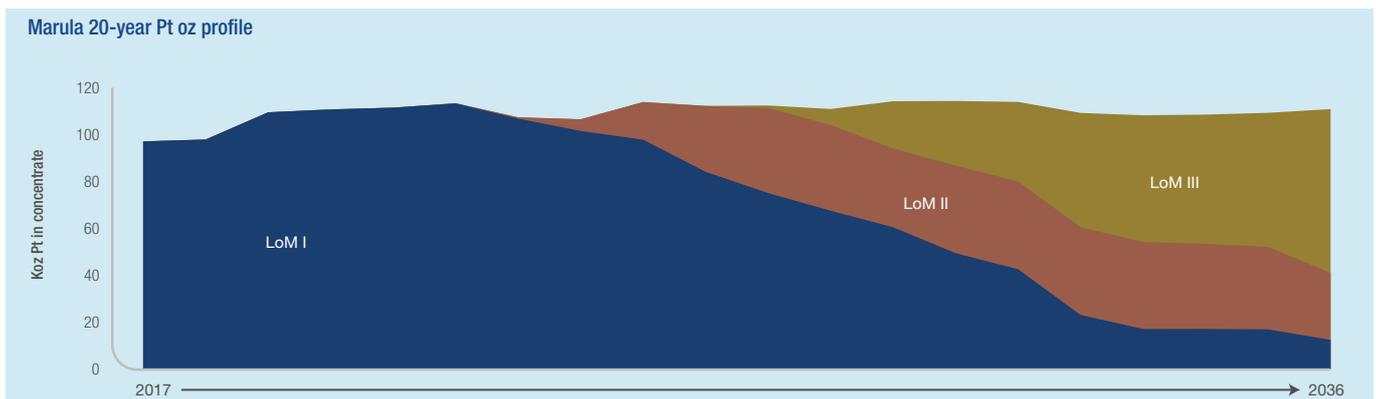
The Group risk management process is briefly described on page 13. In this context the top risks identified at Marula are:

- Failure to achieve production targets
- Community unrest
- Failure to build a new tailings facility
- Impact of Section 54 stoppages
- Failure to improve environmental performance
- Disruption to water supply
- Retention of skills
- Access to capital funding

## Mineral Resource and Mineral Reserve estimation and reconciliation

The statement below reflects total estimates for Marula as at 30 June 2016. The corresponding estimated attributable Mineral Resources and Reserves are summarised elsewhere in this report. Note that Mineral Resources are quoted inclusive of Mineral Reserves and that Mineral Reserves quoted reflect the stoping width. Estimated geological losses have been accounted for in the Mineral Resource estimate. The UG2 Mineral Resource accounts for the main chromitite layer channel width only, without consideration of dilution. A separate table is included to reflect the comparative minimum mining width resource cut. Notably this shows a lower grade but with similar metal content. Grade estimates were obtained by means of ordinary kriging of borehole intersections. No additional work was done on the Merensky Mineral Resource estimation during the year and the same statement is reported as in the previous four years. Changes in the UG2 Mineral Resource estimates since last year reflect an updated estimation using limited additional data.

The Mineral Reserves quoted reflect the grade delivered to the mill rather than the *in situ* channel grade quoted in respect of the Mineral Resources. The modifying factors used in the UG2 Mineral Reserve estimate are based on the mine plan, which envisages hybrid and conventional breast mining operations. No Inferred Mineral Resources have been converted into Mineral Reserves.



# Marula

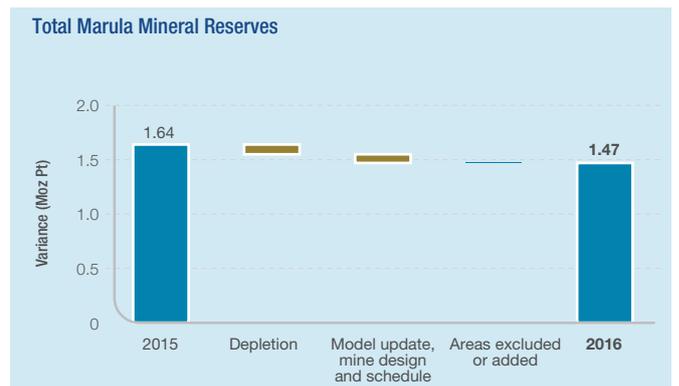
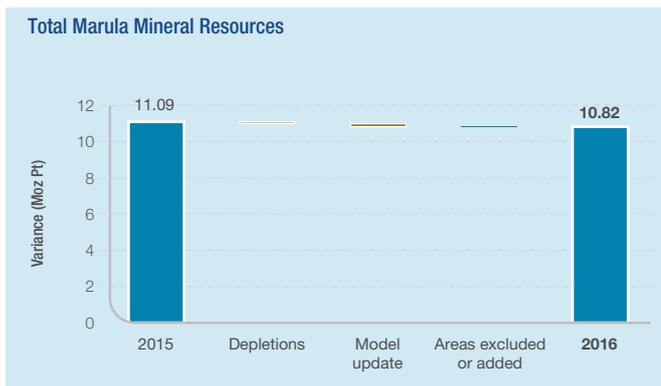
The Mineral Resources and Mineral Reserves are reflected in both 4E and 6E formats. Rounding of numbers may result in minor computational discrepancies. Mineral Resource estimates are inherently imprecise in nature and the results tabulated in this report must be read as estimates and not as calculations. Inferred Mineral Resources in particular are qualified as approximations.

The average nickel and copper grades based on exploration samples are 0.202% Ni and 0.115% Cu for the Merensky Reef channel. The average nickel and copper grades based on exploration samples are 0.056% Ni and 0.025% Cu for the UG2 Reef channel.

There are no material changes in the Mineral Resource and Mineral Reserves estimates compared with the statement published in June 2015. The bulk of the variances can be attributed to normal mining depletion.

The Marula Mineral Resource progression is illustrated below, showing among others, a summary of the total Mineral Resource (“inclusive” of Mineral Reserves); the part of the Mineral Resource that is not progressed to a Mineral Reserve (“exclusive” style reporting); the part of the Mineral Resource that is progressed to Mineral Reserves and also the Mineral Reserves.

Marula Platinum Mineral Resource progression	<b>Marula Merensky Reef Mineral Reserves (Inclusive of dilution)</b>			<b>Marula UG2 Reef Mineral Reserves (Inclusive of dilution)</b>		
	Mt	6E g/t	Moz Pt	Mt	6E g/t	Moz Pt
	none	none	none	26.4	4.67	1.5
	<b>Marula Merensky Reef Mineral Resources progressed to Mineral Reserves</b>			<b>Marula UG2 Reef Mineral Resources progressed to Mineral Reserves</b>		
	Mt	6E g/t	Moz Pt	Mt	6E g/t	Moz Pt
	none	none	none	12.0	10.08	1.4
	<b>Marula Merensky Reef Mineral Resources not progressed to Mineral Reserves</b>			<b>Marula UG2 Reef Mineral Resources not progressed to Mineral Reserves</b>		
	Mt	6E g/t	Moz Pt	Mt	6E g/t	Moz Pt
51.9	4.54	4.1	42.7	10.37	5.3	
<b>Marula Merensky Reef Mineral Resources inclusive of Mineral Reserves</b>			<b>Marula UG2 Reef Mineral Resources inclusive of Mineral Reserves</b>			
Mt	6E g/t	Moz Pt	Mt	6E g/t	Moz Pt	
51.9	4.54	4.1	54.6	10.31	6.7	



# Marula

## Marula Mineral Resources and Mineral Reserves – 100% (inclusive reporting)

as at 30 June 2016

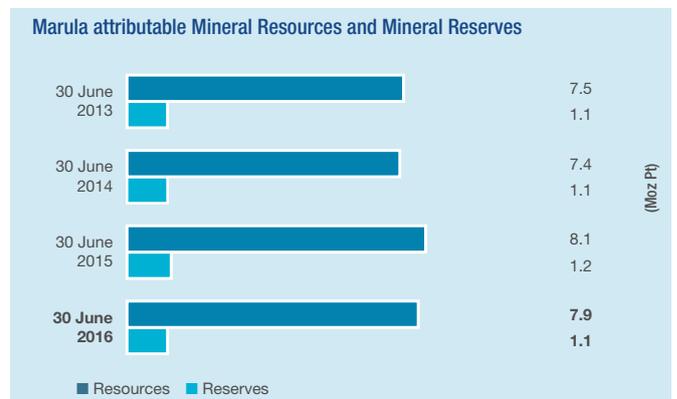
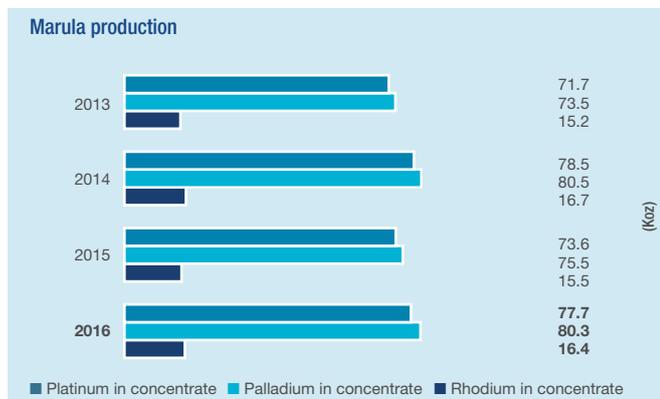
Mineral Resources		as at 30 June 2016									as at 30 June 2015					
Orebody	Category	Tonnes Mt	Width cm	4E grade g/t	6E grade g/t	Ni %	Cu %	4E Moz	6E Moz	Pt Moz	Tonnes Mt	Width cm	4E grade g/t	6E grade g/t	4E Moz	Pt Moz
Merensky	Measured	34.3	100	4.26	4.56	0.20	0.11	4.7	5.0	2.7	34.3	100	4.24	4.55	4.7	2.7
	Indicated	7.9	100	4.24	4.54	0.19	0.11	1.1	1.2	0.6	7.7	100	4.26	4.54	1.1	0.6
	Inferred	9.7	100	4.17	4.46	0.21	0.12	1.3	1.4	0.7	9.9	100	4.16	4.46	1.3	0.8
UG2	Measured	33.3	57	8.65	10.17	0.05	0.02	9.3	10.9	4.0	34.0	57	8.75	10.17	9.6	4.2
	Indicated	13.6	62	8.89	10.45	0.06	0.03	3.9	4.6	1.7	14.2	62	8.92	10.38	4.1	1.8
	Inferred	7.7	60	9.07	10.67	0.06	0.03	2.3	2.7	1.0	7.6	60	9.09	10.61	2.2	1.0
	<b>Total</b>	<b>106.5</b>		<b>6.56</b>	<b>7.50</b>	<b>0.13</b>	<b>0.07</b>	<b>22.5</b>	<b>25.7</b>	<b>10.8</b>	<b>107.7</b>		<b>6.62</b>	<b>7.51</b>	<b>22.9</b>	<b>11.1</b>

Mineral Reserves		as at 30 June 2016									as at 30 June 2015				
Orebody	Category	Tonnes Mt	Width cm	4E grade g/t	6E grade g/t	4E Moz	6E Moz	Pt Moz	Tonnes Mt	Width cm	4E grade g/t	6E grade g/t	4E Moz	Pt Moz	
UG2	Proved	4.2	133	4.18	4.91	0.6	0.7	0.2	3.0	136	4.02	4.67	0.4	0.2	
	Probable	22.2	132	3.93	4.62	2.8	3.3	1.2	27.0	137	3.85	4.47	3.3	1.5	
	<b>Total</b>	<b>26.4</b>		<b>3.97</b>	<b>4.67</b>	<b>3.4</b>	<b>4.0</b>	<b>1.5</b>	<b>30.0</b>		<b>3.87</b>	<b>4.49</b>	<b>3.7</b>	<b>1.6</b>	

## Comparison between Mineral Resource estimate for UG2 chromitite layer and the estimate for the UG2 minimum mining width

as at 30 June 2016

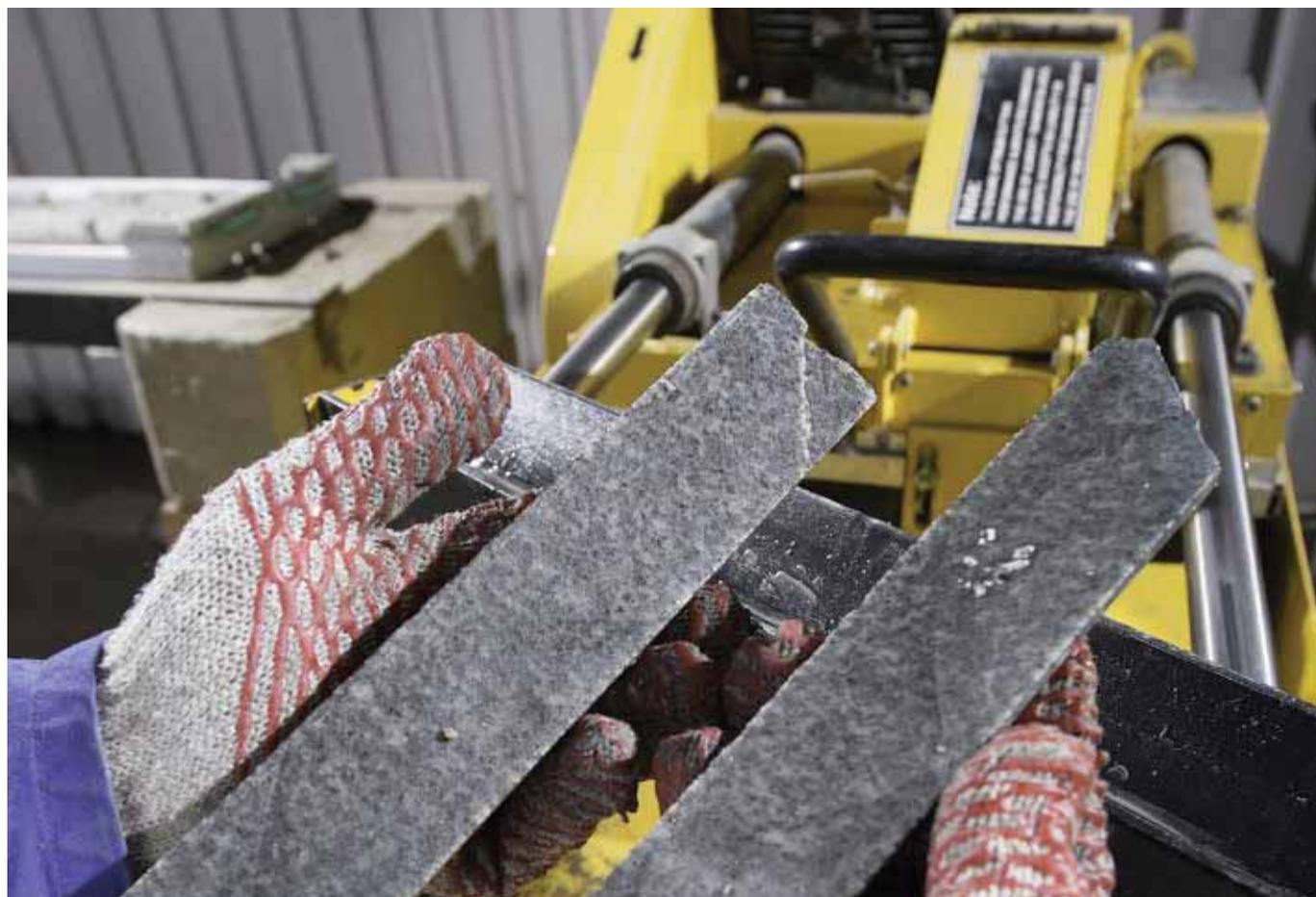
Mineral Resources		Minimum mining width as at 30 June 2016									UG2 chromitite layer as at 30 June 2016						
Orebody	Category	Tonnes Mt	Width cm	4E grade g/t	6E grade g/t	Ni %	Cu %	4E Moz	6E Moz	Pt Moz	Tonnes Mt	Width cm	4E grade g/t	6E grade g/t	4E Moz	6E Moz	Pt Moz
UG2	Measured	52.1	96	6.10	7.17	0.04	0.02	10.2	12.0	4.5	33.3	57	8.65	10.17	9.3	10.9	4.0
	Indicated	21.2	103	6.15	7.24	0.05	0.02	4.2	4.9	1.8	13.6	62	8.89	10.45	3.9	4.6	1.7
	Inferred	12.0	99	6.42	7.55	0.05	0.02	2.5	2.9	1.1	7.7	60	9.07	10.67	2.3	2.7	1.0
<b>Total</b>		<b>85.4</b>		<b>6.16</b>	<b>7.24</b>			<b>16.9</b>	<b>19.9</b>	<b>7.4</b>	<b>54.6</b>		<b>8.77</b>	<b>10.31</b>	<b>15.4</b>	<b>18.1</b>	<b>6.7</b>



## Marula

### Key operating statistics

		2016	2015	2014	2013	2012
<b>Production</b>						
Tonnes milled ex mine	(000t)	<b>1 703</b>	1 662	1 794	1 628	1 579
Head grade 6E	(g/t)	<b>4.25</b>	4.19	4.19	4.19	4.18
Platinum in concentrate	(000 oz)	<b>77.7</b>	73.6	78.5	71.1	69.1
PGM in concentrate	(000 oz)	<b>204.6</b>	193.3	206.4	188.3	182.2
<b>Cost of sales</b>						
	(Rm)	<b>(2 076)</b>	(1 856)	(1 803)	(1 620)	(1 277)
On-mine operations	(Rm)	<b>(1 669)</b>	(1 469)	(1 371)	(1 249)	(984)
Concentrating operations	(Rm)	<b>(206)</b>	(193)	(188)	(161)	(155)
Other	(Rm)	<b>(201)</b>	(194)	(244)	(210)	(138)
<b>Total cost</b>						
	(Rm)	<b>1 875</b>	1 662	1 559	1 410	1 139
Per tonne milled	(R/t)	<b>1 101</b>	1 000	869	866	721
	(\$/t)	<b>76</b>	88	84	98	93
Per Pt oz in concentrate	(R/oz)	<b>24 131</b>	22 582	19 860	19 665	16 483
	(\$/oz)	<b>1 673</b>	1 978	1 915	2 230	2 129
<b>Financial ratios</b>						
Gross margin ex mine	(%)	<b>(23.7)</b>	(13.4)	(0.7)	(15.4)	(6.7)
<b>Capital expenditure</b>						
	(Rm)	<b>89</b>	145	161	127	212
	(\$m)	<b>6</b>	13	16	14	27



Splitting of borehole core.

# Marula

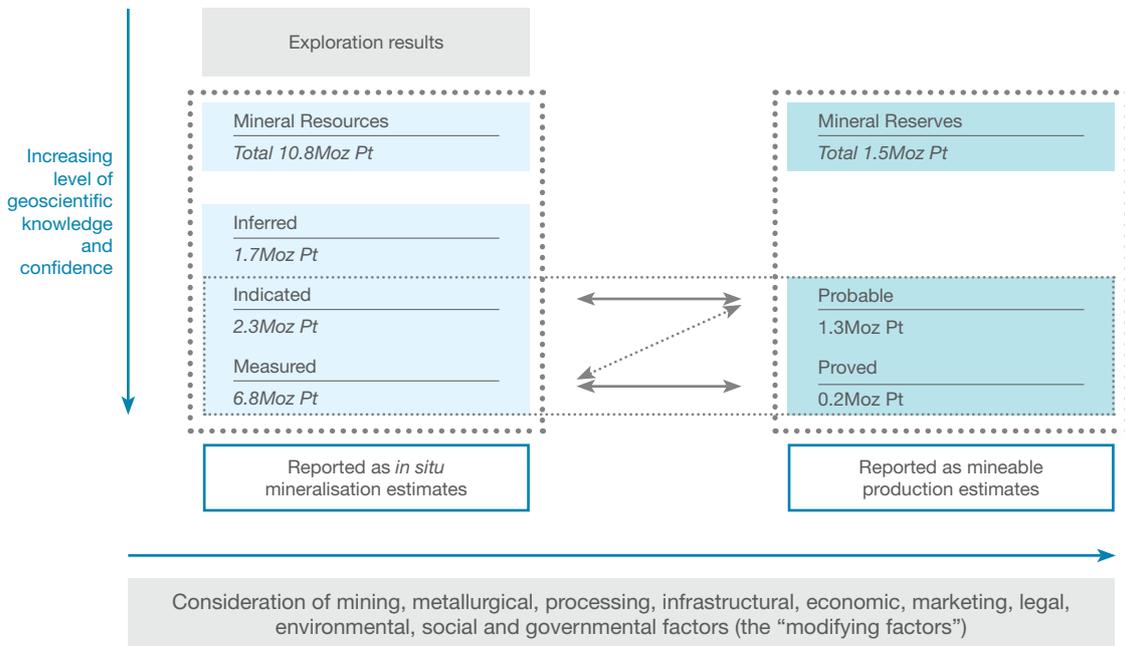
## Valuation

The economic viability of the Marula Mineral Reserves is tested by means of net present value calculations over the LoM of the reserve, determining the lowest real rand basket price that would still render the reserve viable. This is then tested against the internal Marula estimate of the real long-term basket price, the spot price as at 30 June 2016 and a consensus view from various financial institutions. These tests indicate that the Marula Operation requires a real long-term basket price of between R20 000 and R22 000 to be economically viable. While the real spot basket price as at 30 June 2016 was R22 600 (US\$1 555), the Marula internal long-term real basket price is R29 318 (US\$1 975) and the equivalent calculated consensus price is R29 276 (US\$1 972).

## Compliance

Marula has adopted the SAMREC Code for its reporting. The Lead Competent Persons for Marula are Gerrie le Roux and Sifiso Mthethwa, full-time employees of Marula. The Competent Persons, PLATO No: MS0034 and PrSciNat SACNASP Registration No: 400163/13, have 44 years' relevant experience combined. Implats has written confirmation from the Lead Competent Persons that the information disclosed in terms of these paragraphs are compliant with the SAMREC Code and, where applicable, the relevant Table 1 and JSE Section 12 requirements, and that it may be published in the form, format and context in which it was intended.

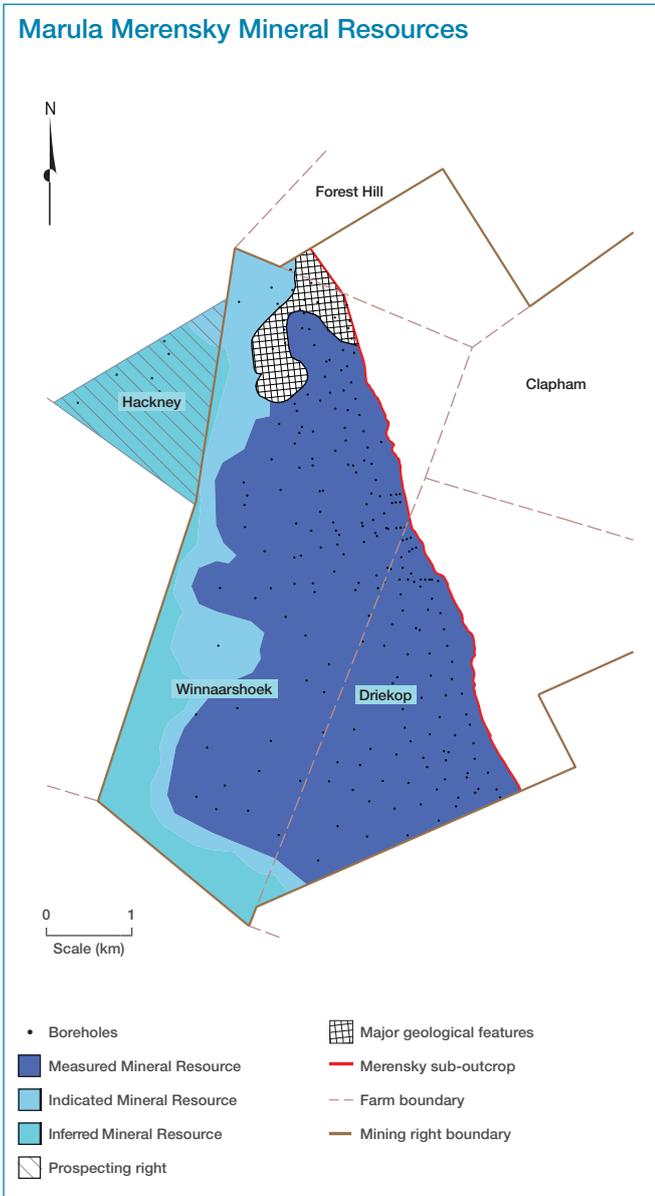
## Relationship between Exploration Results, Mineral Resources and Mineral Reserves (100%)



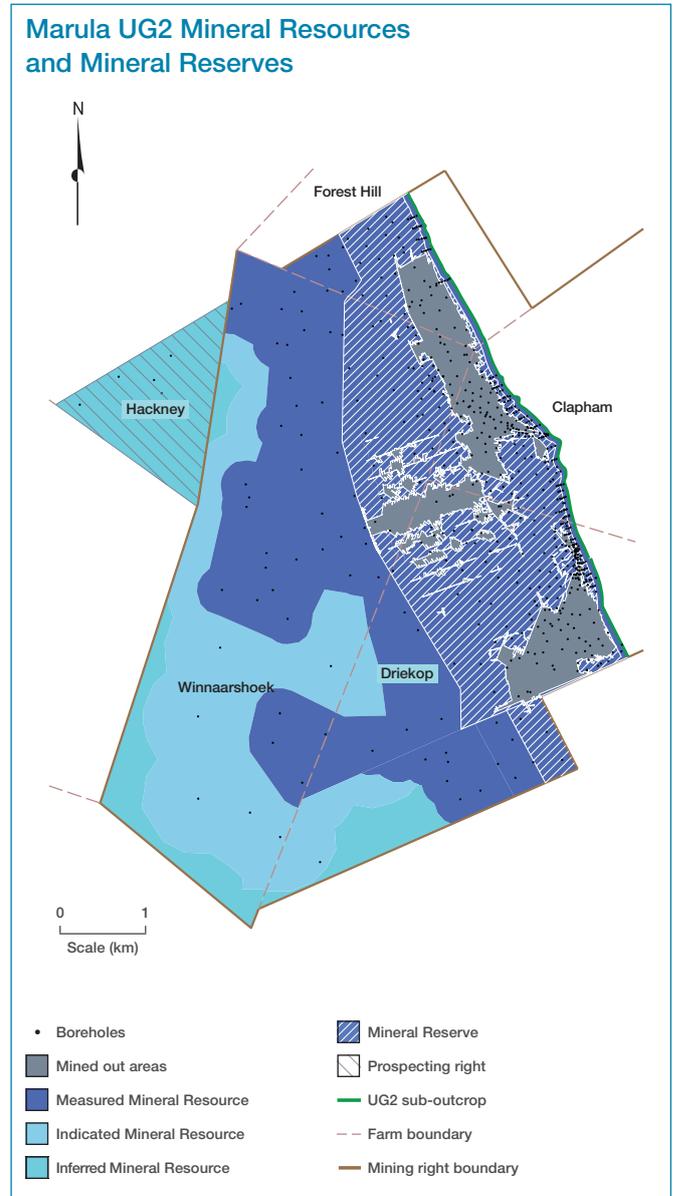
Concentrator plant, Marula.

# Marula

Marula Merensky Mineral Resources



Marula UG2 Mineral Resources and Mineral Reserves



## Two Rivers

Two Rivers Platinum Mine is located on the eastern limb of the Bushveld Complex, some 35km south-west of Burgersfort. The mine extends over a portion of the farm Dwarsrivier 372KT, certain portions of the farm Kalkfontein 367KT and Tweefontein 360KT, and the farm Buffelshoek 368KT. Both the UG2 and Merensky Reefs are present on the farms.



Overland conveyor belt, Two Rivers.

### History

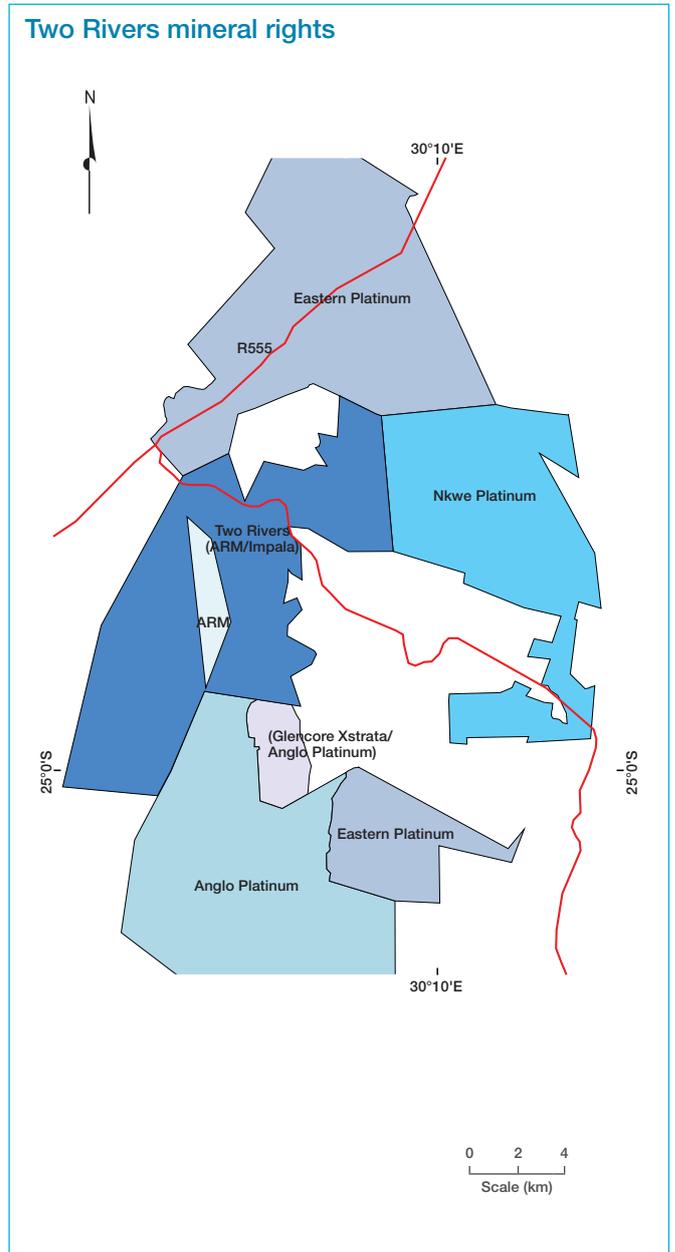
During 2001, Assmang elected to dispose of its platinum interests at the Dwarsrivier Chrome Mine. Two Rivers, the incorporated joint venture between Avmin and Implats, secured the platinum rights in December 2001. Subsequent corporate activity involving Avmin, African Rainbow Minerals (ARM) and Harmony resulted in the transfer of Avmin's share in Two Rivers to a new, empowered platinum entity, ARM Platinum, a division of ARM. The joint venture partners began development of the Two Rivers project in June 2005. The concentrator plant was commissioned in 2006 and in 2008 the mine successfully made the transition from a project to a mechanised operation.

# Two Rivers

Two Rivers locality map



Two Rivers mineral rights



## Mineral rights

The operation is managed by ARM and Implats has a 49% stake in the joint venture. Two Rivers was granted a new-order mining right in 2013 over 2 140ha on the western portion of the farm Dwarsrivier. The mining rights were awarded for a 25-year period at which time the MPRDA allows for an extension. In 2015, portions 4, 5 and 6 of the adjoining farm, Kalkfontein, as well as portions of the farm Tweefontein held by Impala, were incorporated into the Two Rivers mining right. An agreement was also reached for the remaining Implats-owned

mineral rights on portions of the farm Kalkfontein and the farm Buffelshoek in exchange for a royalty payment. A further agreement between ARM and Implats was concluded to incorporate the mineral rights held by Tamboti Platinum (Pty) Ltd, which was acquired by ARM and comprises the RE of the farm Kalkfontein, into the Two Rivers mining area. This will result in a decrease of the Implats shareholding from 49% to 46%. This agreement is awaiting approval of the Section 11 and 102 mineral rights application.

## Two Rivers

### Infrastructure

The tarred access road constructed by Two Rivers to the mine is in a good condition and well maintained. The nearest railway station at Steelpoort is 28km from the mine.

Two Rivers has a Water Use Licence to obtain its water from the Groot and Klein Dwars Rivers and from underground dewatering. The annual WUL (January – December) allocation is 2 926 880m<sup>3</sup>. Average water abstracted in 2015 (Jan – Dec) was 2 035 323m<sup>3</sup>. Electricity is obtained from Eskom via one of two 40MVA transformers at the Uchoba sub-station, which are fed from a 132kV line from the Merensky sub-station.

Mining infrastructure includes two decline shafts, offices, stores, a concentrator plant, a chromitite recovery plant, tailings storage facility and overland ore conveyance.

### Environmental

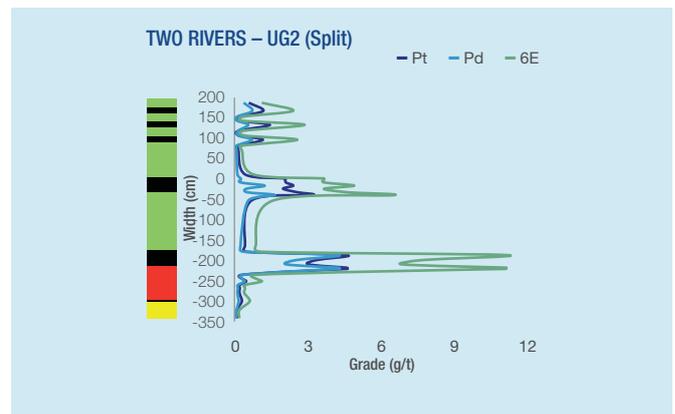
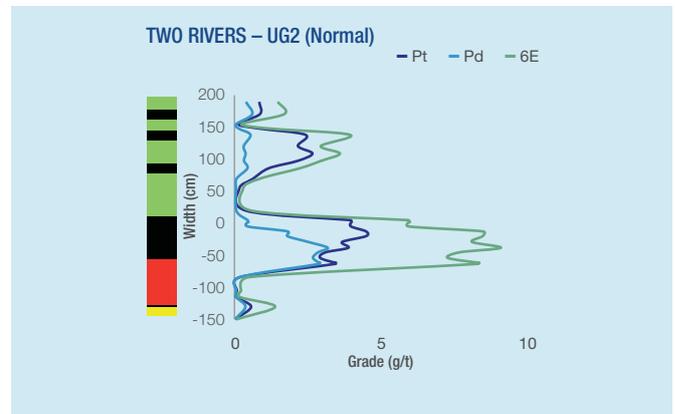
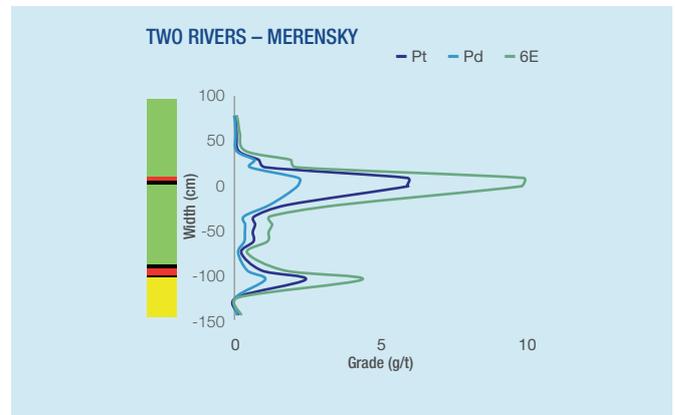
Environmental management activities include monitoring the status of Environmental Management Programme Reports (EMPRs), WUL applications and Environmental Impact Assessments (EIAs).

Two Rivers is currently not ISO 14001 certified but is aligned with ISO 14001 principles. The Isometrics system to record and manage environmental issues is used and it is Two Rivers' intention to be ISO 14001 certified going forward.

### Geology

Both the Merensky and UG2 Reefs are present but only the UG2 is currently exploited. However, no Merensky Reef is present on Tweefontein and the UG2 Reef only occurs on a small portion of this farm. The UG2 Reef outcrops in the Klein Dwarsrivier valley over a north-south strike of 7.5km and dips to the west at 7° to 10°. The vertical separation between the Merensky and UG2 Reefs is around 140m to 160m. Due to the extreme topography, the Merensky Reef outcrops further up the mountain slope.

The topography also means that the UG2 occurs at 935m below surface on the western boundary. The geological succession is broadly similar to other areas of the eastern limb of the Bushveld Complex. An exception is the presence of the Steelpoortpark granite in the south-western part of the project, which is unique to this area. Three distinct reef types have been defined for the UG2 Reef, namely the "normal" reef with a thick main chromitite layer; a "split" reef characterised by an internal pyroxenite/norite lens within the main chromitite layer; and a "multiple split" reef with numerous pyroxenite/norite lenses occurring within the main chromitite layer. The multiple split reef predominates in the southern portion of the mining area. The Merensky Reef is a pyroxenite layer with a chromitite stringer close to the hangingwall contact and also at the basal contact. Mineralisation is primarily associated with the upper and lower chromitite stringers. The graphical illustration of the profiles is shown overleaf.



The geological structure of the area is dominated by the regional north-northeast to south-southwest trending Kalkfontein fault, which has an apparent vertical displacement of 1 200m down throw to the west. A series of sub-parallel faults occur to the south-east adjacent to the Kalkfontein fault, which affect both the MR and UG2 Reefs. These faults exhibit variable apparent vertical displacements of between 20m and 300m, which increase progressively to the south-west.

## Two Rivers

### Modifying factors

The modifying factors used to convert Mineral Resources to Mineral Reserves are derived from historical performance while taking future anticipated conditions into account. The following modifying factors were applied to the resources:

#### Key factors and assumptions

Merensky Reef	Factors	Long-term price assumptions in today's money**		
Geological losses	30%	Platinum	US\$/oz	1 260
Mineral Resource Area	30 million ca	Palladium	US\$/oz	815
Relative density	3.2 – 3.3	Rhodium	US\$/oz	1 045
Channel width	179	Ruthenium	US\$/oz	35
		Iridium	US\$/oz	460
		Gold	US\$/oz	1 080
		Nickel	US\$/t	13 955
		Copper	US\$/t	5 730
		Exchange rate	R/US\$	14.80

\*\*Supporting the Mineral Reserve estimates. These are the Implats price assumptions.

UG2 Reef	Factors	6E metal ratio (%)			
				Merensky	UG2
Geological losses	22 – 32%	Platinum	%	53.5	46.4
Mineral Resource Area	31 million ca	Palladium	%	28.9	26.6
Pillar factors	25 – 30%	Rhodium	%	3.2	8.6
Resource dilution	26 – 30%	Ruthenium	%	6.9	14.2
Mine call factor	95 – 99%	Iridium	%	1.2	3.5
Relative density	3.6 – 3.8	Gold	%	6.2	0.7
Channel width	172cm			<b>Implats' interest</b>	<b>Mining right (ha)</b>
Stoping width	269cm	Two Rivers	49%	10 675	0
Concentrator recoveries	86 – 88%			<b>Prospecting right (ha)</b>	

### Mining methods and mine planning

The UG2 orebody is accessed via two decline shaft systems situated 3km apart, namely the Main Decline and the North Decline. Reef production is through a fully mechanised bord and pillar stoping method. A mining section consists of eight 8-12m bords, with pillar sizes increasing with depth below surface. In the shallow areas up to 100m below surface, the pillars are 6m x 6m in size. The rooms are mined mainly on strike.

A 3D geological model with layer grades and widths per stratigraphic unit is used in the mine planning. The mine scheduling of the two declines is done in Mine 2-4D™. The schedule is evaluated against the grade and thickness block model. The three distinct reef types impact significantly on the mine plan.

Dilution calculations are based on the specific reef type and pay limits are applied to the final mining cut. Hangingwall and footwall overbreak, percentage off-reef, ore remaining (mining losses), geological losses (potholes, faults, dykes and replacement pegmatoid) and a shaft call factor are applied to the planned areas to generate the tonnage and grade profiles.

#### Two Rivers Mineral Reserve distribution

North decline	0.7	(Moz Pt)
Main decline	1.6	

## Two Rivers

The larger portion of the Mineral Reserves (56%) is located in the Main Decline section. The 20-year profile of Two Rivers is shown below. LoM I constitutes production from the Main and North Decline shafts. LoM II is an extension of the Main and North Decline infrastructure into the Kalkfontein and Tweefontein blocks. Various options are being considered for LoM III as depicted below. The profile is based on assumptions and may change in future. Trial mining and a feasibility study was conducted in 2012/13 on the Merensky Reef. This is on hold as full-scale mining of the Merensky Reef is not viable at present. No feasibility study has been concluded in the past year.

An exercise was conducted to estimate the impact of LoM II and III on the viability of the tail of LoM I. Indications are that some 4% to 6% of the LoM I and also the Mineral Reserve estimate will not be viable if LoM II and III do not materialise.

### Processing

Two Rivers has a concentrator plant on site where initial processing is done. It comprises a standard MF2 design as generally used in the industry. Concentrate is transported by road to Impala Mineral Processes in Rustenburg where further processing takes place in terms of an agreement with IRS.

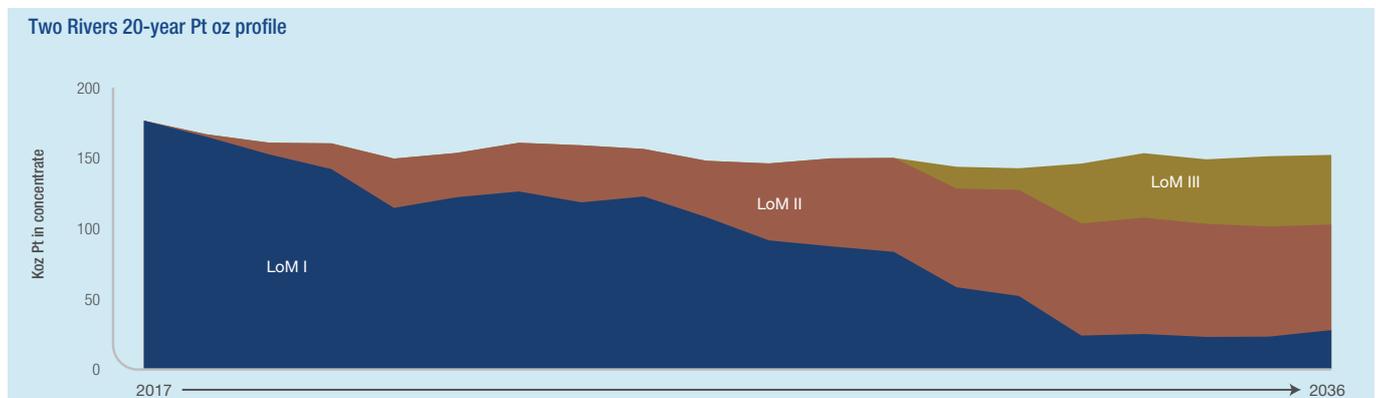
### Two Rivers top risks

The Group risk management process is briefly described on page 13. In this context the top risks identified at Two Rivers are:

- Commodity price and exchange rate risk
- Electricity supply
- Labour stability
- Kalkfontein RE Block – LoM
- Environmental compliance
- Best practice and OEM specifications
- Volatile socio-economic political landscape
- Mining Charter compliance
- New tailings storage facility.

### Mineral Resource and Mineral Reserve estimation and reconciliation

The updated Mineral Resource and Mineral Reserve estimates are tabulated below and reflect total estimates for Two Rivers as at 30 June 2016. Corresponding estimated attributable Mineral Resources and Reserves are summarised elsewhere in this report. Mineral Resources are quoted inclusive of Mineral Reserves and estimated geological losses have been accounted for in the Mineral Resource calculation. Grade estimates were obtained by means of ordinary kriging of UG2 and Merensky Reef borehole intersections. The Merensky Reef model has not been updated in the past two years and the reported estimates are the same as at 30 June 2015.



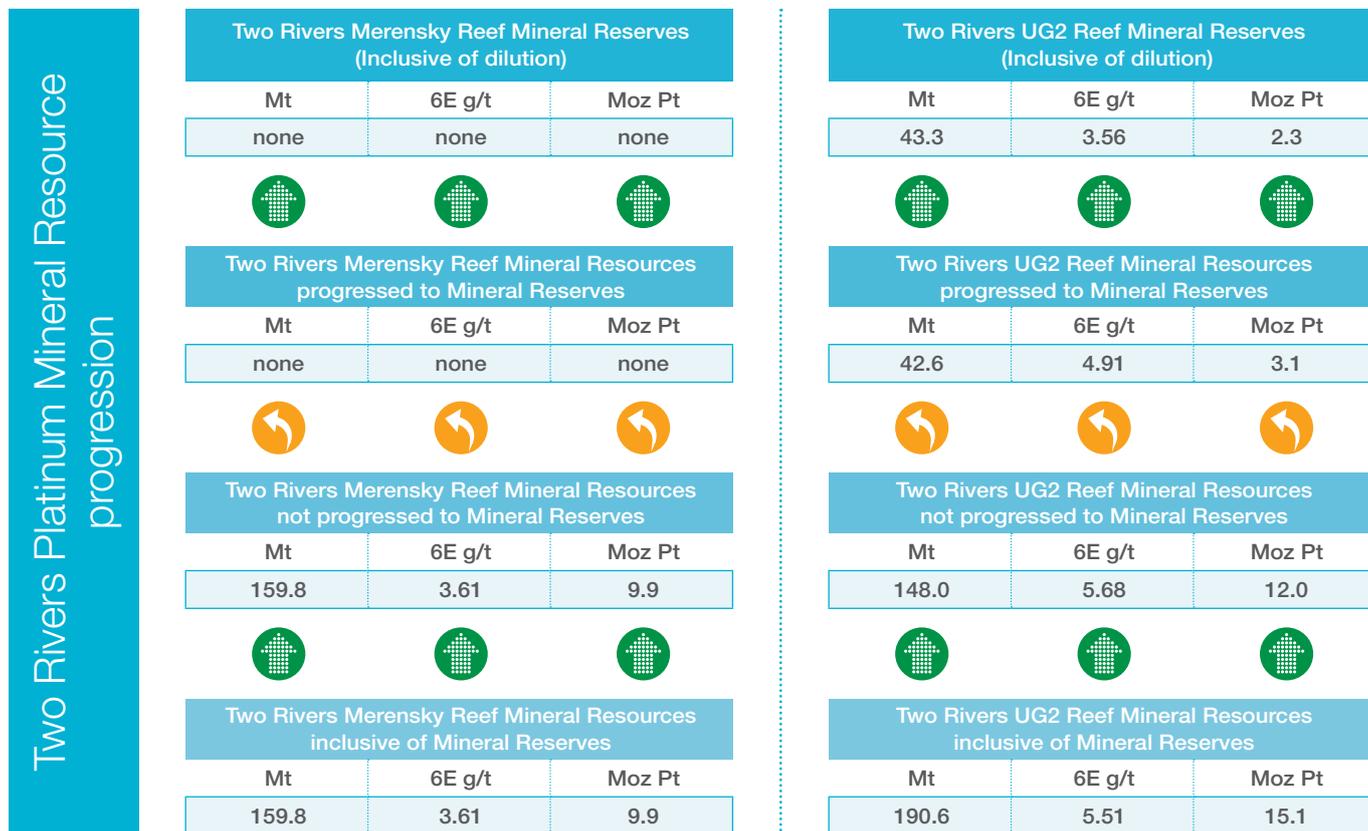
# Two Rivers

Mineral Reserves quoted reflect the width and grade delivered to the mill rather than an *in situ* channel grade quoted in respect of the Mineral Resources. The modifying factors used in the UG2 Mineral Reserve estimate are based on the mine plan, which envisages a mechanised bord and pillar layout. No Inferred Mineral Resources have been converted into Mineral Reserves. The Mineral Resources and Mineral Reserves are reflected in both 4E and 6E formats.

Rounding of numbers may result in minor computational discrepancies. Mineral Resource estimates are inherently imprecise in nature. The results tabulated in this report must be read as estimates and not as calculations. Inferred Mineral Resources in particular are qualified as approximations. More details regarding the Mineral Resources and Mineral Reserves can be found in the 2016 ARM annual report.

The year-on-year comparisons indicate that there has been no material change since the 30 June 2015 statement, as the main change can be attributed to normal mining depletion. The year-on-year reconciliation of the total Two Rivers Mineral Resources and Mineral Reserves is depicted in the accompanying graphs.

In addition, a summary illustration of the progression of Mineral Resources to Mineral Reserves is depicted below, showing the total Mineral Resource estimates (“inclusive” style reporting), those Mineral Resources not progressed to Mineral Reserves (“exclusive” style reporting), the proportion of Mineral Resources that are progressed to Mineral Reserves and the summary Mineral Reserves as derived after modifying factors, including dilution.



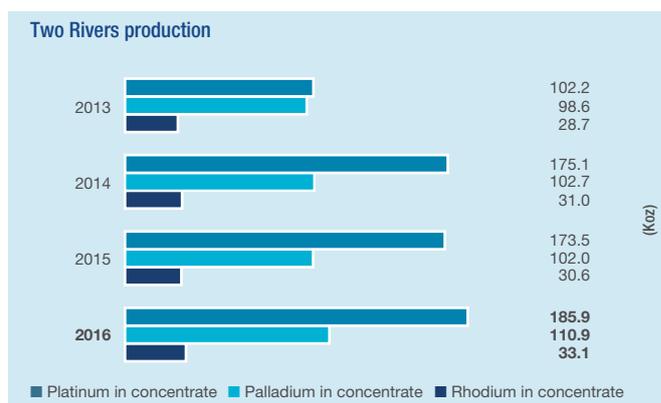
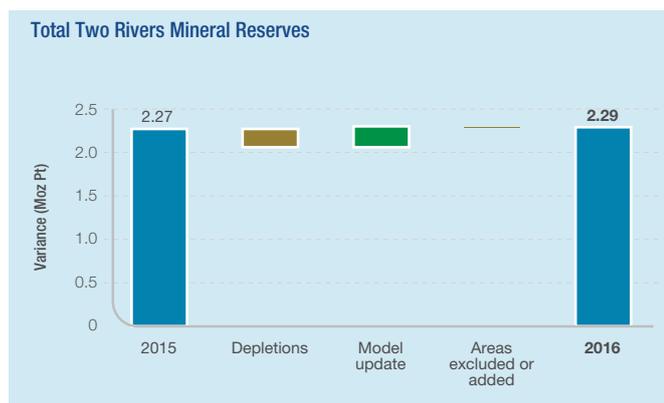
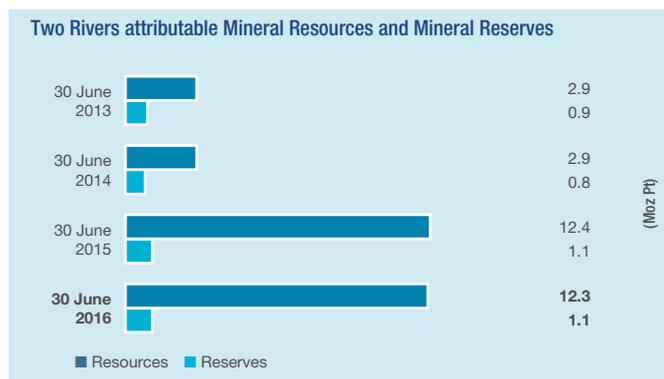
# Two Rivers

## Two Rivers Mineral Resources and Mineral Reserves – 100% (inclusive reporting)

as at 30 June 2016

Mineral Resources		as at 30 June 2016									as at 30 June 2015					
Orebody	Category	Tonnes Mt	Width cm	4E grade g/t	6E grade g/t	Ni %	Cu %	4E Moz	6E Moz	Pt Moz	Tonnes Mt	Width cm	4E grade g/t	6E grade g/t	4E Moz	Pt Moz
Merensky	Indicated	60.6	229	2.85	3.11	0.13	0.08	5.5	6.1	3.3	60.6	229	2.85	3.11	5.5	3.3
	Inferred	99.2	148	3.61	3.92	0.14	0.09	11.5	12.5	6.7	99.2	148	3.61	3.92	11.5	6.7
UG2	Measured	14.9	152	4.54	5.52	0.04	0.01	2.2	2.6	1.3	15.6	150	4.62	5.61	2.3	1.3
	Indicated	57.9	188	4.17	5.03	0.05	0.01	7.8	9.4	4.3	59.4	184	4.18	5.04	8.0	4.4
	Inferred	117.8	169	4.86	5.75	0.04	0.01	18.4	21.8	9.6	117.8	171	4.86	5.75	18.4	9.5
<b>Total</b>		<b>350.4</b>		<b>4.03</b>	<b>4.65</b>	<b>0.09</b>	<b>0.04</b>	<b>45.4</b>	<b>52.3</b>	<b>25.1</b>	<b>352.5</b>		<b>4.04</b>	<b>4.65</b>	<b>45.8</b>	<b>25.2</b>

Mineral Reserves		as at 30 June 2016							as at 30 June 2015					
Orebody	Category	Tonnes Mt	Width cm	4E grade g/t	6E grade g/t	4E Moz	6E Moz	Pt Moz	Tonnes Mt	Width cm	4E grade g/t	6E grade g/t	4E Moz	Pt Moz
UG2	Proved	11.7	246	3.09	3.76	1.2	1.4	0.7	12.0	233	3.18	3.87	1.2	0.7
	Probable	31.5	278	2.87	3.48	2.9	3.5	1.6	29.9	266	2.94	3.56	2.8	1.6
	<b>Total</b>	<b>43.3</b>		<b>2.93</b>	<b>3.56</b>	<b>4.1</b>	<b>4.9</b>	<b>2.3</b>	<b>41.9</b>		<b>3.01</b>	<b>3.65</b>	<b>4.0</b>	<b>2.3</b>



# Two Rivers

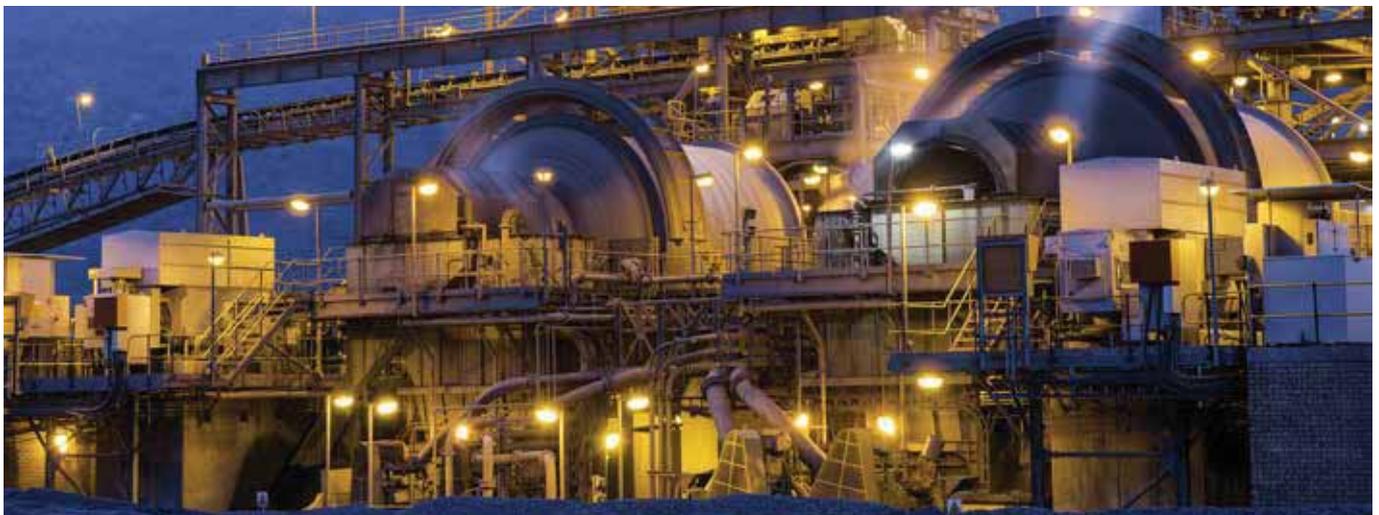
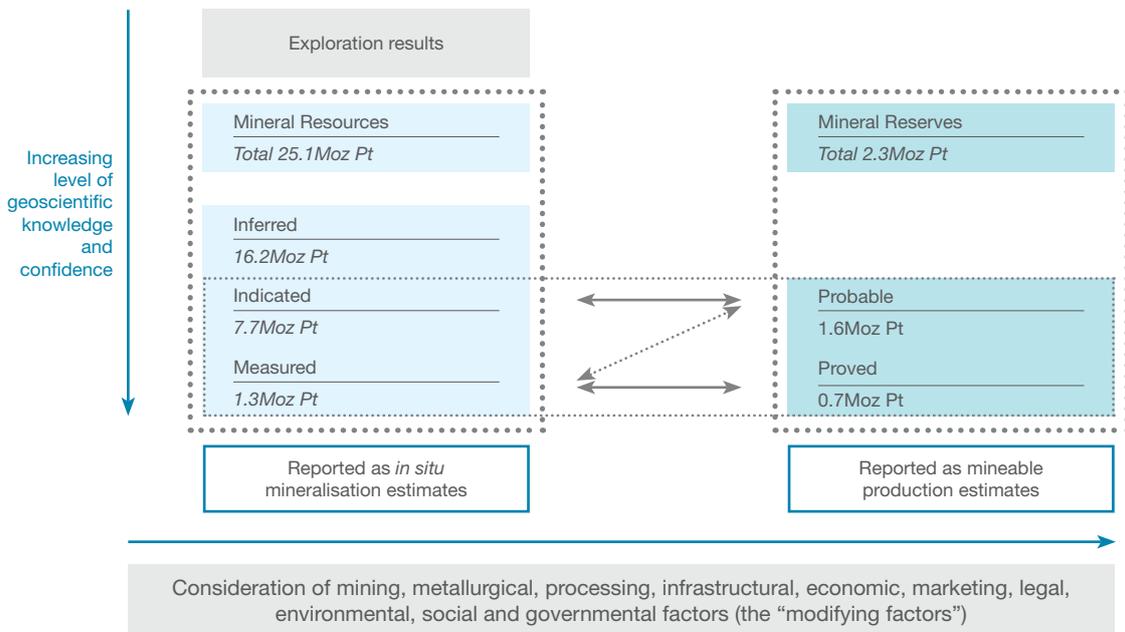
## Valuation

The economic viability of the Two Rivers Mineral Reserves is tested by means of net present value calculations over the LoM of the reserve, determining the lowest real rand basket price that would still render the Mineral Reserve viable. This is then tested against the internal estimate of the real long-term basket price, the spot price as at 30 June 2016 and a consensus view from various financial institutions. These tests indicate that the Two Rivers Operation requires a real long-term basket price of between R21 000 and R22 000 to be economically viable. While the real spot basket price as at 30 June 2016 was R22 600 (US\$1 555), the Two Rivers internal long-term real basket price is R29 318 (US\$1 975) and the equivalent calculated consensus price is R29 276 (US\$1 972).

## Compliance

Two Rivers has adopted the SAMREC Code for its reporting. The CP for Two Rivers Mineral Resources is Shepherd Kadzviti, PrSciNat SACNASP Registration No 400164/05, a full-time employee of ARM. The Competent Person for Two Rivers Mineral Reserves is Michael Cowell, PrSciNat SACNASP Registration No 400102/02, a full time employee of Two Rivers with 25 years of relevant experience. Implats has written confirmation from the Competent Persons that the information disclosed in terms of these paragraphs are compliant with the SAMREC Code and, where applicable, the relevant Table 1 and JSE Section 12 requirements and that it may be published in the form, format and context in which it was intended.

## Relationship between Exploration Results, Mineral Resources and Mineral Reserves (100%)



Concentrator, Two Rivers.

## Two Rivers

### Key operating statistics

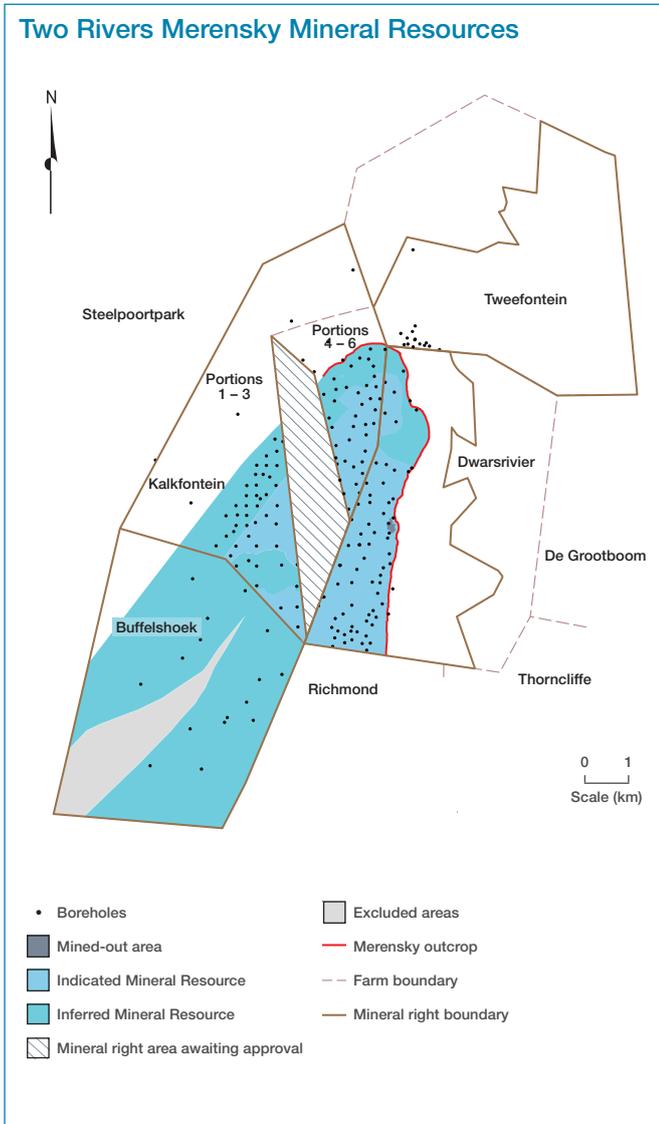
		2016	2015	2014	2013	2012
<b>Production</b>						
Tonnes milled ex mine	(000t)	<b>3 511</b>	3 362	3 279	3 172	3 103
Head grade 6E	(g/t)	<b>4.06</b>	3.98	4.01	4.02	3.86
Platinum in concentrate	(000 oz)	<b>185.9</b>	173.5	175.1	162.2	150.0
PGM in concentrate	(000 oz)	<b>400.7</b>	372.6	374.7	350.4	320.0
<b>Cost of sales</b>						
On-mine operations	(Rm)	<b>(1 785)</b>	(1 714)	(1 657)	(1 581)	(1 357)
Concentrating operations	(Rm)	<b>(404)</b>	(359)	(345)	(314)	(264)
Other	(Rm)	<b>(633)</b>	(584)	(585)	(338)	(206)
<b>Total cost</b>						
Per tonne milled	(R/t)	<b>623</b>	617	611	597	522
	(\$/t)	<b>43</b>	54	59	68	67
Per Pt oz in concentrate	(R/oz)	<b>11 775</b>	11 948	11 433	11 683	10 814
	(\$/oz)	<b>816</b>	1 047	1 103	1 325	1 396
<b>Financial ratios</b>						
Gross margin ex mine	(%)	<b>27.5</b>	27.7	29.5	22.1	21.8
<b>Capital expenditure</b>						
	(Rm)	<b>282</b>	275	319	489	467
	(\$m)	<b>20</b>	24	31	55	60



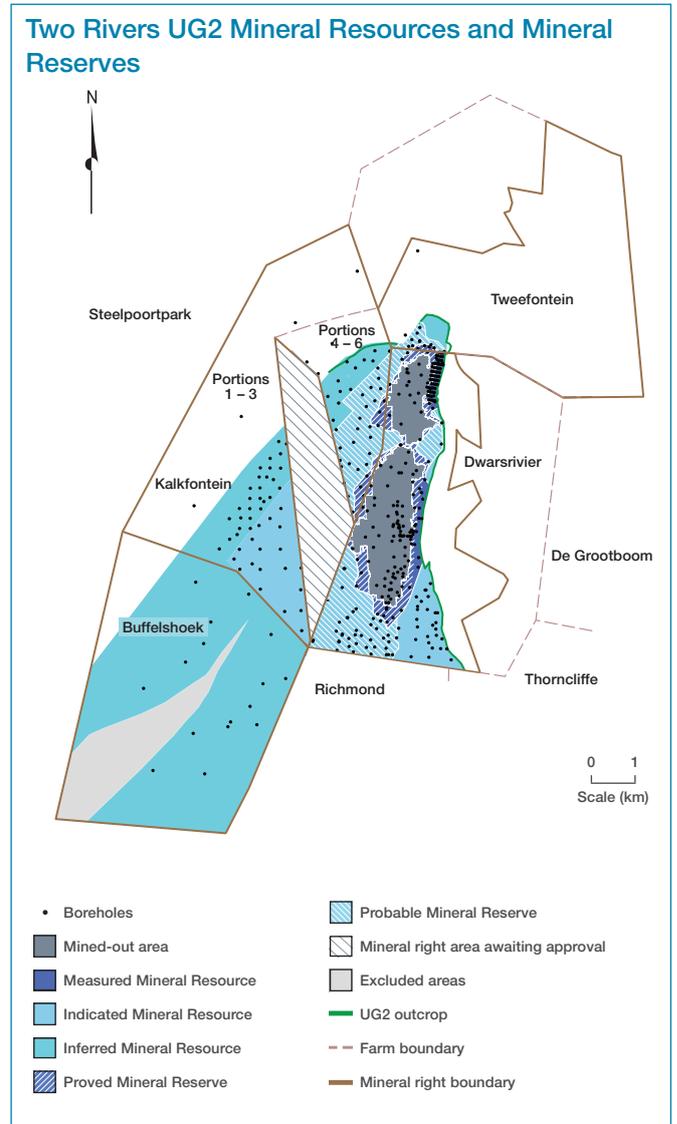
Conveyor belt with UG2 Reef, Two Rivers.

# Two Rivers

Two Rivers Merensky Mineral Resources



Two Rivers UG2 Mineral Resources and Mineral Reserves



## Zimplats

Zimplats' Ngezi Mine is located approximately 150km south-west of Harare, at the southern end of the Sebakwe sub-chamber of the Hartley Complex on the Great Dyke. The Hartley Mine and the Selous Metallurgical Complex (SMC) are located 77km north of the Ngezi Mine in the Darwendale sub-chamber.



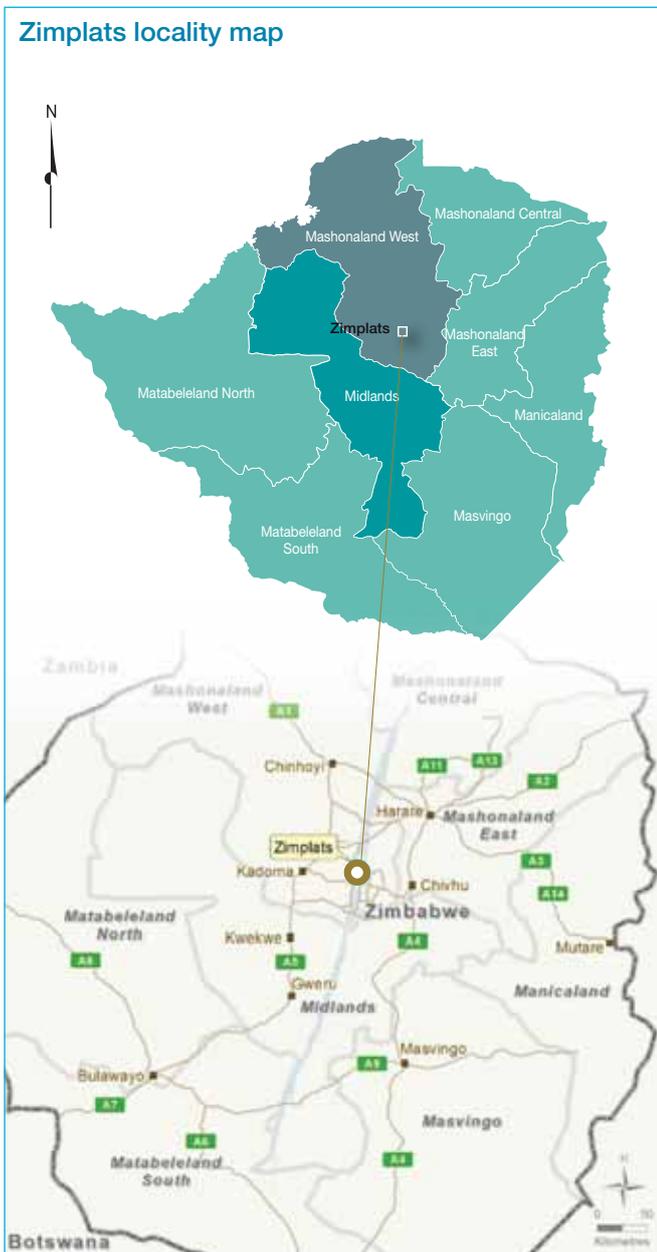
Ngezi, Zimplats.

### History

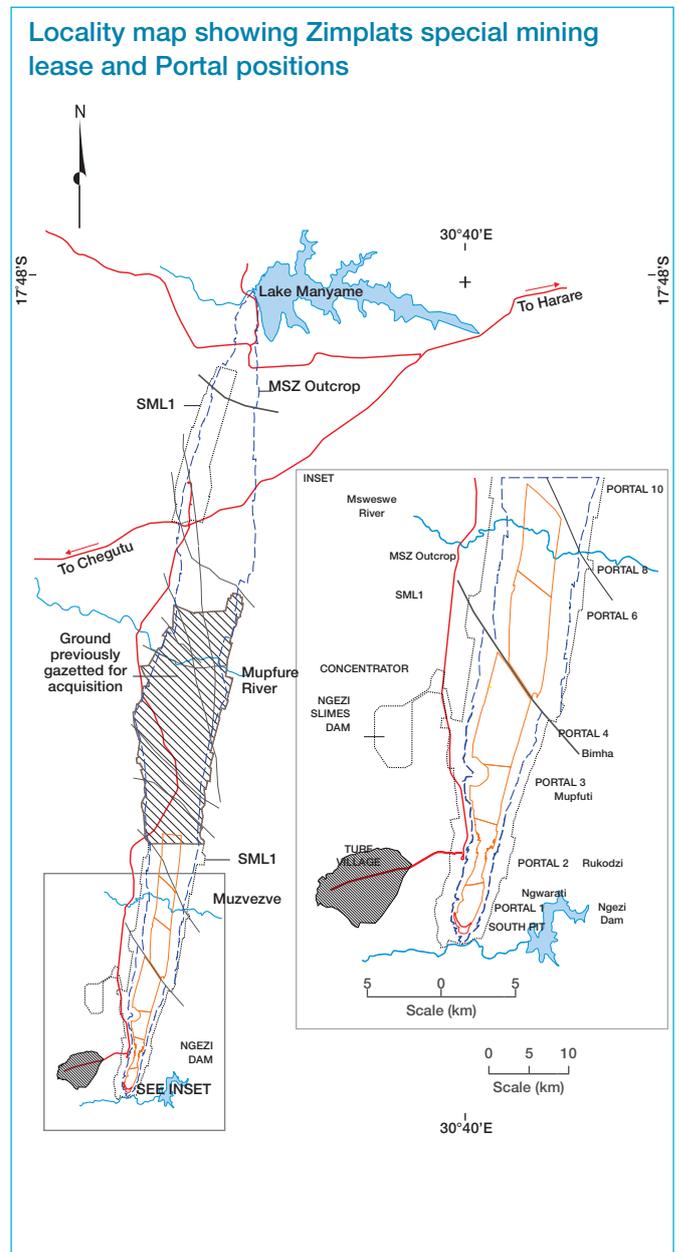
In 1986 Delta Gold Limited (Delta) acquired rights to its first platinum resources on the Great Dyke. Delta brought BHP into a joint venture (66.7% BHP and 33.3% Delta) to develop Hartley Platinum Mine and development started in 1994. By 1998 it had extended its cover to include interests in all the platinum resources of the Hartley Complex. In 1998, Delta Gold demerged its platinum interests into a special purpose vehicle, Zimplats. In 1999 it became apparent that Hartley Platinum had failed to meet its development targets and was put on care and maintenance by BHP. Zimplats subsequently took over BHP's share of Hartley, SMC and initiated the Ngezi/SMC project in 2001 with the assistance of Implats and ABSA Investment. A 2.2 million tonne per year open pit mine was established at Ngezi whose ore was trucked to Selous where it was processed in the SMC concentrator and smelting facilities. The first converter matte was exported to South Africa in April 2002 and Implats progressively increased its shareholding in Zimplats until 2003, when it made an unconditional cash offer to minority shareholders in Zimplats. In 2003, Zimplats embarked on the development of underground operations at Ngezi to replace the east and west open pits, which were stopped in 2008. Over the past eight years the production volumes from the operations have been increased to the current 6.2 million tonnes of ore per year from four underground Portals and one open pit, all of which feed the two concentrator modules at Ngezi, as well as the SMC concentrator. Currently Implats' shareholding in the entity is 87% with the remaining 13% being held by minority shareholders.

# Zimplats

Zimplats locality map



Locality map showing Zimplats special mining lease and Portal positions



## Mineral rights

Zimplats holds a special mining lease covering two areas measuring a total of 48 535ha. The special mining lease number 1, expires in 2019 and the mining agreement allows for a further two extensions of 10 years each on the same conditions. The Hartley Complex is about 100km long and contains 80% of Zimbabwe's PGM resources. Zimplats, through the special mining lease, controls two-thirds of this.

In March 2013, the GoZ gazetted a preliminary notice of its intention to compulsorily acquire a large portion of ground (measuring 27 948 hectares) held under the Zimplats special mining lease and situated on the north of Portal 10 which amounts to 54.6Moz Pt. In March 2013 Zimplats lodged a formal objection to the preliminary notice to compulsorily

acquire the land. From January 2015 Zimplats was actively engaged in discussions with the GoZ in an endeavour to resolve the matter amicably. On 29 June 2016 Zimplats was served with an application filed in the Administrative Court of Zimbabwe in which the GoZ is seeking an order authorising the acquisition by the GoZ of the land described in the preliminary notice referred to above. Papers opposing the application were filed on behalf of Zimplats Holdings Limited and Zimplats. Zimplats will however still seek to have the matter resolved amicably. Depending on the outcome of the matter in the Administrative Court, or the outcome of any further discussions that Zimplats may have with the GoZ on the matter, the Zimplats Mineral Resources may be significantly reduced.

# Zimplats

## Infrastructure

Infrastructure to support production consists of integrated road networks, four production decline Portals, one open pit, conveyor networks and ore load out facilities for road trains. Ore processing infrastructure consists of two concentrator modules at Ngezi with a total combined capacity of 4Mtpa, one concentrator and a smelter at SMC. Water for the Ngezi Operations is drawn from the Ngezi and Chitsuwa dams. Zimplats' annual allocation from the two dams is 11 000Ml and this exceeds the current requirements. The SMC is located some 77km north of Ngezi Mine with processing infrastructure which includes a 2.2Mtpa concentrator, a 13.5MVA smelter, tailings storage facilities, stores and offices. Water for the SMC Operations is abstracted from the Manyane Dam where Zimplats has an annual allocation of 5 000Ml. Power from ZESA's Selous sub-station is fed to the transformers at Ngezi and SMC via the 132kV overhead lines. These assets and the wide network of information technology and communication equipment provide services to the business.

## Environment

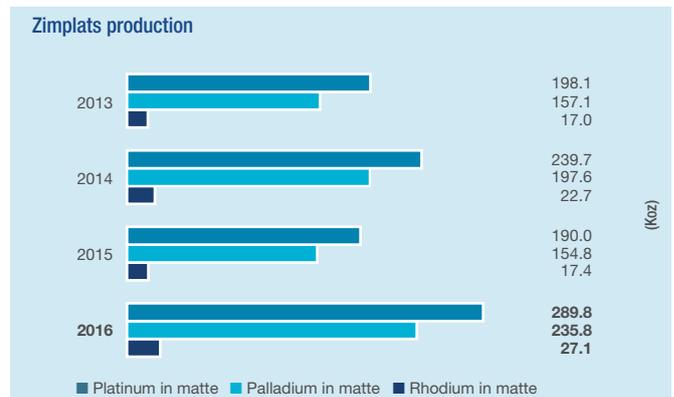
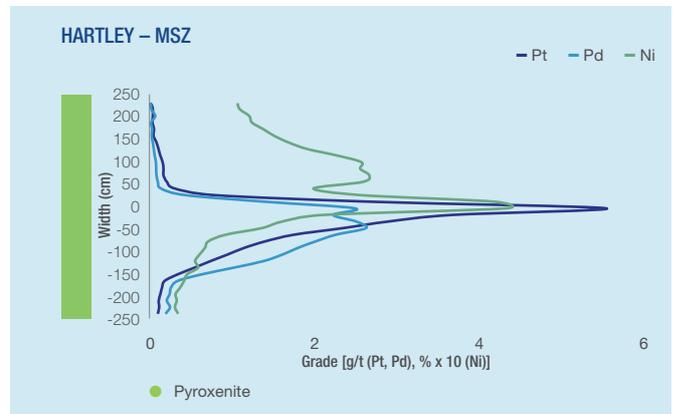
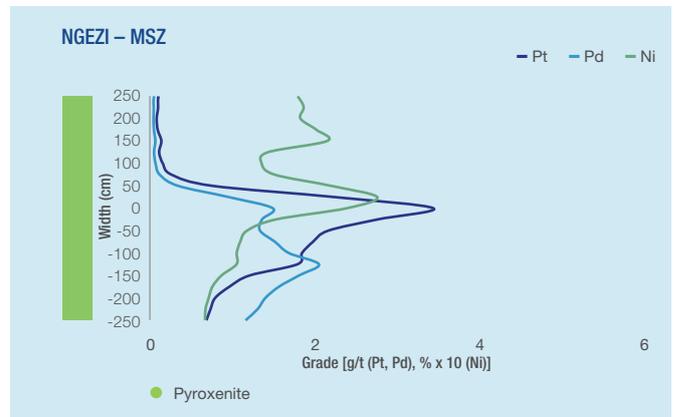
Zimplats is ISO 14001 certified. In line with the environmental management system expectations, all areas are required to identify and report on environmental incidents. Systems are in place to investigate and determine the direct and root causes of high-severity incidents and to address and close out these incidents.

One tailing storage facility is located at SMC within the special mining lease area. The tailing storage facility is designed for a deposition rate of 2.4 million tonnes per year and a LoM storage capacity of 72 million tonnes. Additional space is available to extend the tailings facility in future. The tailings storage facility at Ngezi is designed for a ramp up in deposition from 2 million tonnes to 12 million tonnes per year in line with the mining expansion plan. The current deposition rate is 4.2Mtpa. The tailings dam is designed for a LoM deposition of 450 million tonnes. Tree planting and grassing at Ngezi and the SMC tailings dams are carried out regularly to create a physical barrier and to address the issue of dust from the tailings dam, while efforts are also made to keep the dam moist to suppress dust. The current tailings dam rehabilitation targets new surfaces created as the tailings dam continues to rise.

Zimplats has successfully completed projects to attain 100% compliance with the waste and effluent regulations requirements through the construction of leachate collection systems and landfill lining for both the Ngezi and SMC landfills.

## Geology

The Great Dyke of Zimbabwe developed as a series of initially discrete magma chamber compartments, which coalesced as the chambers filled. On the basis of structure, style of layering and continuity of layers, the Great Dyke has been sub-divided into five sub-chambers namely the Wedza, Selukwe (Shurugwi), Sebakwe, Darwendale and Musengezi sub-chambers. The stratigraphic units in each sub-chamber are classified into the



ultramafic (lower) and the mafic (upper) sequence. The ultramafic rocks are dominated from the base upwards by dunite, harzburgite and pyroxenite, while the mafics consist mainly of gabbro and gabbro-norite. Narrow layers of chromitite occur at the base of cyclic units throughout the ultramafic sequence. The platinum-bearing horizon is known as the Main Sulphide Zone (MSZ), which is part of the lower sequence and is located from about 5m up to 50m below the contact with the mafic sequence.

## Zimplats

The platinum-bearing MSZ is located in the P1 pyroxenite some 5m to 50m below the ultramafic/mafic contact. The MSZ is a continuous layer, 2m to 10m thick, and forms an elongated basin. The zone strikes in a north-northeasterly trend and dips between 5° to 20° on the margins, flattening towards the axis of the basin. Peak base metal and PGM values are offset vertically with palladium peaking at the base, platinum in the centre and nickel towards the top.

Visual identification of the MSZ is difficult, therefore systematic monitoring of the reef using various sampling methods is needed to guide mining.

### Modifying factors

The modifying factors used to convert Mineral Resources to Mineral Reserves are derived from historical performance while taking future anticipated conditions into account. The following modifying factors were applied to the resources:

#### Key factors and assumptions

Main Sulphide Zone	Factors	Long-term price assumptions in today's money**		
Geological losses	5 – 26%	Platinum	US\$/oz	1 260
Mineral Resource Area	337 million ca	Palladium	US\$/oz	815
Pillar factors	20 – 34%	Rhodium	US\$/oz	1 045
Resource dilution	6 – 10%	Ruthenium	US\$/oz	35
Mine call factor	91%	Iridium	US\$/oz	460
Relative density	3.18 – 3.25	Gold	US\$/oz	1 080
Resource width	236cm	Nickel	US\$/t	13 955
Stoping width	275cm	Copper	US\$/t	5 730
Concentrator recoveries	80 – 81%	Exchange rate	R/US\$	14.80

\*\*Supporting the Mineral Reserve estimates.

Zimplats Portal names		6E metal ratio (%) Main Sulphide Zone			
Portal 1	Ngwarati	Platinum	%	46.8	
Portal 2	Rukodzi	Palladium	%	37.6	
Portal 3	Mupfuti	Rhodium	%	4.0	
Portal 4	Bimha	Ruthenium	%	3.6	
		Iridium	%	1.7	
		Gold	%	6.3	
		<b>Implats' interest</b>	<b>Mining right (ha)</b>	<b>Prospecting right (ha)</b>	
		Zimplats	87%	48 535	0

### Mining methods and mine planning

The current mine infrastructure consists of four Portals (decline shafts) and one open pit. The deepest operating depth is some 310m at Portal 4 (Bimha Mine). Boundaries between individual Portals are usually based on a maximum strike length of 3km or are terminated on known geological discontinuities such as major faults. Minor faults and other geological discontinuities are present at the operations and are accounted for as geological losses during the Mineral Resources and Mineral Reserves estimation process.

On all the underground Portals, Zimplats employs a narrow reef, shallow dipping mechanised room and pillar mining method to extract ore from stopes whose nominal width is

2.5m at dips of less than 9°. The trackless mechanised machinery consist of low profile single boom face rigs for drilling, low profile roof bolters for support drilling, 10t load and dump (LHDs) and 30t dump trucks. A self-directed work team (SDWT) is allocated about 20 rooms and its total face length is dependent on the sizes (widths) of the pillars and rooms. This enables the SDWT to adhere to a mining cycle consisting of face drilling and blasting, support installation and loading and hauling with adequate redundancy to achieve set production targets. At Portals 1 (Rukodzi Mine) and 2 (Ngwarati Mine), the broken rock is loaded onto trucks by LHD and trucked to a surface crusher. Portal 3 (Mupfuti Mine) has an underground crushing plant and ore is tipped to the crusher and conveyed to surface.

## Zimplats

The production target for each fleet varies from 17 500t to above 20 000t of ore per month, depending on the particular mine, ground conditions and the existing pillar layout. The typical layout comprises 7m panels with the different sizes of in-stope pillars, which are determined by the depth below surface and these are surrounded by barrier pillars setting out and a 200m x 200m 'paddock'. This pillar layout is meant to contain the likelihood of cascading pillar failure should in-stope pillars fail. Ngwarati and Rukodzi mines do not have barrier pillars or paddocks owing to their shallow depth below surface. At all the Portals, the spans of rooms may decrease and pillar dimensions may increase in bad ground. A combination of roof bolts and tendons is integral to the support design.

In FY2015, there was extensive support pillar failure that led to cascading collapse of a larger footprint, which was initiated in the deeper sections of Portal 4 (Bimha Mine). This was mainly attributed to the influence of a low angle shear that is prevalent at the mine. The shear undulates between the hangingwall and footwall of the reef horizon and has a deleterious effect on pillar strength, which contributed to this collapse. Geotechnical investigations carried out by independent geotechnical consultants recommended a new pillar layout that will stop the likelihood of cascading pillar failure. The new pillar layout was adopted at Mupfuti and Bimha mines and will be used for all new projects Zimplats develops in the future. The extraction ratio based on the new pillar layout is below 70%, compared to above 80% on the old pillar layout. The reduced extraction percentages in the mines are reflected in the Mineral Reserves.

Bimha Mine redevelopment is on target and all redeployed teams are set to return to Bimha as per the redevelopment schedule. The mine will achieve the original design production volumes of 1.8Mtpa in April 2018 and the South Pit Operation will subsequently be shut down.

A total combined production of 6.2Mtpa will be sustained beyond the next 30 years as new Portals are on course to replace the mature Rukodzi and Ngwarati mines. The Portal 6 feasibility study for a 2.2Mtpa mine is near completion and this operation will replace the two mines in FY2022 and FY2025 respectively. The mining envelopes for the trackless operations have been increased from 3km on strike to 6km as Portal 6 will

take up the production volumes for both mines. The production from the new mine is meant to feed ore to the SMC concentrator.

Portal 8 is next on line and evaluation work on this project is set to begin in FY2017.

The distribution of the Mineral Reserves across the Portals is depicted in the accompanying 20-year LoM graphs. The Hartley Mine is presently on care and maintenance and provides additional opportunity for future production.

### Processing

Ore from the mines is processed by two concentrators (one at SMC and the other at Ngezi). The concentrator at Ngezi has two similar modules, which were commissioned in 2009 and 2013 respectively. Each module has a capacity of 2Mtpa, which makes up a total of 4Mtpa. There is a provision to install another 2Mtpa module in future. The SMC concentrator has a capacity of 2.2Mtpa.

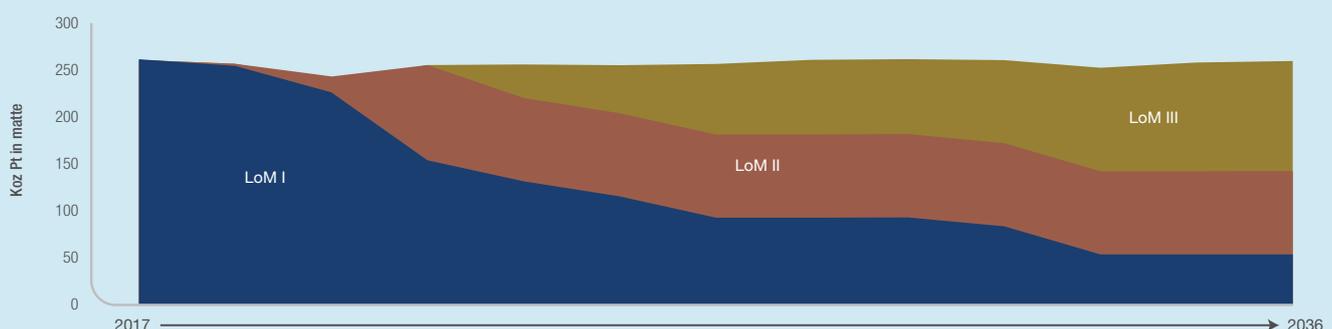
Approximately one-third of the mined ore (2.2 million tonnes) is transported by road trains to the concentrator at SMC, which operates a single semi-autogenous grinding mill (SAG), while the rest is transported by overland conveyor system to the crusher and ball mill concentrator modules at Ngezi. Concentrate from both Ngezi plants and SMC is then smelted in an arc furnace and converted to matte at SMC. The resulting matte is despatched to Impala's refinery in Springs under the terms of a life-of-mine agreement with Impala Refinery Services.

### Zimplats top risks

The Group risk management process is briefly described on page 13. In this context the top risks identified at Zimplats are:

- PGM price fluctuations
- Unavailability of reliable and secure power
- Excessive taxation
- Failure to preserve cash
- Uncertainty regarding indigenisation
- Inability to attain funding
- Tailings dam failure
- Smelter risk
- Failure to deliver mineral beneficiation
- Unsustainable cost increase.

Zimplats 20-year Pt oz profile



# Zimplats

## Mineral Resource and Mineral Reserve estimation and reconciliation

The Zimplats Mineral Resource and Mineral Reserve statement as at 30 June 2016 is shown overleaf. Corresponding estimated Mineral Resources and Mineral Reserves attributable to Implats are summarised elsewhere in this report. Note that the Mineral Resources are quoted inclusive of Mineral Reserves and that Mineral Resources estimates allow for estimated geological losses, while no allowance is made for anticipated support pillar losses during eventual mining. The Mineral Reserves quoted reflect anticipated grades delivered to the mill.

Day-to-day operations are monitored using in-house lead collection fire assays with AA finish. The Mineral Resources and Mineral Reserves in this statement are based largely on external nickel sulphide collection fire assays with ICP-MS finish. The differences between the methods are incorporated within the modifying factors that have been applied, which means that there may be slight distortions in recovery and other parameters.

Oxides have lower metallurgical recovery than sulphides with conventional technology and are currently marginal to sub-economic. Oxides are rarely sampled directly, therefore some elements, particularly palladium, may be depleted relative to the figures quoted below.

Mineral Resources have been estimated using kriging techniques on assay data derived from surface boreholes. Estimates are based on composite widths that vary depending on cut-off grades, which are based on appropriate economic parameters. The recently completed numerical modelling

exercise has confirmed that the revised pillar layout is robust and will arrest any propagation of pillar failure in the mine.

The main difference in the Mineral Resource estimate from the 2015 statement, other than depletion, is the increase of Measured Resources in the Portal 6 area following reduction of the percentage of the unknown geological losses during the re-modelling for the Portal 6 feasibility study.

The year-on-year increase in Mineral Reserves is the result of depletion and the increase in Reserves at Bimha (Portal 4) is attributable to the conversion of the P4 North Measured Mineral Resources to Reserves. This Reserve will be mined via the Bimha mine declines. The change in modifying factors is at Mupfuti and Bimha mines where the inclusion of large barrier and regional pillars had the effect of reducing extraction percentages as reported in 2015. The reduction in extraction percentages does not reflect any change in view on the viability of these Portals, as they are still believed to be fundamentally viable and this has no impact on the Mineral Resource estimates.

Rounding-off of figures in this report may result in minor computational discrepancies. Where this occurs it is not deemed significant. Mineral Resources estimates are inherently imprecise and require the application of judgement and are subject to future revisions. The results tabulated in this report must be read as estimates and not as calculations. Inferred Mineral Resources in particular are qualified as approximations.

More details regarding the Mineral Resources and Mineral Reserves can be obtained from the 2016 Zimplats annual report.

## Zimplats Mineral Resource progression

Zimplats Main Sulphide Zone Mineral Reserves (Inclusive of dilution)		
Mt	6E g/t	Moz Pt
111.5	3.50	5.9
		
Zimplats Main Sulphide Zone Mineral Resources progressed to Mineral Reserves		
Mt	6E g/t	Moz Pt
146.7	3.60	8.1
		
Zimplats Main Sulphide Zone Mineral Resources not progressed to Mineral Reserves		
Mt	6E g/t	Moz Pt
1 921.8	3.60	100.9
		
Zimplats Main Sulphide Zone Mineral Resources inclusive of Mineral Reserves		
Mt	6E g/t	Moz Pt
2 068.4	3.60	109.0*

\*Zimplats' Mineral Resources will reduce by 54.6Moz Pt if the GoZ is successful in obtaining the ground north of Portal 10.

# Zimplats

The transparent Mineral Resource progression for Zimplats is illustrated on the previous page, including a summary below of the total Mineral Resources (“inclusive” of Mineral Reserves), that part of the Mineral Resources that is not progressed to Mineral Reserves (“exclusive” style reporting), the part of the Mineral Resources that is progressed to Mineral Reserves and also the Mineral Reserves.

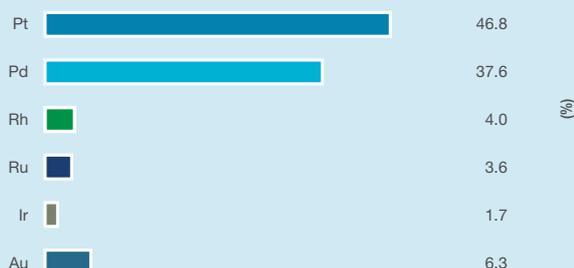
## Zimplats Mineral Resources and Mineral Reserves – 100% (inclusive reporting)

as at 30 June 2016

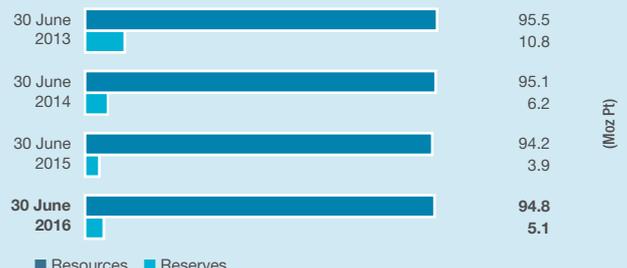
Mineral Resources	Category	as at 30 June 2016									as at 30 June 2015					
		Tonnes Mt	Width cm	4E grade g/t	6E grade g/t	Ni %	Cu %	4E Moz	6E Moz	Pt Moz	Tonnes Mt	Width cm	4E grade g/t	6E grade g/t	4E Moz	Pt Moz
Ngezi Portals (including Ngezi South open pit) – Advanced to Reserve MSZ	Measured	65.7	250	3.44	3.62	0.10	0.07	7.3	7.7	3.6	53.6	250	3.46	3.64	6.0	3.0
	Indicated	81.0	250	3.40	3.58	0.10	0.08	8.8	9.3	4.5	50.1	250	3.43	3.61	5.5	2.8
	<b>Total</b>	<b>146.7</b>		<b>3.41</b>	<b>3.60</b>	<b>0.10</b>	<b>0.07</b>	<b>16.1</b>	<b>17.0</b>	<b>8.1</b>	<b>103.7</b>		<b>3.45</b>	<b>3.63</b>	<b>11.5</b>	<b>5.8</b>
Ngezi Portals – Not advanced to Reserve MSZ	Measured	80.1	250	3.29	3.48	0.11	0.08	8.5	9.0	4.2	95.4	250	3.27	3.45	10.0	4.9
	Indicated	385.3	230	3.25	3.53	0.12	0.09	41.5	43.8	20.7	404.8	239	3.34	3.52	43.5	21.6
	Inferred	72.3	200	3.25	3.41	0.12	0.08	7.5	7.9	4.1	72.3	200	3.25	3.41	7.5	4.1
<b>Total</b>	<b>537.7</b>		<b>3.33</b>	<b>3.51</b>	<b>0.12</b>	<b>0.08</b>	<b>57.6</b>	<b>60.7</b>	<b>28.9</b>	<b>572.5</b>		<b>3.32</b>	<b>3.50</b>	<b>61.1</b>	<b>30.5</b>	
Mining lease north of Portal 10 MSZ	Indicated	70.0	192	3.44	3.70	0.20	0.18	7.7	8.3	3.4	70.0	192	3.44	3.70	7.7	3.4
	Inferred	1 021.0	239	3.22	3.50	0.12	0.09	105.7	114.9	50.2	1 021.0	239	3.22	3.50	105.7	50.2
	<b>Total</b>	<b>1 091.0</b>		<b>3.23</b>	<b>3.51</b>	<b>0.13</b>	<b>0.10</b>	<b>113.4</b>	<b>123.2</b>	<b>53.6</b>	<b>1 091.0</b>		<b>3.23</b>	<b>3.51</b>	<b>113.4</b>	<b>53.6</b>
Hartley MSZ	Measured	28.3	158	4.53	4.78	0.14	0.12	4.1	4.3	2.0	28.3	158	4.53	4.78	4.1	2.0
	Indicated	143.1	189	3.97	4.19	0.13	0.11	18.3	19.3	9.3	143.1	189	3.97	4.19	18.3	9.3
	Inferred	46.3	191	3.89	4.10	0.13	0.10	5.8	6.1	3.0	46.3	191	3.89	4.10	5.8	3.0
<b>Total</b>	<b>217.7</b>		<b>4.03</b>	<b>4.25</b>	<b>0.13</b>	<b>0.11</b>	<b>28.2</b>	<b>29.7</b>	<b>14.2</b>	<b>217.7</b>		<b>4.03</b>	<b>4.25</b>	<b>28.2</b>	<b>14.2</b>	
Oxides – all areas MSZ	Measured	16.0	250	3.42	3.61	1.10	0.07	1.8	1.9	0.9	16.2	250	3.42	3.61	1.8	0.9
	Inferred	38.3	217	3.56	3.76	1.12	0.10	4.4	4.6	2.2	38.3	217	3.56	3.76	4.4	2.2
	Inferred north of Portal 10	21.0	239	3.17	3.44	1.12	0.10	2.1	2.3	1.0	21.0	239	3.17	3.44	2.1	1.0
<b>Total</b>	<b>75.4</b>		<b>3.42</b>	<b>3.64</b>	<b>0.11</b>	<b>0.09</b>	<b>8.3</b>	<b>8.8</b>	<b>4.1</b>	<b>75.6</b>		<b>3.42</b>	<b>3.64</b>	<b>8.3</b>	<b>4.1</b>	
<b>Total</b>	<b>2 068.4</b>		<b>3.36</b>	<b>3.60</b>	<b>0.12</b>	<b>0.09</b>	<b>223.6</b>	<b>239.4</b>	<b>109.0</b>	<b>2 060.4</b>		<b>3.36</b>	<b>3.60</b>	<b>222.5</b>	<b>108.3</b>	

Mineral Reserves	Category	as at 30 June 2016									as at 30 June 2015					
		Tonnes Mt	Width cm	4E Grade g/t	6E grade g/t	Ni %	Cu %	4E Moz	6E Moz	Pt Moz	Tonnes Mt	Width cm	4E Grade g/t	6E grade g/t	4E Moz	Pt Moz
MSZ	Proved	51.3	276	3.31	3.50	0.10	0.07	5.5	5.8	2.7	21.0	274	3.31	3.50	2.2	1.1
	Probable	60.1	275	3.31	3.49	0.10	0.07	6.4	6.8	3.2	62.6	275	3.37	3.56	6.8	3.4
	<b>Total</b>	<b>111.5</b>		<b>3.31</b>	<b>3.50</b>	<b>0.10</b>	<b>0.07</b>	<b>11.9</b>	<b>12.5</b>	<b>5.9</b>	<b>83.7</b>		<b>3.36</b>	<b>3.54</b>	<b>9.0</b>	<b>4.5</b>

Zimplats MSZ 6E metal ratio

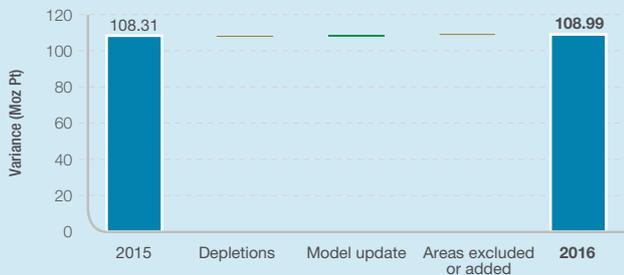


Zimplats attributable Mineral Resources and Mineral Reserves

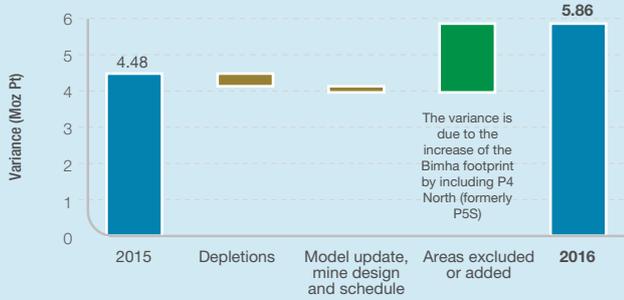


# Zimplats

Total Zimplats Mineral Resources



Total Zimplats Mineral Reserves



## Valuation

The economic viability of the Zimplats Mineral Reserves is tested by means of net present value calculations over the LoM of the reserve, determining the lowest real rand basket price that would still render the reserve viable. This is then tested against the internal Zimplats estimate of the real long-term basket price, the spot price as at 30 June 2016 and a consensus view from various financial institutions. These tests indicate that the Zimplats

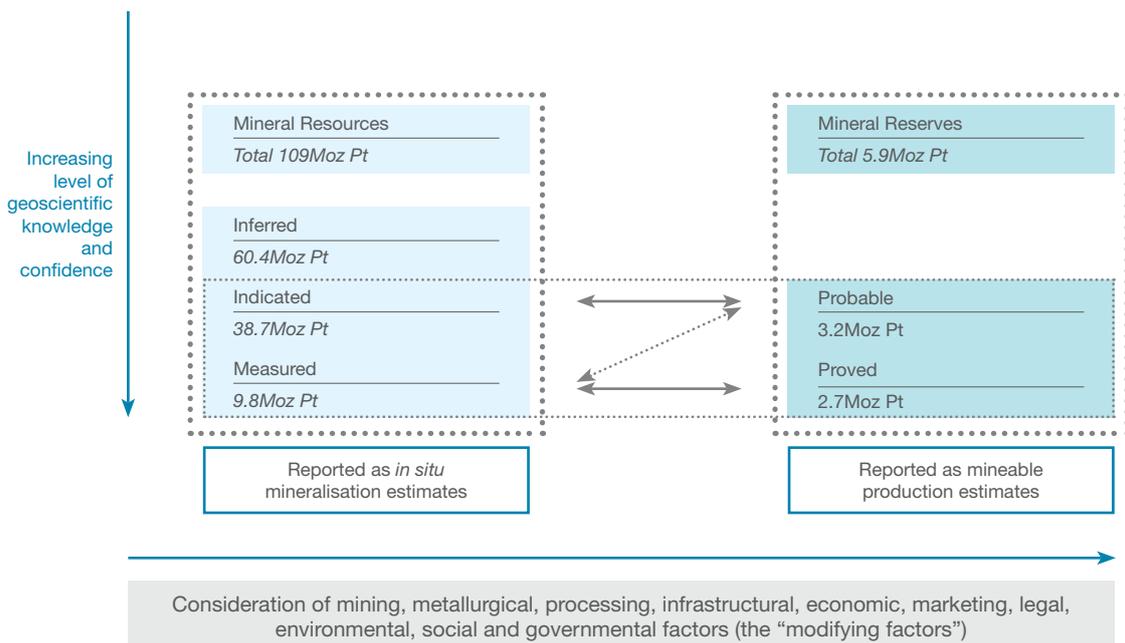
Operation requires a real long-term basket price of between R21 000 to R22 000 to be economically viable. While the real spot basket price as at 30 June 2016 was R22 600 (US\$1 555), the Zimplats internal long-term real basket price is R29 318 (US\$1 975) and the equivalent calculated consensus price is R29 276 (US\$1 972).

## Compliance

Zimplats Mineral Resources and Mineral Reserves are estimated and reported in accordance with the Implats code of practice for the estimation, classification and reporting of Mineral Resources and Mineral Reserves. The code of practice is an Implats Group-wide protocol that seeks to provide more prescriptive guidance than the Australasian Code for Reporting Exploration Results, Mineral Resources and Mineral Reserves, the Joint Ore Reserve Committee Code (JORC Code), 2012 Edition. Zimplats Mineral Resources and Mineral Reserves also meet the requirements of the Code for the Technical Assessment and Valuation of Mineral and Petroleum Assets and Securities for Independent Experts reports, the VALMIN Code, 2005 edition.

The Lead Competent Persons designated in terms of the JORC Code, who took responsibility for the reporting of Mineral Resources and Mineral Reserves as of 30 June 2016, are Steven Duma, (Pr. Sci. Nat), AusIMM and Caston Mutevhe, (Pr. Eng) ECSA, SAIMM who are full-time employees of Zimplats. Steve is responsible for Mineral Resources and has 19 years of experience in mining and exploration of which 8 years have been in platinum in Zimbabwe and South Africa. Caston is responsible for Mineral Reserves and has 22 years of experience in mining of which 8 years have been in the platinum mining industry in Zimbabwe. Implats has written confirmation from the Lead Competent Persons that the information disclosed in terms of these paragraphs are compliant with the JORC Code and, where applicable, the relevant JORC Table 1 and JSE Section 12 requirements and that it may be published in the form, format and context in which it was intended.

## Relationship between Exploration Results, Mineral Resources and Mineral Reserves (100%)



# Zimplats

## Key operating statistics

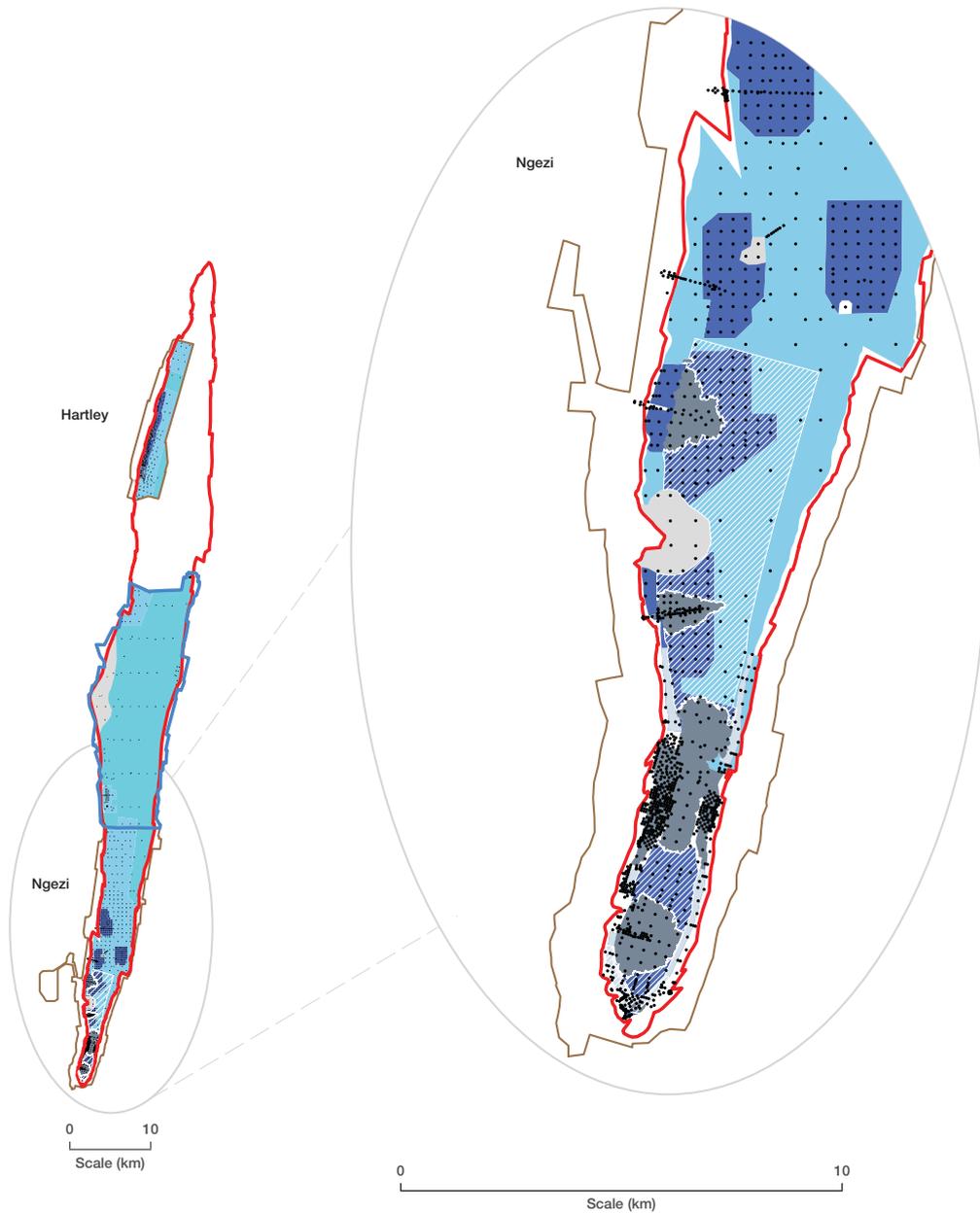
		2016	2015	2014	2013	2012
<b>Production</b>						
Tonnes milled ex mine	(000t)	<b>6 406</b>	5 164	5 939	4 683	4 393
Head grade 6E	(g/t)	<b>3.48</b>	3.47	3.47	3.53	3.53
Platinum in matte	(000 oz)	<b>289.8</b>	190.0	239.7	198.1	187.1
PGM in matte	(000 oz)	<b>616.8</b>	406.0	515.5	416.2	396.4
<b>Cost of sales</b>						
	(Rm)	<b>(6 198)</b>	(4 181)	(3 934)	(2 708)	(2 076)
On-mine operations	(Rm)	<b>(2 904)</b>	(2 071)	(1 850)	(1 350)	(1 012)
Processing operations	(Rm)	<b>(1 572)</b>	(1 232)	(1 139)	(711)	(571)
Other	(Rm)	<b>(1 722)</b>	(878)	(945)	(647)	(493)
<b>Total cost</b>						
	(Rm)	<b>4 721</b>	3 650	3 208	2 283	1 795
Per tonne milled	(R/t)	<b>737</b>	707	540	488	409
	(\$/t)	<b>51</b>	62	52	55	53
Per Pt oz in matte	(R/oz)	<b>16 291</b>	19 211	13 383	11 524	9 594
	(\$/oz)	<b>1 130</b>	1 683	1 291	1 307	1 239
<b>Financial ratios</b>						
Gross margin ex mine	(%)	<b>8.2</b>	10.3	34.1	34.9	43.4
<b>Capital expenditure</b>						
	(Rm)	<b>981</b>	968	1 166	1 381	2 104
	(\$m)	<b>68</b>	85	112	157	272



Selecting core for laboratory testwork, Zimplats.

# Zimplats

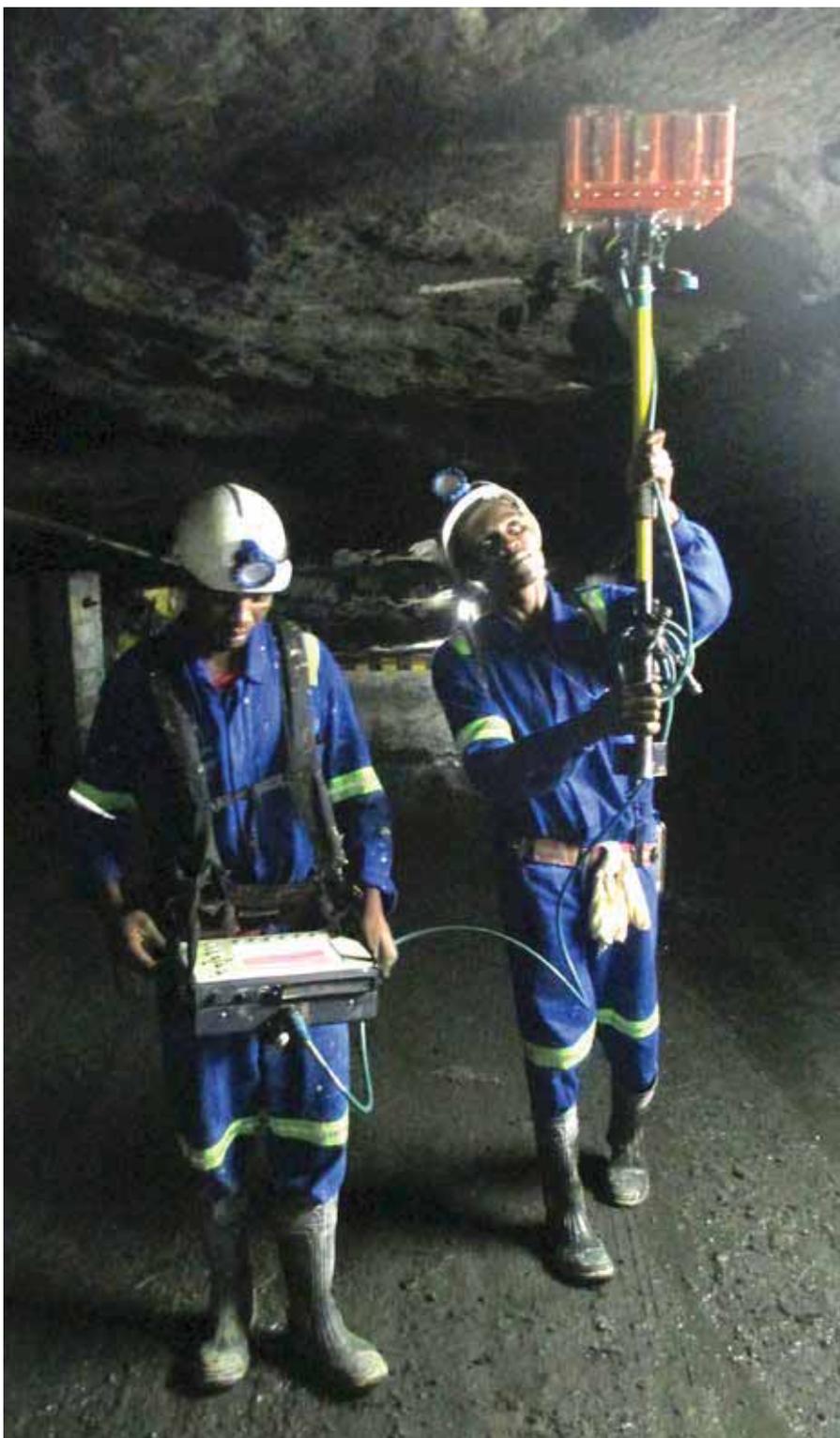
## Zimplats MSZ Mineral Resources and Mineral Reserves



- Boreholes
- Mined-out areas
- Measured Mineral Resource
- Indicated Mineral Resource
- Inferred Mineral Resource
- Open-pit resource
- Mineral Reserve
- Ground gazetted for compulsory acquisition
- Excluded Mineral Resource
- MSZ outcrop
- Mining right boundary

## Mimosa

Mimosa is located 20km west of the town of Zvishavane, 150km east of Bulawayo on the Wedza Complex of the Great Dyke in Zimbabwe.



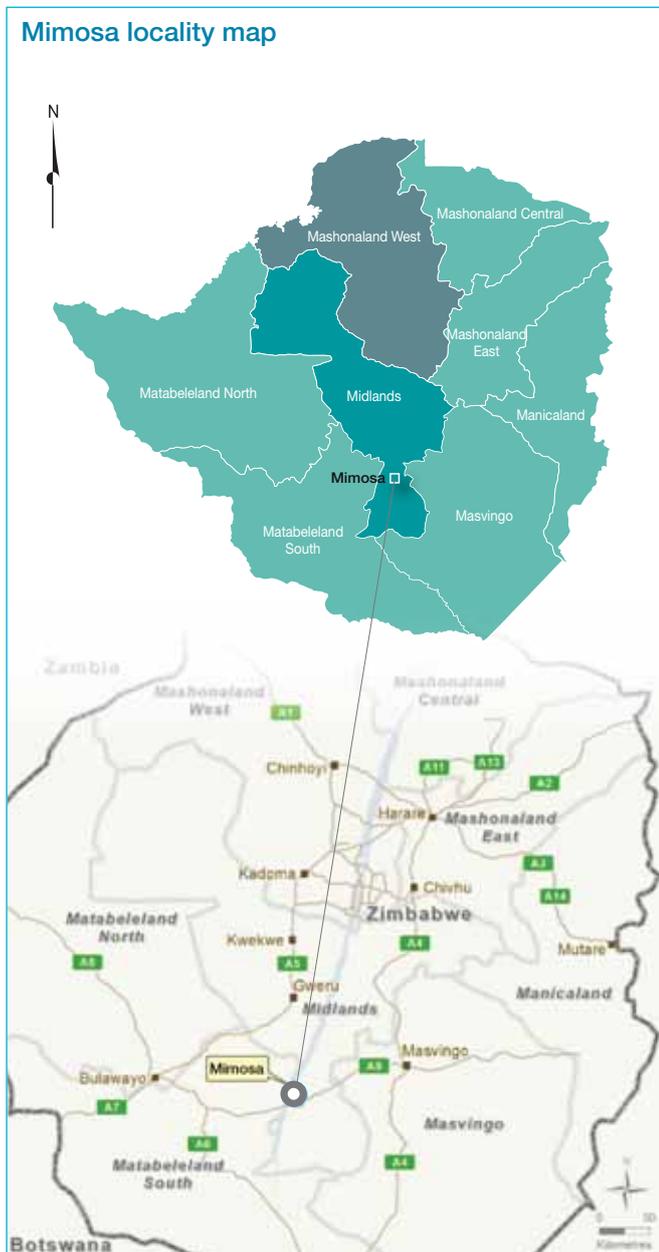
Ground penetrating radar survey, Mimosa.

### History

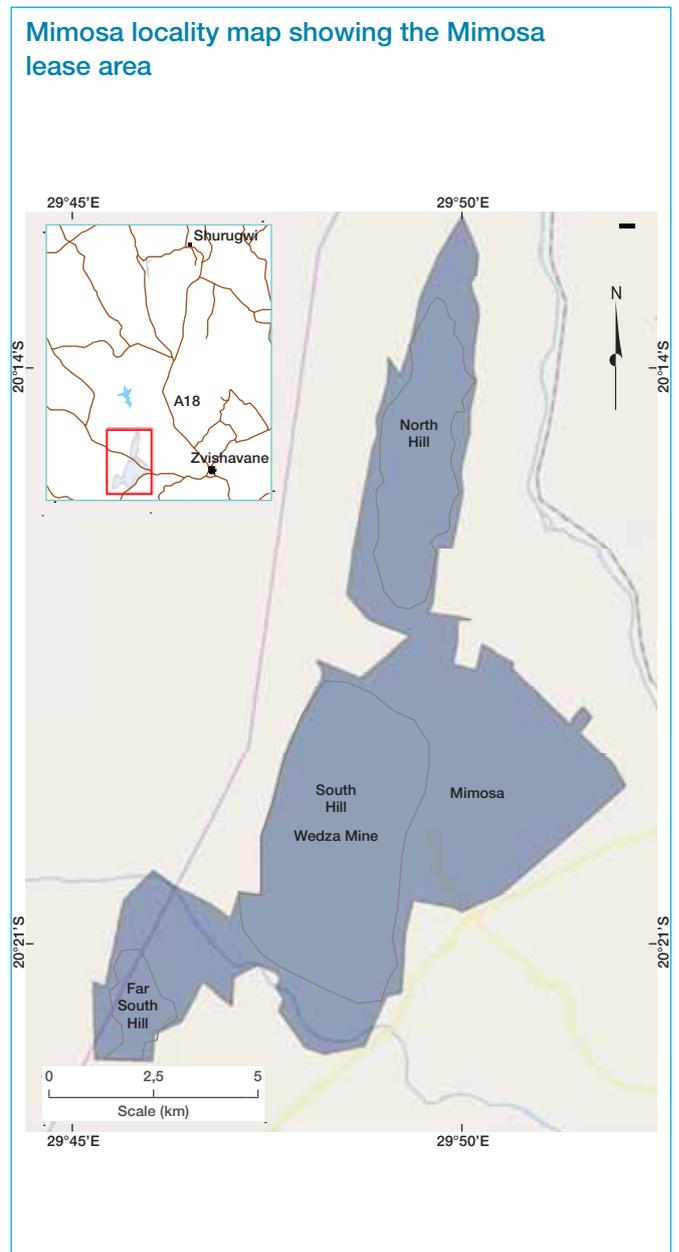
Mining operations started in the Mining Company (Mimosa) area in 1926 with mineral extraction from oxide ores in the North Hill. Operations lasted approximately two years and approximately 60oz of platinum was recovered. Union Carbide Zimbabwe secured an EPO in the Wedza area over the Mimosa deposit in 1962. Exploration and trial mining were periodically undertaken over a 30-year period. Mimosa was acquired by Zimasco from Union Carbide in 1993. Zimasco piloted platinum mining in Zimbabwe by resuscitating the operation and steadily increasing production to 1 000 tonnes per day, which was achieved in 1998. In July 2001, Implats acquired a 35% stake in Mimosa and increased this stake to 50% with a further acquisition of 15% in August the following year. Aquarius acquired a 50% stake in Mimosa during the same year. Sibanye Gold concluded a deal on 12 April 2016 which resulted in Sibanye Gold Ltd acquiring all the shares that formerly belonged to Aquarius. Mimosa is wholly owned by Mimosa Investments Limited, a Mauritius-based company held by Implats and Sibanye in a 50:50 joint venture.

# Mimosa

Mimosa locality map



Mimosa locality map showing the Mimosa lease area



## Mineral rights

The Mimosa mining rights are covered by a mining lease covering an area of 6 591 hectares. The mining lease, namely Lease No 24, was granted to Mimosa on 5 September 1996. The lease was registered for nickel, copper, cobalt, gold, silica, chromite and platinum group minerals and Mimosa Mines (Pvt) Ltd currently holds the mining rights to that lease. The lease agreement gives Mimosa exclusive mining rights for PGMs and base metals within the vertical limits of its boundary.

The GoZ has been pursuing the greater participation in the mining sector by indigenous Zimbabweans. Implats is continuing to engage with the GoZ with respect to agreeing plans for the indigenisation of Mimosa. The current position on the implementation of the indigenisation plans remains unclear and depending on what position is ultimately taken by the GoZ, Implats' attributable Mineral Resources and Mineral Reserves may be significantly reduced.

# Mimosa

Mimosa holds contiguous mining rights over the above mentioned areas totalling 6 591ha. The indigenisation plan has not been completed and the reported attributable Mineral Resources and Mineral Reserves are still at the same attributable ownership level of 50%.

Given the above, it must be noted that Mimosa has the legal entitlement to the minerals being reported upon without any known impediments.

## Infrastructure

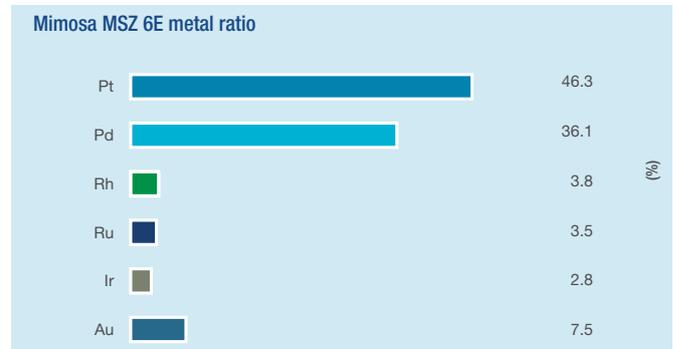
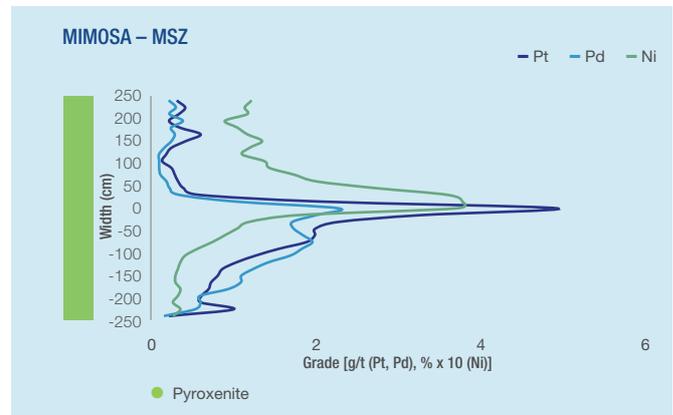
The mining operation is well established with a mature infrastructure. The mine currently extracts 2 900 Ml raw water per annum from the Khumalo weir. The weir is 6km from the mine and located in the Ngezi River. The river is supplied downstream from the Palawan Dam. Water is released from the dam for the mine and other water use permit holders.

The power supply to the mine is through a 132kV overhead powerline feeder teeing off Mberengwa switching station located  $\pm 15$ km south of the Mimosa Mine consumer sub-station. The maximum load capacity of the line feeding the mine consumer sub-station is 118MVA. It is adequate to accommodate an additional load.

The access tar road to the mine is in a good condition and well maintained. The nearest railway station (Bannockburn) is 16km from the mine.

## Environmental

All environmental parameters are covered in the mine's Environmental Impact Assessment (EIA) covering the whole mining lease. Project specific EIAs are also carried out as and when required. Mimosa is certified to operate on an ISO 14001 and OSHAS 18001 business management system. The system has a comprehensive, auditable method of identifying, implementation, monitoring and tracking of all aspects and impacts of its activities to the environment. The system is subject to internal reviews, audits and also external audits.



## Geology

PGM mineralisation at Mimosa is located in four erosionally isolated and fault-bounded blocks, namely, from north to south, the North Hill orebody, South Hill orebody, Mtshingwe Block orebody and Far South Hill orebody areas. Each of these blocks is host to a pyroxenite layer known as the P1 pyroxenite layer which is overlain by a layer of gabbro. The platinum-bearing Main Sulphide Zone (MSZ) is located in the P1 pyroxenite some 10m below the ultramafic/mafic contact. The MSZ is a continuous layer, 2m to 3m thick, and forms an elongated basin. The zone strikes in a north-northeasterly trend and dips at about 14° on the margins flattening towards the axis of the basin. The MSZ at Mimosa has a well-defined grade profile where peak base metal and PGM values are offset vertically, with palladium dominant towards the base, platinum in the centre and nickel towards the top. At Mimosa the MSZ is visually identified using pyroxene and sulphide mineralisation followed by confirmatory channel sampling. Minor faults and dykes are present at Mimosa. Although no potholes have been identified, low-grade areas and areas of no mineralisation, or “washouts”, have been intersected. These are all accounted for in the Mineral Resource and Mineral Reserve statement.

# Mimosa

## Modifying factors

The modifying factors used to convert Mineral Resources to Mineral Reserves are derived from historical performance while taking future anticipated conditions into account. The following modifying factors were applied to the resources:

### Key factors and assumptions

Main Sulphide Zone	Factors	Long-term price assumptions in today's money**		
Geological losses	11 – 26%	Platinum	US\$/oz	1 260
Mineral Resource Area	2 351 ca	Palladium	US\$/oz	815
Pillar factors	22 – 28%	Rhodium	US\$/oz	1 045
Resource dilution	8 – 12%	Ruthenium	US\$/oz	35
Mine call factor	92 – 96%	Iridium	US\$/oz	460
Relative density	3.15 – 3.18	Gold	US\$/oz	1 080
Resource width	200cm	Nickel	US\$/t	13 955
Stoping width	200cm	Copper	US\$/t	5 730
Concentrator recoveries	78 – 80%	Exchange rate	R/US\$	14.80

\*\*Supporting the Mineral Reserve estimates (Implats price forecast).

	6E metal ratio (%) Main Sulphide Zone		
Platinum	%	46.3	
Palladium	%	36.1	
Rhodium	%	3.8	
Ruthenium	%	3.5	
Iridium	%	2.8	
Gold	%	7.5	
	Implats' interest	Mining right (ha)	Prospecting right (ha)
Mimosa	50%	6 591	0

## Mining methods and mine planning

Mimosa is a shallow underground mine accessed by the Blore Decline Shaft system. The bord and pillar mining method is employed and stoping widths average around 2m. The bord widths vary from 15m, 7m to 6m wide, depending on the ground control district. Minimum pillar sizes are dependent on depth to give a safety factor of greater than 1.6, with pillars being 10m x 3m above 16 level, 10m x 3.5m from 16 Level and below, 10m x 4.5m and 4m x 8m in 6m bords in special areas as determined by the ground control districts. The strike pillars in panels are elongate along strike to cater for the predominant east-west faults and dykes and to avoid shear movement down-dip. Mining bords advance along strike. The mining cycle involves mechanised support drilling and installation, mechanised face drilling, charging and blasting and mechanised lashing onto a conveyor network to an underground bunker.

From the bunker ore is conveyed out to a surface stockpile. Optimum stoping widths and mining cut selection are regularly reviewed given variation in metal prices and the non-linear distribution on the different metals. Mining models are defined relative to the platinum peak and recent work confirmed that a 2m slice is presently the optimum cut. The Mineral Resources and Mineral Reserves listed below are based on a slice that extends from 0.45m above the platinum peak datum to 1.55m below the datum. The reported mined grade is based on inverse distance block modelling of borehole values using Surpac™. Mine design and scheduling is done using MineShed™. The mine plan is derived from a target milling throughput. Strategic stockpile levels are factored into the volumes to be hoisted. Losses due to mining and geology are applied to the planned tonnages and then consolidated into the LoM profile. The LoM I depicted overleaf includes on-reef

## Mimosa

stopping from the Wedza shaft Mineral Reserve area into the southern part of the South Hill orebody known as the Mtshingwe area. The updated LoM indicate the new mine plan, which dictated accelerated mining of the Mtshingwe block, in order to deliver a constant head grade to the mill.

An exercise was conducted to estimate the impact of LoM II and III on the viability of the tail of LoM I. Indications are that some 4% to 6% of the LoM I and also the Mineral Reserve estimate will not be viable if LoM II does not materialise.

### Processing

Mimosa has a concentrator plant on site where initial processing is done. Concentrate is transported by road to Impala Mineral Processes in Rustenburg in terms of an offtake agreement with IRS. An alternative option for local beneficiation is being pursued. A feasibility study is also in progress to investigate the viability to increase output by some 30%.

### Mimosa top risks

The Group risk management process is briefly described on page 13. In this context the top risks identified at Mimosa are:

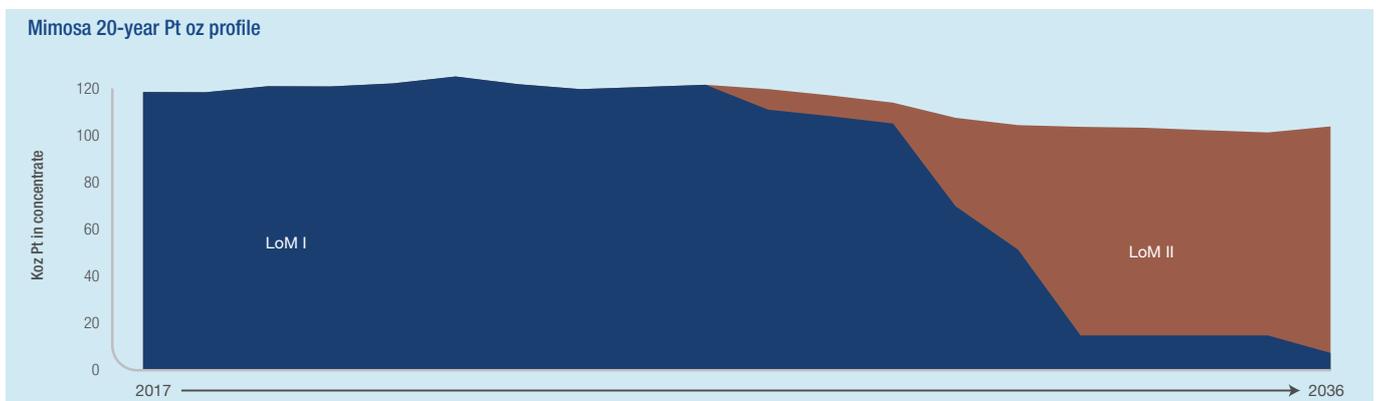
- Metal price fluctuations
- Tax on unbeneficiated platinum
- Unavailability of reliable and secure power
- Major safety incidents
- Sovereign risk
- Resource nationalisation – Indigenisation
- Social licence to operate
- Global recession
- Skills flight
- Access to capital funding

### Mineral Resource and Mineral Reserve estimation and reconciliation

The updated Mineral Resource and Mineral Reserve estimates are tabulated below. The statement above reflects the total Mineral Resource and Mineral Reserve estimate for Mimosa as at 30 June 2016. Mineral Resources are quoted inclusive of Mineral Reserves. Mineral Resource estimates allow for estimated geological losses, while no allowance is made for anticipated support pillar losses during eventual mining. Mineral Resource grades are quoted *in situ*, while Mineral Reserve grades are quoted after applying mine to mill modifying factors. The Mineral Resource estimates have been done using Surpac™ software to apply inverse distance techniques. Current Mineral Resource and Mineral Reserve estimates have included latest assay results, however, assay results from the 2016 drilling campaign are pending and will be reflected in the next update of the estimates.

The Mineral Reserves quoted reflect anticipated grades delivered to the mill and estimations are aligned to the business plan by estimating tonnes and grades at 2m mining width. No Inferred Mineral Resources have been converted into Mineral Reserves. The Mineral Reserve statement as at 30 June 2016 includes a large portion of the Mtshingwe block given the project approval and continued development into this area.

Rounding of numbers may result in minor computational discrepancies. Mineral Resource estimates are inherently imprecise in nature. The results tabulated in this report must be read as estimates and not as calculations. Inferred Mineral Resources in particular are qualified as approximations. The updated pillar design in selected ground district areas impacted on the overall extraction rate, but the year-on-year comparisons indicate that there has been no material change since the 30 June 2015 statement. The main change can be attributed to normal mining depletion.



In addition a summary illustration of the progression of Mineral Resources to Mineral Reserves is depicted below, showing the total Mineral Resource estimates (“inclusive” style reporting), those Mineral Resources not progressed to Mineral Reserves

(“exclusive” style reporting), the proportion of Mineral Resources that is progressed to Mineral Reserves and the summary Mineral Reserves as derived after modifying factors, including dilution.

# Mimosa

Mimosa Mineral Resource progression

Mimosa Main Sulphide Zone Mineral Reserves (Inclusive of dilution)		
Mt	6E g/t	Moz Pt
30.4	3.85	1.7
		
Mimosa Main Sulphide Zone Mineral Resources progressed to Mineral Reserves		
Mt	6E g/t	Moz Pt
43.3	3.94	2.6
		
Mimosa Main Sulphide Zone Mineral Resources not progressed to Mineral Reserves		
Mt	6E g/t	Moz Pt
82.1	3.76	4.6
		
Mimosa Main Sulphide Zone Mineral Resources inclusive of Mineral Reserves		
Mt	6E g/t	Moz Pt
125.5	3.82	7.2



Mine dump survey, Mimosa.

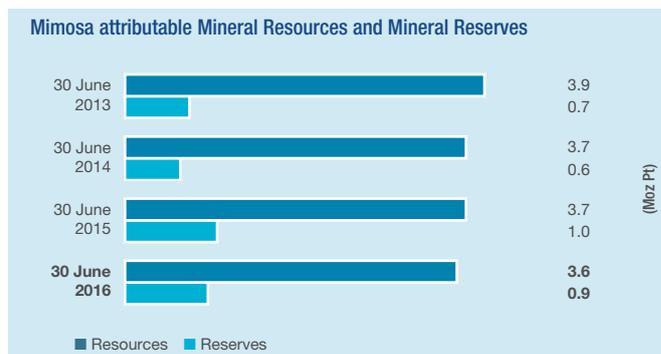
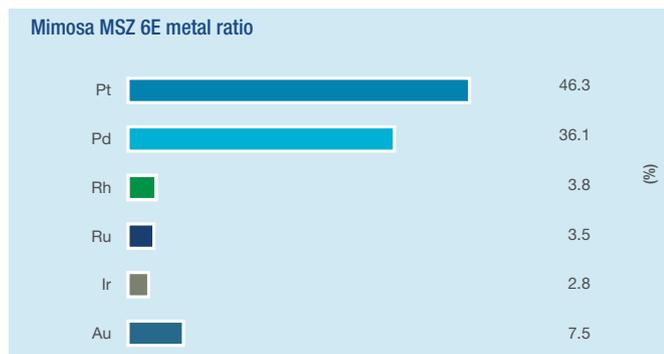
# Mimosa

## Mimosa Mineral Resources and Mineral Reserves – 100% (inclusive reporting)

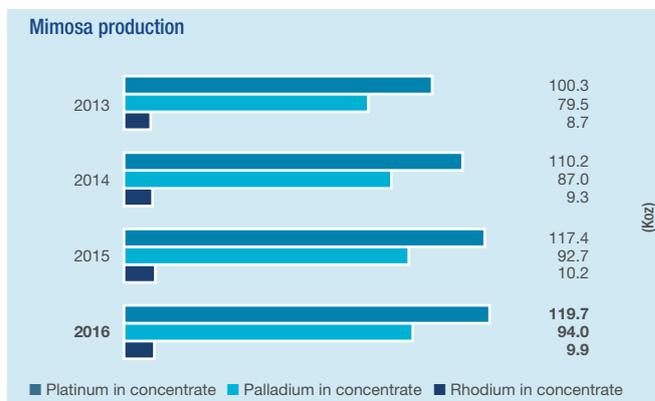
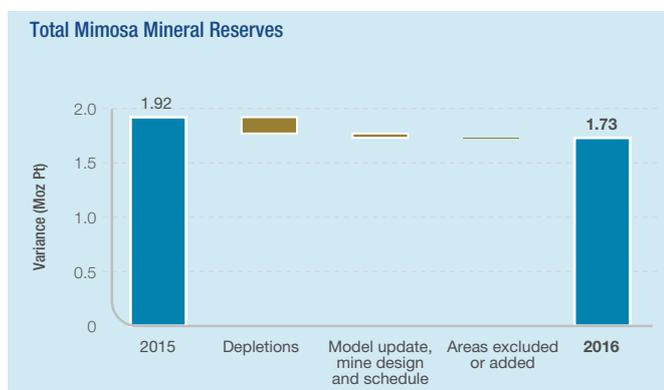
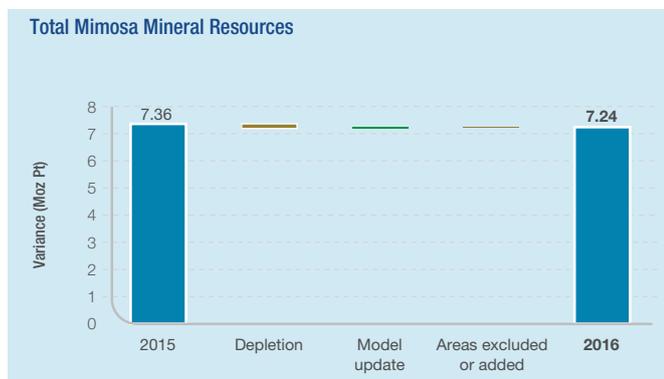
as at 30 June 2016

Mineral Resources		as at 30 June 2016									as at 30 June 2015				
Orebody	Category	Tonnes Mt	Width cm	4E grade g/t	6E grade g/t	Ni %	Cu %	4E Moz	6E Moz	Pt Moz	Tonnes Mt	Width cm	4E grade g/t	6E grade g/t	Pt Moz
South Hill MSZ	Measured	44.6	200	3.78	4.00	0.14	0.11	5.4	5.7	2.7	46.6	200	3.78	4.00	2.8
	Indicated	13.4	200	3.47	3.69	0.14	0.12	1.5	1.6	0.7	13.4	200	3.47	3.69	0.7
	Inferred	7.0	200	3.60	3.79	0.15	0.10	0.8	0.9	0.4	7.0	200	3.60	3.79	0.4
	Inferred (oxides)	4.4	200	3.16	3.30	0.12	0.11	0.4	0.5	0.2	4.4	200	3.16	3.30	0.2
	<b>Total</b>		<b>69.4</b>		<b>3.66</b>	<b>3.87</b>	<b>0.14</b>	<b>0.11</b>	<b>8.2</b>	<b>8.6</b>	<b>4.05</b>	<b>71.4</b>		<b>3.67</b>	<b>3.88</b>
North Hill MSZ	Measured	18.2	200	3.47	3.68	0.14	0.10	2.0	2.1	1.0	18.2	200	3.47	3.68	1.0
	Indicated	16.3	200	3.61	3.84	0.16	0.12	1.9	2.0	0.9	16.3	200	3.61	3.84	0.9
	Inferred	2.0	200	3.52	3.74	0.14	0.10	0.2	0.2	0.1	2.0	200	3.52	3.74	0.1
	Inferred (oxides)	7.6	200	3.53	3.75	0.15	0.11	0.9	0.9	0.4	7.6	200	3.53	3.75	0.4
	<b>Total</b>		<b>44.0</b>		<b>3.54</b>	<b>3.75</b>	<b>0.15</b>	<b>0.11</b>	<b>5.0</b>	<b>5.3</b>	<b>2.5</b>	<b>44.0</b>		<b>3.54</b>	<b>3.75</b>
Far South Hill MSZ	Measured	4.4	200	3.70	3.94	0.14	0.11	0.53	0.56	0.3	4.4	200	3.70	3.94	0.3
	Indicated	1.5	200	3.86	4.11	0.15	0.11	0.19	0.20	0.1	1.5	200	3.86	4.11	0.1
	Inferred	0.05	200	3.94	4.19	0.16	0.11	0.01	0.01	0.0	0.0	200	3.94	4.19	0.0
	Inferred (oxides)	6.0	200	3.40	3.63	0.13	0.10	0.66	0.07	0.3	6.0	200	3.40	3.63	0.3
	<b>Total</b>		<b>12.1</b>		<b>3.57</b>	<b>3.81</b>	<b>0.14</b>	<b>0.11</b>	<b>1.4</b>	<b>1.5</b>	<b>0.7</b>	<b>12.1</b>		<b>3.57</b>	<b>3.81</b>
<b>Overall total</b>		<b>125.5</b>		<b>3.61</b>	<b>3.82</b>	<b>0.14</b>	<b>0.11</b>	<b>14.6</b>	<b>15.4</b>	<b>7.2</b>	<b>127.5</b>		<b>3.62</b>	<b>3.83</b>	<b>7.4</b>

Mineral Reserves		as at 30 June 2016									as at 30 June 2015				
Orebody	Category	Tonnes Mt	Width cm	4E grade g/t	6E grade g/t	Ni %	Cu %	4E Moz	6E Moz	Pt Moz	Tonnes Mt	Width cm	4E grade g/t	6E grade g/t	Pt Moz
South Hill MSZ (Wedza)	Proved	15.6	200	3.46	3.69	0.16	0.12	1.7	1.9	0.9	18.7	200	3.47	3.71	1.0
	Probable	1.5	200	3.29	3.51	0.14	0.11	0.2	0.2	0.1	1.6	200	3.29	3.51	0.1
	<b>Total</b>	<b>17.1</b>		<b>3.44</b>	<b>3.68</b>	<b>0.15</b>	<b>0.11</b>	<b>1.9</b>	<b>2.0</b>	<b>0.9</b>	<b>20.3</b>		<b>3.46</b>	<b>3.69</b>	<b>1.1</b>
South Hill MSZ (Mtshingwe)	Proved	4.0	200	3.88	4.13	0.14	0.11	0.5	0.5	0.2	4.2	200	3.88	4.14	0.3
	Probable	9.3	200	3.75	4.03	0.13	0.10	1.1	1.2	0.5	9.3	200	3.75	4.03	0.5
	<b>Total</b>	<b>13.3</b>		<b>3.79</b>	<b>4.06</b>	<b>0.13</b>	<b>0.10</b>	<b>1.6</b>	<b>1.7</b>	<b>0.8</b>	<b>13.5</b>		<b>3.79</b>	<b>4.07</b>	<b>0.8</b>
<b>Total South Hill Mineral Reserve</b>		<b>30.4</b>		<b>3.59</b>	<b>3.85</b>	<b>0.15</b>	<b>0.11</b>	<b>3.5</b>	<b>3.8</b>	<b>1.7</b>	<b>33.8</b>		<b>3.59</b>	<b>3.84</b>	<b>1.9</b>



# Mimosa



various financial institutions. These tests indicate that the Mimosa Operation requires a real long-term basket price of between R19 000 to R21 000 to be economically viable. While the real spot basket price as at 30 June 2016 was R22 600 (US\$1 555), the Mimosa internal long-term real basket price is R29 318 (US\$1 975) and the equivalent calculated consensus price is R29 276 (US\$1 972).

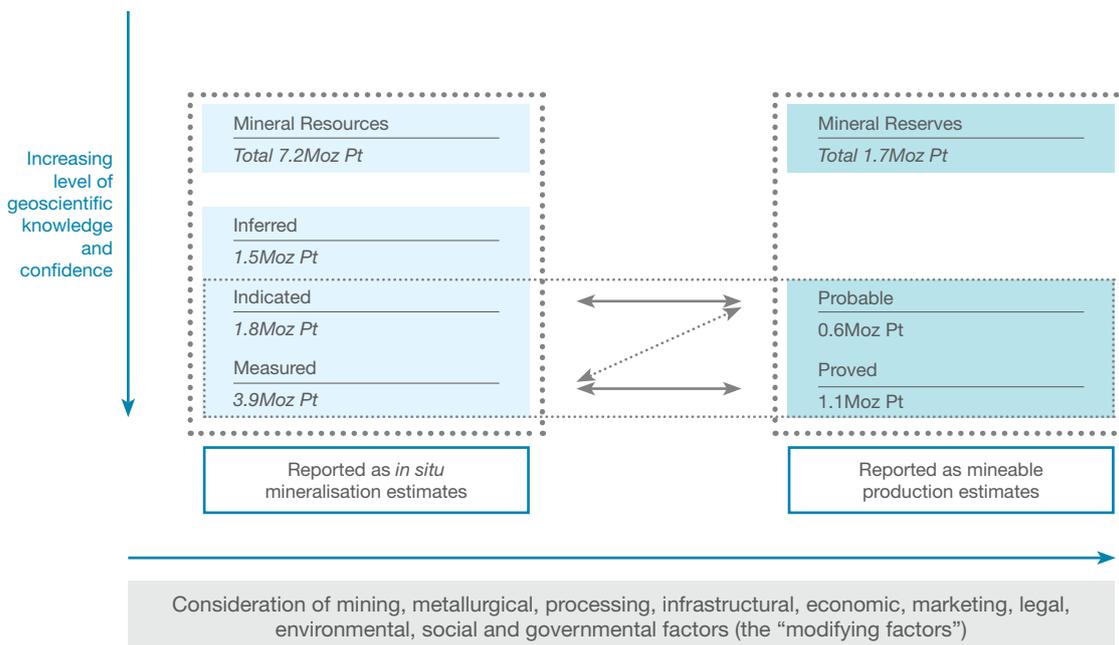
## Compliance

Mimosa has adopted the SAMREC Code for its reporting. The Lead Competent Person for Mimosa is Dumisayi Mapundu, a full-time employee of Mimosa. The competent person, CertSci Nat SACNASP Registration No 200021/05, has 20 years' relevant experience and Implats has written confirmation from the Lead Competent Person that the information disclosed in terms of these paragraphs are compliant with the SAMREC Code and, where applicable, the relevant Table 1 and JSE Section 12 requirements and that it may be published in the form, format and context in which it was intended.

## Valuation

The economic viability of the Mimosa Mineral Reserves is tested by means of net present value calculations over the LoM of the Reserve, determining the lowest real rand basket price that would still render the reserve viable. This is then tested against the internal Mimosa estimate of the real long-term basket price, the spot price as at 30 June 2016 and a consensus view from

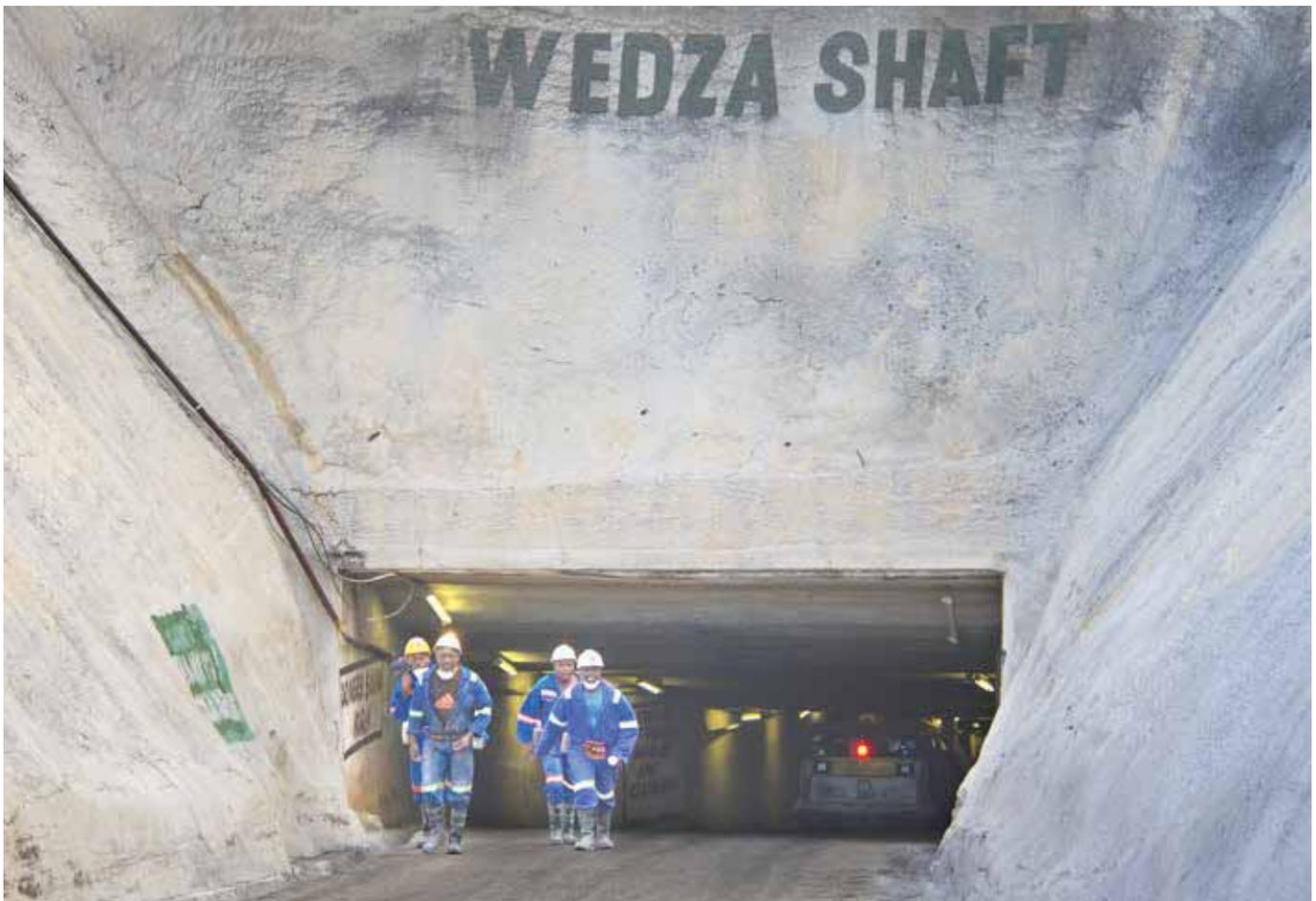
## Relationship between Exploration Results, Mineral Resources and Mineral Reserves (100%)



# Mimosa

## Key operating statistics

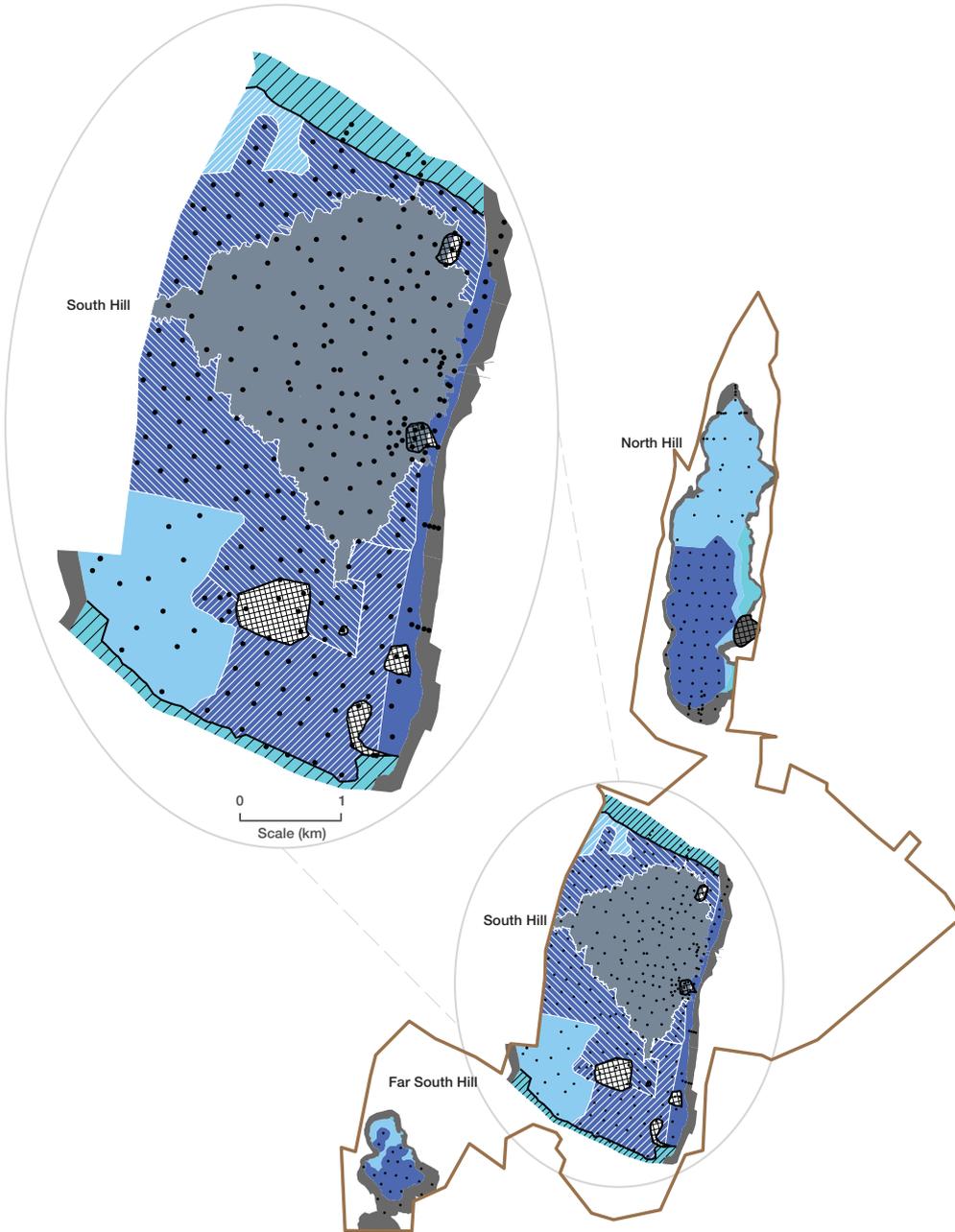
		2016	2015	2014	2013	2012
<b>Production</b>						
Tonnes milled ex mine	(000t)	<b>2 641</b>	2 586	2 453	2 381	2 324
Head grade 6E	(g/t)	<b>3.88</b>	3.93	3.92	3.95	3.93
Platinum in concentrate	(000 oz)	<b>119.7</b>	117.4	110.2	100.3	106.0
PGM in concentrate	(000 oz)	<b>253.7</b>	250.1	234.6	214.8	222.8
<b>Cost of sales</b>						
	(Rm)	<b>(3 372)</b>	(2 640)	(2 398)	(1 956)	(1 498)
On-mine operations	(Rm)	<b>(1 764)</b>	(1 375)	(1 425)	(1 110)	(813)
Concentrating operations	(Rm)	<b>(632)</b>	(501)	(375)	(311)	(242)
Other	(Rm)	<b>(976)</b>	(764)	(598)	(535)	(443)
<b>Total cost</b>						
	(Rm)	<b>2 525</b>	2 043	1 958	1 576	1 193
Per tonne milled*	(R/t)	<b>956</b>	790	798	662	513
	(\$/t)	<b>66</b>	69	77	75	66
Per Pt oz in concentrate	(R/oz)	<b>21 094</b>	17 402	17 768	15 713	11 255
	(\$/oz)	<b>1 463</b>	1 525	1 713	1 782	1 453
<b>Financial ratios</b>						
Gross margin ex mine	(%)	<b>(3.3)</b>	22.9	19.3	24.2	37.7
<b>Capital expenditure</b>						
	(Rm)	<b>456</b>	343	349	265	497
	(\$m)	<b>32</b>	30	34	30	64



Wedza Shaft, Mimosa.

# Mimosa

Mimosa Mineral Resources and Mineral Reserves



- |                           |                            |                                |                       |
|---------------------------|----------------------------|--------------------------------|-----------------------|
| • Boreholes               | Indicated Mineral Resource | Probable Mineral Reserve       | Geological feature    |
| Mined-out areas           | Inferred Mineral Resource  | Inferred resource – bad ground | Mining right boundary |
| Measured Mineral Resource | Proved Mineral Reserve     | Oxide                          |                       |

## Afplats, Imbasa and Inkosi

Afplats and the adjacent prospecting rights area of Imbasa and Inkosi is situated on the farms Leeuwkop 402 JQ, Kareepoort 407 JQ, Wolvekraal 408 JQ and portions of the farm Hartebeestpoort B 410 JQ, which is located about 15km west of the town of Brits in the North West province, in the western limb of the Bushveld Complex.



Depth marking by exploration drillers.

### History

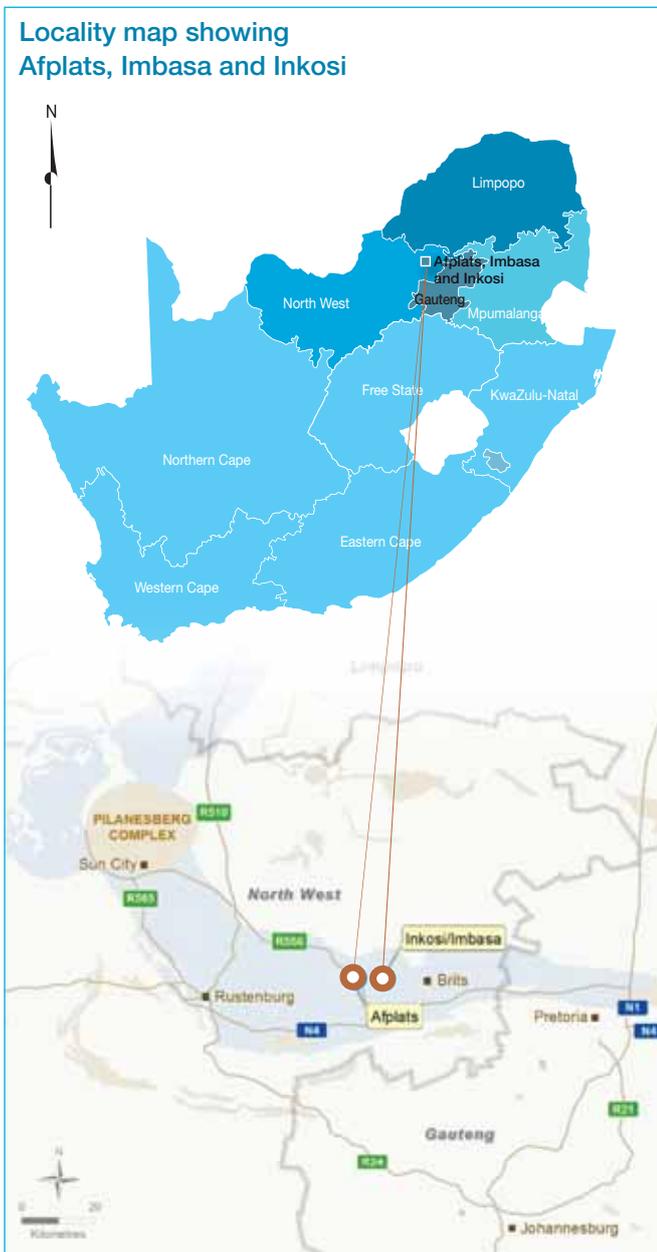
Implats acquired its interest in the Afplats, Imbasa and Inkosi mineral rights through the acquisition of African Platinum Plc in 2007. Since the dissolution of African Platinum Plc, the Afplats, Imbasa and Inkosi prospecting rights are held by Implats together with joint venture partners. The ownership of Afplats comprising the farms Leeuwkop, Kareepoort and Wolvekraal, is jointly owned by Implats (74%) and the Bakwena community (Ba-Mogopa Platinum Investments (Pty) Ltd, 26%). The remainder of the Imbasa/Inkosi interest is held by a BEE partner Pfula Investments (Pty) Ltd. The Mineral Resources of the three areas are therefore reported separately to reflect this ownership. The extent of the different areas is listed on page 96 together with Implats' interest.

In November 2010 the respective boards approved the commencement of a feasibility study, with the early work for the pre-sink of the main shaft commencing on 1 April 2011. This feasibility study was completed in 2011.

During November 2013, a decision was made that another feasibility study be undertaken that would convert the conventional mining layout into a bord and pillar layout. This work was completed by December 2014, but was not approved by the board. The vertical shaft sinking project has been stopped and the Leeuwkop Project has been deferred for four years. By December 2014, the main shaft has been sunk to 1 198m below surface, having traversed the Merensky Reef.

## Afplats, Imbasa and Inkosi

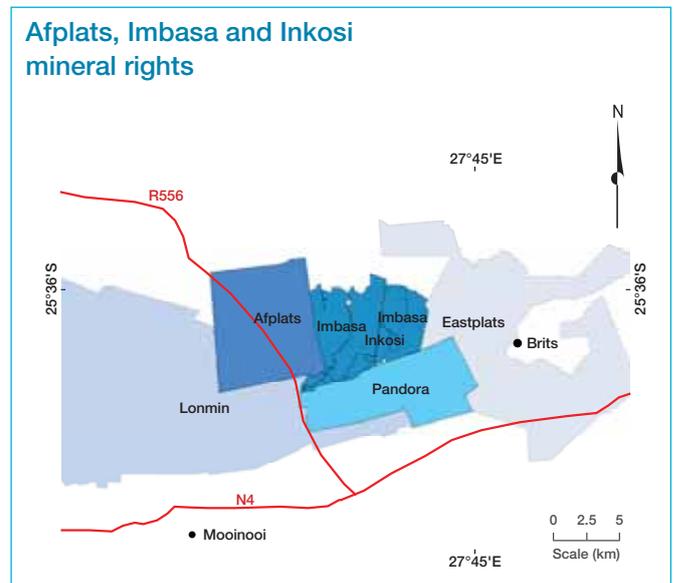
Locality map showing Afplats, Imbasa and Inkosi



### Mineral rights

Afplats is currently the holder of the Leeuwkop mining right, in respect of the farm Leeuwkop 402 JQ to mine platinum group metals and other base metals and by products. The new-order mining right was awarded for a 30-year period in 2008. In terms of the MPRDA holders of the mining rights may apply for more than one renewal period of a maximum of 30 years each as per the supporting Mining Work Programme, 60 working days before the relevant expiry date.

Afplats, Imbasa and Inkosi mineral rights



Afplats is also the holder of the Kareepoort 407 JQ and Wolvekraal 408 JQ prospecting right relating to all minerals, excluding dimension stone. The prospecting right was awarded for a five-year period, renewable for a maximum of three more years. The expiry date of the prospecting right was 26 June 2012. The renewal application was manually lodged with the DMR on 23 March 2012.

An application was lodged on 6 June 2013, under section 102 of the MPRDA, to amend the Afplats mining right by incorporating the prospecting area into the existing mining right. This application has not yet been executed.

On 15 December 2015 Afplats submitted its detailed Section 52 application in terms of the MPRDA, in which it has advised the Minister of Mineral Resources of the deferment of the Afplats Leeuwkop Mine Project relating to the Afplats Leeuwkop Mining Right.

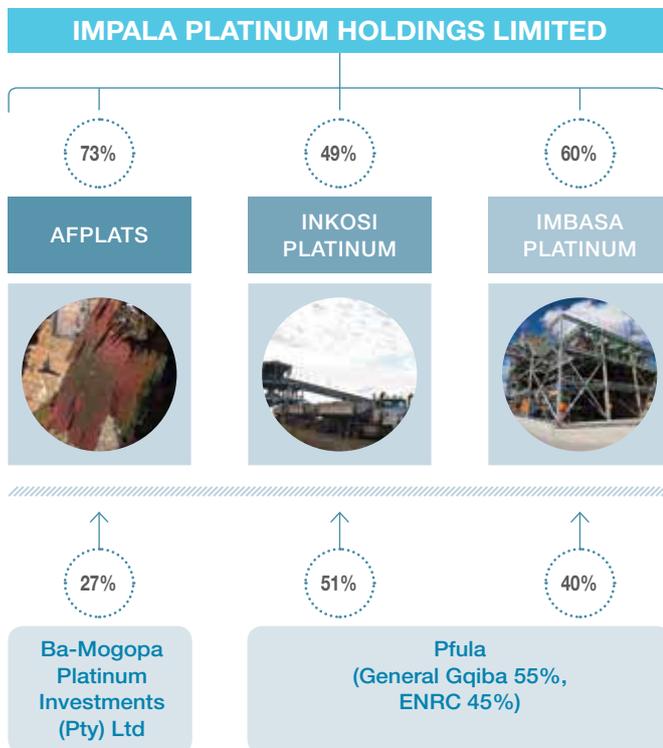
A converted prospecting right was received on 2 July 2005 by Inkosi Mining (Proprietary) Ltd (Inkosi). Inkosi applied for the renewal of this prospecting right for an additional three-year period. The renewal is still pending. An additional 274ha was awarded to Inkosi (known as the Gap area) on 3 February 2009. It expired in February 2012. A renewal was lodged in November 2011 and was executed in February 2015.

The prospecting right of the Imbasa Project was awarded to Imbasa (Pty) Ltd (Imbasa) by the DMR on 7 June 2006 for all minerals. Imbasa applied for the renewal of this prospecting right for an additional period of three years. The renewal is still pending.

## Afplats, Imbasa and Inkosi

	Mining right (ha)	Prospecting right (ha)	Implats' interest (%)
Afplats	4 602	1 065	74
Imbasa		1 673	60
Inkosi		2 584	49

The company structure of Afplats, Imbasa and Inkosi is shown below, illustrating the ownership.



### Infrastructure

Afplats' Leeuwkop Shaft is accessed by a 1.8km tarred road, built by Afplats, from the existing provincial road R556. The current infrastructure includes the shaft sinking headgear and winder houses, electricity supply by Eskom through the Big Horn sub-station, potable water supply from the Madibeng Municipality, offices and change houses for the sinking contractor and Afplats employees. All infrastructure is in a secured fenced-off area.

The Imbasa and Inkosi project is being conducted from the Leeuwkop Shaft area and has no separate infrastructure at this stage.

### Environmental

Surface topography, geo-hydrological and environmental study recommendations have been taken into account in positioning the surface infrastructure. The location of known heritage sites have been identified and demarcated. Suitable positions have been identified for the future waste dump and tailings dam. Detailed drainage arrangements were designed to ensure that the separation of clean and dirty water takes place, as no uncontrolled water run-off is permitted. A noise berm of adequate dimension to the south of the Leeuwkop Shaft has been designed that will minimise noise interference with the local village of Segwaelane some 800m away from the shaft.

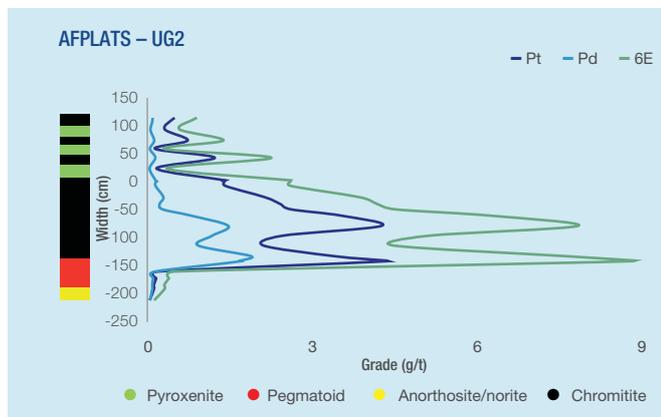
### Geology

Both the Merensky and UG2 Reefs have been explored at Afplats, Imbasa and Inkosi, but only the UG2 Reef is currently considered to be economically exploitable. The UG2 Reef comprises a main and upper chromitite layer separated by narrow pyroxenite partings. This will be exploited as a single package. The Merensky Reef is the upper portion of the pyroxenite layer with a very thin chromitite stringer close to the hangingwall contact. Mineralisation peaks over the chromitite stringer and decreases into the footwall. The UG2 Reef occurs about 1 050m below surface at the southern boundary of the farm Leeuwkop. The vertical separation between the Merensky and UG2 Reefs averages 200m and both reefs dip northwards at 9°.

The Reefs will be disrupted by minor and major faults, dolerite dykes, late stage ultramafic replacement pegmatoid bodies and potholes.

The UG2 Reef consists of two layers of chromitite, separated by thin layers of pyroxenite and is on average 1.35m thick across the Afplats, Imbasa and Inkosi areas. From a mining perspective it would be impractical and dangerous to mine the lower UG2 chromitite layer with a higher grade without the inclusion of the upper UG2 chromitite layer with a lower grade. The two UG2 chromitite layers were combined in the grade estimation and reported as the Mineral Resource width.

## Afplats, Imbasa and Inkosi



All the known geological losses are discounted from the Mineral Resources and a factor for the unknown geological losses is applied to the remainder of the areas. The global extraction rate for Afplats is 78% and for the Imbasa and Inkosi area 73%.

### Mining methods and mine planning

A feasibility study was completed in 2011, based on a conventional mining method layout. This feasibility study was approved by the Implats board. During November 2013, a decision was made that another feasibility study be undertaken that would convert the conventional mining layout into a bord and pillar layout. The mine planning was completed in a 3D spatial environment and the shaft sinking layout was updated to suit the mining method. This work was completed in December 2014, but not approved by the board. The Mineral Resource has therefore not been reclassified to the Mineral Reserve category pending the full project approval and funding in accordance with Implats' practice. The feasibility study area represents 42% of the Afplats Mineral Resource area.

The vertical shaft sinking project has been stopped and the Leeuwkop Project has been deferred for four years. By December 2014, the main shaft has progressed to a depth of 1 198m below surface – above the planned shaft bottom position of 1 396m below surface.

A pre-feasibility study for Imbasa and Inkosi, based on a conventional mining method, was completed in January 2014. Based on the work completed at Afplats' Leeuwkop Project for

a bord and pillar mining layout, it was decided that a desktop study be completed during FY2015 for the Imbasa and Inkosi area to compare four different mining methods. This work was completed by November 2015. Mechanised mining options were found more favourable than the conventional mining layout.

The indicative LoM profile for the Leeuwkop Project is included in the Impala discussion. This is under review given the present cash constraints and the consideration of a mechanised mining layout.

### Mineral Resource estimation and reconciliation

No additional data was added to the Mineral Resource estimation and there is therefore no change to the previous statement. The following notes should be read in conjunction with the Mineral Resource table.

The Mineral Resource statement as at 30 June 2016 reflects the total estimate for the Afplats, Imbasa and Inkosi areas. The attributable Mineral Resources are reported in the summary sections. Implats has chosen not to publish the Merensky Reef Mineral Resource estimates as the eventual economic extraction is presently in doubt. The previous depth cut-off of 2 350m below surface for Mineral Resources was reviewed during 2014 and was updated to reflect a 2 000m below surface cut-off. The eventual economic extraction of certain Mineral Resources below current and planned infrastructure is in doubt. These were excluded from the main Mineral Resource estimates. This impacted only on Inferred Mineral Resources and these areas are indicated in the accompanying map.

The estimate has been conducted using the Isatis™ software. A multi-pass search was used for the estimation and capping of extreme values was applied for UG2 Reef data. Estimated losses have been accounted for in the Mineral Resource calculation varying from 22% to 27%. There is no change in the UG2 Reef Mineral Resource estimate since the previous statement. The Mineral Resources are reflected in both 4E and 6E formats. Rounding of numbers may result in minor computational discrepancies. Mineral Resource estimates are inherently imprecise in nature. The results tabulated in this report must be read as estimates and not as calculations. Inferred Mineral Resources in particular are qualified as approximations.

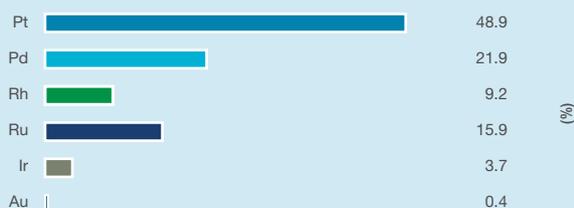
## Afplats, Imbasa and Inkosi

### Afplats, Imbasa and Inkosi Mineral Resources (100%)

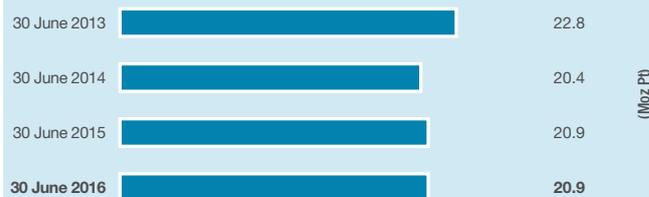
as at 30 June 2016

Mineral Resources		as at 30 June 2016									as at 30 June 2015					
Orebody	Category	Tonnes Mt	Width cm	4E grade g/t	6E grade g/t	Ni %	Cu %	4E Moz	6E Moz	Pt Moz	Tonnes Mt	Width cm	4E grade g/t	6E grade g/t	4E Moz	Pt Moz
Afplats UG2	Measured	98.4	133	5.19	6.47	0.03	0.01	16.4	20.5	10.0	98.4	133	5.19	6.47	16.4	10.0
	Indicated	10.8	136	5.11	6.36	0.03	0.01	1.8	2.2	1.1	10.8	136	5.11	6.36	1.8	1.1
	Inferred	55.9	129	5.06	6.25	0.03	0.01	9.1	11.2	5.5	55.9	129	5.06	6.25	9.1	5.5
<b>Total Afplats</b>		<b>165.1</b>		<b>5.14</b>	<b>6.39</b>	<b>0.03</b>	<b>0.01</b>	<b>27.3</b>	<b>33.9</b>	<b>16.6</b>	<b>165.1</b>		<b>5.14</b>	<b>6.39</b>	<b>27.3</b>	<b>16.6</b>
Imbasa UG2	Indicated	28.2	137	4.59	5.74	0.03	0.01	4.2	5.2	2.6	28.2	137	4.59	5.74	4.2	2.6
	Inferred	40.2	144	4.53	5.70	0.03	0.01	5.9	7.4	3.6	40.2	144	4.53	5.70	5.9	3.6
Inkosi UG2	Indicated	67.9	135	4.87	6.14	0.03	0.01	10.6	13.4	6.6	67.9	135	4.87	6.14	10.6	6.6
	Inferred	38.4	142	4.64	5.88	0.03	0.01	5.7	7.3	3.6	38.4	142	4.64	5.88	5.7	3.6
<b>Total Afplats</b>		<b>174.7</b>		<b>4.70</b>	<b>5.92</b>	<b>0.03</b>	<b>0.01</b>	<b>26.4</b>	<b>33.2</b>	<b>16.3</b>	<b>174.7</b>		<b>4.70</b>	<b>5.92</b>	<b>26.4</b>	<b>16.3</b>
<b>Total</b>		<b>339.8</b>		<b>4.91</b>	<b>6.15</b>	<b>0.03</b>	<b>0.01</b>	<b>53.7</b>	<b>67.1</b>	<b>32.8</b>	<b>339.8</b>		<b>4.91</b>	<b>6.15</b>	<b>53.7</b>	<b>32.8</b>

Afplats, Imbasa and Inkosi UG2 6E metal ratio



Afplats attributable Mineral Resources



### Compliance

Implats is committed to independent third-party reviews of Mineral Resource and Mineral Reserve estimates. These reviews, which provide assurance and assist with the principle of continuous improvement, are undertaken on a two-year cycle.

The Mineral Corporation reviewed the processes followed at Afplats to compile the Mineral Resources and the input of the geology and Mineral Resources to estimate a Mineral Reserve during the feasibility study. This work was completed in December 2014. During 2013, an independent Mineral Resource estimate for the Inkosi and Imbasa area was completed by The Mineral Corporation. The estimates completed for Afplats, Imbasa and Inkosi are SAMREC compliant. The Mineral Corporation noted that the method of reconciliation reviewed gives detailed account of the movement

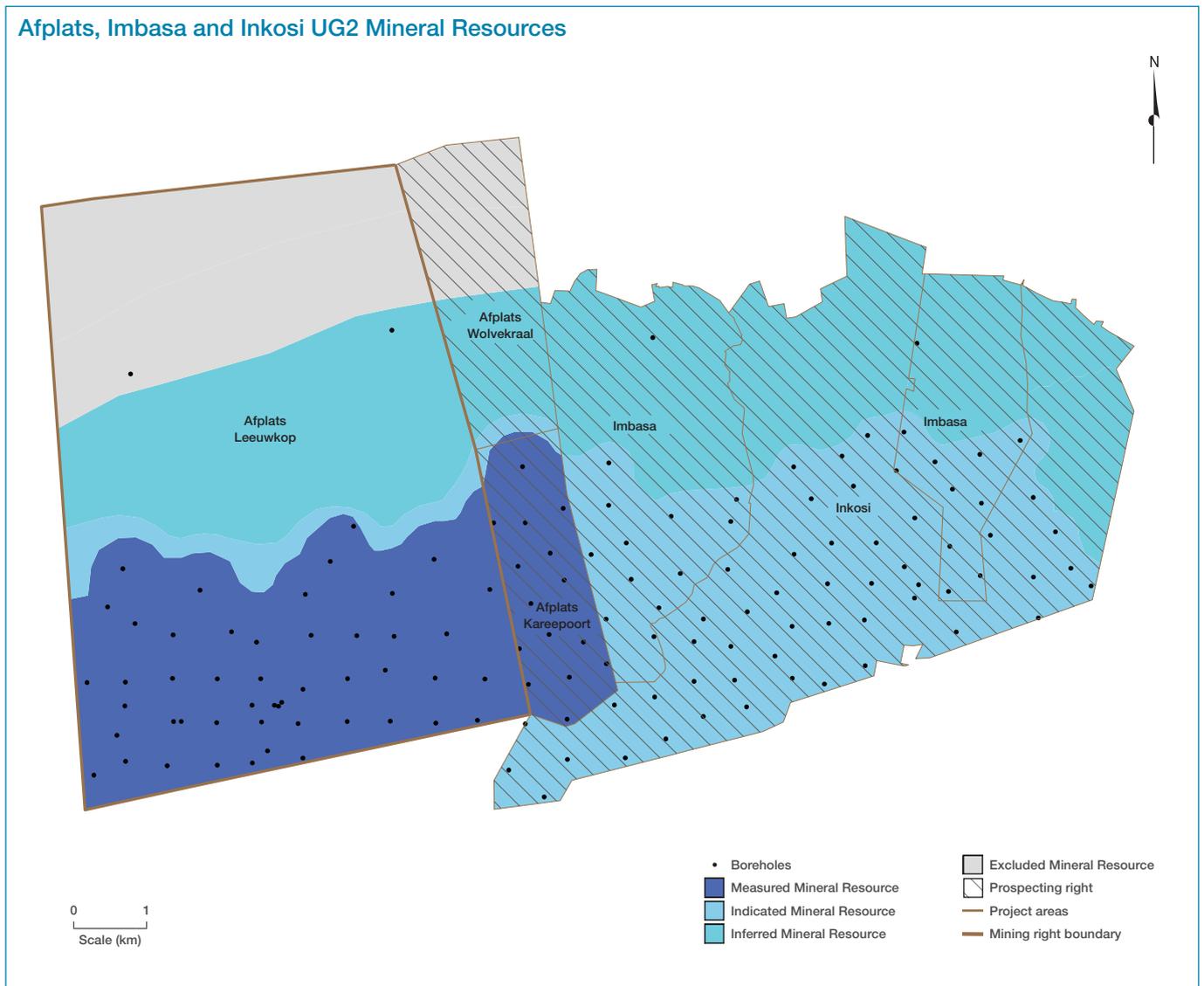
of Mineral Resources – both into the inventory and between classification categories. The Mineral Resource classification is clear, transparent and auditable.

During FY2016 a SAMREC Table 1 report was compiled for Afplats only and reviewed by The Mineral Corporation. A Table 1 report will be completed for the Imbasa and Inkosi area during the next financial year.

The Lead Competent Person for Afplats is Jacolene de Klerk, a full-time employee of Impala. The Competent Person, PrSciNat SACNASP Registration No: 400085/10, has 11 years' relevant experience. Implats has written confirmation from the lead Competent Person that the information disclosed in terms of these paragraphs is compliant with the SAMREC Code and, where applicable, the relevant Table 1 and JSE Section 12 requirements, and that it may be published in the form, format and context in which it was intended.

# Afplats, Imbasa and Inkosi

Afplats, Imbasa and Inkosi UG2 Mineral Resources



## Chromium ore at Implats

# Vast proportions of the world's chromium Mineral Resources are to be found in the Bushveld Complex of South Africa and the Great Dyke of Zimbabwe.

The world chromium ore production originates from the mineral chromite (a chromium-iron oxide) in the rock or ore called chromitite. The majority of the chromium Mineral Resources of the world are to be found in the Bushveld Complex of South Africa and the Great Dyke of Zimbabwe, where it occurs as numerous thin and laterally contiguous stratiform chromitite layers, interlayered with mafic and ultramafic rocks.

Up to 11 chromitite layers are known in the Great Dyke, named from the top down as Seams 1 to 11. Thirteen chromitite layers are known in the Bushveld Complex, which are further clustered into three groups, the lower, middle and upper groups of chromitite layers. Named from the bottom up, they are termed LG1 to LG7, MG1 to MG4, and the UG1 and UG2. In places, individual chromitite layers may comprise multiple layers of subsidiary chromitite units, separated by intercalated silicate units.

Although some of the chromitite layers have been known since 1865, limited mining only commenced in 1916 in the Bushveld Complex and in 1919 on the Great Dyke. The use and mining of chromium escalated after the conclusion of the Second World War. About half of the total world chromium ore production is mined from the Bushveld Complex.

In the Bushveld Complex, only the LG6, MG1 and UG2 chromitite layers are amenable to underground mining. The uppermost chromitite layer (UG2) is between 50 and 400m below the Merensky Reef and hosts economically exploitable quantities of PGMs within the chromitite. The UG2 chromitite layer is therefore mined at all the Implats Operations, principally for the PGMs. Chromium can therefore be seen as a by-product of the UG2 Reef in South Africa. The LG6 and MG1, with an average  $\text{Cr}_2\text{O}_3$  grade of between 40% and 50%, is more than 250m below the UG2 Reef. They can therefore not be mined from the existing infrastructure at the Implats Operations and are mined by other operators close to surface in opencast and underground mining operations for the chromium content only.

The UG2 Reef at Impala has an average *in situ*  $\text{Cr}_2\text{O}_3$  grade of about 33%, and a mined grade of about 16%. The mined ore from the UG2 Reef is milled and processed to recover the PGMs at the mine's two PGM concentrator plants. The tailings from the central concentrator is pumped directly to the tailings dams, as this is predominantly Merensky Reef tailings. Some of the tailings generated by the UG2 PGM recovery plant is reprocessed at two metallurgical plants to recover the chromite. Impala has an off-take agreement with Merafe Resources and sells 220kt of chromite concentrate recovered at one of the chromite recovery plants. The second chromite recovery plant which is owned by Impala Chrome was commissioned in 2010 and is operated by Chrome Traders (Pty) Ltd. Currently about 230kt per annum of chromite is reprocessed by Chrome

Traders and the remainder is pumped to the tailings dams. The retrieved chromite from the UG2 tailings has an average  $\text{Cr}_2\text{O}_3$  grade of about 42%. The number 3 and number 4 tailings dams at Impala currently contain about 500Mt of milled and processed ore, with an average  $\text{Cr}_2\text{O}_3$  grade of less than 8%.

At the Marula Mine, ore from the UG2 Reef is milled and processed to retrieve the PGMs at the PGM recovery plant of the mine. The Makgomo chrome recovery plant subsequently reprocesses the UG2 tailings generated by the PGM recovery plant to extract the chromitite. The plant has been operating since 2010. Owned by Makgomo Chrome (Pty) Ltd, the plant is operated by Chrome Traders (Pty) Ltd, that has an off-take agreement whereby all of the chromite concentrate produced is purchased on a free carrier basis from the plant. Makgomo Chrome is 50% owned by the Marula Community Chrome (Pty) Ltd, 30% by Implats and 20% by Marula Platinum Mine. Currently about 150kt of chromite concentrate is produced per annum and the remainder is pumped to the tailings dams. The *in situ* grade of the UG2 chromitite layer at Marula has not been determined, but the chromite concentrate has an average  $\text{Cr}_2\text{O}_3$  grade of about 42%. The tailings dam at Marula currently contains about 15.7 million tonnes of milled and processed UG2 ore at an average  $\text{Cr}_2\text{O}_3$  grade of about 12%.

At the Two Rivers Platinum Mine, ore from the UG2 Reef is milled and processed to recover the PGMs at the mine's MF2 PGM concentrator. The chromite recovery plant then reprocesses the UG2 tailings generated by the concentrator to recover the chromite. The chromite recovery plant was commissioned in 2013. The plant is owned and operated by Two Rivers, which also has an off-take agreement with Chrome Traders whereby all of the concentrate produced is purchased on a free carrier basis from Two Rivers. Currently about 240kt per annum of chromite is produced at a  $\text{Cr}_2\text{O}_3$  grade of 41.5%, and a silica content of less than 3%, and the remainder is pumped to the tailings dams. The UG2 tailings at Two Rivers that have been reprocessed have an average  $\text{Cr}_2\text{O}_3$  grade of about 15%. The tailings dams at Two Rivers currently contain about 24 million tonnes of milled and processed ore with an average  $\text{Cr}_2\text{O}_3$  grade of about 17%.

No mining has taken place at Afplats, Imbasa and Inkosi. The UG2 Reef in this area has an average *in situ*  $\text{Cr}_2\text{O}_3$  grade of about 31%.

At Zimplats the uppermost chromitite layer (Seam 1) is about 220m below the MSZ. It can therefore not be mined from the existing infrastructure and is mined by other operators and artisanal miners close to surface for its chromium content only. This is also the case at Mimosa.

The available information is currently not sufficient to support a comprehensive Mineral Resource or Mineral Reserve statement for the chromium ore production by Implats.

## Areas excluded from Mineral Resource estimates

Implats has adopted an approach to exclude those areas where the eventual economic extraction is in doubt from the Mineral Resource estimates. Amongst others, all areas deeper than 2 000m below surface are excluded from the Mineral Resource statement.

Implats introduced a depth cut-off in 2010 whereby mineralisation below a certain depth is excluded from the Mineral Resource estimate. This depth cut-off is applicable to the Bushveld Complex setting and is reviewed annually considering a range of assumptions, specifically the virgin rock temperature (VRT), cooling requirements, available technology, support design and other cost, prices and mining depth limits presently in the platinum industry. It is recognised that while the actual depth cut-off could vary from area to area and over time as conditions vary a constant depth is assumed for all operations at present. The depth cut-off of 2 350m was applied during the 2013 Implats Mineral Resource estimates and equated approximately to a VRT of 73° C. The depth cut-off was effectively set at 2 000m below surface in 2014. Additional to the depth cut-off areas, various Mineral Resource blocks are considered on a case-by-case basis. Effectively all mineralisation deeper than 2 000m below surface has now been excluded from the Mineral Resource statements, as well as other areas where the eventual economic extraction is in doubt.

In order to avoid confusion, these areas are not reported with the Mineral Resources but separately in this section as exploration results. For further clarity, note that these are excluded from the summation of total Mineral Resources per area and the attributable Mineral Resources. These areas are indicated as excluded Mineral Resources on the Mineral Resource maps per operation.

The indicative quantum of such exploration results are as follows:

- At Impala the estimate for the areas underlain by the Merensky and UG2 Reef that are excluded in the Mineral Resource estimates is in the order of some 28Moz Pt. More than 60% of these areas occur at depths greater than 2 350m below surface
- At Afplats all of the Merensky Reef is excluded from the Mineral Resource estimates given the unlikely eventual economic extraction. In addition, there are areas where the UG2 Reef occurs at depths deeper than 2 000m and these are excluded in the Mineral Resource estimates listed in the Afplats section. The indicative quantum of such exploration results is in the order of some 22Moz Pt for the UG2 Reef and Merensky Reef
- At Two Rivers, an area west of the major fault on the farms Kalkfontein and Buffelshoek is excluded from the Mineral Resource estimate. The indicative quantum of such exploration results is in the order of some 9Moz Pt in total for the Merensky and UG2 Reefs
- At Zimplats, areas which are excluded from the Mineral Resource estimates are indicated on the Mineral Resource maps. These are mostly low grade areas and the quantum of these is not material in comparison with the total estimate for Zimplats.



Sulphides in Merensky Reef core, Impala.

## Glossary of terms

<b>4E (equivalent to 3PGE+Au)</b>	Refers to the sum of platinum, palladium, rhodium and gold content as determined by a nickel sulphide collection fire assay procedure; this is considered to be the most accurate assay procedure, and results can usually be compared between laboratories.
<b>6E (equivalent to 5PGE+Au)</b>	Refers to the sum of platinum, palladium, rhodium, ruthenium, iridium and gold content as determined by a nickel sulphide collection fire assay procedure; this is considered to be the most accurate assay procedure, and results can usually be compared between laboratories.
<b>AA</b>	Atomic absorption spectroscopy is an analytical technique which uses the absorption of light to measure the concentration of elements.
<b>Afplats</b>	Afplats Proprietary Limited.
<b>Anorthosite</b>	Igneous rock composed almost entirely of plagioclase feldspar.
<b>ARM</b>	African Rainbow Minerals Limited of which ARM Platinum is a subsidiary.
<b>ASX</b>	Australian Securities Exchange.
<b>AusIMM</b>	Australasian Institute of Mining and Metallurgy.
<b>BEE</b>	Black economic empowerment.
<b>Bord and pillar</b>	Underground mining method where ore is extracted from rectangular shaped rooms, leaving parts of the ore as pillars to support the roof. Pillars are usually rectangular and arranged in a regular pattern.
<b>Concentrating</b>	A process of splitting the milled ore in two fractions, the smaller fraction containing the valuable minerals, the rest waste.
<b>Chromitite</b>	A rock composed mainly of the mineral chromite.
<b>Decline</b>	A shallow dipping mining excavation used to access the orebody.
<b>Development</b>	Underground excavations for the purpose of accessing Mineral Reserves.
<b>DMR</b>	Department of Mineral Resources, formerly known as the Department of Minerals and Energy (DME).
<b>Diorite</b>	Igneous rock composed of amphibole, plagioclase feldspar, pyroxene and small amounts of quartz.
<b>Dunite</b>	Igneous rock consisting mainly of olivine.
<b>Dyke</b>	A wall-like body of igneous rock that intruded (usually vertically) into the surrounding rock in such a way that it cuts across the stratification (layering) of this rock.
<b>ECSA</b>	Engineering Council of South Africa: The Engineering Profession Act, 2000 (Act No 46 of 2000), was promulgated in 2000; the Act became effective in 2011. In terms of section 18(1), the Act empowers ECSA to register persons in certain prescribed Categories of Registration. Paragraph 9 of the SAMREC Code refers to ECSA: A 'Competent Person' is a person who is registered with SACNASP, ECSA or PLATO, or is a Member or Fellow of the SAIMM, the GSSA or a Recognised Overseas Professional Organisation (ROPO).
<b>Felsic rock</b>	An igneous rock composed mainly of a light-coloured mineral, like feldspar (or plagioclase) and usually quartz, which are more than 60% by volume.
<b>Gabbro</b>	Igneous rock composed mainly and approximately equally of plagioclase feldspar and clinopyroxene.
<b>g/t</b>	Grams per metric tonne. The unit of measurement of metal content or grade, equivalent to parts per million.
<b>GSSA</b>	Geological Society of South Africa.
<b>ha</b>	Abbreviation for hectare, unit of area measured equal to 10 000 square metres.

## Glossary of terms

<b>Harzburgite</b>	Igneous rock composed mainly of olivine and pyroxene.
<b>ICP-MS</b>	Inductively coupled plasma mass spectrometry is a type of mass spectrometry which is capable of detecting metals at low levels. This is achieved by ionizing the sample with inductively coupled plasma and then using a mass spectrometer to separate and quantify those ions.
<b>In situ</b>	In its natural position or place.
<b>IRS</b>	Impala Refining Services Limited.
<b>JORC Code</b>	The 2004 Australasian Code for Reporting of Mineral Resources and Ore Reserves. This was updated and reissued as the JORC Code 2012.
<b>JSE</b>	JSE Limited, the South African securities exchange based in Johannesburg. Formerly the JSE Securities Exchange and prior to that the Johannesburg Stock Exchange.
<b>JV</b>	Joint venture.
<b>Kriging</b>	A geostatistical estimation method that gives the best-unbiased linear estimates of point values or of block averages.
<b>LoM</b>	Life of mine.
<b>Mafic</b>	An igneous rock composed mainly of dark ferromagnesium minerals, which are less than 90% by volume.
<b>Merensky Reef</b>	A horizon in the Critical Zone of the Bushveld Complex often containing economic grades of PGM and associated base metals. The “Merensky Reef”, as it is generally used, refers to that part of the Merensky unit that is economically exploitable, regardless of the rock type.
<b>Mill grade</b>	The value, usually expressed in parts per million or gram per tonne, of the contained material delivered to the mill.
<b>Moz</b>	Million ounces. All references to ounces are troy ounces with the factor being 31.10348 metric grams per ounce.
<b>MPRDA</b>	Minerals and Petroleum Resources Development Act of South Africa.
<b>MSZ</b>	The Main Sulphide Zone (MSZ) is the PGM-bearing horizon hosted by the Great Dyke. In addition to the economically exploitable PGMs there is associated base metal mineralisation. The MSZ is located 10m to 50m below the ultramafic/mafic contact in the P1 pyroxenite.
<b>Mt</b>	Abbreviation for million metric tonnes.
<b>Norite</b>	Igneous rock composed mainly of plagioclase feldspar and orthopyroxenes in approximately equal proportions.
<b>Pegmatoid</b>	An igneous rock that has the coarse-crystalline texture of a pegmatite but lacks graphic intergrowths.
<b>PGE</b>	Platinum group elements comprising the six elemental metals of the platinum group. The metals are platinum, palladium, rhodium, ruthenium, iridium and osmium.
<b>PGM</b>	Platinum group metals being the metals derived from PGE.
<b>PLATO</b>	The South African Council for Professional and Technical Surveyors.
<b>Pyroxenite</b>	Igneous rock composed mainly of pyroxene and minor feldspar.
<b>QAQC</b>	Quality Assurance and Quality Control.
<b>RBR</b>	Royal Bafokeng Resources.
<b>Reef</b>	A local term for a tabular metalliferous mineral deposit.

## Glossary of terms

<b>RPO</b>	Recognised Professional Organisation.
<b>SACNASP</b>	South African Council for Natural Scientific Professions: The Natural Sciences Profession Act, 2003 (Act No 27 of 2003), was approved in 2003. The Act empowers SACNASP to register persons in certain prescribed categories of registration. Paragraph 9 of the SAMREC Code refers to SACNASP: "A 'Competent Person' is a person who is registered with SACNASP, ECSA or PLATO, or is a Member or Fellow of the SAIMM, the GSSA or a Recognised Overseas Professional Organisation (ROPO)."
<b>SAIMM</b>	Southern African Institute of Mining and Metallurgy.
<b>SAMREC</b>	The South African Mineral Resource Committee.
<b>SAMREC Code</b>	The South African Code for the Reporting of Exploration Results, Mineral Resources and Mineral Reserves.
<b>SAMVAL Code</b>	The South African Code for the reporting of Mineral Asset Valuation.
<b>Section 11</b>	Section 11 of the MPRDA provides that the Minister's written consent is required for the cession, transfer or sale of a right, or an interest in such right, as well as the sale of a controlling interest in an unlisted company or close corporation.
<b>Section 52</b>	Section 52 of the MPRDA provides that the holder of a mining right must, after consultation with applicable trade unions, inform the Minerals and Mining Development Board if any mining operation is to be curtailed or to cease with the likely consequence being that 10% or more of the workforce or more than 500 employees, are likely to be retrenched in any 12-month period.
<b>Section 102</b>	Section 102 of the MPRDA provides that a right may not be amended or varied without the written consent of the Minister. This includes the mining work programme, environmental management programme, extension of the area or addition of minerals or seams.
<b>Seismic surveys</b>	A geophysical exploration method whereby rock layers can be mapped based on the time taken for wave energy reflected from these layers to return to surface.
<b>Smelting</b>	A pyrometallurgical process to further upgrade the fraction containing valuable minerals.
<b>SSC</b>	SAMREC/SAMVAL Committee.
<b>Stoping</b>	Underground excavations to effect the removal of ore.
<b>UG2 Reef</b>	A distinct chromitite horizon in the Upper Critical Zone of the Bushveld Complex usually containing economic grades of PGE and limited associated base metals.
<b>Ultramafic rock</b>	An igneous rock composed mainly of dark ferromagnesium minerals, which are more than 90% by volume.
<b>Websterite</b>	Igneous rock composed almost entirely of clino- and orthopyroxene.

## Mineral Resource and Mineral Reserve definitions

**SAMREC Code** – The Code sets out a required minimum standard for the Public Reporting of Exploration Results, Mineral Resources and Mineral Reserves. References in the Code to Public Report or Public Reporting pertain to those reports detailing Exploration Results, Mineral Resources and Mineral Reserves and which are prepared as information for investors or potential investors and their advisers. SAMREC was established in 1998 and is modelled on the Australasian Code for reporting of Mineral Resources and Ore Reserves (JORC Code). The first version of the SAMREC Code was issued in March 2000 and adopted by the JSE in their Listings Requirements later that same year. The Code has been adopted by the SAIMM, GSSA, SACNASP, ECSA, IMSSA and SAGC, and it is binding on members of these organisations. For background information and the history of the development of the Code, please refer to the SAMREC Code, March 2000. A second edition of the SAMREC Code was issued in 2007 with an amendment being issued in 2009 and the latest edition was released in May 2016, this supersedes the previous editions of the Code.

A **'Competent Person'** (CP) is a person who is registered with SACNASP, ECSA or SAGC, or is a Member or Fellow of the SAIMM, the GSSA, IMSSA or a Recognised Professional Organisation (RPO). These organisations have enforceable disciplinary processes including the powers to suspend or expel a member. A complete list of recognised organisations will be promulgated by the SAMREC/SAMVAL Committee (SSC) from time to time. The Competent Person must comply with the provisions of the relevant promulgated Acts. A Competent Person must have a minimum of five years relevant experience in the style of mineralisation or type of deposit under consideration and in the activity which that person is undertaking. If the Competent Person is estimating or supervising the estimation of Mineral Resources, the relevant experience must be in the estimation, assessment and evaluation of Mineral Resources. If the Competent Person is estimating, or supervising the estimation of Mineral Reserves, the relevant experience must be in the estimation, assessment, evaluation and assessment of the economic extraction of Mineral Reserves. Persons being called upon to sign as a Competent Person must be clearly satisfied in their own minds that they are able to face their peers and demonstrate competence in the commodity, type of deposit and situation under consideration.

A **'Mineral Resource'** is a concentration or occurrence of solid material of economic interest in or on the earth's crust in such form, grade or quality and quantity that there are reasonable prospects for eventual economic extraction. The location, quantity, grade, continuity and other geological characteristics of a Mineral Resource are known, estimated or interpreted from specific geological evidence and knowledge, including sampling. Mineral Resources are subdivided, and must be so reported, in order of increasing confidence in respect of geoscientific evidence, into Inferred, Indicated or Measured categories. Geological evidence and knowledge required for the estimation of Mineral Resources must include sampling data of a type, and at spacings, appropriate to the geological, chemical, physical, and mineralogical complexity of the mineral occurrence, for all classifications of Inferred, Indicated and Measured Mineral Resources.

An **'Inferred Mineral Resource'** is that part of a Mineral Resource for which quantity and grade or quality are estimated on the basis of limited geological evidence and sampling. Geological evidence is sufficient to imply but not verify geological and grade or quality continuity. An Inferred Resource has a lower level of confidence than that applying to an Indicated Mineral Resource and must not be converted to a Mineral Reserve. It is reasonably expected that the majority of Inferred Mineral Resources could be upgraded to Indicated Mineral Resources with continued exploration.

An **'Indicated Mineral Resource'** is that part of a Mineral Resource for which quantity, grade or quality, densities, shape and physical characteristics are estimated with sufficient confidence to allow the application of Modifying Factors in sufficient detail to support mine planning and evaluation of the economic viability of the deposit. Geological evidence is derived from adequately detailed and reliable exploration, sampling and testing and is sufficient to assume geological and grade or quality continuity between points of observation. An Indicated Mineral Resource has a lower level of confidence than that applying to a Measured Mineral Resource and may only be converted to a Probable Mineral Reserve. An Indicated Mineral Resource has a higher level of confidence than that applying to an Inferred Mineral Resource.

## Mineral Resource and Mineral Reserve definitions

A **'Measured Mineral Resource'** is that part of a Mineral Resource for which quantity, grade or quality, densities, shape, and physical characteristics are estimated with confidence sufficient to allow the application of Modifying Factors to support detailed mine planning and final evaluation of the economic viability of the deposit. Geological evidence is derived from detailed and reliable exploration, sampling and testing and is sufficient to confirm geological and grade or quality continuity between points of observation. A Measured Mineral Resource has a higher level of confidence than that applying to either an Indicated Mineral Resource or an Inferred Mineral Resource. It may be converted to a Proved Mineral Reserve or to a Probable Mineral Reserve.

A **'Mineral Reserve'** is the economically mineable part of a Measured and/or Indicated Mineral Resource. It includes diluting materials and allowances for losses, which may occur when the material is mined or extracted and is defined by studies at pre-feasibility or feasibility level as appropriate that include application of Modifying Factors. Such studies demonstrate that, at the time of reporting, extraction could reasonably be justified. The reference point at which Mineral Reserves are defined, usually the point where the ore is delivered to the processing plant, must be stated. It is important that, in all situations where the reference point is different, such as for a saleable product, a clarifying statement is included to ensure that the reader is fully informed as to what is being reported.

A **'Probable Mineral Reserve'** is the economically mineable part of an Indicated, and in some circumstances, a Measured Mineral Resource. The confidence in the Modifying Factors applying to a Probable Mineral Reserve is lower than that applying to a Proved Mineral Reserve.

A **'Proved Mineral Reserve'** is the economically mineable part of a Measured Mineral Resource. A Proved Mineral Reserve implies a high degree of confidence in the Modifying Factors.

**'SAMVAL Code'** – The South African Code for the reporting of Mineral Asset Valuation (the SAMVAL Code or 'the Code') sets out minimum standards and guidelines for Reporting of Mineral Asset Valuation in South Africa. The process for establishing the SAMVAL Code was initiated through an open meeting at a colloquium convened by the Southern African Institute of Mining and Minerals (SAIMM) in March 2002. The first edition of the SAMVAL Code was released in April 2008, with further amendments in July 2009. After various discussions it became apparent that a review process was required, and this was initiated in September 2011 at an open meeting at which participants were invited to express their opinions on matters that were unclear, or that required inclusion/exclusion or modification, in the 2008 edition and this resulted in the recent update released in May 2016.

A **'Competent Valuator'** (CV) is a person who is registered with ECSA, SACNASP, or SAGC, or is a Member or Fellow of the SAIMM, the GSSA, SAICA, or a Recognised Professional Organisation (RPO) or other organisations recognised by the SSC on behalf of the JSE Limited. A Competent Valuator is a person who possesses the necessary qualifications, ability, and relevant experience in valuing mineral assets. A person called upon to sign as a Competent Valuator shall be clearly satisfied in their own mind that they are able to face their peers and demonstrate competence in the valuation undertaken.

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