9 December 2015

The Directors
Sibanye Gold Limited
Libanon Business Park
1 Hospital Road
Libanon Westonaria, 1779

Dear Sirs

Competent Person's Report for Sibanye Gold Limited on Rustenburg Operations

T1.1 A/B/C (i)-(iii), SV 2.1, SV 2.2, SV 2.13

Rustenburg Operations, wholly owned by Rustenburg Platinum Mines Limited ("RPM" or "the Company") are located centrally on the Western Limb of the Bushveld Complex, near the town of Rustenburg in North West Province (within the Republic of South Africa), approximately 123 kilometres ("km") west of Pretoria and 126 km northwest of Johannesburg. Rustenburg Operations comprises the Bathopele, Siphumelele, Thembelani and Khuseleka mining operations, two concentrating plants, an on-site chrome recovery plant, the Western Limb Tailings Retreatment plant ("WLTR plant") and associated surface infrastructure.

The lease area covers an extensive 28 km strike length with the orebody extending 8 km down dip – Rustenburg Operations refers exclusively to this lease area and associated activities. Rustenburg Operations exploits the platinum group element ("PGE") bearing resources in the Merensky and UG2 reefs to produce concentrate containing PGEs, as well as, gold and base metals.

Sibanye Gold Limited ("Sibanye", or "the Client", or "the Group") requires the compilation of a Competent Person's Report ("CPR") for its purchase of Rustenburg Operations. At the request of Sibanye, Snowden Mining Industry Consultants (Pty) Limited ("Snowden") has prepared this CPR and fulfilled the role of CPR collator and peer reviewer. Relevant documentation and information was reviewed and verified for accuracy by Snowden, RPM, DRA Projects SA (Pty) Limited ("DRA"), Design to Mine Consulting Limited ("DTM") and Cyest Corporation (Pty) Limited ("Cyest"), collectively "the authors", for this CPR.

On 9 September 2015, Sibanye reported the intended acquisition of Rustenburg Operations from RPM, for an upfront consideration of ZAR1.5 billion ("B") in cash or shares and a deferred consideration equal to 35% of the distributable free cash flows generated by the Rustenburg Operations over a six year period, subject to a minimum nominal payment of ZAR3.0 B (referred to as "the Transaction"). Sibanye has reported that should there still be an outstanding balance at the end of the six year period, Sibanye has the option to elect to extend the period by a further two years. Any remaining balance at the end of this period will be settled by Sibanye either in cash or shares. The Transaction agreements comprise a sale and purchase agreement, sale and toll treatment of concentrate agreement, use and access agreement and parent company guarantee. The implementation of the Transaction is both subject to and conditional on the fulfilment of conditions precedent customary for a transaction of this nature.

The compilation of this CPR is based on technical and financial data gathering undertaken between 1 October 2014 and 9 December 2015. The Report Date is 9 December 2015; and the Valuation Date is 1 October 2015. The Mineral Resource estimation for this CPR has been prepared in accordance with the South African Code for the Reporting of Exploration Results, Mineral Resources and Mineral Reserves, 2007 Edition, as amended in July 2009 ("SAMREC Code"). Mr Quartus Snyman of RPM is the Competent Person ("CP") for Mineral Resources of the Rustenburg Operations.

The Mineral Reserve estimation for this CPR has been prepared in accordance with the SAMREC Code and the Johannesburg Stock Exchange ("JSE") Listings Requirements. Mr Frank Egerton of DRA is the CP for Mineral Reserves of the Rustenburg Operations and overall CP for this CPR.

The Mineral Asset Valuation ("Valuation") for this CPR has been prepared by DTM in accordance with the South African Code for the Reporting of Mineral Asset Valuation, 2008 Edition, as amended in July 2009 ("SAMVAL Code"). The Competent Valuator is Mr John Miles of DTM.

The authors have endeavoured, by making reasonable enquiry of Sibanye, to ensure that all material information in the possession of Sibanye has been fully disclosed to the authors. However, the authors have not carried out a comprehensive audit of the records of Rustenburg Operations to verify that all material documentation has been provided.

Sibanye has agreed to indemnify the authors from any liability arising from the author's reliance upon information provided or not provided to it by Sibanye. A draft version of this report was provided to the executive directors of Sibanye, along with a request to confirm that there are no material errors or any omissions in the CPR and that the information in the CPR is factually accurate. Confirmation in those terms has been provided in writing to the authors and has been relied upon by the authors.

This report is provided subject to the following qualifications and assumptions:

a) Sibanye has made available to the authors all material information in its possession or known to Sibanye in relation but not limited to the legal, geological, mining, process, environmental, financial and marketing aspects of Rustenburg Operations and that Sibanye has not withheld any material information and that information is accurate and up to date in all material respects.

b) All geological reports, Mineral Resource estimations and other technical documents provided by Sibanye correctly and accurately record the result of all geological and other technical activities conducted to date in relation to the relevant mining titles and accurately record any advice from relevant technical experts

c) RPM has good and valid title to all mining titles or other land tenure required to explore, develop, mine and operate in the manner proposed, including tenure required for access, transport and infrastructure needs for current and planned Rustenburg Operations advancement.

d) All necessary governmental and other consents and approvals (including environmental aspects) required to operate and the associated activities under the relative legislation have been obtained or will be forthcoming without any material delay and on terms which will not cause any material change to any exploration, mining, processing or other activities proposed and which will not cause any material change to the costs of such activities

e) Sibanye will have access to sufficient working capital or other sources of finance to conduct the proposed activities of Rustenburg Operations.

f) Macro or other economic conditions will not cause any material change to the prices expected to be obtained for the mineral products expected to be produced and marketed from the Rustenburg Operations.

g) All factual information provided by Sibanye as to its history or future intentions, financial forecasting or the effect of relevant agreements is correct and accurate in all material respects.

In relation to the above qualifications and assumptions, the authors have not undertaken comprehensive enquiries or audits to verify that the assumptions are correct and give no representation that the assumptions are correct.

The authors have prepared this CPR on the assurance that all mineral rights relating to the revised acquisition are currently in good standing. Snowden has reviewed Rustenburg Operations mineral rights but has not attempted to establish the legal status of the mineral rights and has relied on independent legal opinion.

The authors have reviewed, where applicable, exploration expenditure and supporting documentation provided by Rustenburg Operations as at 9 December 2015, as well as information on platinum transactions in the public domain over the last eight years.

The preferred valuation method is a Cash Flow Approach, considering the detailed planning that has been undertaken to generate projections that reflect the technical and economic parameters and assumptions existing at the date of this report; and is supported by extensive operating experience. The Cash Flow Model is most sensitive to metal prices including the US$:ZAR exchange rate and secondly to operating costs.

The Competent Valuator's Concluding Opinion of Value is presented in the table below for the single, fiscal Project entity, on a 100% basis, with a preferred ZAR13,310 M, using a discount rate of 8.0% (real) for the Mineral Asset. The preferred value is comparable to the Market Approach upper value of ZAR13,440 M.

Valuation approach	Concluding opinion of value, in ZAR M		
	Lower	Preferred Value	Upper
Cash Flow Approach	10,650	**13,310**	17,240

Source: Cash Flow Model, 2015

It must be noted that the forecasts of prices and exchange rates, parameters, plans and assumptions may change significantly over time. Should these change materially, the Valuation determined may be significantly different. The Competent Valuator is under no obligation to advise of any change in circumstances after the Valuation Date, or to review, revise or update the Valuation or opinion.

The lead CP for this CPR is Mr Frank Egerton. Mr Vince Agnello (collator), with the assistance of several other employees from Snowden, Sibanye, RPM, DRA, Cyest, DTM and the associated companies, have contributed to the compilation of this CPR. Prior to distribution, the CPR was reviewed by Mr Bill McKechnie.

The authors and their associated companies, excluding RPM and Sibanye, are independent of and do not have any material interest in Sibanye, RPM or the Mineral Asset. The authors are remunerated for their work by way of a professional fee determined according to a standard schedule of rates which is not contingent on the outcome of the Valuation.

The undersigned states that this Letter, Executive Summary and detailed CPR are a true reflection of Rustenburg Operations.

Yours faithfully

Original signed

WF McKechnie
BSc (Hons), Pr.Sci.Nat., FGSSA, MSAIMM
Senior Principal Consultant
Snowden Mining Industry Consultants (Pty) Limited
Duties: Oversight of CPR collation

Original signed

Frank Egerton
BSc Eng. (Mining), FSAIMM
Senior Mining Consultant
DRA Projects SA (Pty) Limited
Duties: CP sign-off of overall CPR, CP: Mineral Reserves

Original signed

John Miles
MSc (Mining), CEng, IOM3
Principal Mining Consultant
Design to Mine Consulting Limited
Duties: Competent Valuator

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1 EXECUTIVE SUMMARY

1.1 Purpose and structure of this Competent Person's Report

T1.1A/B/C (ii)-(iii), T1.2C(i), SV 2.1, SV 2.2, SV 2.4

Rustenburg Operations are located centrally on the Western Limb of the Bushveld Complex, near the town of Rustenburg in North West Province (within the Republic of South Africa), approximately 123 kilometres ("km") west of Pretoria and 126 km northwest of Johannesburg. Rustenburg Operations comprises the Bathopele, Siphumelele, Thembelani and Khuseleka mining operations, two concentrating plants, an on-site chrome recovery plant, the Western Limb Tailings Retreatment plant ("WLTR plant") and associated surface infrastructure. The lease area covers an extensive 28 km strike length with the orebody extending 8 km down dip; Rustenburg Operations refers exclusively to this lease area and associated activities.

Rustenburg Operations exploits the platinum group element ("PGE") bearing Merensky and UG2 reefs to produce concentrate containing PGEs, as well as, gold and base metals. The converted and new order mining rights for the Rustenburg Operations mining area covers 15,351.8 hectares ("ha") and includes the use of various mining methods, namely bord and pillar, conventional stopping and trackless development.

The Kroondal and Marikana Pooling and Sharing Arrangements with Aquarius Platinum (South Africa) (Pty) Limited, Waterval Smelter, Rustenburg Base Metal Refinery ("RBMR"), Precious Metal Refinery ("PMR") and Western Limb Distribution Centre ("WLDC") are excluded from the Transaction and this CPR.

Sibanye Gold Limited ("Sibanye", or "the Client", or "the Group") requires the compilation of a Competent Person's Report ("CPR") to support its purchase of Rustenburg Operations. At the request of Sibanye, Snowden Mining Industry Consultants (Pty) Limited ("Snowden") has prepared this CPR. Snowden has fulfilled the role of CPR collator and peer reviewer, and has placed reliance on several third parties that have undertaken work for each discipline – these parties are noted in Section 2.3 of the CPR.

Relevant documentation and information was reviewed and verified for accuracy by Snowden, Rustenburg Platinum Mines Limited ("RPM"), DRA Projects SA (Pty) Limited ("DRA"), Design to Mine Consulting Limited ("DTM") and Corporation (Pty) Limited ("Cyest"), collectively "the authors", for this CPR. Mr Quartus Snyman of RPM is the Competent Person ("CP") for Mineral Resources of the Rustenburg Operations; and Mr Frank Egerton of DRA is the CP for Mineral Reserves of the Rustenburg Operations and overall CP for this CPR. Mr John Miles (DTM) is the Competent Valuator and has undertaken the overall Valuation of the Mineral Asset.

On 9 September 2015, Sibanye reported the intended acquisition of Rustenburg Operations from RPM, through one of its subsidiaries, Sibanye Rustenburg Platinum Mines (Pty) Limited, for an upfront consideration of ZAR1.5 billion ("B") in cash or shares and a deferred consideration equal to 35% of the distributable free cash flows generated by the Rustenburg Operations over a six year period, subject to a minimum nominal payment of ZAR3.0 B (referred to as "the Transaction"). Sibanye has reported that should there still be an outstanding balance at the end of the six year period, Sibanye has the option to elect to extend the period by a further two years. Any remaining balance at the end of this period will be settled by Sibanye either in cash or shares. The Transaction agreements comprise a sale and purchase agreement, sale and toll treatment of concentrate agreement, use and access agreement and parent company guarantee. The implementation of the Transaction is both subject to and conditional on the fulfilment of conditions precedent customary for a transaction of this nature.

The compilation of this CPR is based on technical and financial data gathering undertaken between 1 October 2014 and 9 December 2015. The Report Date is 9 December 2015; and the Valuation Date is 1 October 2015. The authors of this CPR have followed the guidelines of the South African Code for the Reporting of Exploration Results, Mineral Resources and Mineral Reserves, 2007 Edition, as amended in July 2009 ("SAMREC Code") and consider this CPR to be compliant with Table 1 of the SAMREC Code, and the SAMREC Code overall.

Platinum, palladium, rhodium and gold, are collectively referred to as "4E" or "3PGE+Au" and with the addition of ruthenium and iridum as "6E" in this report. The United States dollar ("US$") and South African Rand ("ZAR") are the principal currencies used in this report.

The CPR will be published in full on the Sibanye website (www.sibanyegold.co.za).

The Executive Summary is a true reflection of the full CPR.

Side-bar annotations in this CPR reference the Chapter 12 checklist of the Johannesburg Stock Exchange Limited ("JSE") Listing Requirements. 'T' annotations in the CPR headers reference Table 1 of the SAMREC Code and are cross-referenced in Appendix C (SAMREC Code Checklist), e.g. T1.7A(i) relates to Item 1.7A(i) in the SAMREC Code checklist; 'SV' annotations in the CPR headers reference Table 2 of the South African Code for the Reporting of Mineral Asset Valuation, 2008 Edition, as amended in July 2009 ("SAMVAL Code") and are cross-referenced in Appendix D (SAMVAL Code Checklist), e.g. SV 2.3 relates to clause 2.3 of the SAMVAL Code.

1.2 Mineral rights

T1.7A/B/C (i)-(iii), SV 2.3

Pursuant to the Transaction, Sibanye will acquire from RPM certain of RPM's exploration, development, mining, concentrating and tailings re-processing business forming part of its operating division known as the "Rustenburg Operations". The Rustenburg Operations presently comprises, *inter alia*, eight "converted" mining rights granted under the transitional provisions of Schedule II, and a single new order mining right granted under section 23 of the Minerals and Petroleum Resources Development Act, Act No. 28 of 2002 (as amended) ("MPRDA"), which are currently held by RPM. The mining rights are listed in Table 5.1.

RPM is in the process of consolidating the mining rights, in accordance with the provisions of Section 102 of the MPRDA, into two mining rights. RPM intends transferring one of these mining rights (the Sale Right) to Sibanye, subject to obtaining approval under section 11 of the MPRDA. The Sale Right constitutes a consolidation of certain portions of mining rights 80 MR, 81 MR, 83 MR, 84 MR and 86 MR, as well as the entire mining area covered by mining rights 43 MR, 79 MR and 85 MR, into 82 MR. The balance of the mining rights will be consolidated into 80 MR and will be retained by RPM ("Retained Right").

1.3 Summary of geology and mineralisation

SV 2.5

The Bushveld Complex ("BC") is estimated to have formed approximately 2,060 Ma ago. Its mafic rock sequence, the Rustenburg Layered Suite ("RLS"), is the world's largest known mafic igneous layered intrusion and contains more than 90% of the world's known reserves of PGEs. The RLS occurs geographically as five apparently discrete compartments termed "limbs", three of which are being exploited for PGEs. These are the Western, Eastern and Northern Limbs.

The Pilanesberg Complex, the remnant of an alkaline volcanic plug, which intruded into the Bushveld Complex about 1,250 Ma, splits the Western Limb into two lobes (northwestern and southwestern) while the Eastern Limb is split into two lobes (northeastern and southeastern lobes) by the Steelpoort Fault. The Rustenburg Operations is located south east of the Pilanesberg Complex on the Western Limb.

Two main, regional facies of the Merensky Reef are recognised in the Western Limb of the RLS, namely the Swartklip Facies and the Rustenburg Facies, north and south of the Pilanesberg Complex respectively. The delineation of these facies sub-divisions relate to a much thinner vertical separation between the Merensky Reef and the UG2 horizons in the Swartklip Facies, originally identified north of the Pilanesberg, but also now also recognised in down dip sections of the RLS south of the Pilanesberg.

The persistence of the Merensky Reef and UG2 Reef in the Rustenburg Operations Lease Area has been confirmed mainly by extensive surface and underground drilling as well as 3D seismic surveys. The only aberration to this pattern is in the vicinity of the two major dunite pipes, the Brakspruit and Townlands pipes.

The main PGE bearing reefs form an open arc from east to west, with the strike varying from 90º in the east to 145º in the west. The dip of the reef is generally constant, at between 9º and 10º. On the farm Paardekraal, the dip decreases locally to between 1º and 5º (in a feature called the Regional Depression) and increases to between 15º and 30º along a monocline trending roughly east to west at depth. The dip decreases to between 3º and 7º across the farms Klipgat and to a lesser extent Turffontein, in a graben area, roughly trending east to west.

The Merensky Reef and UG2 Reef layers occur in the Upper Critical Zone stratigraphy of the RLS, which comprises well-developed cyclic units divided into various well defined sub-units as follows:

- Bastard Pyroxenite;
- Merensky Reef;
- Merensky Footwall;
- UG2 Hangingwall;
- UG2 Chromitite Layer/Reef; and,
- UG1 Chromitite Layer.

The Merensky Reef is, in most instances, well defined and typically consists of a pegmatoidal feldspathic pyroxenite layer, bounded on the top and bottom by thin chromitite layers. A notable feature of the Merensky Reef is the regularity of thickness, within limits of 5 cm to 60 cm, over large areas. However, variation does occur and the pegmatoidal feldspathic reef can vary locally in thickness, from a few centimetres up to approximately 1.5 m. The Merensky Reef contains economically important base metal sulphide ("BMS") and PGE mineralisation. Mineralisation of the Merensky Reef generally occurs in the pegmatoidal feldspathic pyroxenite and to a limited extent in the hangingwall and footwall, with highest PGE concentration peaking at the chromitite stringers.

The UG2 Reef, which is consistently developed throughout the RLS, is rich in chromitite but with lower gold, copper and nickel values as compared to that of the Merensky Reef. The UG2 Reef average thickness varies between 55 cm and 75 cm, and comprises a single, well developed chromitite layer. Within the Rustenburg Operations Lease Area, the UG2 Reef occurs vertically between 90 m and 150 m below the Merensky Reef and dips in a northerly direction. The UG2 Reef is more prone to undulations than the Merensky Reef resulting in rolling reef.

As at all other platinum mines, the Merensky Reef and the UG2 Reef are affected by structural and other geological features, including potholes and Iron Rich Ultramafic Pegmatoids ("IRUPs"), which result in geological losses and impact on mining.

1.4 Data verification

Data validation is undertaken according to RPM standards and protocols; and includes drilling, logging, sampling, assaying, quality assurance/quality control ("QA/QC"), database management data components.

RPM manages the drillhole data in the SABLE Data Warehouse ("SABLE") database, and use its in-built validations to check for logging continuity within individual drillholes/deflections, missing information and other basic checks. Underground grade control sample section data is stored in a separate database. Outside of the databases, an iterative validation-editing cycle was followed. Prior to any Resource modelling exercise, extensive validation procedures were used to check the drillhole and underground sample section information, which includes the information available from other sources (such as from surrounding mining operations if available).

The validation procedures enable the more fundamental validations to be automated with errors and inconsistencies being flagged, reported and followed-up/verified prior to being accepted for resource modelling consideration.

1.5 Mineral Resource and Mineral Reserve

SV 2.6

The Merensky and UG2 Resource models are updated by a dedicated Resource Modeller at the Rustenburg Operations. This is completed annually after the drillhole and underground Mineral Resource Management ("MRM") database sign-offs and subsequent structural and geological loss sign-offs. The Merensky and UG2 resource models are reviewed and compared to the previous year's resource model and signed off by a competent person's team prior to being handed over to the mine planning department.

Snowden has undertaken various audits on behalf of RPM and considers that changes in the geological loss, domain and mining width/cut definitions and structural interpretation will not materially affect the overall resource number estimates or confidence and therefore assigns a low to medium risk to these (Snowden, 2015c).

In January 2015, Snowden completed a detailed Mineral Resource and Mineral Reserve estimate audit of Rustenburg Operations (Snowden, 2015c). It was Snowden's opinion that the evaluation and reporting of the Resource and Reserves was completed to appropriate standards (Snowden, 2015c). No material errors were identified with the Resource and Reserve estimate and recommended that Anglo American Platinum Limited ("AAPL") can confidently rely on the Resource and Reserve estimates for Rustenburg Operations Life of Mine ("LoM") scheduled and public reporting.

The data collection processes, data validation and QA/QC as well as interpretation and estimation methods used to arrive at the Mineral Resource statements for Rustenburg Operations Lease Area have been reviewed by Snowden (Snowden, 2015c).

1.5.1 Geological modelling

A standardised AAPL Group approach is used to estimate the geological losses for Resources at the Rustenburg Operations. This involves identification and quantification of the geological losses from all possible sources, historic mining, surface exposure and any geophysical and geological exploration data. This ensures that geological losses are determined in a standardised manner once a year. The final geological loss estimates are signed off annually together with the completion of the Geological Structural Model, to ensure the best possible input into the Company's Business and Mine Planning processes. The total geological losses, determined by structural domain, are divided into known and unknown geological losses for appropriate use in mine planning and scheduling. This is defined by similar geological attributes regarding structural characteristics and complexity and/or geological loss feature frequency, size or distribution.

Consideration is given to regional aspects such as facies like pothole reef vs. normal reef, aspects of dip, strike and undulation characteristics. Pothole size, frequency and distribution as well as dyke and or fault characteristics and frequency play a major role when defining areas of similarity. Ground conditions, such as jointing in the hangingwall and/or footwall are also considered. The correct zoning of structural domains and the annual review and revision, if needed, represents an essential step prior to the actual measurements and estimation process. In most instances there is a structural domain defined from historic mining which corresponds to an area to be estimated ahead of mining, but deemed to have similar structural geological characteristics.

1.5.2 Grade estimation

The estimation parameters were defined using a kriging neighbourhood analysis ("KNA") and the variogram models defined by the Merensky and UG2 Geozones respectively. The KNA tested the impact of different estimation parameters on the estimate by interpreting changes in the kriging efficiency and kriging variance.

The Merensky Reef in the poorly (sparsely) and moderately informed area the kriging efficiency and kriging variance reaches stability at a block size of approximately 300 m. Within the Merensky Reef well-informed areas (underground sample sections and drillholes) the kriging efficiency and kriging variance reaches stability at a block size of approximately 100 m.

The UG2 Reef in the poorly (sparsely) and moderately informed area the kriging efficiency and kriging variance reaches stability at a block size of approximately 500 m. Within the UG2 Reef well-informed areas (underground sample sections and drillholes) the kriging efficiency and kriging variance reaches stability at a block size of approximately 125 m.

The East and West Waterval tailings dam estimation parameters were defined using KNA. The KNA tested the impact of different estimation parameters on the estimate by interpreting changes in the kriging efficiency and kriging variance ordinary kriging in three dimensions was used, utilising the Datamine software package. The Waterval tailings dam modelling procedure follows the standardised AAPL Group approach three dimensional ("3D") modelling techniques as applied to the tailings dams. The top of dam is defined from the topographic survey while the base of the dam is defined by the lowermost contact as intersected by the drillholes. The 3D tailings dam model validation includes a comparison of PGE grade plots of the model and drillhole data, utilising identical colour legend intervals. The model validation has shown very good correlation between the model and drillhole intersections.

Search distances for grade and width estimation were based on variogram ranges for each element. A minimum of seven and a maximum of 20 samples were used for estimation as determined from the KNA. Multiple search passes were used to estimate blocks not populated by the first search pass. The minimum and maximum number of samples used remained constant, except in the third pass where they increased to 20 and 40 respectively.

1.5.3 Mineral Resource statement

SV 2.6

The Mineral Resources of the Rustenburg Operations are classified, verified, and reported in accordance with JSE Listings Requirements, industry and professional guidelines. The classifications are based on the SAMREC Code.

Reporting is undertaken by professionals with appropriate experience in the estimation, economic evaluation, exploitation, and reporting of mineral resources relevant to the various styles of mineralisation under consideration. RPM's experience with the various orebodies that it is evaluating and mining spans decades, with the result that RPM personnel have a thorough understanding of the factors important to the assessment of their economic potential.

Mineral Resources are, by definition, exclusive of any diluting materials that might arise as a consequence of the mining method and specific geological circumstances applicable to the mining of that Mineral Resource. Table 1.1 below shows the total Mineral Resources for the entire mine property as at 1 October 2015.

Table 1.1 Total Mineral Resources inclusive of Mineral Reserves as at 1 October 2015

Orebody	Category	Tonnes (Mt)	4E grade (g/t)	4E (Moz)	Pt grade (g/t)	Pd grade (g/t)	Rh grade (g/t)	Au grade (g/t)	Base metals	
									Cu (%)	Ni (%)
Merensky Reef	Measured	66.5	6.18	13.2	3.96	1.67	0.24	0.30	0.101	0.226
	Indicated	43.0	5.95	8.2	3.77	1.64	0.23	0.30	0.107	0.224
	Inferred	11.0	5.75	2.0	3.61	1.61	0.24	0.28	0.097	0.203
	Total resource	**120.5**	**6.06**	**23.5**	**3.86**	**1.66**	**0.24**	**0.30**	**0.103**	**0.225**
UG2 Reef	Measured	331.9	4.69	50.0	2.57	1.61	0.48	0.04	0.009	0.096
	Indicated	87.1	5.01	14.0	2.71	1.76	0.49	0.05	0.009	0.096
	Inferred	4.3	5.22	0.7	2.80	1.86	0.52	0.04	0.009	0.096
	Total resource	**423.3**	**4.76**	**64.8**	**2.60**	**1.64**	**0.48**	**0.04**	**0.009**	**0.096**
Tailings	Measured	87.6	1.07	3.0	0.64	0.30	0.05	0.09	0.019	0.078
	Indicated	6.6	1.20	0.3	0.70	0.34	0.04	0.11	0.019	0.078
	Inferred	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
	Total resource	**94.2**	**1.08**	**3.3**	**0.64**	**0.30**	**0.05**	**0.09**	**0.019**	**0.078**
4E prill split (as %)										
Merensky Reef					63.8	27.3	4.0	4.9		
UG2					54.6	34.5	10.1	0.8		
Tailings					59.4	27.6	4.4	8.7		

Source: RPM, 2015
Note: No Resource cut-off applied. Totals may not add up due to rounding.
Mineral Resource is stated Inclusive of Mineral Reserve.

A portion of the Rustenburg Operations' Mineral Resources, amounting to 20.9 Mt at 4.95 g/t (3.3 Moz 4E) of UG2 has been excluded from the Transaction as it has been historically committed to the Kroondal PSA on a royalty basis. Table 1.2 excludes these Mineral Resources and reflects the Mineral Resource base for the Transaction.

Table 1.2 Total Mineral Resources excluding royalty ground as at 1 October 2015

Orebody	Category	Tonnes (Mt)	4E grade (g/t)	4E (Moz)	Pt grade (g/t)	Pd grade (g/t)	Rh grade (g/t)	Au grade (g/t)	Base metals	
									Cu (%)	Ni (%)
Merensky Reef	Measured	66.5	6.18	13.2	3.96	1.67	0.24	0.30	0.101	0.226
	Indicated	43.0	5.95	8.2	3.77	1.64	0.23	0.30	0.107	0.224
	Inferred	11.0	5.75	2.0	3.61	1.61	0.24	0.28	0.097	0.203
	Total resource	**120.5**	**6.06**	**23.5**	**3.86**	**1.66**	**0.24**	**0.30**	**0.103**	**0.225**
UG2 Reef	Measured	316.4	4.67	47.5	2.56	1.60	0.48	0.04	0.009	0.096
	Indicated	82.2	5.01	13.2	2.71	1.76	0.49	0.05	0.009	0.096
	Inferred	4.3	5.22	0.7	2.80	1.86	0.52	0.04	0.009	0.096
	Total resource	**402.9**	**4.75**	**61.5**	**2.59**	**1.64**	**0.48**	**0.04**	**0.009**	**0.096**
Tailings	Measured	87.6	1.07	3.0	0.64	0.30	0.05	0.09	0.019	0.078
	Indicated	6.6	1.20	0.3	0.70	0.34	0.05	0.11	0.019	0.078
	Inferred	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
	Total resource	**94.2**	**1.08**	**3.3**	**0.64**	**0.30**	**0.05**	**0.09**	**0.019**	**0.078**
4E prill split (as %)										
Merensky Reef					63.8	27.3	4.0	4.9		
UG2					54.5	34.4	10.1	0.8		
Tailings					59.4	27.6	4.4	8.7		

Source: RPM, 2015
Note: No Resource cut-off applied. Totals may not add up due to rounding.
Mineral Resource is stated Inclusive of Mineral Reserve.

The Hoedspruit Mineral Resource is discussed in Section 7.2.10 and comprises Merensky Reef and UG2 Reef mineralisation. This area does not form part of the Mineral Resources presented in Table 1.1 and Table 1.2. The Hoedspruit Mineral Resource comprises 8.8 Mt at 5.35 g/t (1.6 Moz), equivalent to less than 2% of the overall Mineral Resource.

1.5.4 Mineral Reserve Statement

SV 2.6

In terms of clause 32 of the SAMREC Code, mining and non-mining related modifying factors have been verified as realistic and have resulted in an economically viable Proved and Probable Mineral Reserve, as shown in Table 1.3.

In Table 1.3, Level 1 ("L1") represents production that is available from the current infrastructure developed using approved project capital expenditure and derived from Measured and Indicated Mineral Resources. Planning Level 2 ("L2") represents production requiring new project capital expenditure but is also derived from Measured and Indicated Mineral Resources.

Table 1.3 Total Mineral Reserve estimate as at 1 October 2015, for underground and surface ore sources

Reserve classification	Tonnes (Mt)	4E grade (g/t 4E)	Ni grade (%)	Cu grade (%)	4E content (Moz)	Prill splits			
						Pt (%)	Pd (%)	Rh (%)	Au (%)
Merensky L1 + L2									
Proved	14.04	5.46	0.11	0.01	2.47	64.1	27.3	4.0	4.6
Probable	0.66	5.26	0.12	0.01	0.11	64.5	27.0	4.0	4.5
Mineral Reserve	**14.70**	**5.45**	**0.11**	**0.01**	**2.58**	**64.1**	**27.3**	**4.0**	**4.6**
UG2 L1 + L2									
Proved	132.72	3.67	0.11	0.01	15.67	54.3	34.7	10.3	0.8
Probable	21.13	4.20	0.11	0.01	2.85	53.8	35.7	9.7	0.8
Mineral Reserve	**153.85**	**3.74**	**0.11**	**0.01**	**18.52**	**54.3**	**34.8**	**10.2**	**0.8**
Tailings storage facility(ies)									
Proved	77.56	1.00	0.07	0.02	2.49	62.9	28.3	5.2	3.8
Probable	15.56	1.06	0.07	0.02	0.53	61.3	28.6	6.1	4.0
Mineral Reserve	**93.12**	**1.01**	**0.07**	**0.02**	**3.02**	**62.6**	**28.3**	**5.3**	**3.8**
Total Reserve summary									
Proved	224.32	2.86	0.10	0.02	20.63	56.5	33.0	8.9	1.6
Probable	37.35	2.91	0.09	0.02	3.49	55.3	34.4	9.0	1.4
Mineral Reserve	**261.67**	**2.87**	**0.10**	**0.02**	**24.12**	**56.4**	**33.2**	**8.9**	**1.5**

Source: DRA, 2015

Notes:

1. *L1 Reserve as at 1 October 2015 based on nine month forecasted and scheduled depletion from MRE as declared on 31 December 2014.*
2. *Economic tail cut applied to the Mineral Reserve Estimate.*
3. *Tailings Surface ore sources Reserve as at 1 October 2015 based on nine month actual survey measured depletion of surface TSF ore sources from remaining surface ore sources as declared on 31 December 2014.*

1.6 Development and operations

SV 2.2, SV 2.3

Salient features of the Rustenburg Operations include a planned average annual 4E production of 861 koz (including 504 koz platinum) over the period 2016 to 2020; a 4E inclusive Resource of 88.3 Moz as at 1 October 2015; and 4E Mineral Reserves of 24.1 Moz as at 1 October 2015.

1.6.1 Mining

Ore is mined using underground mining methods from two orebodies, the Merensky and UG2 Reefs at various shafts located on the Rustenburg Operations Lease Area. Waste rock generated from the mining activities is placed on individual waste rock dumps at the shafts.

The mining assets formerly comprised of five underground mines including Khuseleka, Thembelani, Khomanani, Siphumelele, and Bathopele. These were consolidated in 2013 to form the three mines of Thembelani (includes Khuseleka), Siphumelele and Bathopele , while Khomanani 1, Khomanani 2 and Khuseleka 2 shafts were placed on care and maintenance (“C&M”).

The planned LoM for Rustenburg Operations extends to 2041; but there are plans to close some of the individual shafts before then.

1.6.2 Processing

Ore is transported from the shaft areas via rail and conveyor to the Waterval concentrators (comprising the Waterval UG2 concentrator and the Waterval Retrofit concentrator). The ore is then crushed, followed by two-stage milling and flotation where reagents are added to produce a slurry concentrate. The slurry concentrate is delivered to the Waterval Smelter where it is weighed and sampled, dried, melted and undergoes a converting process – the Anglo Platinum Converting Process ("ACP"), to generate matte. The crushed matte is sent to RBMR to produce base metals (copper, nickel, cobalt and sodium sulphate). Resulting matte and concentrate is received by the PMR where the concentrate is refined into the respective PGEs (platinum, palladium, rhodium, iridium, ruthenium, osmium and gold), to a high degree of purity. The Chrome Retreatment Plant ("CRP") treats Waterval UG2 concentrator tailings to recover a saleable chromite concentrate. Tailings generated from the Waterval concentrators is transferred and deposited on the Paardekraal tailings storage facility ("TSF").

The WLTR plant was constructed in order to reprocess tailings residue from the Klipfontein TSF. The process involves the re-mining of the existing TSFs and the processing of slurry at the WLTR plant. Tailings generated from the WLTR plant process is transferred and deposited on the Hoedspruit TSF.

1.6.3 Sub-let areas and Other Assets

Rustenburg Operations has leased an old disused pit to the Rustenburg Municipality for proposed use as a waste disposal site. An Environmental Impact Assessment ("EIA") has been approved by the department of Environmental Affairs ("DEA") to establish and develop a general landfill site within the open pit area. Contractual arrangements have been put in place to ensure that the Municipality, as a third party, operates the landfill in accordance with expected technical best practice and good governance. In terms of the Environmental Management Plan ("EMP") which is based on the EIA, the Municipality will implement closure requirements at the end of life, at its cost.

In addition, third party contractors crush rock at some of the waste rock dumps for off-site usage, converting mining waste to crushed product.

1.6.4 Care and maintenance

A combination of factors necessitated a major portfolio review by RPM, which commenced in 2012. The key recommendation of the portfolio review was the plan to reduce production targets to more closely align output with expected future demand and stop the production of loss-making ounces. Important outcomes of the review included placement of three shafts, Khuseleka 2, Khomanani 1 and Khomanani 2 on long-term C&M (in addition to Siphumelele 3 and Thembelani 2, which were previously placed on C&M).

1.7 Mineral Asset Valuation

An independent Valuation of the Mineral Reserves, Mineral Resources and exploration results of the Mineral Asset was undertaken. Unless explicitly stated, the valuation and associated information is provided on the basis of 100% of the mineral rights contained in the Mineral Asset, excluding the Kroondal PSA. The value attributable to Rustenburg Operations is based on the corporate structure outlined in Figure 3.2, whereby 100% of the Mineral Asset value is attributable to Sibanye.

The compilation of this CPR is based on technical and financial data gathering undertaken between 1 October 2014 and 9 December 2015. The Report Date is 9 December 2015; and the Valuation Date is 1 October 2015.

1.7.1 Valuation approaches and methods

SV 2.8

The SAMVAL Code requires that a Competent Valuator must apply at least two valuation approaches in determining a mineral asset valuation. The three generally accepted mineral asset valuation approaches are:

- Cash Flow or DCF Approach:
  - The Cash Flow Approach relies on the "value-in-use" principle and requires determination of the net present value ("NPV") of future cash flows over the useful life of a mineral asset. This approach is used in the valuation of the Mineral Asset.
- Market Approach:
  - The Market Approach relies on the principle of "willing buyer, willing seller" and requires that the amount obtainable from the sale of the mineral asset is determined as if in an arm's-length transaction. The Market Approach followed applies a rand value per in-situ resource tonne determined by analysis of the transactional value of recently traded similar mineral assets. This approach is used in the valuation of the Mineral Asset.
- Cost Approach:
  - The Cost Approach relies on historical and/or future amounts spent on the mineral asset. This approach is usually applied to early exploration assets and has not been used in the valuation of the Mineral Asset considered in this report.

1.7.2 Cash flow approach valuation

T5.7C(ii)-(v), SV 2.8

The cash flow valuation model is referred to as the Cash Flow Model in this report. All cost information has been provided in mid-2015 money terms and the original production and cost schedule commenced on 1 January 2015. The Cash Flow Model has been modified to a new start date of 1 October 2015, with discounting from the same date.

The Cash Flow Model runs from Q4 2015 to FY2041, with financial years ending 31 December, and is undertaken in Nominal terms. The results of the Cash Flow Model are presented in both Nominal and Real terms. The NPV is determined from the post-tax, pre-dividend and pre-finance cash flow projections from the operation.

Only Mineral Reserves are considered in the Cash Flow Model; no Inferred Mineral Resources have been included.

LoM production projections

The Cash Flow Model is based on physical projections for mining and processing production provided by DRA for the Bathopele, Siphumelele, Thembelani and Khuseleka production centres and separated by reef type (Merensky or UG2) as well as the planning level. The production and necessary development has been scheduled using appropriate software and the format of the underlying data is given in months for the first three years (2015 to 2017) and thereafter annually. The mining production schedule has been developed from first principles.

The processing schedule reflects Run of Mine ("RoM") ore production from the Investment Centres outlined in Section 8.1, with ore processed at the Waterval Retrofit concentrator and the Waterval UG2 concentrator as well as tailing dump re-treatment. Tailings re-treatment currently comprises the separate WLTR plant that has limited remaining life, while the Waterval historical tailings are extensive and will be processed through the Waterval Retrofit concentrator.

All recovered content is assumed equivalent to metal produced for revenue purposes. The metals are contained in a concentrate that is being delivered to RPM's refining and smelting facilities.

In addition to the RoM and tailings re-treatment facilities, a CRP is operated by a third party to recover a chromite concentrate from the UG2 concentrator tailings. The production of the CRP has been modelled to include this as a contribution to net revenue for the Rustenburg Operations.

The DRA production projections commence 1 January 2015 but only the projections commencing 1 October 2015 have been used as part of the Cash Flow Model to respect the model start date of 1 October 2015. The modified schedule does not account for any differences between forecast and actual production for the period January 2015 to September 2015.

Actual RoM production for the period January 2015 to September 2015 is 4% higher in terms of tonnes processed and 3% lower in terms of recovered 4E metal than reflected by the original schedule. Production at Thembelani has been lower than planned but the overall shortfall has been reduced by positive variances at other shafts. The overall shortfall in tonnes and recovered ounces compared to the LoM RoM tonnage and recovered ounces of 168.6 Mt and 18.0 Moz is not material; and the use of the original projections from 1 October 2015 are considered to be still appropriate.

Metal prices and fiscal assumptions

Commodity price forecasts for platinum, palladium, rhodium, gold, nickel, copper and cobalt as well as for the ZAR/US$ exchange rate have been taken from an institutional consensus forecast as at August 2015. The consensus forecast comprises 17 institutions that have provided price forecasts between July 2015 and August 2015 and provides nominal metal prices for the next five years (2015 to 2019) and a long term real price in mid-2015 money terms. The median consensus price forecast has been used as an input to the Cash Flow Model. The prices for ruthenium and iridium have been provided by SFA (Oxford). The metal price and exchange rate assumptions from the consensus forecast are shown in Table 1.4.

Table 1.4 Price and exchange rate assumptions (Real)

Metal	Unit	2015	2016	2017	2018	2019	LT
Platinum	US$/oz	1,173	1,224	1,317	1,407	1,389	1,500
Palladium	US$/oz	778	813	862	875	827	850
Rhodium	US$/oz	1,118	1,371	1,772	1,822	2,296	1,750
Gold	US$/oz	1,194	1,170	1,197	1,173	1,183	1,200
Ruthenium*	US$/oz	58	58	58	58	58	58
Iridium*	US$/oz	500	500	500	500	500	500
Nickel	US$/lb	6.23	7.11	7.39	7.70	7.81	8.16
Copper	US$/lb	2.69	2.69	2.87	3.05	2.87	2.95
Cobalt	US$/lb	13.6	13.2	12.9	12.7	12.3	11.9
Exchange rate	US$1:ZAR	11.98	11.92	11.83	11.44	11.51	11.93

Source: ICF, 2015
*Note: * Price forecast from SFA (Oxford), 2015*

The exchange rate and US denomintated metal prices for 2015 are recognised as different to the current exchange rate and spot prices. However in ZAR terms the metal prices are more comparable with the consensus 2015 price for platinum and palladium some +3% and -2% to current prices respectively. The current rhodium price in ZAR terms is significantly lower than the 2015 consensus price, but this is compensated for by a stronger ZAR gold price. Overall the weighted 4E consensus basket price is some 5% higher than current prices. The consensus price forecast projects a long term 4E basket price that is some 20% higher, in ZAR terms, than that forecast for 2015. The long term 4E basket price has been applied in the Cash Flow Model from 2020 onwards.

Purchase and toll treatment of concentrate

The net revenue in the Cash Flow Model is based on the terms and conditions of the sale and toll treatment of concentrate agreement entered into between Sibanye and RPM for the concentrate generated by the Rustenburg Operations. The agreement principally comprises purchase of concentrate (“PoC”) terms and conditions for all metals modelled in the Cash Flow Model to end December 2018 followed by toll treatment terms and conditions for the 4E metals (platinum, palladium, rhodium and gold) for a further eight years to end December 2026. During the toll treatment period the remaining metals (nickel, copper, ruthenium, iridium and cobalt) will continue to be subject to PoC terms and conditions. For the purposes of the Cash Flow Model, the toll treatment period terms and conditions have been assumed to continue for the LoM.

1.7.3 Operating expenditure (“opex”)

Estimates of operating costs have been developed and provided by Cyest, according to the LoM schedule commencing 1 January 2015. The operating costs estimates have been developed in mid-2015 money terms.

The operating costs used in the Cash Flow Model have had real escalation applied to the categories of labour and utilities to account for anticipated above SA CPI inflation increases to wages and utilities respectively. For labour and utilities real inflation of 2.5% and 7% respectively has been assumed for three years from 2016 to 2018. This results in a long term escalation factor applied to the source costs for labour and utilities of 1.08 and 1.23 respectively. A summary of the Cash Flow Model operating costs for 2016 (first full production year), 2017 and 2018 is given in terms of cost category (Table 1.5), excluding and including real terms inflation.

The principal cost is labour which represents 61% of Shaft head costs and 48% of total costs. Power represents 7% of total costs and is the principal element of the utility cost category. Explosives and concentrator reagents are the main consumables of the stores cost.

Overhead costs include Central Services, management, group centralised costs (“GCC”) and other indirect costs (“OIC”). Central services costs include production services such as centralised railways and engineering workshops, and non-production services such as accommodation and protection services. GCC includes shared services such as IT, accounting and employee services. OIC includes costs such as share based payments, audit fees, and guarantee charges.

Table 1.5 Operating expenditure by cost category (ZAR M)

Cost category	Value in ZAR M					
	Mid-2015 money terms			Real		
	2016	2017	2018	2016	2017	2018
Labour	3,267	3,301	3,445	3,348	3,468	3,710
Stores	1,152	1,198	1,225	1,152	1,198	1,225
Sundry expenses	203	203	214	203	203	214
Contractors	418	440	439	418	440	439
Utilities	392	394	407	420	451	499
Shaft head cost	**5,433**	**5,536**	**5,731**	**5,542**	**5,760**	**6,087**
Labour	175	139	139	180	146	150
Stores	400	407	411	400	407	411
Sundry expenses	130	130	130	130	130	130
Contractors	0	0	0	0	0	0
Utilities	344	345	346	368	395	424
RoM processing	**1,049**	**1,021**	**1,026**	**1,078**	**1,078**	**1,114**
Tailings processing	468	216	216	480	230	238
Processing	**1,517**	**1,237**	**1,242**	**1,557**	**1,308**	**1,352**
Overhead	1,377	1,387	1,393	1,395	1,424	1,451
Total operating costs	**8,327**	**8,161**	**8,366**	**8,494**	**8,493**	**8,890**
Unit opex	**Unit costs in ZAR/t**					
Mining	740	720	730	760	750	780
Processing (excl. tailings)	140	130	130	150	140	140
Overhead	190	180	180	190	190	190
RoM operating costs	**1,070**	**1,030**	**1,040**	**1,100**	**1,080**	**1,110**
Total operating costs*	**610**	**740**	**740**	**620**	**770**	**790**

Source: Cash Flow Model, 2015
*Note: * Total operating costs includes tailings and processing costs and additional tailings tonnages*

The overall impact of the real escalation applied in the Cash Flow Model is to increase costs by 6% above the base costs of which mining is increased by 7% and processing by 6%. The LoM average unit cost is ZAR1,170/t RoM of which mining, processing and overhead comprise ZAR810/t RoM, ZAR150/t RoM and ZAR210/t RoM respectively. Total LoM unit operating cost including the processing of tailings is ZAR780/t (RoM plus tailings).

Mining, processing and overhead operating costs are discussed in detail in Section 8.7 and Section 9.6 and the section above respectively.

1.7.4 Capital expenditure ("capex")

Capex estimates have been provided by DRA and Cyest and reported in the Cash Flow Model according to the principal categories of Project capital and Stay in business ("SIB") capital. For mining, Project capital comprises infrastructure capital provided by DRA and capital development provided by Cyest. Capital development is for waste development necessary to replace productive capacity up to the first three crosscuts on each new half level. SIB capital includes capital required for business continuity and not included in the above classification. All processing, TSF and overhead capital estimates have been provided by DRA. A summary of the capital costs included in the Cash Flow Model including contingencies is shown in Table 1.6.

Table 1.6 Capital expenditure by cost category (ZAR M)

Cost category	Value in ZAR M				
	LoM	2015	2016	2017	2018
Mining capex					
SIB capex	10,823	129	542	553	566
Project capex	4,367	41	503	589	754
Mining total capex	**15,190**	**170**	**1,045**	**1,142**	**1,320**
Processing capex					
SIB capex	124	17	47	32	28
Project capex	22	-	22	-	-
Processing total capex	**147**	**17**	**69**	**32**	**28**
Overhead SIB capex					
SIB capex	1,227	16	80	54	47
Project capex	-	-	-	-	-
Overhead SIB capex	**1,227**	**16**	**80**	**54**	**47**
Total SIB capex	12,174	161	669	639	641
Total Project capex	4,389	41	525	589	754
Grand total capex	**16,564**	**203**	**1,194**	**1,228**	**1,396**

Source: Cash Flow Model, 2015

Mining SIB capital represents 7.8% of shaft head cost. Mining project capital is scheduled each year until 2028 with over 55% expended in the first five years. The level of contingency contained in the Project capex is 15%. Mining SIB capital is scheduled evenly during production with a maximum not exceeding 10% of working costs in any one year. SIB capital is not planned for the two years prior to the end of mine life. Processing capital costs, Project capital and SIB, are only planned to end 2018 and according to the schedule above, and subsequently provided for as part of operating costs.

Overhead SIB capex provides for ongoing costs associated with maintenance of the centralised facilities such as potable water supply, railways and railway control systems, security and security systems, road repairs, and the supply of water and compressed air. Overhead SIB capital costs have been planned, similarly to mining SIB, until the last two years of production and represent 3.5% of overhead operating cost overall, and not exceeding 6% in any one year.

Mining, processing and overhead capital costs are discussed in detail in Section 8.7, Section 9.8 and the section above respectively.

Mineral royalties and taxes

State royalties have been determined according to the requirements of the Mineral and Petroleum Resources Royalty Act, 2010 (the “Royalty Act”). The Royalty Act includes different rates for unrefined and refined metals according to the following formula:

- Royalty rate (Unrefined) = 0.5 + [EBIT/(Gross sales x 9)] x 100 with a maximum of 7%; and,
- Royalty rate (Refined) = 0.5 + [EBIT/(Gross sales x 12.5)] x 100 with a maximum of 5%.

The agreement between Sibanye and RPM includes a PoC treatment period whereby concentrate is sold to RPM followed by toll treatment of the 4E metals such that the refined 4E metals are available for sale by Sibanye. The mineral royalty payment has been modelled in the Cash Flow Model by using the unrefined royalty rate calculation during the PoC treatment period (to end-2018) and the refined royalty rate calculation for the toll treatment period (the remainder of the LoM). The toll treatment of concentrate is limited to the 4E metals, but as these comprise over 95% of the payable revenue the refined royalty rate calculation has been applied to all metals for simplicity.

The average mineral royalty percentage reflected in the Cash Flow Model is 2.1% of revenue.

In addition to the State mineral royalty, a royalty is payable to the Royal Bafokeng Nation (“RBN”) for the rights to mine and recovery of minerals from certain mining areas.

The corporate tax rate in South Africa is 28% and all capital expenditure is deducted for tax purposes in the year that it is incurred. Unredeemed capital balances are allowed to be carried forward. There is zero starting unredeemed capital balance in the Cash Flow Model.

The revenues and all costs reflected in the Cash Flow Model are stated to be excluding value added tax (“VAT”).

Working capital

Debtors’ for the various commodities were determined using the payable days discussed in Section 18.9.1 (Sub-section: Purchase and toll treatment of concentrate) and principally comprise 105 days for PoC treatment and 110 days for toll treatment of concentrate. Payment terms for all creditors’ are assumed as 30 days. A working capital starting balance of ZAR2,223 M was provided by Rustenburg Operations. Changes in the projected working capital requirements per period have been modelled using the Nominal Cash Flow Model. The results reported for the Real Cash Flow Model reflect the de-escalated changes in working capital derived from the Nominal Cash Flow Model.

Discount rate

The valuation of the entity was undertaken on a 100% stand-alone basis using a real terms discount rate of 8.0%. The discount rate has been determined using a WACC and CAPM approach from data for South African platinum producers over a seven year period. The free cash flow, post of tax and mineral royalties, but before any interest and financing costs, was discounted to determine a NPV for the entity.

Other considerations

Mining companies are required to make a financial provision for environmental closure and rehabilitation. A closure cost of ZAR801 M (mid-2015 money terms) from the updated closure liability assessment prepared by SRK Consulting (South Africa) (Pty) Limited (“SRK”) in 2015 has been used in the Cash Flow Model. The outstanding balance is funded from the forecast cash flow, assuming a starting trust fund balance of ZAR284 M provided by RPM. More details on environmental closure and rehabilitation are provided in Section 13.5.

A corporate social responsibility charge equivalent to 1% of the after tax operating cash flow has been included as an additional cost in the Cash Flow Model.

Net present value (“NPV”) and sensitivity analysis

NPV, internal rate of return (“IRR”) and payback time are typically used as indicators of project performance and for valuation using the Cash Flow Approach. As the Rustenburg Operations form an operating mine and there is no initial capital investment required, NPV is considered the most appropriate indicator of economic performance for this Mineral Asset. The discounted free cash flow in the Cash Flow Model, and as summarised, reflects a NPV of ZAR13,310 M for 100% of the Mineral Asset, using a discount rate of 8.0% (Real) for the production of some 168.6 Mt at a grade of 3.9 g/t 4E for some 21.1 Moz of 4E metals over a LoM period of 26 years.

The Cash Flow Model is most sensitive to metal prices including the US$:ZAR exchange rate and secondly to operating costs. The Cash Flow Model is least sensitive to capital cost changes, as capital costs are less than 10% of total costs and the Mineral asset is an ongoing operation. The results of the sensitivity analysis at the base discount rate of 8.0% (real) are shown in Table 1.7 below.

Table 1.7 High level sensitivity analysis

Sensitivity range	Value in ZAR (M)		
	Metal prices	Operating expenditure	Capital expenditure
-20%	-2,780	25,110	14,470
-15%	1,220	22,150	14,170
-10%	4,680	19,190	13,900
-5%	8,980	16,220	13,600
Base case	**13,310**	**13,310**	**13,310**
5%	17,590	10,350	13,010
10%	21,910	7,380	12,710
15%	26,230	4,400	12,410
20%	30,550	1,270	12,100

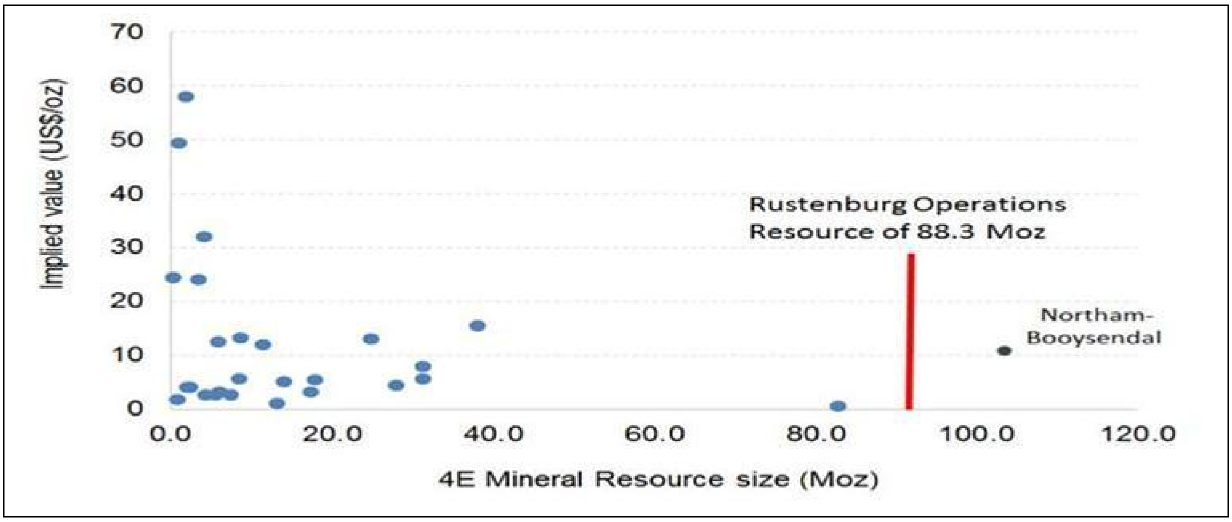
Source: Cash Flow Model, 2015

1.7.5 Market Approach Valuation

The second valuation method for Rustenburg Operations production and development properties is based on the Market Approach using comparable transactions. The Market Approach relies on the principle of “willing buyer, willing seller” and assumes that the amount received from the sale of the asset is determined on an arm’s length basis. The methodology follows comparison of the asset under consideration to relatively recent asset transactions with similar characteristics. This approach is generally based upon a monetary value per unit of Mineral Resource, or where available, Mineral Reserve.

The relative infrequency of recent platinum transactions, particularly of operating assets, necessitates the use of data extending back to August 2007. Snowden has reviewed several historical transactions which can broadly be divided into two groups, namely transactions relating to pre-production assets (27 transactions were considered) that primarily comprise Mineral Resources only, and operational transactions that include both Mineral Resources and Mineral Reserves (eight transactions were considered). The implied value per Mineral Resource unit for the pre-production transactions is illustrated in Figure 1.1. The average implied value for Mineral Resources associated with pre-production assets is US$12.03/oz.

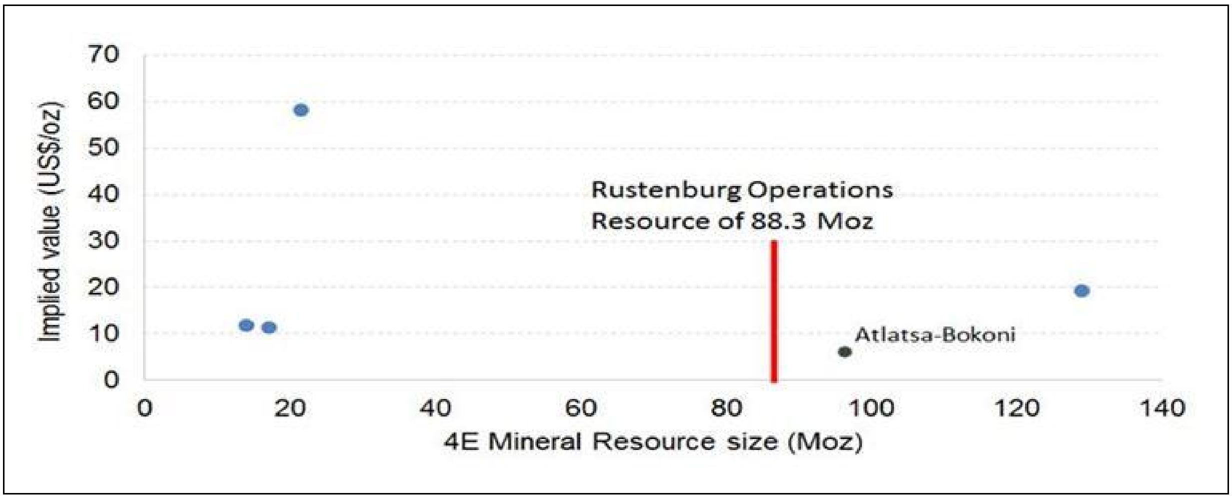
Figure 1.1 Implied unit values for pre-production PGE mineral assets/ transactions



Source: Snowden, 2015d

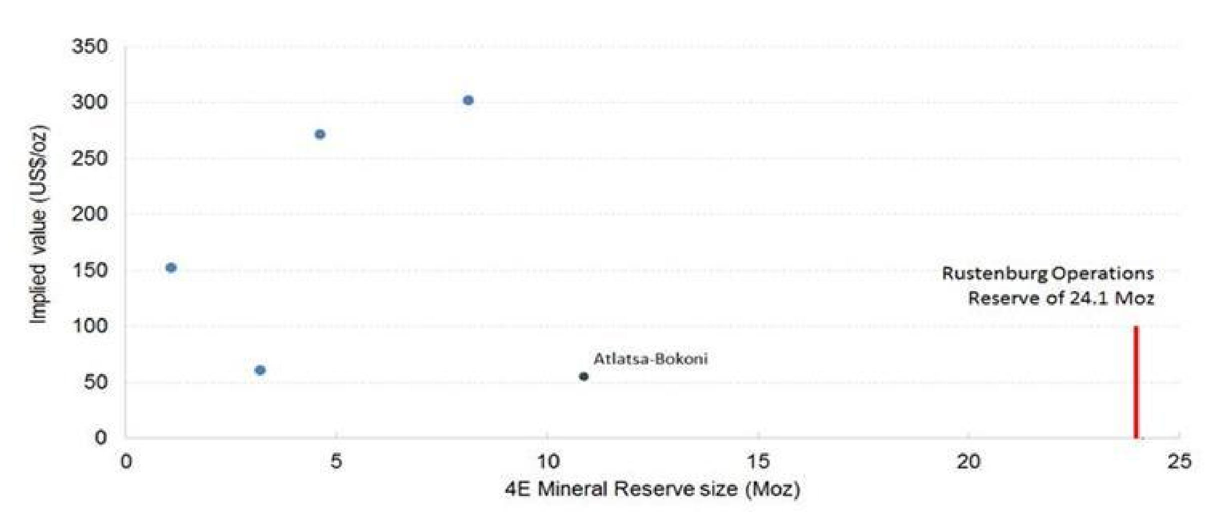
In total, eight historic transactions relating to operating assets were evaluated. However, of these, three were not considered comparable as the transactions included related parties and share "buy backs" and thus are not considered "arm's length" transactions. On the basis of the transaction value for the remaining five transactions, the implied value for the Mineral Resources and Mineral Reserves are illustrated in Figure 1.2 and Figure 1.3 respectively.

Figure 1.2 Implied Mineral Resource unit values for operational PGE mines/ transactions



Source: Snowden, 2015d

Figure 1.3 Implied Mineral Reserve unit values for operational PGE mines/ transactions



Source: Snowden, 2015d

Due to the limited number of comparable operating asset transactions, as well as the fact that most transactions were completed in significantly different PGE market conditions (2007 to 2010) to those experienced today, a further comparison to current market trading multiples has been undertaken. This process has determined the current enterprise value ("EV") for the larger JSE listed PGE companies, defined as a company's market capitalisation and debt, minority interests and preferred shares; less total cash and cash equivalents, as at 1 October 2015. Mineral Resources and Mineral Reserves were used to determine an implied EV US$ per ounce of PGE. The EV determination was based on information obtained from Bloomberg (2015) and confirmed by Snowden; and is shown in Table 1.8 below.

Table 1.8 Listed PGE mining companies' EV and implied Resource/ Reserve values

Listed mining company	Enterprise Value (US$ M)	Attributable 4E Moz		EV per Resource ounce (US$/oz)	EV per Reserve ounce (US$/oz)
		Resources	Reserves		
Northam	1,296.2	194.4	19.2	6.67	67.69
RB Plats	537.2	32.0	7.1	16.76	75.22
Lonmin	537.5	179.1	42.4	3.00	12.68
Implats	2,254.8	368.0	46.2	6.13	48.81
AAPL	5,587.0	919.3	206.0	6.08	27.12

Source: Bloomberg, 2015

Note: EV – Enterprise Value, as at 1 October 2015; Northam – Northam Platinum Limited; RB Plats – Royal Bafokeng Platinum Limited; Implats – Impala Platinum Holdings Limited; AAPL – Anglo American Platinum Limited; RS – Rustenburg Section/ Rustenburg Operations

1.7.6 Implied value for the Rustenburg Operations

In spite of a relatively wide range of unit values presented above, a narrower range has been selected by identifying historical transactions with similar attributes.

Snowden notes that when valuing mineral assets based on implied Mineral Resource values (including both pre-production and operational assets), which contain a large Mineral Resource (Figure 1.1 to Figure 1.2), typically above 25 Moz, the implied US$/oz values range between US$0.60/oz and US$19.10/oz, with an average value of US$9.20/oz. Snowden is of the opinion that the Rustenburg Operations is most comparable to the Atlatsa – Bokoni transaction, with an implied value of US$6.21/oz, due to a comparable resource size and similar PGE prices at the time of the transactions. Furthermore, this value is also aligned to the current EV per mineral resource trading multiples current observed on the JSE listed companies.

The range of implied Mineral Reserve values is between US$55.09/oz and US$302.09/oz with an average value of US$168.13/oz. Importantly, the range of transactions considering Mineral Reserves is limited and Snowden notes that the Rustenburg Operations contain almost double the Mineral Reserves of the next largest historical transaction on a Mineral Reserve basis. Similar to the reason(s) above, Snowden is of the opinion that the Rustenburg Operations is most comparable to the Atlatsa – Bokoni transaction, which contains the largest Mineral Reserve base with an implied value of US$55.09/oz, which is broadly in line with the currently observed EV per Mineral Reserve ounce trading multiples.

Sibanye Gold – RPM transaction

On 9 September 2015, Sibanye reported the intended acquisition of Rustenburg Operations from RPM, through one of its subsidiaries, SRPM, for an upfront consideration of ZAR1.5 B in cash or shares and a deferred consideration equal to 35% of the distributable free cash flows generated by the Rustenburg Operations over a six year period, subject to a minimum nominal payment of ZAR3.0 B (referred to as “the Transaction”). Sibanye has reported that should there still be an outstanding balance at the end of the six year period, Sibanye has the option to elect to extend the period by a further two years. Any remaining balance at the end of this period will be settled by Sibanye either in cash or shares. The Transaction agreements comprise a sale and purchase agreement, sale and toll treatment of concentrate agreement, use and access agreement and parent company guarantee. The implementation of the Transaction is both subject to and conditional on the fulfilment of conditions precedent customary for a transaction of this nature.

The total Mineral Resource for this Transaction is 88.3 Moz 4E, excluding Royalty ground. The total Mineral Reserve (including all surface and underground Mineral Reserves, with tail cut applied as at 1 October 2015) is 24.12 Moz 4E. On the basis of the implied valuation metrics outlined above, Table 1.9 shows the implied and preferred value ranges for the Rustenburg Operations.

Table 1.9 Implied and preferred value ranges for Rustenburg Operations

Component	Unit	Total Resource/ Reserve	Implied value			
			Low	Average	High	Preferred
Mineral Resources						
Mineral Resource estimate	Moz	88.26				
Implied unit value	US$/oz		0.60	9.20	19.20	6.21
Implied value	US$ M		53	812	1,695	548
Implied value*	ZAR M		737	11,295	23,572	7,624
Mineral Reserves						
Mineral Reserve estimate	Moz	24.12				
Implied unit value	US$/oz		55.09	168.13	302.09	55.09
Implied value	US$ M		1,328	4,052	7,280	1,328
Implied value*	ZAR M		18,467	56,362	101,270	18,467

Source: Snowden, 2015d
*Note: * Exchange rate used of US$1:ZAR13.91*

Due to the relatively large Mineral Reserve base associated with the Rustenburg Operations, in comparison to historic transactions, Snowden does not consider the Mineral Reserve implied values to accurately reflect a true value for the Rustenburg Operations. As such Snowden's preferred value range for the Rustenburg Operations is on the basis of an implied Mineral Resource value.

1.7.7 Market Approach Valuation summary

For the reasons contemplated above, comparable PGE properties range between US$6.21/oz Atlatsa – Bokoni transaction (an operating mine) and US$10.95/oz (Northam – Booysendal transaction, pre-production mineral asset), for mineral assets that are comparably similar. An upper and lower in-situ implied value has been calculated using US$10.95/oz and US$6.21/oz respectively, as shown in Table 1.10.

Positive considerations for Rustenburg Operations include the following: it is the world's fifth largest platinum producer; has a long LoM with significant production scalability; developed infrastructure, which supports LoM and stand-alone operations; extension and optionality in the Mineral Asset base; value enhancing chrome recovery and tailings retreatment operations in place; sustainable PoC terms that provide secure off-take for Sibanye; and an experienced management team and labour workforce.

Negative considerations include the following: old shafts and concentrators relative to other platinum operations; it is a mid to high unit cost per ounce platinum producer.

Snowden is of the opinion that Rustenburg Operations is more comparable to the Atlatsa – Bokoni transaction, the Bokoni Mine has a large resource size, a significant Mineral Reserve (although approximately half the size of Rustenburg Operations), developed infrastructure, and similar PGE metal prices at time of transaction.

In real terms, current platinum prices of some US$1,000/oz and exchange rate of approximately US$1:ZAR13.91 are comparable to the prices prevalent at the time of the Atlatsa – Bokoni transaction of July 2009 (US$1,200/oz and exchange rate of approximately US$1 :ZAR8.50) used to support the Market Approach Valuation.

Balancing the positive and negative considerations, whilst comparing to the Northam – Booysendal transaction and Atlatsa – Bokoni transaction, Snowden consider a fair value to be closer to the Atlatsa – Bokoni transaction implied values of US$6.21/oz. A preferred value of US$6.21/oz has been applied to the Mineral Asset value, as shown in Table 18.18.

Table 1.10 Derivation of in-situ Resource unit value in US$/4E oz

Component	Unit	Lower limit	Preferred value	Upper limit
Implied value per ounce	US$/oz	6.21	6.21	10.95
Implied value for Rustenburg Operations	US$ M	548	548	966
Implied value for Rustenburg Operations	ZAR M	7,620	7,620	13,440
Actual Rustenburg Operations transaction, Sept 2015*	US$/oz		3.66	

Source: Snowden, 2015a
*Note: * Transaction added for comparative purposes; rounding applied to ZAR values*
Exchange rate used of US$1:ZAR13.91

A Market Approach value of US$548 M (or ZAR7.6 B) in comparison to the DCF base value of US$957 M (or ZAR13,310 M) is noted, using a 1 October 2015 exchange rate of ZAR13.91:US$1.

1.7.8 Range of values

SV 2.15

The base case discount rate for the Cash Flow Approach has been determined using a WACC and CAPM methodology. As discussed above, the average performance of South African traded platinum producing companies has been used to determine a beta of 1.37 that supports the nominal and real discount rates of 14.1% and 8.0% respectively and the base case NPV. Using the same set of data for these companies, a minimum and maximum beta value of 0.80 and 1.90 has been determined. Application of these upper and lower beta values results in a lower and upper real discount rate of 5.3% and 10.7% respectively. Applying these discounts to the Cash Flow Model results in a lower and upper NPV of ZAR10,650 M and ZAR17,240 M respectively. The Market Approach results in a lower and upper Mineral Asset value of ZAR7,620 M and ZAR13,440 M respectively. The Cash Flow Approach and Market Approach lower and upper values are shown in Table 1.11.

Table 1.11 Range of values and Concluding Opinion of Value

Valuation approach	Value in ZAR M		
	Lower	Preferred value	Upper
Cash Flow Approach	10,650	13,310	17,240
Market Approach	7,620	7,620	13,440
Valuator's Concluding Opinion of Value	**10,650**	**13,310**	**17,240**

Source: Cash Flow Model, 2015; Snowden, 2015a
Note: Rounding applied to ZAR values

1.7.9 Valuation summary and conclusions

SV 2.10

The preferred valuation method is a Cash Flow Approach, considering the detailed planning that has been undertaken to generate projections that reflect the technical and economic parameters and assumptions existing at the date of this report; and is supported by extensive operating experience. The Cash Flow Model is most sensitive to metal prices including the US$:ZAR exchange rate and secondly to operating costs.

The Competent Valuator's Concluding Opinion of Value is the preferred value, according to the Cash Flow Approach, of ZAR13,310 M, using a 8% discount rate (real) for the single, fiscal Project entity. The range of values are shown in the table above (Table 1.11) for the Mineral Asset including a lower and upper value of of ZAR10,650 M and ZAR17,240 M respectively. The preferred value is comparable to the Market Approach upper value of ZAR13,440 M.

Key risks associated with the Mineral Asset are discussed in Section 19.

It must be noted that the forecasts of prices and exchange rates, parameters, plans and assumptions may change significantly over time. Should these change materially, the Valuation determined may be significantly different. The Competent Valuator is under no obligation to advise of any change in circumstances after the effective date of this CPR or to review, revise or update the CPR or opinion.

1.8 Conclusions

1.8.1 Geology and Resources

The data collection processes, data validation and QA/QC as well as interpretation and estimation methods used to arrive at the Mineral Resource statements for Rustenburg Operations Lease Area are undertaken by Rustenburg Operations and select RPM staff.

In January 2015, Snowden completed a detailed Mineral Resource and Mineral Reserve estimate audit of Rustenburg Operations (Snowden, 2015c). It was Snowden's opinion that the evaluation and reporting of the Resources and Reserves was completed to appropriate standards (Snowden, 2015c). No material errors were identified with the Resource and Reserve estimate; and recommended that AAPL can confidently rely on the Resource end Reserve estimates for Rustenburg Operations LoM scheduled and public reporting.

The Mineral Resources of Rustenburg Operations are classified, verified, and reported in accordance with the JSE Listings Requirements, industry and professional guidelines. The classifications are based on the SAMREC Code.

Reporting is undertaken by professionals with appropriate experience in the estimation, economic evaluation, exploitation, and reporting of mineral resources relevant to the various styles of mineralisation under consideration. RPM's experience with the various orebodies that it is evaluating and mining spans decades, with the result that RPM personnel have a thorough understanding of the factors important to the assessment of their economic potential.

1.8.2 Mining

Rustenburg Operations has a long LoM with significant production scalability; well developed infrastructure, which supports integrated and stand-alone operations; extension and optionality in the Mineral Asset base; an experienced management team and labour workforce. A skilled and semi-skilled workforce is readily available in adjacent communities and the greater Rustenburg area.

Infrastructure is considered to be old, but well maintained, with sufficient water and power for planned mining expansions. Current ventilation capacities are considered adequate in the short and medium term. Surface infrastructure from mine to concentrators is in good condition. Current and planned maintenance costs and schedules are considered to be appropriate for the planned LoM.

Modifying factors for the LoM and Resource to Reserve conversion are considered to be reasonable. The current and planned expansions/associated production schedules are considered to be fair.

1.8.3 Process and tailings

The equipment in all plants is in good operating condition and well maintained by experienced staff in accordance with RPM's maintenance procedures. Standard approved AAPL maintenance procedures and standards for all major unit operations and equipment are in place, and comply with all approved regulations. Mass balances, utilising appropriate operation data have been undertaken by RPM staff and are considered adequate.

The reduction in unit operating costs during 2015 indicates stable operating conditions and fair management of the process plants. Forecasted operating costs for the Waterval UG2 concentrator is based on treating RoM to designed capacity. The recent PFS work undertaken has reduced the planned labour complement. No step-up or initial capital will be spent over the LoM on process infrastructure, with SIB capital covering major or partial plant process replacements/modifications.

In DRA's opinion the Rustenburg Operations approach to PGE processing carries low risk in that well established proven technology is being used in all flowsheets and Rustenburg Operations have considerable experience in this method of operation. The primary concentrators have been in operation for more than 20 years.

Tailings

DRA consider that all TSF facilities are in good operating condition and well maintained by experienced staff. The TSF facility conditions are continually monitored as part of the mining contractor's operational responsibilities and the approved professional engineers for the facilities are SRK who are retained for the ongoing monitoring and DMR annual reporting. The costs to cover ongoing maintenance are sufficiently allowed for in the operating and SIB cost estimates. Records of maintenance performed are readily available.

A three staged dust management plan has partially been implemented at Paardekraal TSF. Water management on the TSFs are well controlled with the supernatant pool located centrally around the decant towers. The TSFs also conforms to the statutory freeboard requirements. Six monthly audits are performed by independent consultants to ensure compliance with respect to operating procedures and all legal requirements.

It is assumed that the Klipfontein and Waterval East and Waterval West TSFs which are being reclaimed or unused respectively would have been rehabilitated during the life of the operation and no additional costs will be incurred at the end of LoM. The only costs applied by SRK are for the top surface tailings scarification and revegetation costs on the final TSF landform. All water management and ongoing monitoring and maintenance are included elsewhere in the closure estimates.

1.8.4 Environmental and social considerations

The existing site environmental risks are associated with proposed rehabilitation processes and financial provision, applicable to the Closure Plan. Other key risks are safety related, and would be indicated by the impact on production, and hence revenue, associated with safety incidents, Regulation 55 Performance Assessments (compliance audits) conducted in terms of the MPRDA, and by the annual Integrated Water use Licence ("IWUL") audits required in terms of the National Water Act (Act 36 of 1998) or "NWA", none of which have been reviewed (or made available) for this report.

Clarification is required as to whether Rustenburg Operations requires licences in terms of the National Environmental Management: Air Quality Act, No. 39 of 2004 ("NEM:AQA") and the National Environmental Management: Waste Act, No. 59 of 2008 ("NEM:WA").

Based on site observations, discussions with relevant personnel, and a review of all relevant documentation, environmental considerations are managed well for the scale and age of the assets and only a few material issues were identified, with the site having developed or commenced with the implementation of plans for the majority of the issues identified.

There are five informal settlements on the Rustenburg Operations Lease Area which are in close proximity to key infrastructure e.g. shafts, fridge plants and the WLTR plant. However, access to the infrastructure is security controlled and the Rustenburg Operations have historically not been impacted by the informal settlements nor its occupants.

1.8.5 Engineering

All engineering and infrastructural aspects are in place for the current operations. On-site engineering facilities satisfactorily sustain the various activities. Additional supporting infrastructure includes emergency services, clinics and communications and recreational areas.

The operating mining areas, both on surface and underground, and including materials handling, are deemed to be in a good operating condition. The maintenance system in place is appropriate for the equipment used and the conditions encountered.

The Waterval UG2 concentrator, and the associated CRP, the Waterval Retrofit concentrator and the WLTR plant are deemed to be in a good condition with no areas of concern emphasised. The experienced staff and the established maintenance procedures ensure that the plants have a high availability for operation. Some corrosion is apparent, but is dealt with under ongoing repairs.

The replacement and refurbishment of engineering equipment as per equipment lifespan has been highlighted and costing for capital equipment and SIB equipment has been quantified.

1.8.6 Valuation

The Cash Flow Model runs from Q4 2015 to FY2041. No Inferred Mineral Resources and only Mineral Reserves are considered in the Cash Flow Model.

The Cash Flow Model is based on physical projections for mining production and processing production provided by DRA that are comparable to that historically achieved at Rustenburg Operations.

Revenue is based on a specific agreement for the sale and toll treatment of concentrate with metal prices and exchange rate sourced from a consensus forecast.

Opex has been estimated from first principles and is broken down into established cost categories, and by Investment Centre, with accuracy to at least a PFS level. Projected operating costs include an allowance for above SA CPI inflation for labour and to utilities costs for three years.

The capex requirements and phasing of capex is considered reasonable per Investment Centre and to support the Rustenburg Operations production profile.

The Competent Valuator considers the calculation of mineral royalties and taxes, working capital, discount rate and inclusion of closure liability assessments to be reasonable. The base case discount rate has been determined using a WACC and CAPM approach.

The preferred valuation method is a Cash Flow Approach, considering the detailed planning that has been undertaken to generate projections that reflect the technical and economic parameters and assumptions existing at the date of this report; and is supported by extensive operating experience. The Cash Flow Model is most sensitive to metal prices including the US$:ZAR exchange rate and secondly to operating costs.

The application of upper and lower beta values results in a lower and upper real discount rate of 5.3% and 10.7% respectively. Applying these discounts to the Cash Flow Model results in a lower and upper NPV of ZAR10,650 M and ZAR17,240 M respectively. The Competent Valuator's Concluding Opinion of Value, according to the Cash Flow Approach, shows a preferred value of ZAR13,310 M for the Mineral Asset, using a discount rate of 8.0% (real). The preferred value is comparable to the Market Approach upper value of ZAR13,440 M.

2 INTRODUCTION

2.1 Purpose and structure of this Competent Person's Report

T1.1A/B/C (ii)-(iii), T1.2B/C(i), T1.7A/B/C(i), SV 2.1, SV 2.2

Rustenburg Operations are located centrally on the Western Limb of the Bushveld Complex, near the town of Rustenburg in North West Province (within the Republic of South Africa), approximately 123 km west of Pretoria and 126 km northwest of Johannesburg. Rustenburg Operations comprises the Bathopele, Siphumelele, Thembelani and Khuseleka mining operations, two concentrating plants, an on-site chrome recovery plant, the Western Limb Tailings Retreatment plant ("WLTR plant") and associated surface infrastructure. The lease area covers an extensive 28 km strike length with the orebody extending 8 km down dip. Rustenburg Operations refers exclusively to this lease area and associated activities.

In this report, Rustenburg Operations is used interchangeably with "Rustenburg Operations Lease Area" or "the Lease Area".

Rustenburg Operations exploits the platinum group element ("PGE") on Merensky and UG2 reefs to produce concentrate containing PGEs, as well as, base metals. The converted and new order mining rights for the Rustenburg Operations mining area covers 15,351.8 hectares ("ha") and includes the use of various mining methods including bord and pillar, conventional stopping and trackless development.

The Kroondal and Marikana Pooling and Sharing Arrangements with Aquarius Platinum (South Africa) (Pty) Limited, Waterval Smelter, Rustenburg Base Metal Refinery ("RBMR"), Precious Metal Refinery ("PMR") and Western Limb Distribution Centre ("WLDC") are excluded from the Transaction and this CPR.

Sibanye Gold Limited ("Sibanye", or "the Client", or "the Group") requires the compilation of a Competent Person's Report ("CPR") for its purchase of Rustenburg Operations. At the request of Sibanye, Snowden Mining Industry Consultants (Pty) Limited ("Snowden") has prepared this CPR. Snowden has fulfilled the role of CPR collator and peer reviewer, and has placed reliance on several third parties that have undertaken work for each discipline – these parties are noted in Section 2.3 of the CPR.

Relevant documentation and information was reviewed and verified for accuracy by Snowden, Rustenburg Platinum Mines Limited ("RPM"), DRA Projects SA (Pty) Limited ("DRA"), Design to Mine Consulting Limited ("DTM") and Cyest Corporation (Pty) Limited ("Cyest"), collectively "the authors" for this CPR. Mr Quartus Snyman of RPM is the Competent Person ("CP") for Mineral Resources of the Rustenburg Operations; and Mr Frank Egerton of DRA is the CP for Mineral Reserves of the Rustenburg Operations and overall CP for this CPR. Mr John Miles (DTM) is the Competent Valuator and has undertaken the overall Valuation of the Mineral Asset.

On 9 September 2015, Sibanye reported the intended acquisition of Rustenburg Operations from Anglo American Platinum Limited ("AAPL"), through one of its subsidiaries, Sibanye Rustenburg Platinum Mines (Pty) Limited, for an upfront consideration of ZAR1.5 billion ("B") in cash or shares and a deferred consideration equal to 35% of the distributable free cash flows generated by the Rustenburg Operations over a six-year period, subject to a minimum nominal payment of ZAR3.0 B (referred to as "the Transaction"). Sibanye has reported that should there still be an outstanding balance at the end of the six year period, Sibanye has the option to elect to extend the period by a further two years. Any remaining balance at the end of this period will be settled by Sibanye either in cash or shares. The Transaction agreements comprise a sale and purchase agreement, sale and toll treatment of concentrate agreement, use and access agreement and parent company guarantee. The implementation of the Transaction is both subject to and conditional on the fulfilment of conditions precedent customary for a transaction of this nature.

RPM and DRA have reviewed the exploration data and the estimation processes and endorses the stated Mineral Resources and Mineral Reserves, reported according to the South African Code for the Reporting of Exploration Results, Mineral Resources and Mineral Reserves, 2007 Edition, as amended in July 2009 ("SAMREC Code"). RPM and DRA are satisfied that the estimates of Mineral Resources and Mineral Reserves are reliable and are accurate within accepted limits of the SAMREC Code and the Johannesburg Stock Exchange Limited ("JSE") Listings Requirements.

DTM has undertaken a Mineral Asset Valuation in terms of the South African Code for the Reporting of Mineral Asset valuation, as amended in July 2009 ("SAMVAL Code"). Discounted Cash Flow ("DCF") valuation has been applied for a Life of Mine ("LoM") forecast period from October 2015 to financial year-end (FY) 2041. A Market Approach has been used to value the total Mineral Resource for Rustenburg Operations.

This CPR reports on and provides a valuation of the Rustenburg Operations Mineral Asset. The compilation of this CPR is based on technical and financial data gathering undertaken between 1 October 2014 and 9 December 2015. The Report Date is 9 December 2015; and the Valuation Date is 1 October 2015.

Snowden was engaged to collate a CPR and provide a CPR in compliance with, and to the extent required by, the SAMREC Code and JSE Listings Requirements. The authors of this CPR have followed the guidelines of the SAMREC Code and consider this CPR to be compliant with Table 1 of the SAMREC Code, and the SAMREC Code overall.

2.2 Verification and validation

The authors have conducted a thorough assessment of all material technical issues likely to influence the valuation of the Mineral Assets, including inspection, discussion and enquiry, examination of historical information, review of and, where considered appropriate, modification of estimates and classification of Mineral Resources and Mineral Reserves, production forecasts, and macro-economic parameters and commodity price forecasts.

2.3 Reliance on other Experts

SV 2.11, SV 2.13

The authors have not conducted an in-depth review of mineral title and ownership. Independent legal due diligence has been undertaken by Edward Nathan Sonnenbergs Incorporated ("ENS"). The authors accept in good faith the legal opinion on this matter expressed by ENS management. Mineral title and ownership details are provided in Section 5.

There has been no reliance on experts who are not CPs in the preparation of this CPR. In compiling this CPR, the following CPs have undertaken work, as shown in Table 2.1. In specific sections, the CPR refers to a DRA opinion; in this context it would refer to either CP: Mining (DRA: Frank Egerton) or CP: Process (DRA: Tony Nyakudarika).

Consent has been received from each CP for inclusion of their work in this CPR. The CPR is considered to be a succinct, accurate collation of the respective CPs' work. DRA have undertaken Prefeasibility Study ("PFS") work and review on the Rustenburg Operations, with twelve separate reports culminating into an overall PFS that has been referenced as "DRA, 2015" in this CPR. Cross-referenced documents in Table 2.1 are discussed in Section 20: References. Wynand Marx from Bluhm Burton Engineering (Pty) Limited ("BBE") is the CP: ventilation; and Johan Hanekom from Middindi Consulting (Pty) Limited (Middindi) is the CP: geotechnical in this CPR.

Table 2.1 Competent Person's Report responsibility matrix

Discipline	CPR work undertaken	Competent Person/Valuator	Cross-reference/ source document
Transaction and company history	RPM and Sibanye	-	SENS announcement
Location, access, climate	Snowden	-	Snowden, 2015
Legal, permitting, mineral rights	ENS	-	ENS, 2015
Local and regional geology	RPM	Quartus Snyman	RPM, 2015
Exploration	RPM	Quartus Snyman	RPM, 2015
Sample preparation, analyses, and security	RPM	Quartus Snyman	RPM, 2015
Mineral Resource estimate	RPM	Quartus Snyman	RPM, 2015
Mineral Reserve estimate	DRA	Frank Egerton	DRA, 2015
Mining methods	DRA	Frank Egerton	DRA, 2015
Ventilation	BBE	Wynand Marx	DRA, 2015
Geotechnical studies	Middindi	Johan Hanekom	Middindi, 2015
Mineral processing and metallurgy	DRA	Tony Nyakudarika	DRA, 2015
Tailings	DRA	Tony Nyakudarika	DRA, 2015
Engineering and capital projects	DRA	-	DRA, 2015
Environmental	ERM	Donald Gibson	ERM, 2015
Human Resources	DRA	-	DRA, 2015
Corporate social investment	Snowden	-	RPM, 2015
Occupational health and safety	ERM, RPM	-	ERM, 2015; RPM, 2015
Market studies	SFA (Oxford)	Stephen Forrest	SFA (Oxford), 2015
Mineral Asset Valuation	DTM	John Miles	DTM, 2015
Capital expenditure	DRA	Various	DRA, 2015
Operating expenditure	Cyest	Various	Cyest, 2015
Risk assessment	All	Various	

Source: Snowden, 2015b

2.3.1 Technical and financial reliance

The authors place reliance that all technical, financial and legal information provided to them as at 9 December 2015, is valid and accurate for the purpose of compiling this CPR. The authors have satisfied themselves that such information is both appropriate and valid for the Valuation as reported herein.

The authors have not materially adjusted technical information provided to them – corrections and recommendations were undertaken during the initial review phase (October 2014 to October 2015) prior to CPR collation. The authors are in agreement with all technical opinions stated in this CPR; and consider that these reasonably reflect the current and proposed capital programs and LoM schedules.

2.3.2 Legal reliance

The authors have prepared this CPR on the assurance that all mineral rights relating to Rustenburg Operations are currently in good standing. The authors have not attempted to establish the legal status of the mineral rights. ENS has undertaken the independent legal due diligence.

2.3.3 Documentation reviewed

Documentation reviewed in compiling the CPR comprises, contracts, agreements, approvals, historical technical and financial records and future forecasts and other relevant documentation and statements.

2.4 Warranties, limitations, declarations and consent

The scheduled Mineral Reserves contained within forecasts are comparable to the current Mineral Reserve estimates for the Mining Rights discussed in Section 5. These Mineral Reserves have been reconciled with Mineral Reserve depletions. The authors have verified that the Rustenburg Operations mine plans, budgets and estimates are reasonable within the context of past performance of the Rustenburg Operations, as well as in alignment with similar RPM platinum operations and the current performance of the Mineral Asset.

The achievement of mine plans, budgets and estimates are neither warranted nor guaranteed. The estimates, as presented and discussed herein, cannot be assured and are based on economic assumptions, some of which are beyond the control of Sibanye. Future cash flows and profits derived from such forecasts are inherently uncertain and actual results may be materially more or less favourable.

2.4.1 Declarations

The authors will receive a fee for the preparation of this report in accordance with normal professional consulting practice. The authors, excluding Sibanye and RPM, do not have, at the date of this report, any financial interest in Sibanye or the Rustenburg Operations and consider themselves to be independent in terms of 4.28(a), 12.9(c) and 12.10(a)(ii) of the JSE Listings Requirements.

2.4.2 Disclaimers

Mineral Reserves are based on the modifying factors and assumptions currently applied, future Mineral Reserve estimates may need to be revised should these factors or assumptions change. Mine plans, technical economic parameters and the Cash Flow Model include forward-looking statements, which are necessarily estimates and involve a number of risks and uncertainties that could cause actual results to differ materially.

This CPR includes technical information, which requires subsequent calculations to derive subtotals, totals and weighted averages. Such calculations may involve a degree of rounding and consequently introduce minor errors. Where such errors occur, the authors do not consider these to be material.

2.5 Cautionary statements for United States investors

The United States ("US") Securities and Exchange Commission ("SEC") permits mining companies in their filings with the SEC, to disclose only those mineral deposits that a company can economically and legally extract or produce from. Certain terms are used in this report, such as "resources", that the SEC guidelines strictly prohibit companies from including in filings.

3 MINING AND DEVELOPMENT ASSETS

3.1 Company history

SV 2.3, SV 2.4

3.1.1 Sibanye Gold Limited

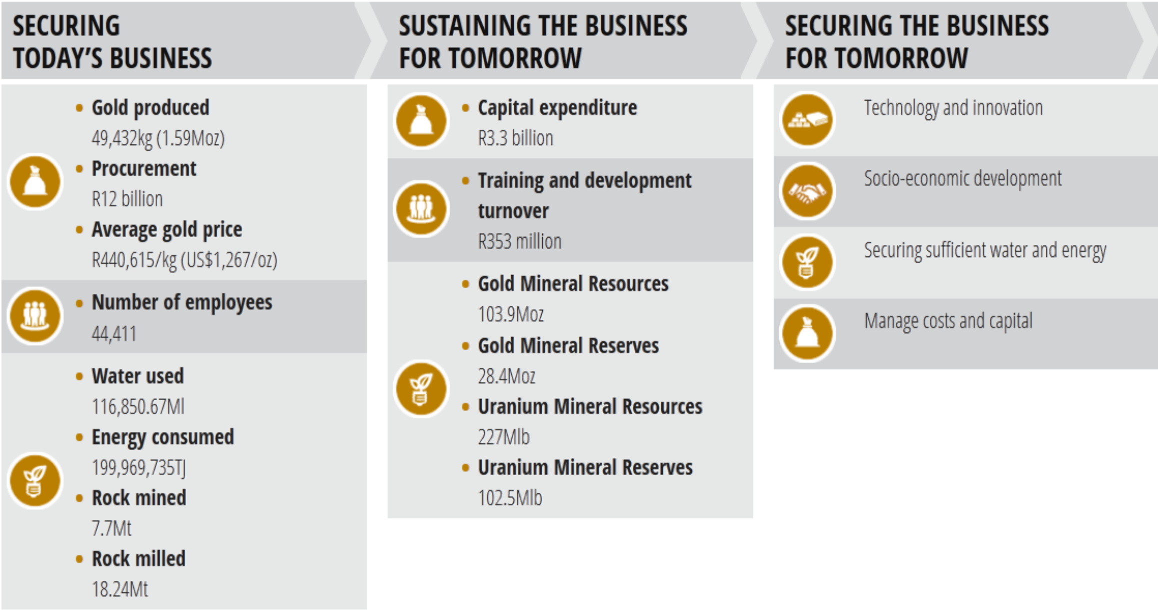
Sibanye is an independent, South African-domiciled mining group, which currently owns and operates four underground and surface gold operations – the Cooke, Driefontein and Kloof operations in the West Witwatersrand region, and the Beatrix Operation in the south of the Free State province. In addition to its mining activities, the Group owns and manages significant extraction and processing facilities at the operations where the gold-bearing ore is treated and processed before it is refined. The Group has a number of organic growth projects including the West Rand Tailings Retreatment Project on the Far West Rand and the Burnstone project on the South Rand of Gauteng province, as well as the Beisa North, Beisa South, Bloemhoek, De Bron-Merriespruit, Hakkies and Robijn projects in the Free State.

Sibanye is the largest individual producer of gold from South Africa and is one of the world's 10 largest gold producers. In 2014, the Group produced 49,432 kg (2013: 44,474 kg) or 1.59 Moz (2013: 1.43 Moz) of gold at an all-in cost of ZAR375,854/kg (2013: ZAR354,376/kg) or US$1,080/oz (2013: US$1,148/oz) and invested ZAR3.3 B (2013: ZAR2.9 B) in capital at its operations. A high level Sibanye business overview is shown in Figure 3.1.

In 2014, Sibanye acquired the Cooke underground and surface operations from Gold One International Limited ("Gold One"); concluded the acquisition of Witwatersrand Consolidated Gold Resources Limited ("Wits Gold"), a JSE and Toronto Stock Exchange ("TSX") listed gold and uranium exploration company with significant gold resources in South Africa; and exercised the option held by Wits Gold to acquire the Burnstone gold mine from the previous owner, Great Basin Gold Limited ("Great Basin Gold"). At December 2014, Sibanye held gold Reserves of 28.4 Moz, (2013: 32.7 Moz restated) and uranium Reserves of 102.5 million pounds or "Mlb" (2013: 102.8 Mlb restated).

Sibanye Gold Limited is listed on the Main Board of the JSE in terms of its stock exchange licence (ordinary shares) and on the New York Stock Exchange ("NYSE") American Depositary Receipts ("ADRs").

Figure 3.1 Sibanye business overview



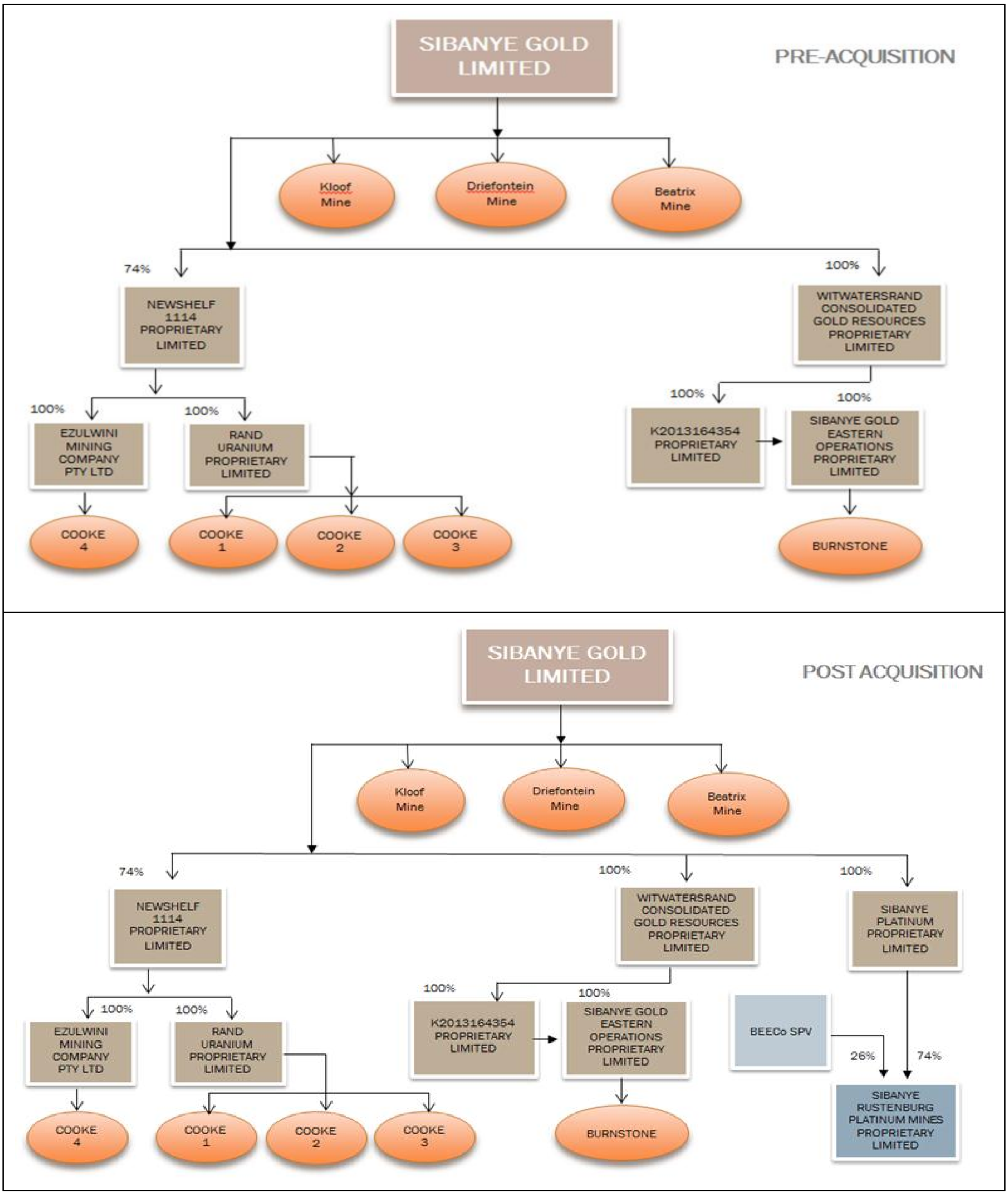
Source: Sibanye, 2015b

Rustenburg Operations transaction

On 9 September 2015, Sibanye reported the intended acquisition of Rustenburg Operations from RPM, through one of its subsidiaries, Sibanye Rustenburg Platinum Mines (Pty) Limited, for an upfront consideration of ZAR1.5 B in cash or shares and a deferred consideration equal to 35% of the distributable free cash flows generated by the Rustenburg Operations over a six year period, subject to a minimum nominal payment of ZAR3.0 B (referred to as "the Transaction"). Sibanye has reported that should there still be an outstanding balance at the end of the six-year period, Sibanye has the option to elect to extend the period by a further two years. Any remaining balance at the end of this period will be settled by Sibanye either in cash or shares. The Transaction agreements comprise a sale and purchase agreement, sale and toll treatment of concentrate agreement, use and access agreement and parent company guarantee. The implementation of the Transaction is both subject to and conditional on the fulfilment of conditions precedent customary for a transaction of this nature.

The Sibanye structure before and after the Transaction is shown in Figure 3.2.

Figure 3.2 Sibanye structure before and immediately after acquisition



Source: Sibanye, 2015a

Notes:

1. *Kloof, Driefontein, Beatrix, Cooke 1, Cooke 2, Cooke 3, Cooke 4 are operational mines and Burnstone is a project.*
2. *Ovals are not incorporated entities but operating divisions.*
3. *Sibanye Platinum (Pty) Limited's ("Sibanye Platinum") 100% holding in Sibanye Rustenburg Platinum Mines (Pty) Limited will reduce to 74% once the 26% Black Empowerment transaction is finalised. The Sibanye Platinum executive team will oversee the assets.*

3.1.2 Rustenburg Platinum Mines Limited ("RPM") and Rustenburg Operations

T1.2C(i)

AAPL, previously Amplats, originated out of the unbundling of Johannesburg Consolidated Investment Company Limited in 1995. During July 1997, the Amplats Group was restructured, which resulted in the renaming of the Rustenburg Platinum Holdings to Anglo Platinum Limited which has subsequently been retitled AAPL and became the sole listed entity of the Group. Rustenburg Operations are wholly owned by RPM, a wholly owned subsidiary of AAPL. RPM mines processes, refines and markets platinum and other PGEs as well as base metals at their operations.

The Rustenburg Operations mining business was restructured in 2013 with three shafts (Khomanani 1, Khomanani 2 and Khuseleka 2) placed on Care and Maintenance, in addition to Siphumelele 3 and Thembelani 2 which were previously placed on Care and Maintenance. This implies that no mining is taking place as these shafts. The business units and associated infrastructure are shown in Table 3.1.

The 2016 planned production rate for Rustenburg Operations is estimated at 470 ktpm for UG2 and 140 ktpm for Merensky. Waste rock generated from the mining activities is placed on individual waste rock dumps at the shafts. The planned LoM for Rustenburg Operations extends to 2041.

The ore is transported from the shaft areas via rail and conveyor to the Waterval Concentrators (comprising Waterval UG2 concentrator and Waterval Retrofit concentrator). Here the ore is crushed and reagents are added to produce a wet concentrate. The wet concentrate is delivered to the Waterval Smelter where it is dried, melted and undergoes a converting process to generate matte. The crushed matte is sent to the RBMR to produce base metals (copper, nickel, cobalt and sodium sulphate). Resulting matte and concentrate is received by the PMR where the concentrate is refined into the respective PGEs (platinum, palladium, rhodium, iridium, ruthenium, osmium and gold), all to a high degree of purity. Tailings generated from the Waterval concentrators is transferred and deposited on the Paardekraal TSF.

The WLTR plant was constructed in order to reprocess tailings residue from the Klipfontein TSF. The process involves the remaining of the existing TSFs and the processing of slurry at the WLTR plant (concentrator). Tailings generated from the WLTR process are transferred and deposited on the Hoedspruit TSF.

The Rustenburg Operations asset package as part of the Transaction, includes the entire Rustenburg Operations footprint (excluding smelting and refining operations, and the Kroondal and Marikana Pooling and Sharing Arrangements) and is shown in Table 3.1.

Table 3.1 Rustenburg Operations asset package

Component sections	
Mine shafts	
• Khuseleka 1 Shaft (currently in production) • Khuseleka 2 Shaft • Thembelani 1 Shaft (currently in production) • Thembelani 2 Shaft • Bathopele Mine (Central and East declines) (currently in production) • Old Central Deep Shaft	• Khomanani 1 Shaft • Khomanani 2 Shaft • Siphumelele 1 Shaft (currently in production) • Siphumelele 2 Shaft (currently operating as a Training Shaft) • Siphumelele 3 Shaft
Process	
• Waterval UG2 concentrator • Waterval Retrofit concentrator • Tailings dams (Klipfontein, Hoedspruit, Paardekraal complex (PK1-5), Waterval West)	• Waterval chrome recovery plant • Western Limb Tailings Retreatment plant ("WLTR plant")
Other	
• In relation to the Mine shafts (some of which are on care and maintenance), all associated infrastructure including (where relevant) headgear, offices, workshops and associated waste rock dumps • Three sewerage plants located on the Mine Area • Storage hubs at Khuseleka 2 and Thembelani 2 • Remains of the Klipfontein Concentrators (previously stripped) • Conveyor from Bathopele to Waterval UG2 concentrator • Fridge plants located on the Mine Area • Waste disposal site located next to Waterval UG2 concentrator • Single accommodation villages • Singe Quarters and Married Quarters • Rustenburg Operations rail network	• Ventilation shafts located on the Mine Area • All offices located on Non-Retained Land • All workshops located on Non-Retained Land • Training facilities known as ADC (Anglo Development Centre), KDC (Klipfontein Development Centre) and OSD (Occupational Skills Development) • ASSU (Anglo Shared Services Unit) • Recreation Club located on the Mine Area • Supply chain sidings and stores located on Non-Retained Land • Bleskop Sports Stadium • Waterval Waste Water Treatment Works • Mine villages • Specific residential properties off the mining right • Bleskop hospital

Source: RPM, 2015

Table 3.2 shows the previous names of the various shafts.

Table 3.2 Previous names of the various shafts

Old name	New name
Paardekraal	Thembelani 1 Thembelani 2
Frank	Khomanani 1 Khomanani 2
Turffontein	Siphumelele 1
Brakspruit	Siphumelele 2
Bleskop	Siphumelele 3
Waterval	Bathopele
Townlands	Khuseleka 1
Boschfontein	Khuseleka 2

Source: RPM, 2015

3.2 Operational performance

T1.3C (i), SV 2.4

The Sibanye operational performance is shown in Table 3.3.

Table 3.3 Salient features of Sibanye Financial Year ("FY") 2014 and FY2013

Component	FY 2014 (ZAR M)	FY 2013 (ZAR M)
Revenue – continuing operations	21,780.5	19,331.2
Operating profit*	7,469.1	7,357.9
Net operating profit	4,214.4	4,254.0
Exploration costs	(15.1)	-
Profit for the year	1,506.9	1,698.3
Headline earnings	1,417.5	2,309.8
Total assets	27,921.9	19,994.9
Exchange rate (US$1:ZAR)		
- Average	10.82	9.60
- Closing	11.56	10.34

Source: Sibanye, 2015a
*Note: * Operating profit is defined as revenue minus operating costs (where operating cost is defined as cost of sales excluding amortisation and depreciation*

The Rustenburg operations have historically formed part of RPM, and have not constituted a separate legal entity. As such, the operations have not been in a position to, nor have they been required to, maintain standalone financial accounts. Any divisional financial information has been subsequently determined using departures from International Financial Reporting Standards in certain instances, with Group cost and revenue allocation principles applied to this division. As a consequence, the Rustenburg Operations financial information may not be necessarily meaningful or a useful indication of Rustenburg Operations' financial performance as a standalone entity.

4 LOCATION AND ACCESS

4.1 Location and project description

T1.5B/C(i) , SV 2.3

The Rustenburg Operations are located in the North West Province, northeast of the towns of Rustenburg and Kroondal. Rustenburg Operations is 123 km west of Pretoria and 126 km northwest of Johannesburg. The most direct routes to Rustenburg Operations include the N4 (dual carriage tarred road) from Pretoria or the R512 (regional dual carriage tarred road) from Johannesburg, which intersects with the N4. A further 6 km on the R24 (dual carriage way) will take one to key areas within Rustenburg Operations.

The Rustenburg Operations Lease Area covers approximately 130 km^2 and is in excess of 20 km from east to west and 15 km from north to south. The area is characterised by relatively flat lands surrounded by the Magalies mountain range in the south and a number of small hills in the east.

Rustenburg Operations has mined the Merensky Reef in the Rustenburg area since 1929 and more recently the UG2 Reef. Since 1949, mining has been continuous and at an increasing rate until the present day.

4.2 Property description

T1.4B/C(i),(ii), T1.5B/C(ii)

Rustenburg Operations holds the rights over all its mining, process and associated infrastructure. The Rustenburg Operations are currently 100% owned and operated by RPM. The owners of the various surface rights are shown in Section 5.3.

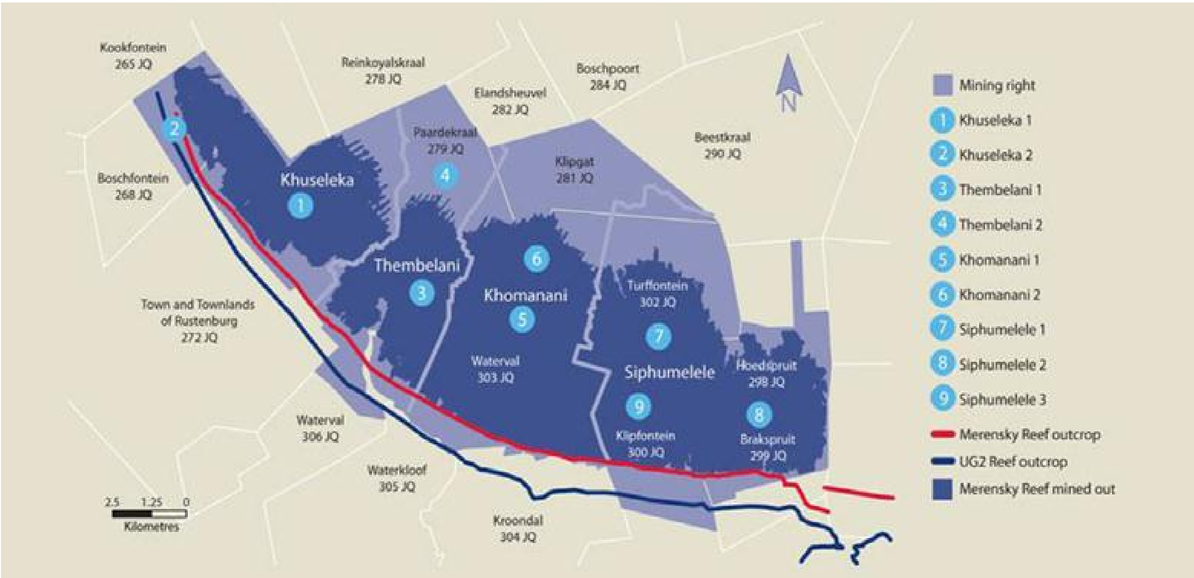
The location of Rustenburg Operations in South Africa is shown in Figure 4.1. Mining and mineralisation over the Rustenburg Operations Lease Area is shown in Figure 4.2.

The business units and associated infrastructure are presented in Section 3.1.2.

Figure 4.1 Location of Rustenburg Operations in South Africa

Source: RPM, 2015

Figure 4.2 Rustenburg Operations showing mining and mineralisation



Source: RPM, 2015

4.3 Accessibility

There are national and regional tarred roads within 25 km of Rustenburg Operations. Main access roads are tarred and are, generally speaking, in good condition and well maintained. Minimal traffic occurs on the sand or gravel secondary roads, and thus these roads remain in good condition and require less maintenance.

Except for Bathopele Mine, the shafts, processing plants and stores within the Rustenburg Operations are connected via rail. The rail network consists of 70 km of tracks, 28 level crossings, two steel bridges and three passing loops.

Landline, cellular and microwave communications are available at the Rustenburg Operations. Currently, all internet communications at Rustenburg Operations are run through a Central Control System ("CCS") located at Hex River.

4.4 Physiography

T1.5B/C(i), T1.6A(i)

Rustenburg Operations is within the quaternary catchments A22J (Hex River) and A21K (Sterkstroom) at latitude 25°41'S and longitude 27°20'E. The Rustenburg Operations area is characterised by undulating terrain, varying between 1,050 metres above mean sea level (mamsl) and 1,180 mamsl.

The topography to the north, west and east of Rustenburg Operations is dominated by well-established non-perennial watercourses. The sporadic presence of hillocks and rocky outcrops within the Rustenburg Operations licence area is noted. The major rivers in the Rustenburg Operations area include the Hex River bisecting through the western and central sections of the licence area and Sterkstroom River on the eastern perimeter.

The natural vegetation comprises open grasslands and shrubs, but most of the area surrounding Rustenburg has been and is to a certain extent still used for agriculture developments, in particular sunflowers and tobacco. With the growth in the mining sector due to extensive platinum and chrome deposits in the region, agriculture is on the decline. Urban development has taken place mainly in the town of Rustenburg, but informal settlements also exist, including on the Rustenburg Operations Lease Area.

The licence area comprises two primary vegetation types, namely:

- Clay Thorn Bushveld/ Other Turf Thornveld:
  - This veld type occurs on the black vertic clay soils of the flat plains of the North West and Northern Provinces. Acacia tortilis, Acacia karroo and Acacia nilotica dominate the tree layer within this vegetation type. The Clay Thorn Bushveld is the main veld type found within the Rustenburg Operations area.
- Mixed Bushveld:
  - This veld type is very variable depending on soil type, soil depth and aspect, and is represented by many different plant communities and habitat types. It occurs mainly on the undulating to flat plains of the Northern and North West Provinces. The soil is mostly shallow, sandy, sometimes coarse and gravelly, overlying granite, quartzite, sandstone or shale. The vegetation may vary from short, dense, sometimes shrubby bushveld to tall, open tree savanna. Mixed Bushveld occurs in small parts of the Rustenburg Operations licence area.

4.5 Climate

T1.6A(i)

Rustenburg Operations licence area falls within the boundary between two climatic regions, namely Region H ("Highveld") and Region NT ("North Transvaal"). This area, therefore, shares some characteristics of both climatic regions.

Rainfall occurs throughout the year, but predominantly between November and March, mainly as a result of thunderstorms. Annual rainfall averages approximately 650 mm. Generally speaking, the wettest month of the year is January, with an average monthly total rainfall of 132 mm. The driest month is July, with an average monthly total rain fall of approximately 2 mm. Snow is a rare phenomenon in the Rustenburg area, and would typically occur, briefly, less than one day per annum.

Mean annual air temperatures range from 11.8°C in June/July to 23.8°C in January. Average daily maxima range from 20.4°C to 30.3°C, and minima from 2.8°C to 17.2°C.

Winds are mainly light to moderate and blow from the northeasterly sector, except for short periods during thunderstorms or weather changes when they have a southerly component. A clear distinction can be made between the day and night-time wind conditions. Night-times are characterised by an increase in the number of calms, and by the predominance of low velocity wind (generally below 3 m/s) from the south-westerly, southern and south-easterly sectors. Calm wind conditions occur nearly twice as much during the night than daytime hours. Winds during the day are mainly from the northwestern, northern and northeastern sectors. Increased wind velocities are noted for daytime hours, with wind velocities in excess of 5 m/s occurring relatively frequently.

The lightning ground flash density in the study area is between 5 to 7 strikes/km^2/year on a scale of 0 to 19.

5 MINERAL RIGHTS

5.1 Mining law and mining title

T1.7A/B/C(ii)-(iii), T5.1A/B/C(i), SV 2.3

South Africa has a complex system of mineral tenure. Old order rights (mineral rights issued prior to May 2004), had to be converted to new order rights under the new regulations of the Minerals and Petroleum Resources Development Act, Act No. 28 of 2002 (as amended) ("MPRDA") within specific time periods. For this purpose new order rights have been classified into specific categories. Old order mining rights were to have been lodged for conversion on or before 30 April 2009. The conversion process is not automatic. A key requirement in the transitional phase, prior to new order mining right approval, is the submission of a social and labour plan ("SLP"), a mine works program ("MWP"), proof of technical and financial competence, compliance with the equity ownership targets for participation of historically disadvantaged South Africans ("HDSAs") in the Mining Charter as well as an approved environmental management program report ("EMPR") (now an environmental authorisation under the "One Environmental System").

The MPRDA also provides that a mining right is valid for a period of up to 30 years and may be renewed for periods of up to 30 years.

From 8 December 2014, the National Environmental Management Act 107 of 1998 ("NEMA") and its regulations set out the procedures for undertaking environmental impact assessments ("EIAs") and for developing an environmental authorisation for the construction, operation and closure of mine. An approved environmental authorisation certifies that all the legislative requirements at the date when a prospecting or mining right is granted have been met or adequately provided for, and that ongoing compliance with the approved environmental authorisation will be monitored.

An important facet of the MPRDA is that it promotes holding of and transfer of mineral rights by HDSAs. The Mining Charter was published by the Minister of Mineral Resource, following engagement with the mining industry and labour organisations, under section 100(2) of the MPRDA. The Mining Charter was initially published in October 2002 and took effect simultaneously with the MPRDA on 1 May 2004. It was subsequently amended in September 2010. Currently under the Mining Charter a mining company is required to achieve a "*minimum target of 26 percent ownership to enable meaningful economic participation of HDSAs"* by 2014. The Mining Charter contains employment equity targes of at least 40% HDSA participation in mining company management within five years, with 10% being participation by women.

All of the Mining Rights and the Prospecting Right granted are subject to the limitation that "Ministerial consent is required to encumber, cede, transfer, mortgage, let, sublet, assign, alienate or otherwise dispose of shareholding, equity, interest or participation in the right, or a controlling interest in the holder of right, except in the case of a change of controlling interest in listed companies".

The MPRDA Amendment Act 49 of 2008 was assented to by the South African President on 21 April 2009, and partly came into effect on 7 June 2013.

Sibanye confirms that it qualifies under the legislation referred to above to take transfer of the Sale Right.

5.1.1 Mineral and Petroleum Resources Development Amendment Bill ("MPRDA Bill")

The MPRDA Bill is not yet an act of Parliament. On 16 January 2015 the President of South Africa referred the MPRDA Bill back to the National Assembly for reconsideration. After careful consideration of the Bill and the submissions received, the President was of the view that the Bill would not pass constitutional muster. The Constitution requires that the President must assent to and sign the Bill referred to him by the National Assembly. However, in terms of the Constitution, if the President has reservations about the constitutionality of the Bill, he may refer it back to the National Assembly for reconsideration.

5.2 Mining title and mining agreements

T1.7A/B/C (i)-(iv), SV 2.3

The Rustenburg Operations presently comprises, *inter alia*, eight "converted" Mining Rights granted under the transitional provisions of Schedule II, and a single new order Mining Right granted under section 23 of the MPRDA, which are currently held by RPM. The Mining Rights are listed in Table 5.1.

Table 5.1 RPM Mining Rights/licence areas

New Order Mining Right	Date of Mining Right conversion/granted	Area (ha)	Expiry date
NW 30/5/1/2/2/43 MR ("43 MR")	4 July 2007	212.86	3 July 2037
NW30/5/1/2/2/79 MR ("79 MR")	29 July 2010	68.23	28 July 2040
NW30/5/1/2/2/80 MR ("80 MR")	29 July 2010	97.73	28 July 2040
NW30/5/1/2/2/81 MR ("81 MR")	18 September 2012	9,124.37	17 September 2042
NW30/5/1/2/2/82 MR ("82 MR")	29 July 2010	2,624.98	28 July 2040
NW30/1/2/2/83 MR ("83 MR")	7 October 2011	749.09	6 October 2041
NW30/1/2/2/84 MR ("84 MR")	29 July 2010	320.45	28 July 2040
NW30/1/2/2/85 MR ("85 MR")	29 July 2010	121.45	28 July 2040
NW30/5/1/2/2/86 MR ("86 MR")	7 October 2011	5,221.25	6 October 2041

Source: RPM, 2015

RPM is in the process of consolidating the aforementioned Mining Rights, in accordance with the provisions of section 102 of the MPRDA, into two Mining Rights, one of which (the Sale Right) RPM, subject to obtaining approval under section 11 of the MPRDA, intends transferring to Sibanye. The Sale Right constitutes a consolidation of certain portions of Mining Rights 81 MR, 83 MR, 84 MR and 86 MR, as well as the entire mining area covered by Mining Rights 43 MR, 79 MR and 85 MR, into 82 MR. The balance of the Mining Rights will be consolidated into 80 MR and will be retained by RPM ("Retained Right") for purposes of the Kroondal and Marikana Pooling and Sharing Arrangements.

Appendix A highlights the relevant portions of the Mining Rights to be consolidated in the Sale Right.

In addition, RPM has made application for a prospecting right over a Portion of Portion 170 of the Farm Paardekraal 279 JQ and for a prospecting right over Portion 53 of the Farm Waterval 306 JQ. To the extent that such applications are successful, RPM intends transferring, subject to obtaining approval under section 11 of the MPRDA, such prospecting right(s) to Sibanye.

The authors have been informed that the documents in respect of the above-mentioned Mining Rights have been viewed and examined by ENS.

DMR has not advised RPM of a breach of or non-compliance with any term or condition of its Mining Rights granted under the MPRDA. The total surface area of the Mining Rights intended to be transferred to Sibanye is approximately 15,351.8 ha in extent.

5.3 Surface rights

T1.7A/B/C(i), T5.1A/B/C(i), SV 2.3

The properties indicated in Appendix A cover the entire extent of the Mining Right. Surface access is only required on certain portions of the Mining Right. The ground where surface access is required can be divided into three groups:

- RPM owned land that Sibanye will acquire as part of the Transaction (Appendix B);
- Third party owned land on which surface right permits ("SRPs") exist; and
- Third party owned land on which a surface lease agreement exists.

With the completion of the Royal Bafokeng Nation lease agreement currently being finalised, all land on which key infrastructure is located will either be owned, covered by SRPs or accessed through lease arrangements.

The surface leases on the Mining Right area are in Table 5.2.

Table 5.2 RPM surface leases

Property	Size (ha)	Name of third party lessor	Status of lease agreement	Term/termination date (if known)
Paardekraal 279JQ covering 100 ha	100.0	Rustenburg Local Municipality	Current	30 November 2015
Paardekraal 279JQ covering c. 73.6 ha	73.6			
Remaining Extent of the Farm Hoedspruit No. 298 covering c. 341.0796 ha	341.1	Royal Bafokeng Nation		27 January 2055
Various portions of farms on Boschfontein No. 268 JQ, Klipgat No. 281 JQ, Hoedspruit No. 298 JQ, Klipfontein No. 300 JQ and Turffontein No. 302 JQ covering c. 1356.9865 ha and area covered by existing SRPs of c.503 ha	1,357.0		Area and rate finalised and lease being drafted	Subject to lease finalisation

Source: RPM, 2015

The following immovable properties on the Mining Rights are subject to land claims by the following claimants:

- Klipfontein 300 JQ by the Huma Family;
- Kroondal 304 JQ by Baphalane Ba Kroondal (Community) led by P.R Letlape;

- Waterval 303 JQ by Baphalane Ba Kroondal (Community) led by P.R Letlape;
- Waterval 306 JQ by Baphalane Ba Kroondal (Community) led by P.R Letlape; and,
- Waterkloof 305 JQ by Baphalane Ba Kroondal (Community) led by P.R Letlape.

The statuses of the land claims are as follows:

- Klipfontein 300 JQ:
  - This property claim has been rejected and has been referred to the Land Claims Court. No update has been received on this matter to date.
- Kroondal 304 JQ, Waterval 303 JQ, Waterval 306 JQ and Waterkloof 305 JQ:
  - This property claim is currently under the research phase which has not yet been concluded. The Office of the Regional Land Claims Commissioner North West Province has advised that it is still in the process of obtaining oral history for each and every claimed farm. A deadline was set for 9 October 2014 for providing information. No further update has been received on this matter to date.

5.4 Royalty Act and associated royalties

T1.7A/B/C(ii), T5.1A/B/C(i)

The Mineral and Petroleum Resources Royalty Act, Act No. 28 of 2008 ("Royalty Act") was promulgated on 17 November 2008, with an effective royalty payment commencement date of 1 March 2010. The Royalty Act provides for the imposition of a royalty on the transfer of mineral resources and the Administration Act provides for the administration of matters in connection with such imposition and matters connected therewith. In terms of the Royalty Act, the holders of Mining Rights and persons who win or recover mineral resources from within South Africa ("Affected Persons") must apply to register with the Commissioner for the South African Revenue Service (the "Commissioner") from 1 November 2009, but by no later than 31 January 2010 and a person who qualifies as an Affected Person after 1 November 2009 must apply to register with the Commissioner within 60 days after the day on which that person qualifies as an Affected Person.

The Royalty Act incorporates a formula-based royalty scheme, specific to commodity and level of product refinement. The royalty calculation used in the Valuation, as per the Royalty Act, is shown below:

- Royalty rate (Unrefined) = 0.5 + [EBIT/(Gross sales x 9)] x 100 with a maximum of 7%; and,
- Royalty rate (Refined) = 0.5 + [EBIT/(Gross sales x 12.5)] x 100 with a maximum of 5%.

Sibanye is registered with the South African Revenue Services ("SARS") for Royalty Act purposes. Furthermore, Sibanye is aware of final royalty payments, the SARS submission of return and appropriate reporting requirements, as determined by the Royalty Act and the Mineral and Petroleum Resources Royalty (Administration) Act, Act No. 29 of 2008 (Administrative Act).

6 GEOLOGY

RPM source documents form the basis of Section 6.

6.1 Regional geology

T4.1A(i), SV 2.5

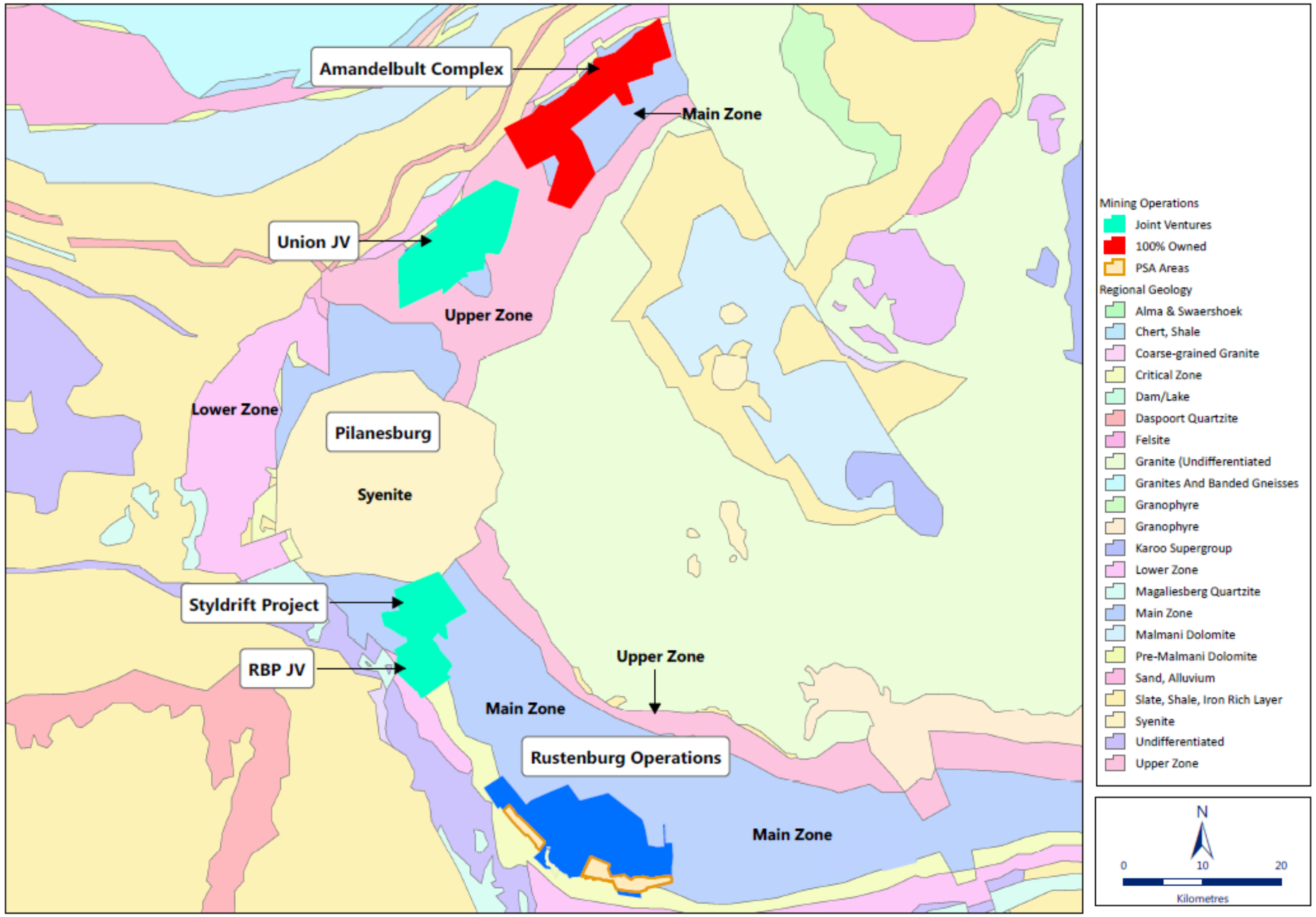
6.1.1 Bushveld Complex

The Bushveld Complex (“BC”) is estimated to have formed approximately 2,060 Ma ago. Its mafic rock sequence, the Rustenburg Layered Suite (“RLS”), is the world’s largest known mafic igneous layered intrusion and contains more than 90% of the world’s known reserves of PGEs. In 2014, an estimated 68% of world platinum (“Pt”) production and 32% of palladium (“Pd”) was produced from mines situated in the BC (USGS, 2014). In addition to PGE, extensive deposits of iron, tin, chromium, titanium, vanadium, copper (“Cu”), nickel (“Ni”) and cobalt also occur. The BC extends approximately 450 km east to west and approximately 250 km north to south. It underlies an area of some 65,000 km^2, spanning parts of the Limpopo, North West, Gauteng and Mpumalanga provinces.

The RLS occurs geographically as five apparently discrete compartments termed “limbs”, three of which are being exploited for PGEs. These are the Western, Eastern and Northern limbs. The RLS comprises rock types ranging from dunite and pyroxenite through norite, gabbro and anorthosite to magnetite- and apatite-rich diorite, subdivided in terms of a mineralogically based, zonal stratigraphy into five principal zones. From bottom to top these are the Marginal, Lower, Critical, Main and Upper Zones. Figure 6.1 shows the extent of the RLS in a regional context.

The Pilanesberg Complex, the remnant of an alkaline volcanic plug, which intruded into the Bushveld Complex about 1,250 Ma, splits the Western Limb into two lobes (northwestern and southwestern) while the Eastern Limb is split into two lobes (northeastern and southeastern lobes) by the Steelpoort Fault. The Rustenburg Operations is located south east of the Pilanesberg Complex on the Western Limb as shown in Figure 6.1.

Figure 6.1 Regional geology



Source: RPM, 2015

The RLS varies in vertical thickness, reaching up to 8 km in places, with some individual layers traceable along strike for over 150 km (Cawthorn, R.G. *et al*., 2006). The PGE bearing reefs are typically only 0.3 m to 15 m thick, although much greater thicknesses are recorded in the Platreef of the Northern Limb. In the Eastern and Western limbs, the Critical Zone contains the two principal PGE-bearing reefs: the Merensky Reef and the UG2 chromitite. In the Northern Limb, the Platreef is thought to be the local equivalent of the Critical Zone and Merensky Reef (Viljoen and Schürmann, 1998).

Two main, regional facies of the Merensky Reef are recognised in the Western Limb of the RLS, namely the Swartklip Facies and the Rustenburg Facies (Wagner, 1929), north and south of the Pilanesberg Complex respectively. The delineation of these facies sub-divisions relate to a much thinner vertical separation between the Merensky Reef and the UG2 horizons in the Swartklip Facies, originally identified north of the Pilanesberg, but also now also recognised in down dip sections of the RLS south of the Pilanesberg.

6.2 Local geology

SV 2.5

6.2.1 Local mine geology

The main PGE bearing reefs form an open arc from east to west, with the strike varying from 90º in the east to 145º in the west. The dip of the reef is generally constant, at between 9º and 10º. On the farm Paardekraal, the dip decreases locally to between 1º and 5º (in a feature called the Regional Depression) and increases to between 15º and 30º along a monocline trending roughly east to west at depth. The dip decreases to between 3º and 7º across the farms Klipgat and to a lesser extent Turffontein, in a graben area, roughly trending east to west.

The persistence of the Merensky Reef and UG2 Reef has been confirmed mainly by extensive surface and underground exploration drilling as well as 3D seismic surveys. The only aberration to this pattern is in the vicinity of the two major dunite pipes, the Brakspruit and Townlands pipes. The vertical separation between the two economic horizons (Merensky Reef and UG2 Reef) varies between 120 m and 140 m. A regional trend of decreasing separation was established resulting in a middling of about 90 m at depth.

As at all other platinum mines, the Merensky Reef and the UG2 Reef are affected by structural and other geological features that contribute to geological losses and impact on mining to a greater or lesser extent, as outlined in more detail in later sections of this report. Geological losses due to these features are in addition to losses caused by fault zones and other structural features:

- The term "Pothole" is applied to features which affect the Merensky Reef and the UG2 Reef and refers to the downward transgression of the reef through single or multiple underlying footwall layers, only to stabilise on a specific footwall layer, lower than the original or normal stratigraphic position. The shape and size of these pothole structures are completely irregular and highly variable and their impact on mineralisation varies from area to area; and,
- Iron Rich Ultramafic Pegmatoid ("IRUP") is the name given to a replacement phenomenon which affects the Merensky Reef and the UG2 Reef, and surrounding rocks. Different levels of IRUP replacement occur but it is only the total replacement that causes large difficulties, as lithological units become unrecognisable. IRUP replacement is typically pegmatoidal, often containing high levels of titanium rich magnetite. The UG2 Reef chromitite is less affected by IRUP than the Merensky Reef, but the lithologies above and below may also be affected.

6.3 Exploration information

T1.4B(i)(ii), T2.2A/B (ii), T2.3A/B(i)(ii), SV 2.4

The Rustenburg Operations has been intensively explored by surface and underground drilling, geophysical surveys (airborne magnetic and 3D seismic), trenching and geological mapping carried out over a period of more than 55 years. This intensive exploration has proven the extension at depth of the Merensky and UG2 Reefs to the north-northeast.

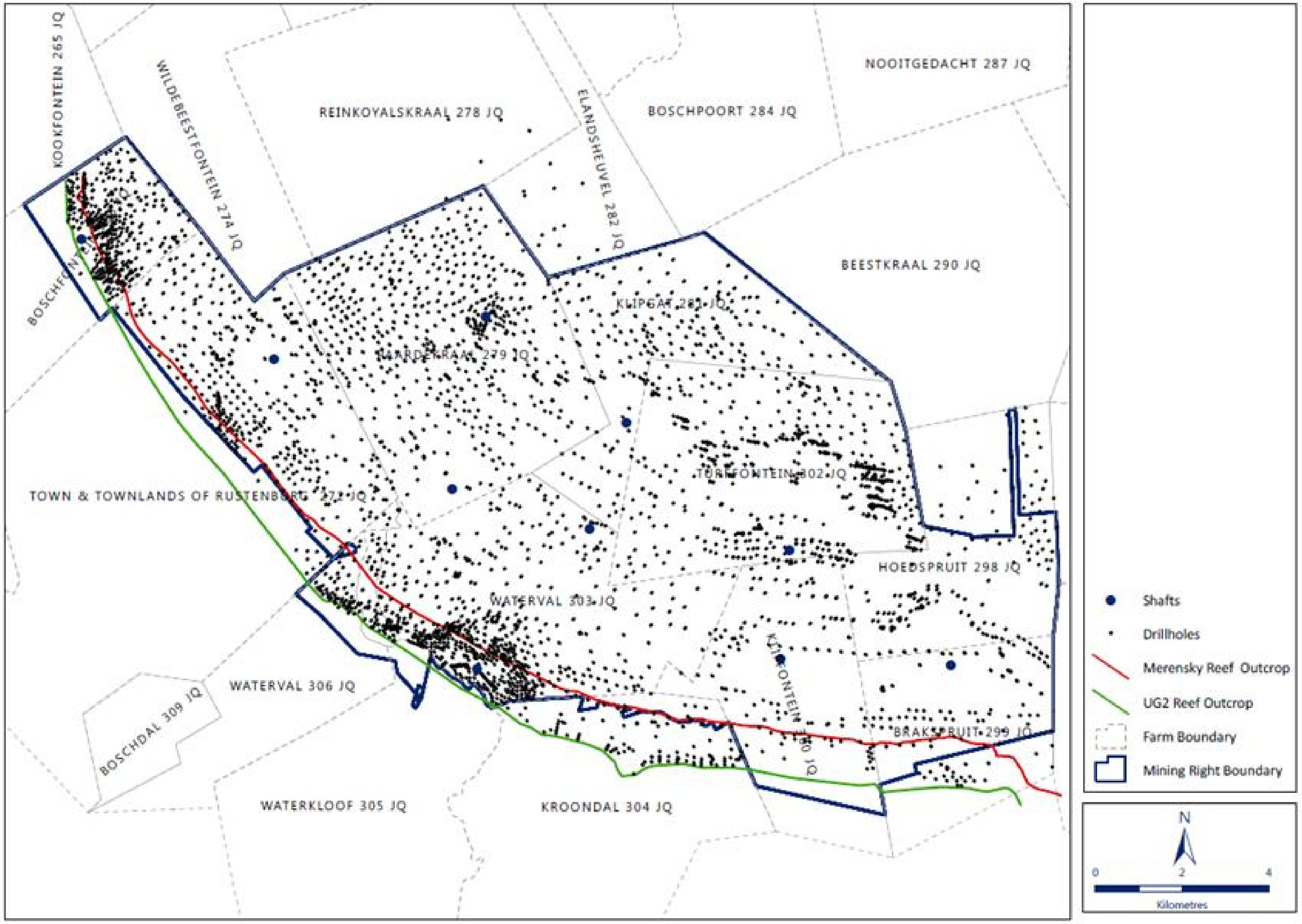
Initial geological understanding of the area was developed from observations made from surface and underground mapping, combined with exploration drillhole information and extrapolations of features observed in other platinum mines in the south-western BC. Current interpretations of the geological and structural framework applicable to the Merensky Reef and the UG2 Reef have evolved as new and more detailed geological information and datasets were obtained. The acquisition and recent re-processing of the 3D seismic data over most of the Rustenburg Operations Lease Area, when correlated with drillhole data, has provided a much higher level of confidence in the validity of these interpretations. However different levels of confidence are applicable to different areas, reflecting the amount of mining or exploration work undertaken, and additional exploration drilling will be necessary in some areas to increase confidence in resource modelling ahead of future development beyond the current LoM.

There has been a significant decline in surface exploration drilling over the past five years with a limited amount of surface exploration conducted on Bathopele Mine during 2015. No surface exploration drilling has been planned for 2016 to 2020 (current budget timeframe).

6.3.1 Exploration drilling

Some 2,701 drillholes and 6,366 deflections have been completed across the Rustenburg Operations. Some 270 drillholes have been completed on the Waterval East and West tailings dams at the Rustenburg Operations. Figure 6.2 shows the location of the collar positions of surface drillholes drilled to date, and includes some from projects in surrounding areas accessed through data sharing agreements with adjacent property owners. Table 6.1 and Table 6.2 summarise the various drilling campaigns undertaken on the Rustenburg Operations property. Drilling plans made provision to intersect both the Merensky and UG2 Reefs in individual drillholes in areas where this was possible. From 2002 onwards surface exploration drillholes were drilled to below the UG1 Reef horizon and a suite of deflections set out on each of the reefs.

Figure 6.2 Surface exploration drillhole coverage within Lease Area



Source: RPM, 2015

Table 6.1 Summary of exploration drilling within the Lease Area

Year	Boschfontein 268 JQ		Brakspruit 299 JQ		Elandsheuwel 282 JQ		Hoedspruit 298 JQ		Klipfontein 281 JQ		Klipfontein 300 JQ	
	Moth	Defl	Moth	Defl	Moth	Defl	Moth	Defl	Moth	Defl	Moth	Defl
1960	144	152					19	62				
1964									1	4		
1965									1	4		
1970												
1975												
1976												
1977												
1980												
1981	1	2										
1983									1	1		
1984									1	1		
1985												
1986												
1988												
1989												
1990												
1991												
1992												
1996												
1997												
1998												
1999												
2000												
2001	84	92	77	81					1	4	13	14
2002	138	147	14	14					2	6	5	6
2003	94	94	15	36			1	9				
2004	1	1					2	6	9	51		
2005	25	26					2	7	11	56		
2006	12	48					4	21	51	213		
2007	39	120					9	60	47	240		
2008							8	48	14	68	11	30
2009							16	85	11	78	2	10
2010							1	11	8	27		
2011	29	29			4	31						
2012	4	4			3	14	1	10	5	29		
2013	14	14					1	7				
2014							1	8				
2015												
Total	**585**	**729**	**106**	**131**	**7**	**45**	**65**	**334**	**163**	**782**	**31**	**60**

Source: RPM, 2015
Note: Moth – Motherhole, Defl – Deflections

Table 6.2 Summary of exploration drilling within the Lease Area (continued)

Year	Kroondal 304 JQ		Paardekraal 279 JQ		Townlands 272 JQ		Turffontein 302 JQ		Waterval portions combined 303, 305, 306, 307 JQ		Total Lease Area	
	Moth	Defl	Moth	Defl	Moth	Defl	Moth	Defl	Moth	Defl	Moth	Defl
1960							17	56			180	270
1964											1	4
1965											1	4
1970			9	9					15	15	24	24
1975					6	6					6	6
1976					3	3					3	3
1977					1	1					1	1
1980			6	14							6	14
1981											1	2
1983											1	1
1984			1	3							2	4
1985			2	5							2	5
1986			1	5							1	5
1988	3	3	1	5							4	8
1989					19	19					19	19
1990			3	12			1	2			4	14
1991			3	14					4	4	7	18
1992			2	2							2	2
1996			3	6							3	6
1997			3	7							3	7
1998			1	3	2	2					3	5
1999			6	21			7	21			13	42
2000	43	44	3	10					93	165	139	219
2001	5	6	14	21	16	16	1	6	58	59	269	299
2002	1	1	4	13	46	47	2	10	47	52	259	296
2003	162	163	5	34	73	77	26	180	188	188	564	781
2004	38	68	28	152			27	167	124	134	229	579
2005	3	13	75	465	19	26	4	19	49	54	188	666
2006			48	258			20	113	52	68	187	721
2007			26	141			24	118	15	28	160	707
2008			26	149			23	126	39	57	121	478
2009			24	142			16	109	12	48	81	472
2010			14	94			2	9	15	17	40	158
2011			14	84			9	58	15	37	71	239
2012			10	51			4	20	42	96	69	224
2013							1	2	11	12	27	35
2014			1	8					2	6	4	22
2015									6	6	6	6
Total	**255**	**298**	**333**	**1,728**	**185**	**197**	**184**	**1,016**	**787**	**1,046**	**2,701**	**6,366**

Source: RPM, 2015
Note: Moth – Motherhole, Defl – Deflections

6.3.2 Airborne geophysics

The entire Rustenburg area has been covered by a high resolution helicopter borne aeromagnetic ("AM") and radiometric survey, carried out in late 2002 and early 2003 by Fugro Airborne Surveys at a line spacing of 50 m and a sensor clearance of 20 m. Various image processing techniques were used to enhance and aid interpretation of this data and, as shown in Figure 6.3, this allowed interpretation of major northwest – southeast structural trends and east - west striking faults. In addition, two dominant trends of magnetically susceptible dykes have been recognised; the northwest-southeast striking positively and negatively magnetized dolerite dykes as well as the east-west trending dolerite dykes. The AM data has also assisted with the identification of dunite pipes as well as potential IRUP areas. Experience in the BC has however shown that the dimensions of actual IRUP's at the Merensky Reef and UG2 Reef elevations are commonly smaller than the dimensions of the associated magnetic anomaly. Consequently the actual IRUP's have a smaller impact on geological losses than suggested by the AM data. Also apparent is the magmatic layering of Bushveld stratigraphy as an indication of the strike of the orebody.

6.3.3 3D Seismics

Between 2003 and 2007, three 3D seismic surveys were completed across the Rustenburg Operations Lease Area and adjacent regions, with data acquisition undertaken by Compagnie Générale de Geophysique ("CGG"), a French based company, on behalf of RPM. The 2003 Rustenburg survey was a low resolution regional survey, while the 2005 Paardekraal (now Thembelani Mine area) and 2007 Rustenburg Deeps area (Siphumelele and Khomanani Mines) were high resolution surveys. These seismic surveys were merged and reinterpreted during the 2007 campaign, while also integrating new drillhole information from all areas across the Rustenburg Operations Lease Area.

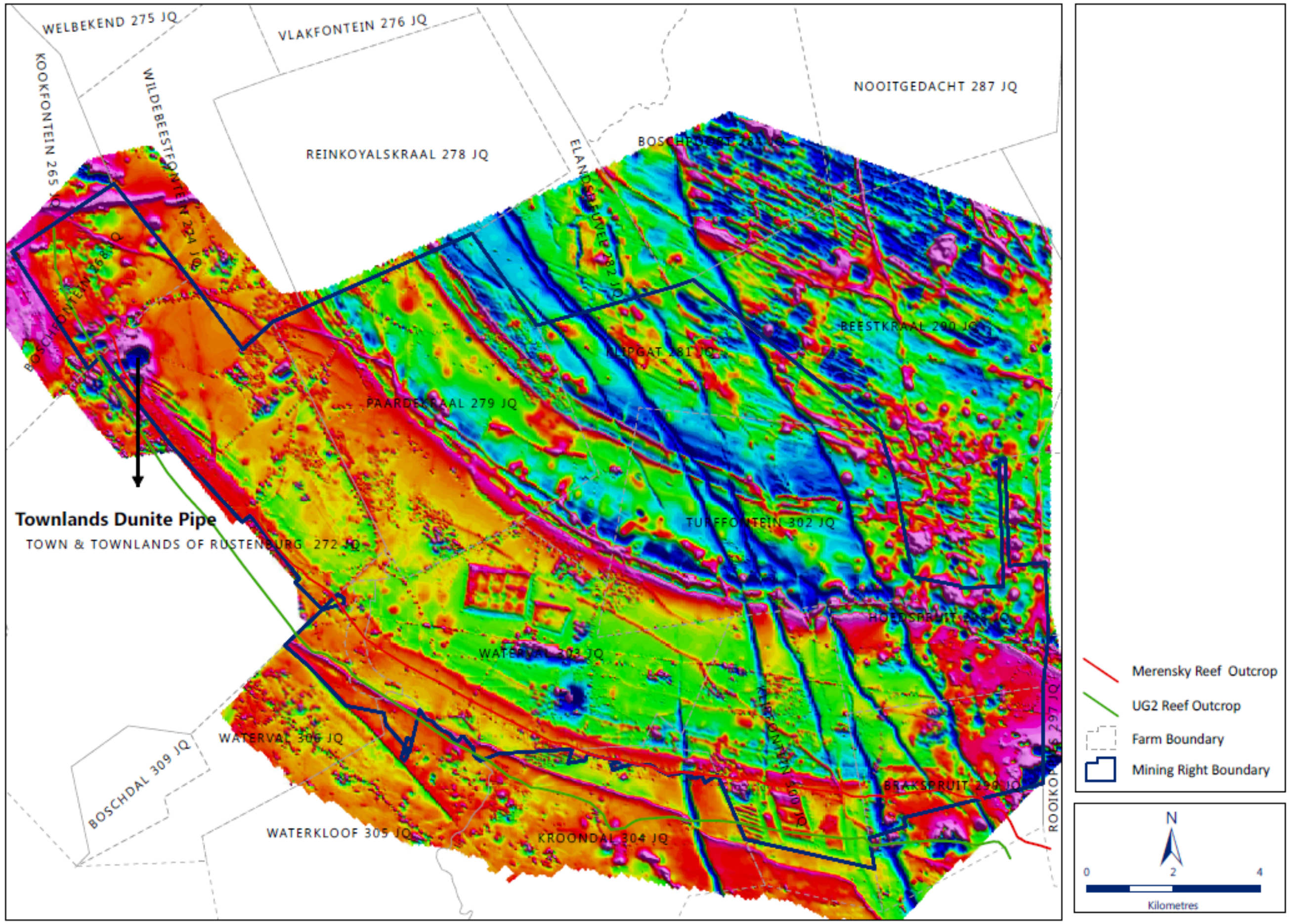
Modelling and interpretation of the merged seismic datasets was carried out by Rock Deformation Research Limited ("RDR"), a company contracted by RPM. Although the Merensky Reef and UG2 Reef could not be imaged directly, close approximations are provided by near reef reflectors which are laterally persistent and stable across the Rustenburg Operations Lease Area. The modelled UG2 and Merensky Reef surfaces show very good correlation with drillhole control.

The seismic surveys contributed important and precise identification, and confirmation of structural patterns and of faults, geometry of economic horizons, major/regional depression-like features and larger potholes. This is of great value in the computation of fault throws, geological reef losses and also provides detailed insights into stratigraphic variations across the property. Isopach estimations for various units show very good correlation with drillhole observations and gives confidence that the seismic widths interpreted indicate real geological variation. This also suggests that the seismic data can be used to support drillhole isopach estimates in areas of low density drillhole coverage.

However, as the seismic model is calibrated to drillhole intersections, the accuracy of predicted elevations tends to diminish away from drillhole control.

The seismic data interpretations are of high quality and can be relied on as providing realistic models of the geology for the Rustenburg Operations area, which when combined with other datasets, will be of great value for exploration and mine planning in the future, not only within the current mining and development project areas, but also in the area beyond the current LoM.

Figure 6.3 Aeromagnetic survey for the Rustenburg area



Source: RPM, 2015

6.3.4 Exploration expenditure

Surface drilling

Table 6.3 shows the three year historical expenditure and planned 2016 expenditure on exploration associated with surface drilling within the Rustenburg Operations Lease Area. Exploration expenditure has been split into Stay in Business ("SIB") capital and Prospecting Works Programs ("PWPs") surface drilling. No SIB surface drilling is planned for 2016 and beyond. Provision has been made for further drilling on the Hoedspruit Prospect.

Since 2009, surface drilling exploration expenditure within the Rustenburg Operations Lease Area has been declining, primarily as a result of comprehensive surface drilling programs undertaken in earlier mining phases of Rustenburg Operations. The confidence level in the Mineral Resource is such that limited surface drilling is required in the near future. Underground exploration is required to replace the current surface drilling program, especially in areas where housing developments on surface prevent access to potential drill sites.

Table 6.3 Rustenburg Operations surface drilling exploration expenditure

	Value (in ZAR M)			
	2013	**2014**	**2015**	**2016 budget**
Mines				
Siphumelele 1	1.9	-	-	-
Thembelani	-	-	-	-
Bathopele	1.3	-	1.7	-
Total mines exploration expenditure	**3.2**	**-**	**1.7**	**-**
Prospects				
Hoedspruit	1.3	1.5	-	2.7
Waterval Kite	-	0.3	-	-
Paardekraal	-	1.5	-	-
Total prospects exploration expenditure	**1.3**	**3.3**	**-**	**-**

Source: RPM, 2015

During 2015 surface exploration drilling was conducted on Bathopele Mine to delineate a large pothole ahead of mining. Further surface drilling for pothole delineation may be required in the future.

The PWP surface drilling over the past three years has focused primarily on the Hoedspruit prospect. A deep-level surface drillhole is planned for 2016. Drilling on Waterval Kite and Paardekraal prospects in 2014 was conducted prior to these prospects being incorporated into the current Mining Right. A Mining Rights amendment (Section 102) has been applied for and is pending with the DMR.

Underground exploration and channel sampling

Table 6.4 shows the four-year historical expenditure and planned 2016 expenditure on underground exploration and channel sampling at Rustenburg Operations.

Underground exploration drilling and channel sampling expenditure at the Rustenburg Operations is aligned to the Mineral Reserve development. It must be noted that that the industrial actions of 2012 and 2014 resulted in work stoppages at the Rustenburg Operations, resulting in reduced Mineral Reserve development and underground drilling and channel sampling expenditure. Table 6.4 shows that the underground drilling and channel sampling expenditure in 2016 will increase as a result of the inclusion of the UG2 projects in the business plan and the increased Mineral Reserve development.

Table 6.4 Underground exploration and channel sampling exploration expenditure

	Value in ZAR M				
	2012*	**2013**	**2014***	**2015**	**2016 budget**
Underground exploration drilling					
Siphumelele (School of Mines)	0.4	0.0	0.0	0.0	0.0
Siphumelele 1	0.6	0.8	0.5	2.1	2.5
Thembelani	2.4	2.9	2.0	2.4	4.9
Khuseleka	0.5	0.5	0.5	0.5	4.2
Bathopele	1.0	1.1	0.9	2.5	2.4
Total underground exploration drilling	**4.9**	**5.2**	**3.9**	**7.4**	**13.9**
Underground channel sampling					
Siphumelele (School of Mines)	0.0	0.0	0.0	0.0	0.0
Siphumelele 1	1.4	2.1	1.9	2.3	3.1
Thembelani	2.8	3.3	1.6	1.8	4.8
Khuseleka	1.1	2.3	1.3	2.6	3.3
Bathopele	2.2	2.5	1.7	1.5	2.4
Total underground channel sampling	**7.6**	**10.2**	**6.4**	**8.3**	**13.7**
Total underground exploration expenditure	**12.4**	**15.5**	**10.4**	**15.7**	**27.7**

Source: RPM, 2015
*Note: * Periods affected by industrial actions (work stoppages)*

6.4 Mineralogical and metallurgical ("M&M") analysis

T1.4B(i)(ii), T3.2C(i)-(iii)

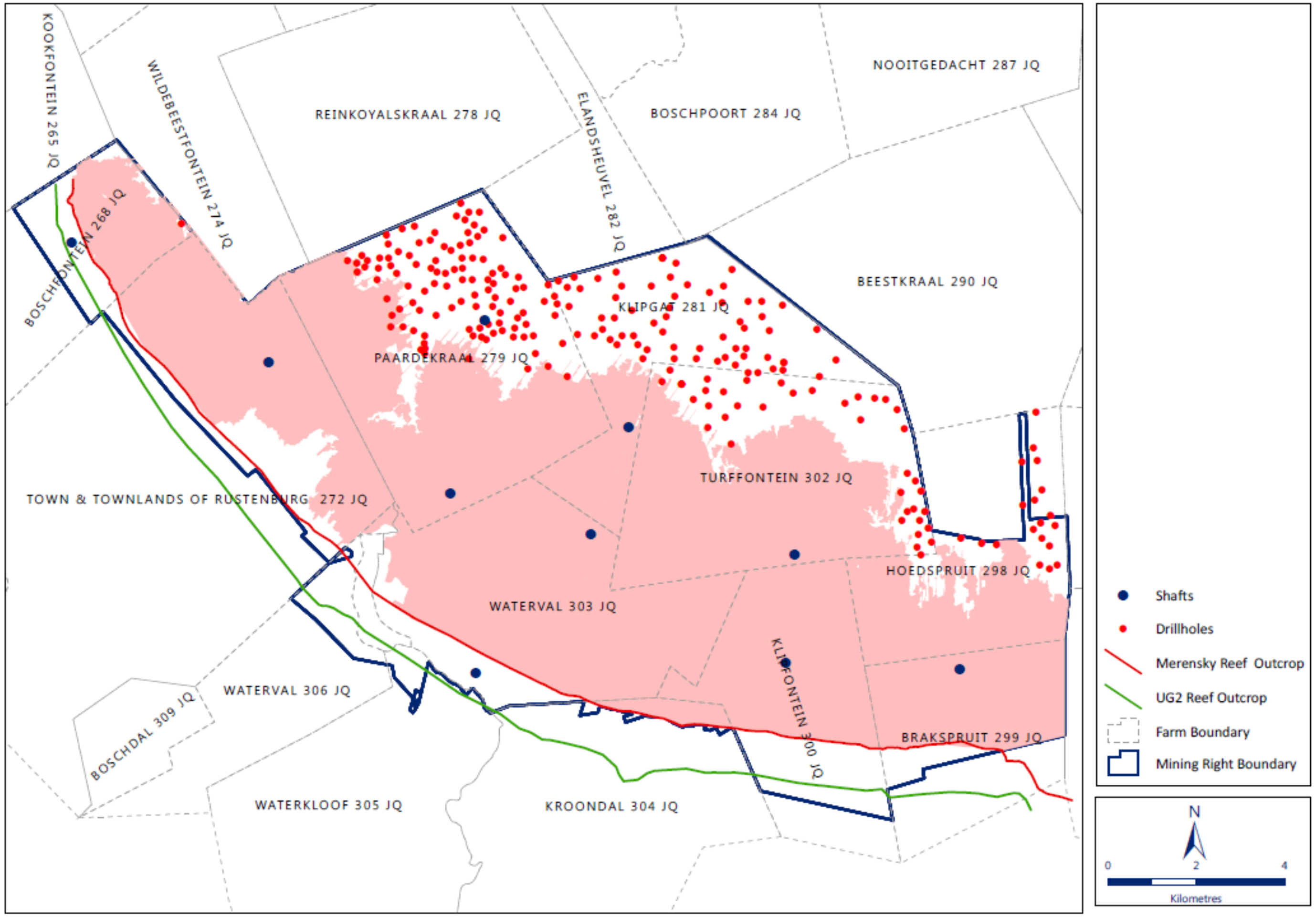
Figure 6.4 and Figure 6.5 reflect the distribution of the Merensky and/or UG2 Reef intersections that have been submitted for M&M analysis respectively. This has been conducted primarily over the past 12 years where complete reef intersections from selected drillholes of either the Merensky Reef or UG2 Reef or both reefs were submitted for analysis. A total of 236 Merensky Reef and 328 UG2 Reef intersections have been submitted for analysis.

The material was initially crushed to less than 3 mm. Although the samples are crushed the particles are still large enough to preserve textural information and association data. The prepared polished sections were also studied using optical microscopy and image analysis (Optimas). All relevant data such as alteration, association and grain sizes of base metal sulphide and chromite grains were noted. The polished sections were also submitted to QEM*SEM for bulk modal analysis.

The platinum-group minerals were detected using a semi-automatic detection program on the scanning electron microscope. This program utilizes the high backscattered brightness of the PGEs to locate each particle. The particle is then returned and notes made regarding its composition, mode of occurrence and grain size. The data is then entered into the PGE database in order to extract all the relevant information regarding the PGEs present in the particular drillhole.

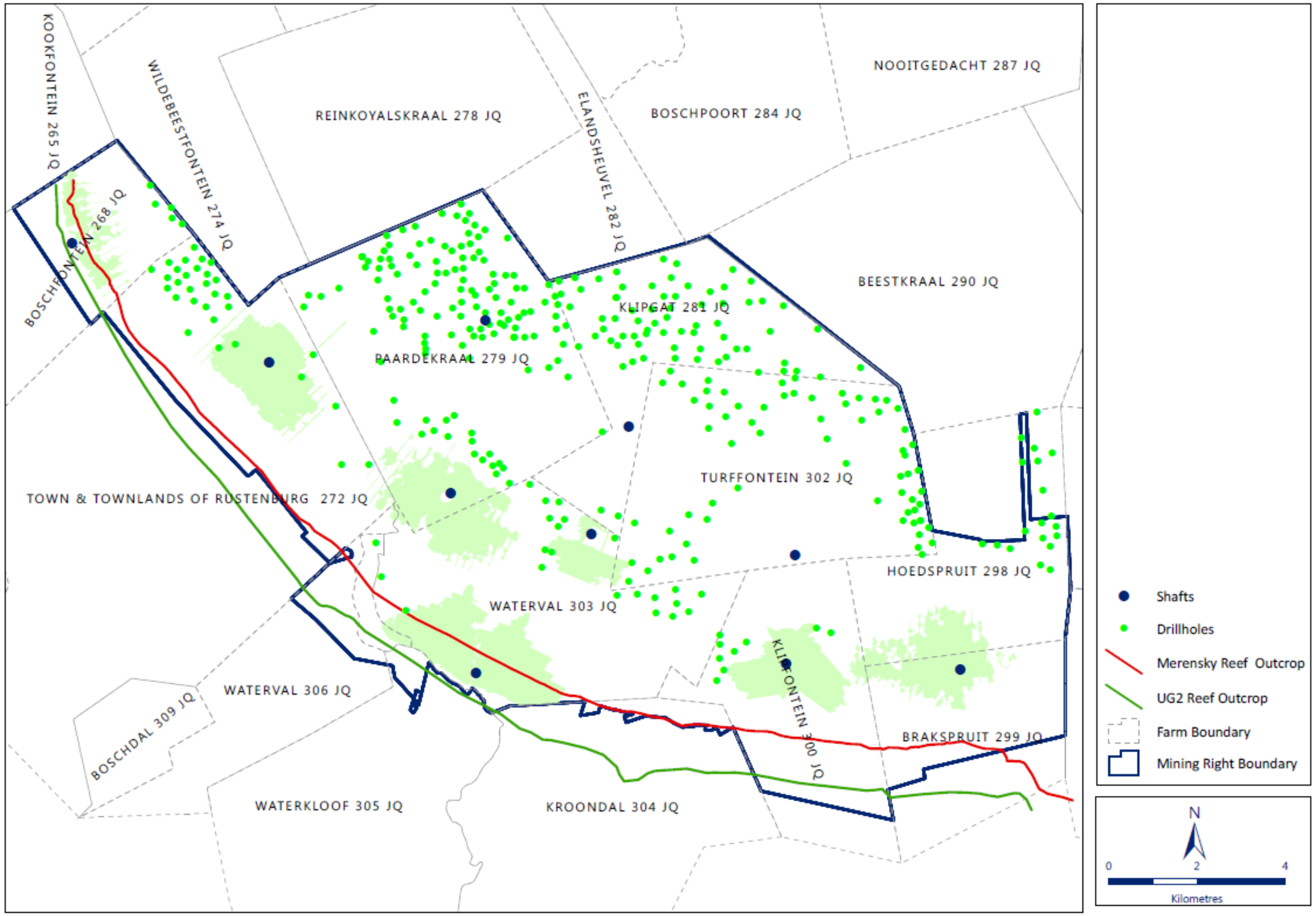
Standard flotation tests were done on each sample using a single stage grind of 60% -75 µm. The flotation concentrates were submitted for Pt, Pd, Rh, Au, Cu, Ni, Cr_2O_3 and S assay. Aliquots of the rougher tailings and head samples were submitted for Pt, Pd, Rh, Au, Cu, Ni, Cr_2O_3 and S analysis.

Figure 6.4 Distribution of mineralogical/ metallurgical intersections within Lease Area for Merensky Reef



Source: RPM, 2015

Figure 6.5 Distribution of mineralogical/ metallurgical intersections within Lease Area for UG2 Reef



Source: RPM, 2015

Table 6.5 represents a summarised recovery trend across the Rustenburg Operations and the individual M&M reports should be studied for more detailed and specific results. The same would apply for the mineralogical test work results which will be area and reef facies specific.

Table 6.5 General recovery results

Reef type	General recovery results
UG2 Reef	Altered ~85% Pt ~80% Pd Unaltered >90% Pt >90% Pd
Merensky Reef	Altered ~85%Pt ~80%Pd Unaltered >90%Pt >90% Pd

Source: RPM, 2015

6.5 Geological structure

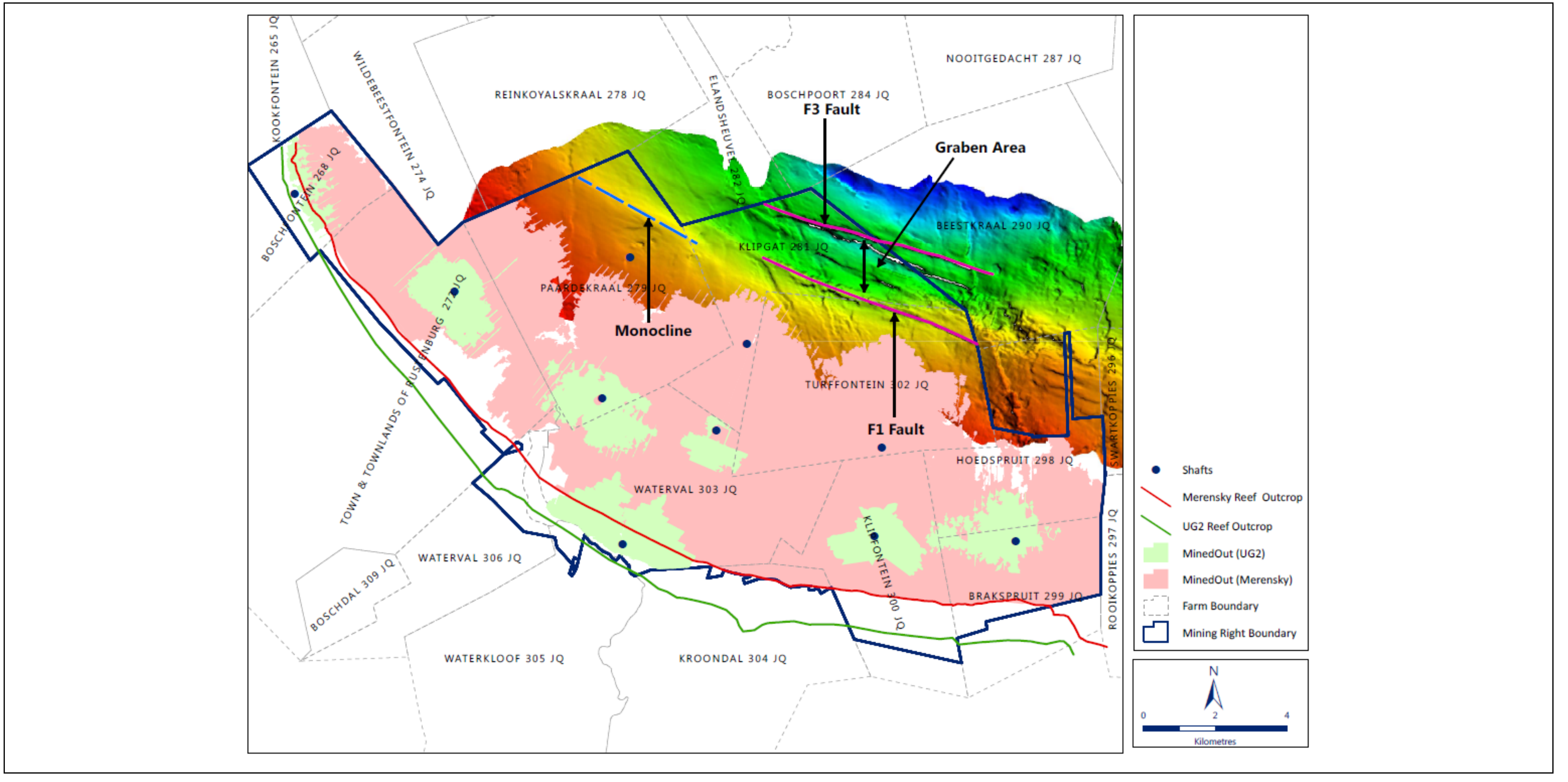
T1.4B(i)(ii), T2.2A/B (ii)

The main PGE bearing reefs form an open arc from east to west in the Rustenburg Operations Lease Area, with the strike varying from 90º in the east to 145º in the west. The dip of the reef is generally constant, at between 9º and 10º. On the farm Paardekraal, the dip decreases locally to between 1º and 5º (in a feature called the Regional Depression) and increases to between 15º and 30º along a Monocline trending roughly east to west at depth. The dip decreases to between 3º and 7º across the farms Klipgat and to a lesser extent Turffontein, in a graben area, roughly trending east to west.

The persistence of the Merensky Reef and the UG2 Reef has been established mainly by extensive surface and underground drilling as well as 3D seismic surveys. The only aberration to this pattern is in the vicinity of the two major dunite pipes, the Brakspruit and Townlands pipes. The vertical separation between the two economic horizons varies between 90 m and 140 m. A regional trend of decreasing separation at depth was established resulting in a middling of about 90 m minimum at depth.

Interpretations of the geological structure of the Rustenburg Operations Lease Area are informed by surface and underground mapping, exploration drilling, airborne and other geophysical surveys as well as 3D seismic surveys. The accumulated datasets have allowed very detailed structural models to be developed, as shown in Figure 6.6, to which a high degree of confidence can be attached.

Figure 6.6 Rustenburg Operations UG2 Reef

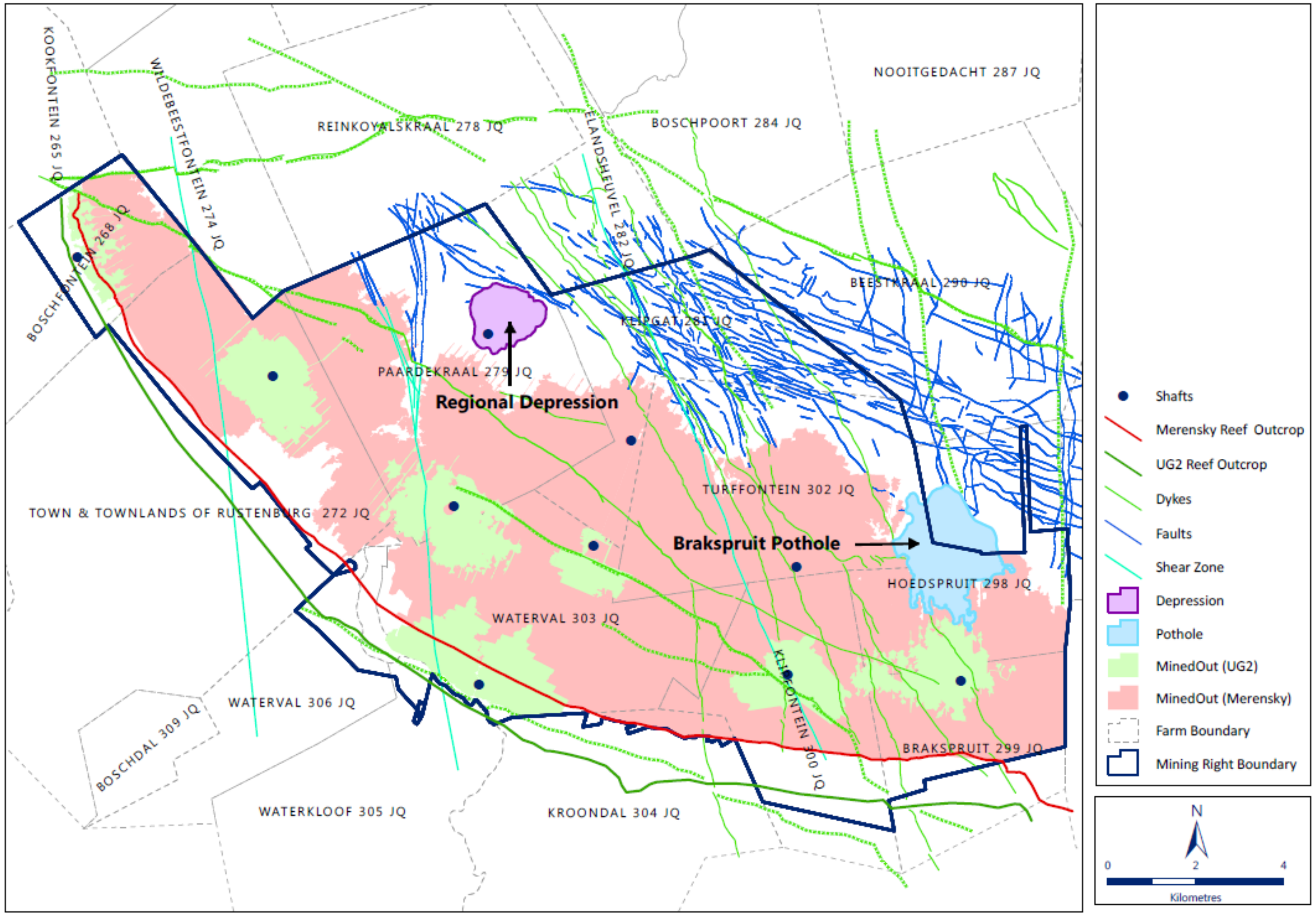


Source: RPM, 2015
Note: Excluding the Boschfontein Area, constructed from 3D seismic and drillhole information coloured on depth below surface

Several well defined fault structures transverse the mine. These faults (such as the Hex River fault) and on occasion dykes, which may have varying displacements of between 5 m and 30 m throws generally display steep dips of between 70º and 90º. Low angle faults do occur but generally have relatively small displacements. At depth, on the farms Klipgat and Turffontein various strike faults trend across the area in an approximate west-northwest to east-southeast direction with various throws. The most significant are the F1 fault which has throws of up to 350 m and the F3 fault with which has throws of up to 120 m. They constitute the boundaries for the regional graben area.

Figure 6.7 shows the main geological structures in the Rustenburg Operations Lease Area for the UG2 Reef. The discontinuities are very similar for Merensky Reef since the structural events post-date the BC emplacement and affect all primary magmatic layering similarly.

Figure 6.7 Geological structural map of Rustenburg Operations Lease Area

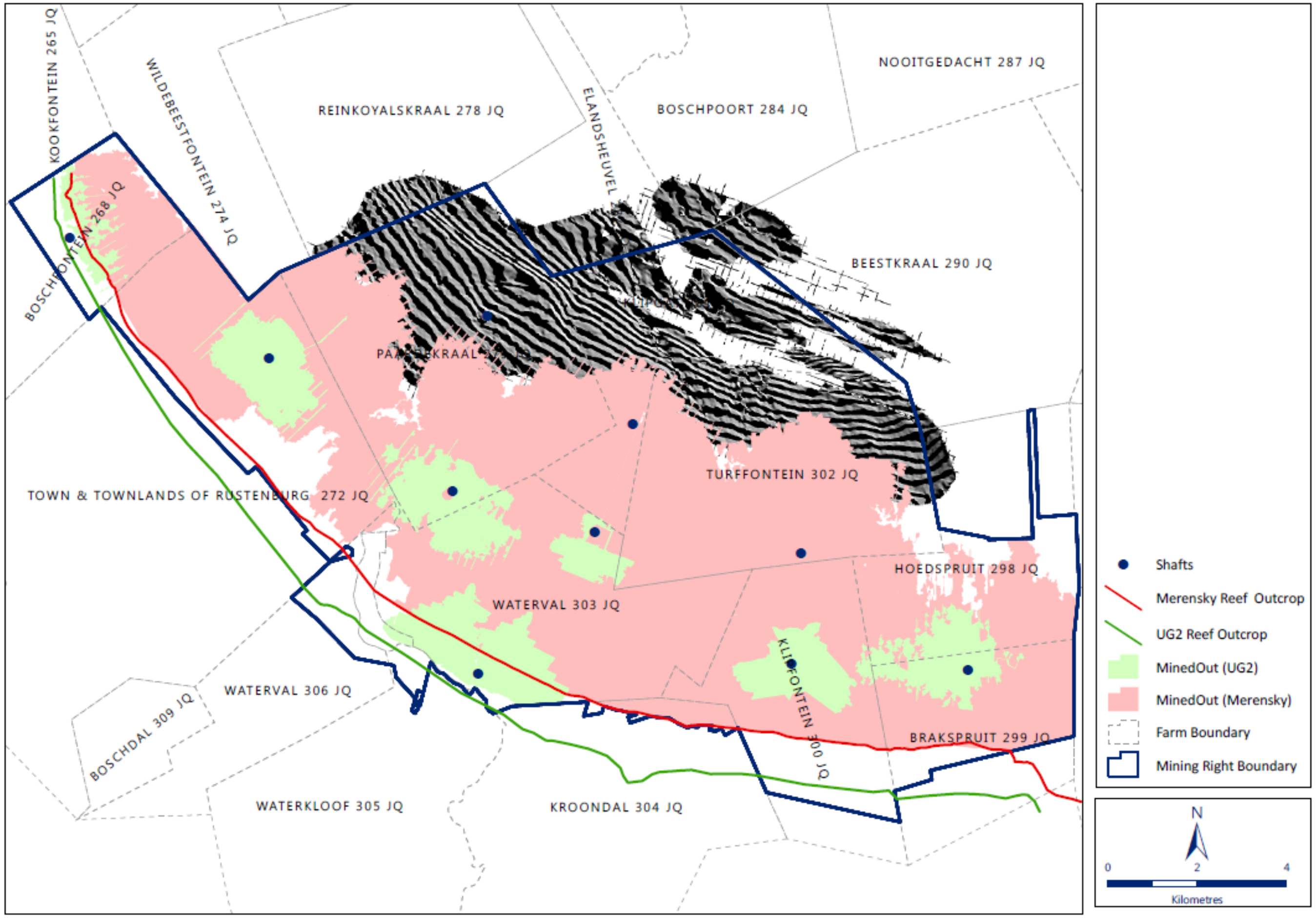


Source: RPM, 2015
Note: Diagram shows only faults that have throws greater than 10 m in blue as well as dykes in green on the Merensky Reef horizon (pink = Mining Rights boundaries)

Various slump like features were also defined from the various datasets, amongst these are two major features, known as the Brakspruit Pothole in the eastern section of Rustenburg, the other a feature named the Regional Depression within the Thembelani 2 Shaft area on the Paardekraal farm, measuring approximately 1.5 km in diameter; where both the Merensky and UG2 Reef horizons are affected.

Figure 6.8 shows an image of the UG2 surface as interpreted from the 2009 merged 3D seismic survey. The UG2 Reef surface is coloured with a zebra stripe colouring which highlights UG2 strike changes on the modelled surface.

Figure 6.8 UG2 strike map



Source: RPM, 2015

Hydrogeology

T10A/B/C(i)

The BC igneous rocks are generally impermeable. The preliminary regional conceptual hydrogeological model focuses on the presence of the network of major structural features (faults, fracture zones, dykes – including the graben related faults) and the possible hydrological connectivity of these as a regional secondary aquifer system. The existing mined out area exposes most of the relevant regional faults and dykes and this conceptual model is discounted after underground visits, fissure inflow sampling and discussions with shaft geologists. Apart from sections of the Hex River/Small Hex River fault system, there appears to be no major deep groundwater storage or hydraulic connectivity associated with the regional structures exposed underground. Deep fissure inflow is generally limited to seepage and low inflow zones (associated with structural features). Hydro chemical and isotope data indicate either the presence of old hyper saline groundwater with no significant recent groundwater recharge or as in the case of the Hex River/Small Hex River fault system, mixed saline and recharged surface water suggesting areas of circulation.

During the early stage of the hydrogeological investigation, evidence of restricted hydraulic connectivity could not be assumed for the "Turk" graben area (previously known as the Turffontein and Frank area), which has not been exposed by underground development, and further investigation will be required. The investigation focussed within the Shaft envelope area which included the proposed Main and Ventilation Shaft sites, the southern boundary (F1 fault), northern boundary (F3 fault) and central graben faults as well as crosscutting dolerite and syenite dykes. This was undertaken using a multidisciplinary approach, employing a combination of geophysical, geological and hydrogeological methods.

Various detailed hydrogeological reports exist for areas where vertical production and ventilation shafts were sunk or planned (Thembelani and Khuseleka) as well as for the Rustenburg Deeps area with comprehensive reports by ERM (ERM, 2012 and ERM, 2009), Cheshire (2005), and Kotze and Schesh (2005), as referenced in Section 20.

6.6 Stratigraphy

T4.1A(i)

The stratigraphy of the RLS as formalised by the South African Committee for Stratigraphy (SACS, 1980) is used in this report.

The Lower, Critical and Main Zones of the RLS are developed across the Rustenburg Operations. The Upper Critical Zone stratigraphy of the RLS, which contains the units of economic interest, the Merensky Reef and UG2 Reef layers, comprises well-developed cyclic units divided into various well defined sub-units as follows:

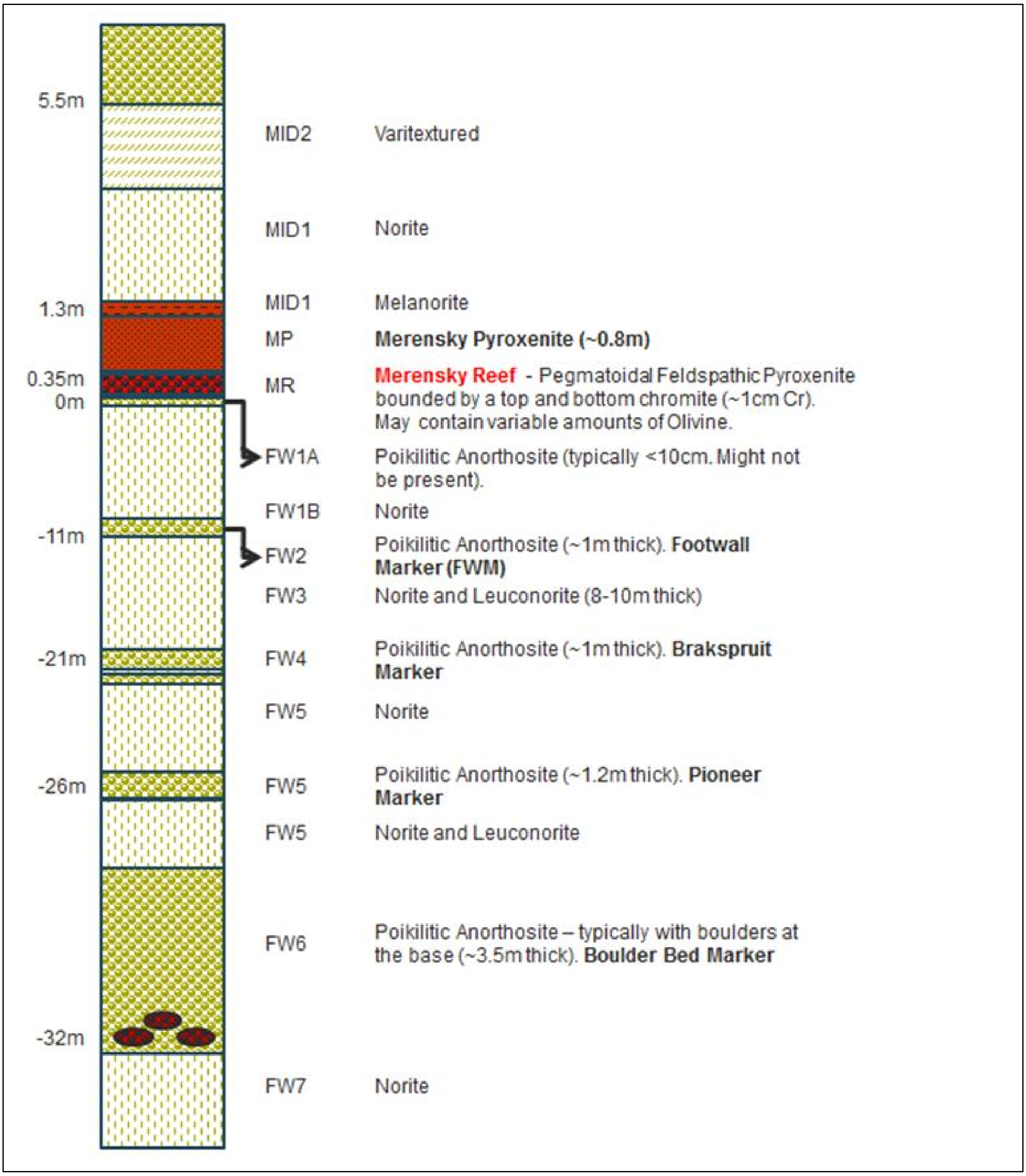
- Bastard Pyroxenite;
- Merensky Reef;
- Merensky Footwall;
- UG2 Hangingwall;
- UG2 Chromitite Layer/Reef; and,
- UG1 Chromitite Layer.

Figure 6.9 and Figure 6.10 illustrate the generalised stratigraphic succession associated with the Merensky Reef and the UG2 Reef in the Rustenburg Operations Lease Area. There are regional minor stratigraphic changes between the farm Boschfontein in the far west and Hoedspruit in the northeast. These are primarily related to thickness variations of the individual stratigraphic units.

The Giant Poikilitic Anorthosite, which is generally regarded as the start of the Critical Zone, occurs typically some 5 m to 10 m above the Bastard Pyroxenite, and approximately between 20 m and 25 m above the Merensky Reef and is typically 7 m to 10 m in thickness.

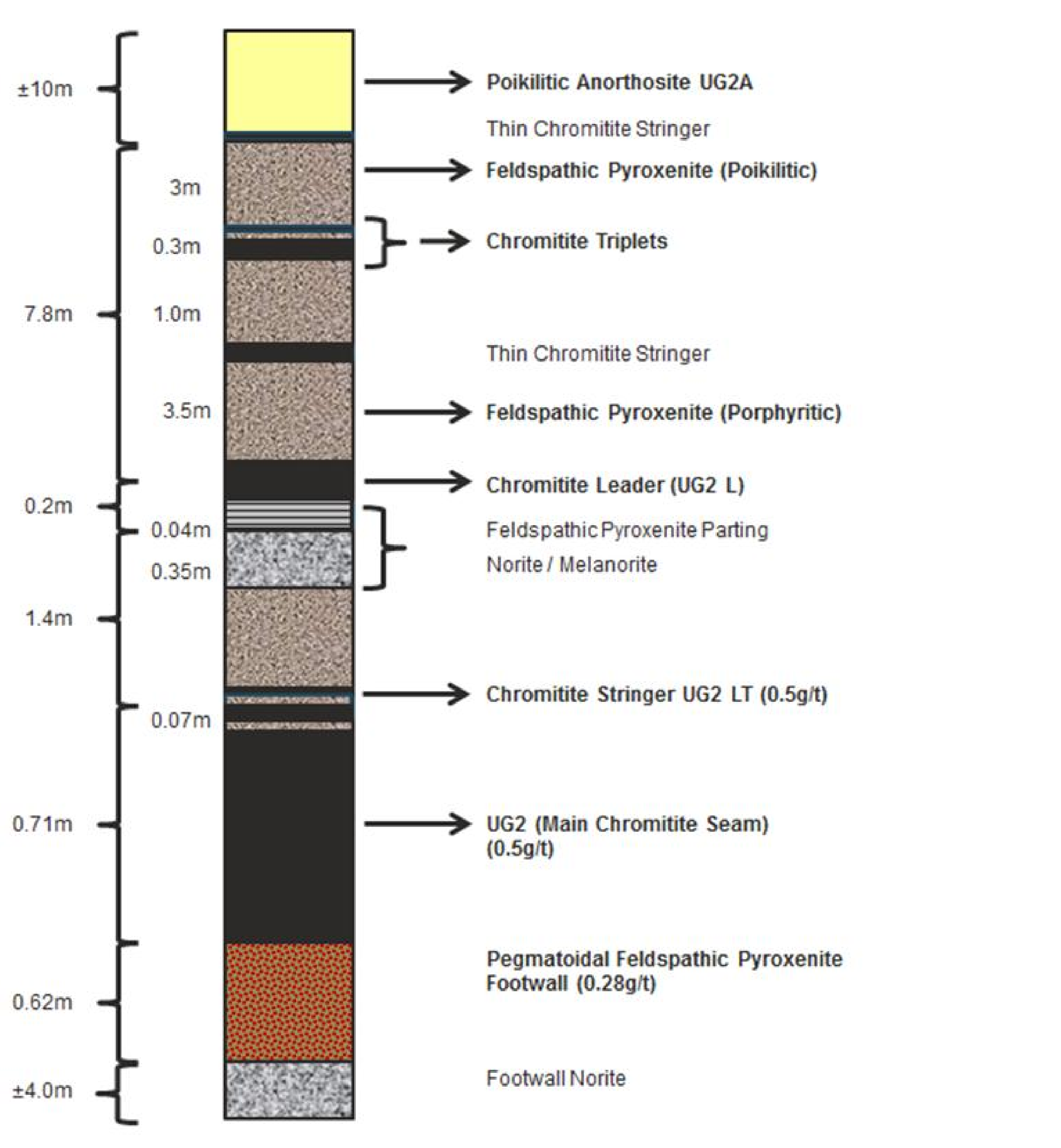
The stratigraphic columns below illustrate the stratigraphy from the Bastard Pyroxenite down to below the Boulder Bed as shown in Figure 6.9 and from the UG2 Reef hangingwall pyroxenite to the UG1 Chromitite layers as shown in Figure 6.10.

Figure 6.9 **General stratigraphic column of the Merensky Reef**



Source: RPM, 2015
Note: Vertical scale applied

Figure 6.10 General stratigraphic column of the UG2 Reef*



Source: RPM, 2015
*Note: * Not to scale*

6.6.1 Merensky Reef

The term "Merensky Reef" refers to the economically important base metal sulphide ("BMS") and PGE enriched layer comprising, texturally variable, plagioclase-bearing orthopyroxenite, olivine orthopyroxenite, chromitite, or less commonly, harzburgite, situated at or near the base of the Merensky Unit.

The hangingwall of the Merensky Reef is a medium grained feldspathic pyroxenite, which grades into a melanorite and ultimately into a norite and a poikilitic anorthosite, above the Bastard Pyroxenite unit. The Bastard pyroxenite is typically 1 m to 3 m in thickness.

The footwall of the Merensky Reef comprises norite/leuconorite and a thin anorthosite layer (10 cm to 20 cm thick), which is underlain by norite. The norite sometimes has a layered texture, where the norite has separated into anorthosite and pyroxenite sub layers.

Several stratigraphic markers are present in the footwall (Footwall Marker, Brakspruit Marker, Pioneer Marker), one of which is the Boulder Bed, a poikilitic anorthosite layer, some 20 m below the reef. Elongated boulders of coarse grained pyroxenite (often pegmatoidal) occur within the layer giving the marker its name.

Throughout the Western Limb of the BC, the style of occurrence of the Merensky Reef is affected by a number of complex geological structures, described as pothole type features, which impact on PGE mineralisation on a local scale.

The variability of the Merensky Reef is a well-known phenomenon. Merensky Reef variability exists in terms of numerous deviations from so-called normal or idealised status. Normal Merensky Reef shows a number of variations, the most common of these being its variation in thickness.

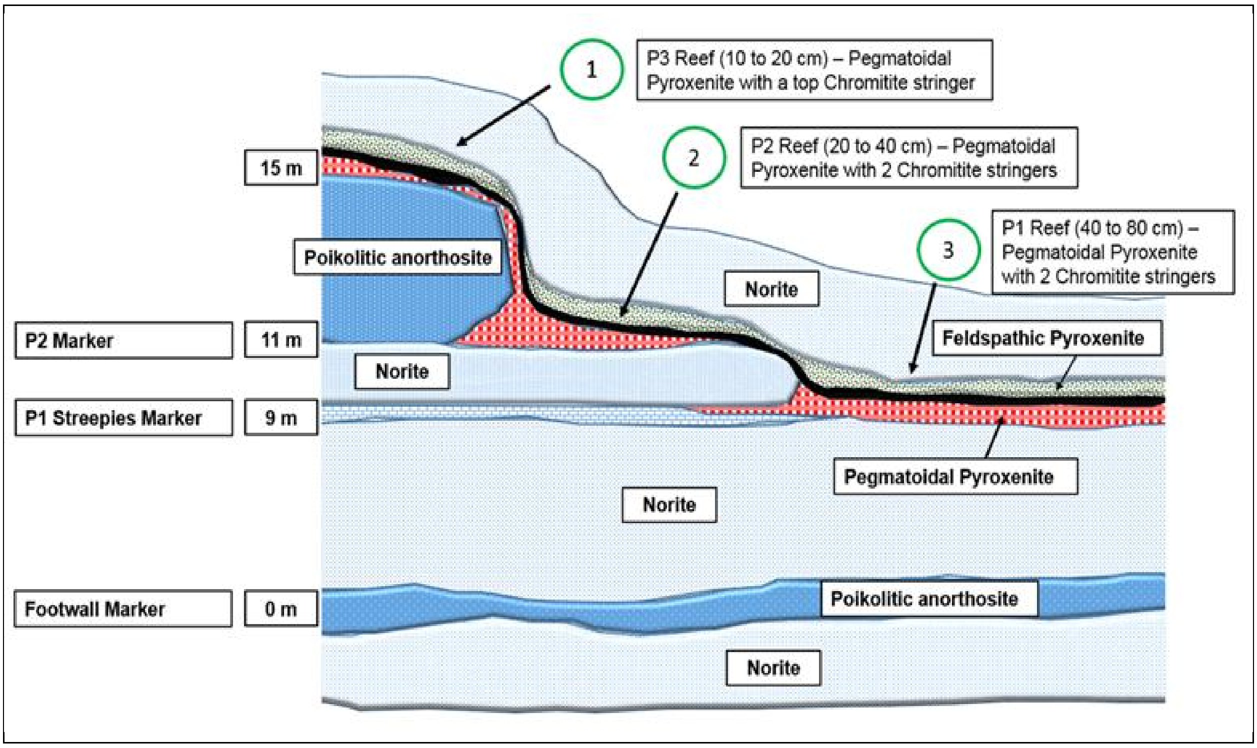
The Merensky Reef is, in most instances, well defined and typically consists of a pegmatoidal feldspathic pyroxenite layer, bounded on the top and bottom by thin chromitite layers. A notable feature of the Merensky Reef is the regularity of thickness, within limits of 5 cm to 60 cm, over large areas. However, variation does occur and the pegmatoidal feldspathic reef can vary locally in thickness, from a few centimetres up to approximately 1.5 m. In the “wide reef” areas there is a tendency for the bottom chromitite layer to be under-developed, or even absent, and the pegmatoidal pyroxenite texture becomes patchier due to the presence of a finer textured pyroxenite. The lower zone of the wide reef tends to be relatively low in value and is often serpentinised.

Merensky Pothole Reef is not as well defined as that encountered further to the north of the Western Limb lobe of the BC at the Union Mine and Amandelbult Mine complexes. However, there are instances where the platiniferous horizon does transgress the normal footwall stratigraphy and rests on a particular unit. The spatial extent of these zones is confined towards the eastern side of the Rustenburg Operations, in the Brakspruit Pothole. Smaller scale potholing occurs but the spatial occurrence, size and frequency is erratic and unpredictable at best. Figure 6.11 presents a schematic illustration of the most prominent Merensky Reef facies within the Rustenburg Operations.

Mineralisation of the Merensky Reef generally occurs in the pegmatoidal feldspathic pyroxenite and to a limited extent in the hangingwall and footwall, with highest PGE concentration peaking at the chromitite stringers. Figure 6.12 shows typical 4E PGE grade profiles for the four basic Merensky Reef (red) feldspathic pegmatoidal facies types. The profiles illustrate the continuation of some mineralisation into the footwall and hangingwall. Economic mining envelopes always contain all three of these components.

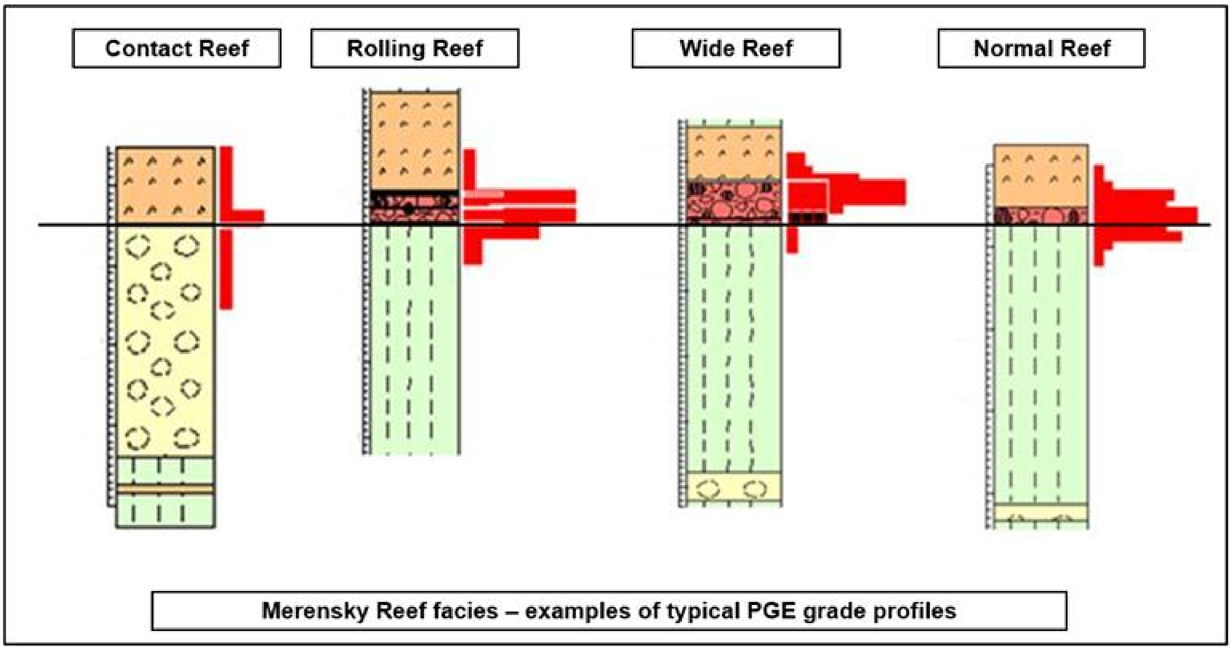
As a consequence the Merensky Reef across the Rustenburg Operations is subdivided into several types of facies but more importantly into geozones which relate to recognisable geostatistical groupings. The 2014 Merensky Reef geozone types are characterised by the differences in reef elevation within the stratigraphic succession, different reef and footwall lithologies, and the width and position of mineralisation within and surrounding the Merensky Reef as well as the geostatistical considerations.

Figure 6.11 Schematic of the basic Merensky Reef facies within the Lease Area



Source: RPM, 2015
Note: Not to scale

Figure 6.12 Typical grade profiles of some Merensky Reef facies types



Source: RPM, 2015
Note: Not to scale

6.6.2 UG2 Reef

The UG2 Reef, which is consistently developed throughout the RLS, is rich in chromitite but with lower gold, copper and nickel values as compared to that of the Merensky Reef. Within the Rustenburg Operations Lease Area, the UG2 Reef occurs vertically between 90 m and 150 m below the Merensky Reef and dips in a northerly direction.

The UG2 Reef is overlain by a 6 m to 7 m thick medium-grained feldspathic pyroxenite (the UG2 pyroxenite) which hosts a succession of thinner chromitite layers commonly referred to as the leader seam and triplets.

The "Main Leader" ("Leader Seam")

This is a chromitite band/layer averaging approximately 15 cm in thickness. The main leader is separated from the UG2 Reef by a layer of feldspathic pyroxenite varying in thickness of between 30 cm and 250 cm.

The Triplet Chromitite Bands ("Triplets")

A 30 cm to 70 cm succession of chromitite stringers/layers interlayered with feldspathic pyroxenite (which often contains disseminated chromitite) occurs. The Triplets are typically developed 2 m to 10 m above the UG2 Reef Main Chromitite Layer.

The most important factor affecting mining of the UG2 Reef is the variation of the stratigraphic separation between the overlying chromitite layers. The UG2 Reef, Leader and Triplets are separated by variable thicknesses, which result in localised thickening or thinning of the stratigraphic package.

Geotechnical concerns exist in those areas where the vertical separation is less than 30 cm between the UG2 Reef Main Band and Leader Band as, in such areas, hangingwall failure may occur during mining operations.

The UG2 Reef is commonly underlain by a pegmatoidal feldspathic pyroxenite layer of highly variable thickness (a few cm to over 2 m) succeeded by norite, pyroxenite and another stratigraphic anorthosite marker. Less commonly, the UG2 Reef is directly underlain by an anorthosite layer and in rare circumstances the UG2 Reef is directly underlain by norite.

The UG2 Reef average thickness varies between 55 cm and 75 cm, and comprises a single, well developed chromitite layer. The immediate hangingwall consists of medium grained feldspathic pyroxenite package of approximately 8 m in thickness, which contains several chromitite stringers.

There are three well developed chromitite units above the UG2 Main Chromitite Band, namely:

- The Chromitite Stringer ("UG2LT") is found approximately 20 cm immediately above the UG2 Main Chromitite Band. The UG2LT tends to merge into the UG2 Main Chromitite Band on pothole edges and within the potholes;
- The UG2 Leader Band Chromitite ("UG2L") is an approximately 20 cm thick chromitite band found approximately 1.4 m above the UG2LT. Its middling to the UG2 Main Chromitite and UG2LT is variable and also depends on their proximity to potholes; and,
- The Triplets are located approximately 6 m above the UG2 Main Chromitite Band; their middling to the reef also depends on their proximity to potholes.

The UG2 Reef is more prone to undulations than the Merensky Reef resulting in rolling reef which, with the variability of the leader position to the main band, creates mining difficulties. UG2 Reef potholing occurs, but the spatial occurrence, size and frequency is erratic and unpredictable.

6.6.3 UG1 Reef

The UG1 Reef package consists of alternating layers of chromitite and white anorthosite, which between the respective lithologies form a natural parting plane due to the lack of cohesion between the chromite grains and anorthosites. Bifurcations and undulations are common within the UG1 Reef package.

In the context of the extraction of the UG2 Reef, the UG1 Reef package will have an impact with respect to the middling to the UG2 Reef and the positioning and/or design and placement of footwall development (haulages) approximately 25 m to 45 m below UG2 Reef in order to provide the necessary ore pass capacity requirements.

7 MINERAL RESOURCES

RPM source documents form the basis of Section 7.

The Merensky and UG2 resource modelling encompasses the entire Rustenburg Operations area and is undertaken by RPM. The descriptions that follow are largely referenced from the associated reports, other collected information and discussions between RPM personnel and its external auditors (such as Snowden and other third parties).

Snowden completed a number of detailed Mineral Resource and Mineral Reserve "estimate" audits at RPM. Snowden's opinion was that the evaluation and reporting of the Resources and Reserves were completed to an appropriate standard and no material errors were identified with the Resource estimates.

The data collection processes, data validation and quality assurance/quality control ("QA/QC") as well as interpretation and estimation methods used to arrive at the Mineral Resource statements for Rustenburg Operations Lease Area have been reviewed by Snowden (Snowden, 2015c).

7.1 Data collection

T2.1A/B/C(i), T2.2A/B(i), T2.3A/B(i)(ii), T2.4A/B/C(i)-(iii), T2.5A(i), T3.1A(i), T3.2A/B(i)-(vi), T3.3 A/B (i)-(v), T3.4A/B(i)-(iv)

Available information comprises drilling and underground sample data, underground mapping as well as remote geophysical and remote sensing data (including aeromagnetic, 3D seismics and wireline surveys). This information is available for the entire Rustenburg area.

7.1.1 Drilling

Diamond drilling is undertaken for both underground and surface exploration. A dry drilling system, using a sonic bit technology, was adopted as a practical solution for maximizing material recovery in a soft material environment for the Waterval tailings dams.

The Waterval tailings drillholes are drilled vertically using 46 mm diameter rods with final depths varying between approximately 20 m on the East tailings dam and between 35 m and 40 m on the West tailings dam. Drillholes were laid out on a 100 m grid with geostatistical crosses designed utilising a 50 m spacing. Collar positions are verified by a certified surveyor and the collars were compared to planned positions and checks done to validate all surveyed collars.

Underground drillholes are drilled at AXT size (35 mm diameter core) and are usually less than 150 m long. Collar positions are verified by the surveyor and bearings and azimuths are based on underground clino-rule measurements. Orientated drillholes are drilled for purposes of structural interpretation. Drillholes at angles less than 60° are not considered for use in the estimation due to the uncertainty of the dip correction in the resource cut compositing process.

For surface exploration holes, the majority core is drilled at BQ size (38 mm diameter core) for both motherholes and a minimum of three deflections. Surface collar locations are sited using hand-held Global Positioning System ("GPS"), the collar positions independently surveyed by two different surveyors and visually verified in ArcView software. Collars are captured into the SABLE Data Warehouse ("SABLE") database and drillhole sites are photographed before and after drilling completion as part of the rehabilitation record.

All surface drillholes are drilled vertically. Downhole surveys using Electronic–Multi-Shot ("EMS") are completed on the motherholes. Over the past five years Gyro Surveys have been conducted on 10% of the drillholes as a check against the EMS surveys. Visual checks are performed in terms of end of hole ("EOH") depths and temperature. Holes are not formally de-surveyed until the estimation stage.

A strict chain of custody is followed with the surface core. Each step in the process between the receipts of the core at the yard to the submission of samples to the laboratory is checked and validated and signed off.

Contract geologists log and mark up the core for sampling at the Waterval Core yard. The responsible geologist then verifies that the logging has been carried out to the correct standards and that the logging and sampling and stratigraphic codes adhere to the standards.

Logs captured into SABLE for each drillhole comprise lithology, structure, alteration, mineralisation, core size and stratigraphy. Core recoveries are generally in excess of 90% especially through the reef and any areas with reduced core recovery are noted in the lithological logging.

7.1.2 Underground mapping

Underground mapping is carried out on a routine basis for all mining excavations by qualified geologists in alignment with AAPL's Group Standard.

Mapping information is entered into a Microstation graphic software package within 24 hours after being verified by the mine geologist with a subsequent report reviewed and signed off by the Chief Geologist or a Senior Geologist. Within 24 hours the mapping information is available for short and long term planning.

The plotting of underground mapping information is governed by a detailed AAPL Group Standard which prescribes all attributes and colour coding of geological features to ensure standardised geology on all underground plans.

7.1.3 Sampling

Sampling is undertaken for all surface drillhole deflections, except those deflections reserved for geotechnical and geometallurgical testwork as well as for all underground sample sections and Waterval tailings dams. External audits (Snowden 2015c) have shown that a good sampling governance practice is in place. All sampling is governed by AAPL's Group Standard.

Drillholes

After logging verification, the core is prepared for geotechnical logging. Half core is sampled for surface drillholes and whole core for underground drillholes, using an approximate sample length of 20 cm (downhole length) for the surface drillholes and between 20 cm and 25 cm for the underground drillholes. Sampling is undertaken on a continuous and consistent basis for both exploration drillhole and underground drillhole core and takes lithological contacts into account as far as possible. The sampling is validated in terms of representation, lithological contacts with respect to the sampling intervals and sampling widths. Sample details are captured in the database and cross-checked against the lithological logging.

Sampling standards comprising blanks and matrix matched Certified Reference Materials ("CRMs") are inserted into the sample stream within reef, hangingwall and footwall samples, ensuring a minimum of one standard every 15th sample. The inserted CRMs utilised within the surface and underground exploration drillholes, since January 2010, are shown in Table 7.1.

Samples are assigned unique consecutive sample numbers. Due care is taken to ensure correct sample numbering and identification. Core is halved using a diamond saw (surface drillholes only) and sample intervals are cut using a hammer and chisel; care is taken to ensure no loss of material or contamination occurs in this process. Since 2009, Archimedes density measurements have been taken on each sample before bagging and tagging: these density measurements are used as a quality control check against the pycnometer assay results from the laboratories.

After the density measurements are completed, the surface drillhole core trays are permanently labelled before they are stacked up in the stacking facility in the Waterval Core yard. All surface drillhole reef intersections are photographed and stored electronically. Underground drillholes are not photographed and the unsampled core is discarded.

The Waterval tailings dam drillhole logging was verified and captured into the SABLE database system as soon as the sample material was collected. Sampling was undertaken on a continuous and consistent basis and validated in terms of representation. Standardised attributes for the tailings dam project were recorded for each sample. The required sample length was 2 m. The drilling procedure (started by drilling an initial 0.5 m), runs for the first 1 m to 2 m, and was found to yield a good sample recovery (as close to 100% as possible). Thereafter 2 m drill runs were completed, although drill runs were reduced if the ground conditions deteriorated.

Tailings dam sampling standards comprising blanks and matrix-matched CRMs inserted into the sample stream, ensuring a minimum of one standard every 15th sample. CRMs used for surface and underground exploration are the same as those inserted in the tailings dam sampling stream. Samples are assigned unique consecutive sample numbers. Due care is taken to ensure correct sample numbering and identification. Sample material is extruded from the rod into the sample plastic bag, shaken to settle the material using its own weight to ensure that it is as closely packed as possible. This allows the sampled material to occupy the whole volume of the plastic sample bag before any measurements of material recovery are made.

Density measurements for the Waterval tailings dams are completed using pycnometer results from the laboratories including the moisture measurement, inclusive of wet and dry mass measurements. Since the compositing procedure is required to weight the grades by density and length, those samples that did not have a pycnometer density assay were assigned the mean ‘compressed’ density of 3.1708, this effectively represents a “whole rock” density. However, for the Waterval tailings dams the undisturbed in-situ density measurement was used for the estimation, as this enables a more realistic value for the in-situ density of the tailings dam material.

Table 7.1 Certified Reference Materials used in surface and underground drillholes

Standard	Laboratory				
	AARL	GEN	SGS	MIN	SP
AMIS0089	-	-	18	-	-
AMiS0252	-	-	2	-	-
AMIS0252	-	-	62	-	-
AMIS0254	-	-	7	-	-
AMIS0256	-	-	32	-	-
G1	272	4	30	-	8
G10	74	3	7	-	-
G12	-	3	15	-	-
G13	-	-	8	-	-
G16	-	-	38	-	-
G17	92	-	295	-	-
G2	341	3	10	-	8
G20	406	10	45	-	-
G21	755	-	221	-	-
G22	-	-	126	-	-
G23	-	-	30	-	-
G24	32	-	192	-	-
G25	145	11	234	-	-
G26	49	-	270	-	-
G27	108	5	118	-	-
G29	11	-	273	-	-
G3	224	-	27	-	8
G30	113	11	276	-	-
G4	818	4	8	34	16
G42	-	-	4	-	-
G5	326	-	12	6	14
G6	830	-	10	252	34
G7	281	-	10	-	8
G8	200	-	-	-	-
G9	2	-	-	-	-

Source: RPM, 2015
Note: AARL – Anglo American Research Laboratory, GEN –Genalysis, SGS – Société Générale de Surveillance, MIN - Mintek, SP – Setpoint. The G standards were produced in-house and SABS certified. The certificates for the AMIS standards can be found at www.amis.co.za.

Underground grade control samples

Underground sampling uses a diamond saw to cut a 4 cm wide channel between which samples are chiselled to a depth of 4 cm. Samples are marked up taking into account the lithological contacts as far as possible (2 cm above and below the top and bottom contacts). Samples are extracted using a hammer and chisel. Sample length dimensions may typically vary between 10 cm and 20 cm and seldom exceed 25 cm depending on the facies, reef type, hangingwall and footwall requirements. Unique sample numbers and codes are assigned and stored in the Mineral Resource Management (“MRM”) database system and samples are labelled using a barcoded sample ticket.

Sampling standards comprising blanks and matrix matched CRMs are inserted into the sample stream within reef, hangingwall and footwall samples, ensuring a minimum of one standard every 10th sample. The inserted CRMs utilised within the underground sample sections, since January 2010, are shown in Table 7.2.

Table 7.2 Certified Reference Materials used in underground sample sections

Standard	Laboratory				
	AARL	EBRL	GEN	SGS	SP
A43	-	2	-	-	-
A47	-	466	2	-	20
AMIS0007	-	2	-	-	-
AMIS0027	-	34	-	-	-
AMIS0034	-	138	-	-	-
AMIS0052	-	191	-	-	6
AMIS0053	-	367	-	-	-
AMIS0063	-	262	-	-	-
AMIS0089	-	392	-	-	-
AMIS0108	2	892	-	-	-
AMIS0122	-	4	-	-	-
AMIS0166	-	4	-	-	-
AMIS0252	-	771	-	-	-
AMIS0254	-	139	-	-	-
AMIS0256	-	283	-	-	-
AMIS0350	-	2	-	-	-
G01	-	1	-	-	-
G09	-	27	-	-	-
G12	-	18	-	-	-
G16	-	683	-	-	-
G17	-	55	-	-	-
G20	-	1,996	28	-	85
G21	-	12	-	-	-
G22	-	1,814	2	10	8
G23	-	2,065	-	-	8
G24	-	358	-	-	-
G29	-	18	-	-	-
G30	-	40	-	-	-
Quartz Blank	-	388	-	-	-

Source: RPM, 2015
Note: AARL – Anglo American Research Laboratory, GEN –Genalysis , SGS – Société Générale de Surveillance, MIN - Mintek, SP – Setpoint. The G standards were produced in-house and SABS certified. The A standards were produced in-house and SABS certified. The certificates for the AMIS standards can be found at www.amis.co.za

7.1.4 Data management and database

Procedures are in place to ensure accuracy and security of the databases. Mine data are split into two databases: exploration drilling and underground sample sections. All the surface and underground exploration drilling data is stored using SABLE Data Warehouse software. The underground sample section data is stored in a separate database known as the MRM database. The SABLE database administrator oversees data management procedures while the database manager on site oversees exploration drillhole data. Data capture is continuous, regularly monitored and validated. Information stored in the database includes collar coordinates, dates of completion of each stage, survey data, lithological logging, alteration logging, structural logging, mineralisation, core size, sampling, CRM information and assay data.

External audits and/or checks on these databases have been undertaken by Snowden on a regular basis (Snowden, 2015c) as part of the end of year resource modelling and detailed numbers audit scope of work requirement.

Drillhole data

SABLE is used for the direct capture, validation, verification and management of all drillhole data. The SABLE database system contains internal checks and validations of sample or lithological overlaps, sample numbers, CRM values, EOH depths and duplicated entries. In addition, the mine undertakes its own routine and random drillhole data validation and verification. SABLE View plots are generated in order to check and verify the logging, sampling and stratigraphic coding assay alignment and stratigraphy.

The SABLE database consists of two branches, namely “complete” and “incomplete”. Data is initially entered into the incomplete branch and only moved to the complete branch after a rigorous validation process. The drillhole assay data is extracted on a monthly basis and evaluated for within-laboratory precision and accuracy using customised scripts in a statistical software package called JMP. Any erroneous and/or queried assay results are identified and QA/QC recommendations made. The dedicated Rustenburg Operations resource geologist performs additional validations on this dataset and confirms the use or non-use of the assay data. If additional pulp material remains this can be re-submit for re-analysed. Approximately 10% of the samples analysed at the primary laboratory are re-submitted for assay at a check laboratory for control purposes. The evaluation of these results, as well as regular audits of all the check laboratories, is done by Group Evaluation Metal Accounting (“GEMA”). Only data in the complete branch that has passed both the precision and accuracy criteria is used for resource grade estimation.

SABLE is used for the direct capture, validation, verification and management of all the Waterval tailings dam drillhole data. The Waterval tailings dam SABLE database system contains internal checks and validations of sample or lithological overlaps, sample numbers, CRM values, EOH depths and duplicated entries. The Waterval tailings dam drillhole assay data is extracted and evaluated for within-laboratory precision and accuracy using customised scripts in a statistical software package called JMP. Any erroneous and/or queried assay results are identified and QA/QC recommendations made. Approximately 10% of the samples analysed at the primary laboratory are re-submitted for assay at a check laboratory for control purposes. The evaluation of these results, as well as regular audits of all the check laboratories, is done by Group Evaluation Metal Accounting (“GEMA”). Only the Tailings dam drillhole data that has passed both the precision and accuracy criteria is used for resource grade estimation.

Databases are regularly backed-up on the head office servers. As logging and sampling procedures have been refined and applied to historical holes the SABLE Data Warehouse has been updated to reflect the newly logged information.

Underground data

Underground sampling data are reported as a 4E PGE value (prill splits, base metals and density are recorded and extracted for use in the resource modelling estimation process). Any missing assay values or invalid assay values are not authorised and therefore not used for resource grade modelling.

Underground assay results are extracted and evaluated on a weekly basis using the same evaluation criteria and customised scripts in JMP as for the drillhole data. Any erroneous and/or queried assay results are identified and QA/QC recommendations made. Approximately 10% of the samples analysed at the primary laboratory are re-submitted for assay at a check laboratory for control purposes. The evaluation of these results, as well as regular audits of all the check laboratories, is undertaken by GEMA.

The underground sample section data is subjected to additional validation procedures by the Resource Modeller prior to being considered for grade estimation purposes.

7.1.5 Assay procedures

The surface, underground and tailings dam sampling assays are analysed by various ISO accredited laboratories for the Rustenburg Operations. The following ISO accredited laboratories have been utilised since January 2010 (Table 7.1 and Table 7.2):

- Anglo American Research Laboratory (“AARL”);
- Genalysis Laboratory Services (SA) (Pty) Limited (“Genalysis”);
- Société Générale de Surveillance SA (“SGS”);
- Mintek (Pty) Limited (“Mintek”); and,
- Set Point Industrial Technology (Pty) Limited (“Setpoint”).

Sample preparation is carried out using appropriate methods. Samples are assayed for 4E (Pt, Pd, Rh and Au), Cu and Ni. The 3E (Pt, Pd, and Au) analyses are carried out using a twin stream Pd fire assay with Ag as co-collector and Inductively Coupled Plasma Optical Emission Spectrometer (“ICP-OES”) finish. Historically Rh was only analysed if the 3E value was greater than 1.5 g/t, using a twin stream Pd collection fire assay with a Pb co-collector and ICP-OES finish. The results of both 4E/3E analyses are stored in the database, and a mean value is used for estimation. Cu and Ni are analysed using X-Ray Diffraction (“XRF”) and density is analysed using a pycnometer. Assays, including the results from laboratory internal standards, are reported within one to three month turnaround time. Prill assays are stored in the SABLE database and the underground MRM database.

7.1.6 Quality assurance/quality control

Data collection procedures and database QA/QC

The database manager at Rustenburg Operations validates surface, underground and tailings dam logging, sampling and data-capture routinely. Shaft geologists undertake plan task observations on geological practices on a regular basis, which is signed off by the Chief Geologist. Structural plans are signed off on-mine by the Chief Geologist.

Validation of drillholes and print copies is completed visually and the responsible geologists verify that logging and sampling has been carried out to the correct standards and adheres to the protocols. Original logs are stored on site.

The data collection is of a good standard, and sufficient to enable confidence in use of the data for estimation. The internal validations in the software and additional validations carried out ensure that data is of a high standard, and sufficient to enable confidence in use of the data for estimation.

Assay QA/QC

A sufficient number of standards and blanks are inserted into the sample stream (equivalent to between 5% and 15% of all samples). Standards consist of in-house standards as well as "AMIS" CRMs. All in-house standards have been South African Bureau of Standards ("SABS") certified using a round robin process. Standard that have not been certified are not used as a "blind" Standard. The CP considers there to be no Standard being used that is not fully certified. All QA/QC samples (CRMs and blanks) are in pulp form and the identity of each standard is not known by the laboratory. Coarse silica sand is used as a blank to investigate for any potential contamination.

All current underground sample section samples are analysed at the Eastern Bushveld Regional Laboratory ("EBRL") near Polokwane. The PGEs (except for Au) are analysed in replicate (twin stream format) whereas for the base metals and density, these are analysed in single stream (one value per sample).

The current drillhole samples are analysed at the SGS laboratory in Johannesburg. The PGEs are analysed with a 25% replication requirement as per the current standard, whereas for the base metals and density, a 10% replication requirement is standard practise.

All drillhole, underground and tailings dam assay results are subjected to a detailed and extensive QA/QC evaluation process using customised scripts in a statistical software package known as "JMP". Only assay results that have passed this test are used to calculate a 4E PGE value. Assay results that fail are reported back to the Rustenburg Operations where a check is conducted as to if there is sufficient pulp material is left, so that samples may be re-submitted for analysis.

In the event of the pair of assay results not being within 10% of each other a re-analysis is automatically performed, provided that sufficient sample pulp material remains. Repeat assays have been completed on a selection of the remaining pulp samples for both the exploration drillholes and underground sample sections.

A further 10% of all samples are sent to an umpire laboratory as a check (e.g. Genalysis in Perth) to investigate the inter-laboratory precision. RPM notes that although no field duplicates are performed, each reef (Merensky and UG2 Reefs) is drilled with inclusive of a number of deflections, thereby obviating the need for field duplicates.

The listed laboratories in Table 7.1 and Table 7.2 use standardised laboratory analytical QA/QC processes to check for contamination, ensuring accuracy and repeatability. External third parties (including the report by Snowden, 2015c) consider the laboratory standards and procedures to be adequate for confidence in the reported assay results.

QA/QC analysis is completed on a batch by batch basis and batches are rejected if errors are encountered. The laboratory produces an internal QC report on a monthly basis. This report is provided to RPM who checks the data to ensure that the results are in line with those reported by the laboratories. In depth QA/QC analysis is performed in preparation for a resource modelling exercise using customised software for the evaluation of assay results which produces a QA/QC report detailing findings and any anomalous assays. The QA/QC procedure makes use of scatter plots, histograms, classical statistics, plots of absolute difference between samples, percentage bias and control charts for CRMs as well as methods to identify potential outlier values. This report is provided to the Resource Modeller who evaluates the outliers, record their decisions and document any appropriate action.

Extensive data audits and QA/QC reporting are undertaken and documented by RPM prior to resource estimation exercises. External third parties, including Snowden's opinion (Snowden, 2015c) consider that the internal and external audits have been thorough, and have identified and addressed data issues adequately for Resource estimation purposes.

7.2 Resource estimation

T1.4B(i)(ii), T2.3A/B(i)(ii), T4.1A/B(i)-(iv), T4.2A/B/C(i)-(vi), T7A/B(i)-(iv), T8A/B(i)-(iv)

The Merensky and UG2 Resource models are updated by a dedicated Resource Modeller at the Rustenburg Operations. This is completed annually after the drillhole and underground MRM database sign-offs and subsequent structural and geological loss sign-offs. The Merensky and UG2 resource models are reviewed and compared to the previous year's resource model and signed off by a competent person's team prior to being handed over to the mine planning department. Three dimensional Resource models for the Waterval East and West Tailings dams were undertaken in 2010 after an exploration drilling programme had been completed.

7.2.1 Data validation

Data validation is undertaken according to RPM standards and protocols; and includes drilling, logging, sampling, assaying, QA/QC, database management data components.

RPM manages the drillhole data (inclusive of the Waterval tailings dam drillholes) in the SABLE database, and use its in-built validations to check for logging continuity within individual drillholes/deflections, missing information and other basic checks. Underground grade control sample section data is stored in a separate database. Outside of the databases, an iterative validation-editing cycle was followed. Prior to any Resource modelling exercise, extensive validation procedures were used to check the drillhole and underground sample section information, which includes the information available from other sources (such as from surrounding mining operations if available). The validation procedures enable the more fundamental validations to be automated with errors and inconsistencies being flagged, reported and followed-up/verified prior to being accepted for resource modelling consideration.

7.2.2 Data manipulation for modelling

Historically the laboratories typically did not assay for Rh when the sum of the Pt + Pd + Au grade was less than 1.5 g/t as the Rh in these instances was relatively low or below the Rh detection limit. Missing Rh assays may also occur when inadequate sample mass remains after the Pt, Pd and Au analyses have been conducted (including repeats). For Resource modelling, a power curve regression was used to define the relationship between Pt grade and Rh grade using available data for each of the hangingwall, reef and footwall components. The regression was then used to estimate the missing Rh grades and hence avoiding a potential over estimation of Rh in the resource models.

Where density data is missing a default value is assigned based on all available drillhole lithological information pertaining to a particular rock type so that density weighted for compositing can be completed.

Data exclusions for modelling

Drillholes and/or underground sample sections were excluded if an intersection was considered unrepresentative or had not passed validation requirements. These exclusions would include reef intersections where sample top and bottom contact coverage was incomplete, intersections affected by dykes, IRUP or potholes, as well as those with anomalous assay values (i.e. those not in line with expected values for that particular stratigraphic layer's mineralisation signature) or incorrect stratigraphic codes.

Compositing

For Merensky Reef, the underground sample sections and drillhole data were composited over channel width and for various hangingwall and footwall components depending on the optimum Resource Cut requirement using length and density weighting. The UG2 Resource Cut data was composited over channel width, geotechnical parting interval and footwall pegmatoid component.

Resource Cut grade and width composites were created utilising density and width weighting of the individual modelled components. No minimum or maximum compositing width limits were enforced as abnormal intersections had been excluded in the validation process. All drillhole composites are corrected for dip and strike; however all underground sample sections have been sampled normal to the plane of the orebody therefore no dip and strike correction is required.

For the Waterval tailings dam, samples were composited over a 2 m width, using length and density weightings to achieve a uniform composed sample interval per drillhole.

7.2.3 Variography

Histograms and probability plots were used to identify potential outlier values and these values were investigated.

Top cutting (removal of high value potential outliers) was applied and/or considered for the reef composite data in order to improve variography but was not removed from the estimation dataset. This was not considered as a risk of overestimation after additional spatial checks had been completed.

For the hangingwall and footwall component data top cutting (removal of high value potential outliers) was applied in order to improve variography as well as to the estimation data to minimise the risk of overestimation, especially in the areas with lower drillhole spacing.

Semivariograms were derived from the composited drillhole and underground dataset, after consideration was given to the need to apply any cutting and/or capping constraints. The cutting and/or capping consideration was assessed in order to improve the variogram models. No data was cut and/or capped for the Merensky Reef or UG2 Reef grade model estimation.

All the variograms were modelled with isotropic spherical structures, since there was little evidence of anisotropy with the exception of Merensky Thick Reef Geozone 8 which was modelled with directional trends for both channel width and grade.

The variogram models were used as estimation parameters for kriging. The variograms were modelled for the 4E PGE grade, prills (Pt, Pd, Rh and Au), base metals (Cu and Ni) and density values. Nugget values varied from between approximately 5% and 75% and the final search range varied from between 555 m and 1,812 m.

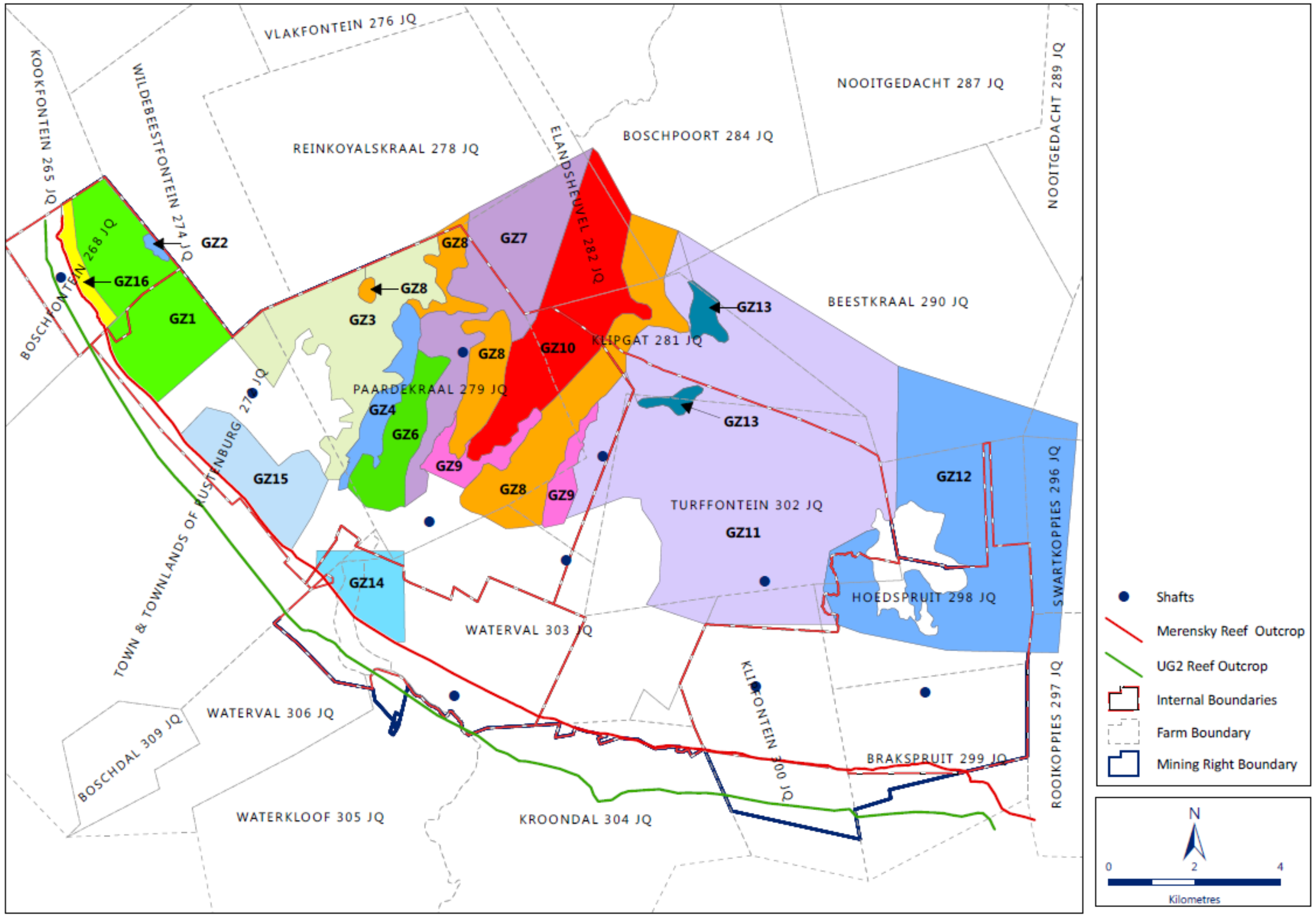
The Merensky Reef at Rustenburg as illustrated in Figure 7.1 has been subdivided into a number of geozones which relate primarily to reef width. The 2014 Merensky geozones have been characterised by differences in reef elevation within the stratigraphic succession and width/mineralisation alignment.

A total of 16 Merensky Reef Geozones have been defined, as shown in Table 7.3. Geozone 5 was mined out before 2010.

The East and West Waterval tailings dams primarily followed the same process and procedure as described above and the variogram models were used as estimation parameters for kriging. Variograms were generated on the composited cut data files. Since the distributions were normal, variograms were modelled using the untransformed data. Variograms were modelled for the 4E PGE grade, prills (Pt, Pd, Rh and Au), base metals (Cu and Ni) and density values. The drillhole composites were analysed in 3D space, hence a whole drillhole was not discarded if a few sample sections could not be recovered due to the moisture content. The downhole variograms was used to determine the nugget and this nugget was applied to all directions. The lag interval was adjusted to investigate variogram stability taking into account the borehole grid intervals. No sub-lags were used. The variograms showed suggestions of directional trends but these were very subjective to the lag interval selected. The adoption of an isotropic model was selected to enable the data to impart the required orientation rather than forcing anisotropy onto the estimation.

All composited data was used for the model grade estimations, however to improve the variography, the composited data individual element (PGE, Pt, Pd, Rh, Au, Cu, Ni, Moisture and Insitu density) values upper limit was cut appropriately.

Figure 7.1 Merensky Reef Geozone distribution across Rustenburg Operations



Source: RPM, 2015

Table 7.3 Merensky Reef Geozones*

Geozone	Descriptor
GZ1	Khuseleka #2 Rolling Reef
GZ2	Khuseleka #2 Thick Reef
GZ3	Khuseleka #1 Rolling Reef
GZ4	Khuseleka/Thembelani Contact Reef
GZ6	Thembelani Rolling Reef
GZ7	Thembelani Thin Reef
GZ8	Thembelani/Khomanani Thick Reef
GZ9	Thembelani/Khomanani Intermediate Thick Reef
GZ10	Khomanani Thin Reef
GZ11	Khomanani/Siphumelele Normal Thin Reef
GZ12	Siphumelele Thin Reef
GZ13	Khomanani – Klipgat Contact Reef
GZ14	Bathopele – Thin Reef
GZ15	Townlands 5
GZ16	Open pit mining

Source: RPM, 2015
*Note: * Geozone 5 has been mined out.*

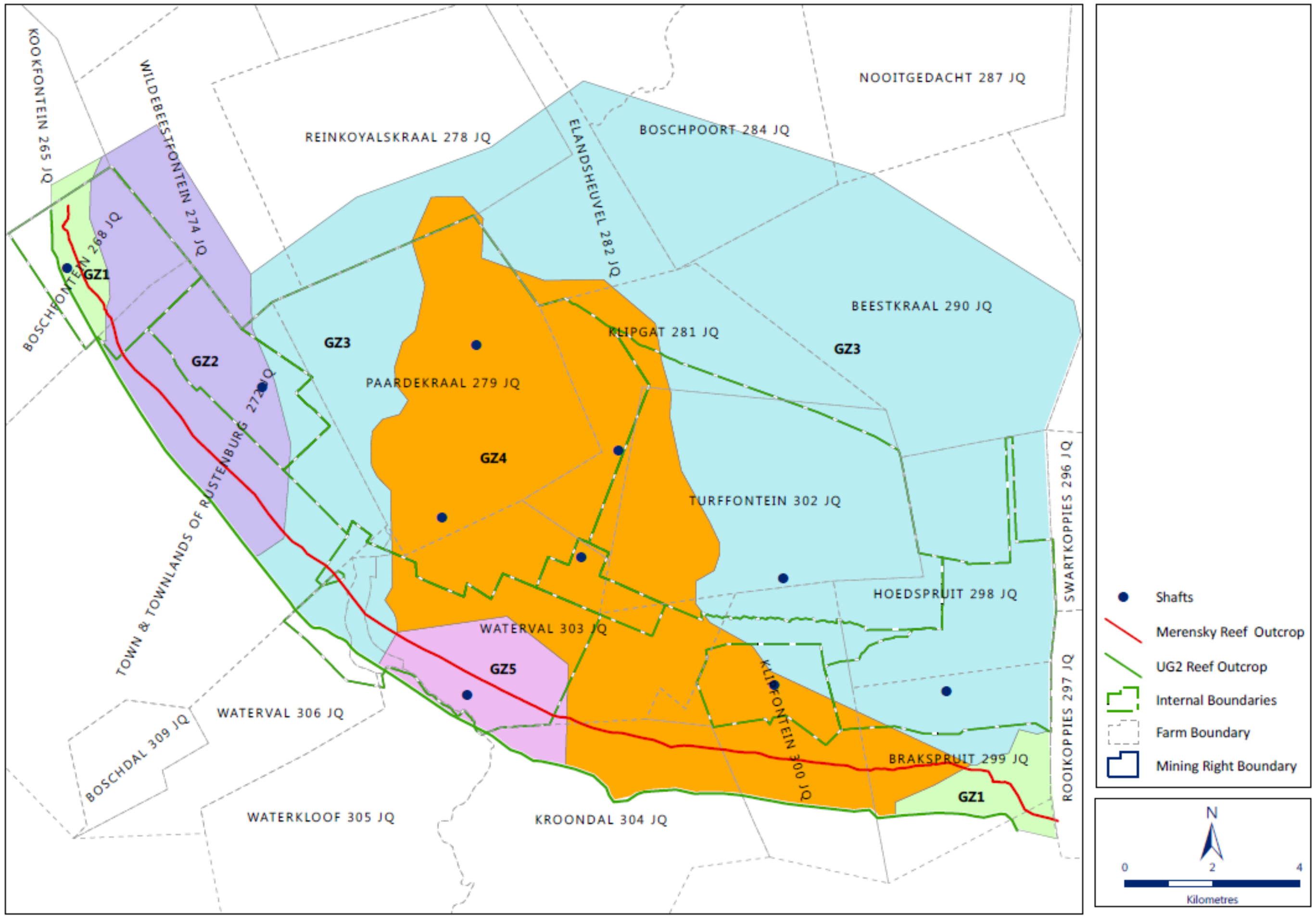
A total of five UG2 Geozones are defined based on channel width and PGE grade based primarily on geostatistical parameters (Table 7.4 and Figure 7.2).

Table 7.4 UG2 Reef Geozones

Geozone	Descriptor
GZ1	Thick Reef – width of 85 cm
GZ2	Normal Reef – width of 70 cm
GZ3	Thin Reef – width of 64 cm
GZ4	Normal Reef – width of 71 cm
GZ5	Thick Reef – width of 77 cm

Source: RPM, 2015

Figure 7.2 Rustenburg Operations UG2 Geozone plan



Source: RPM, 2015

7.2.4 Geological losses

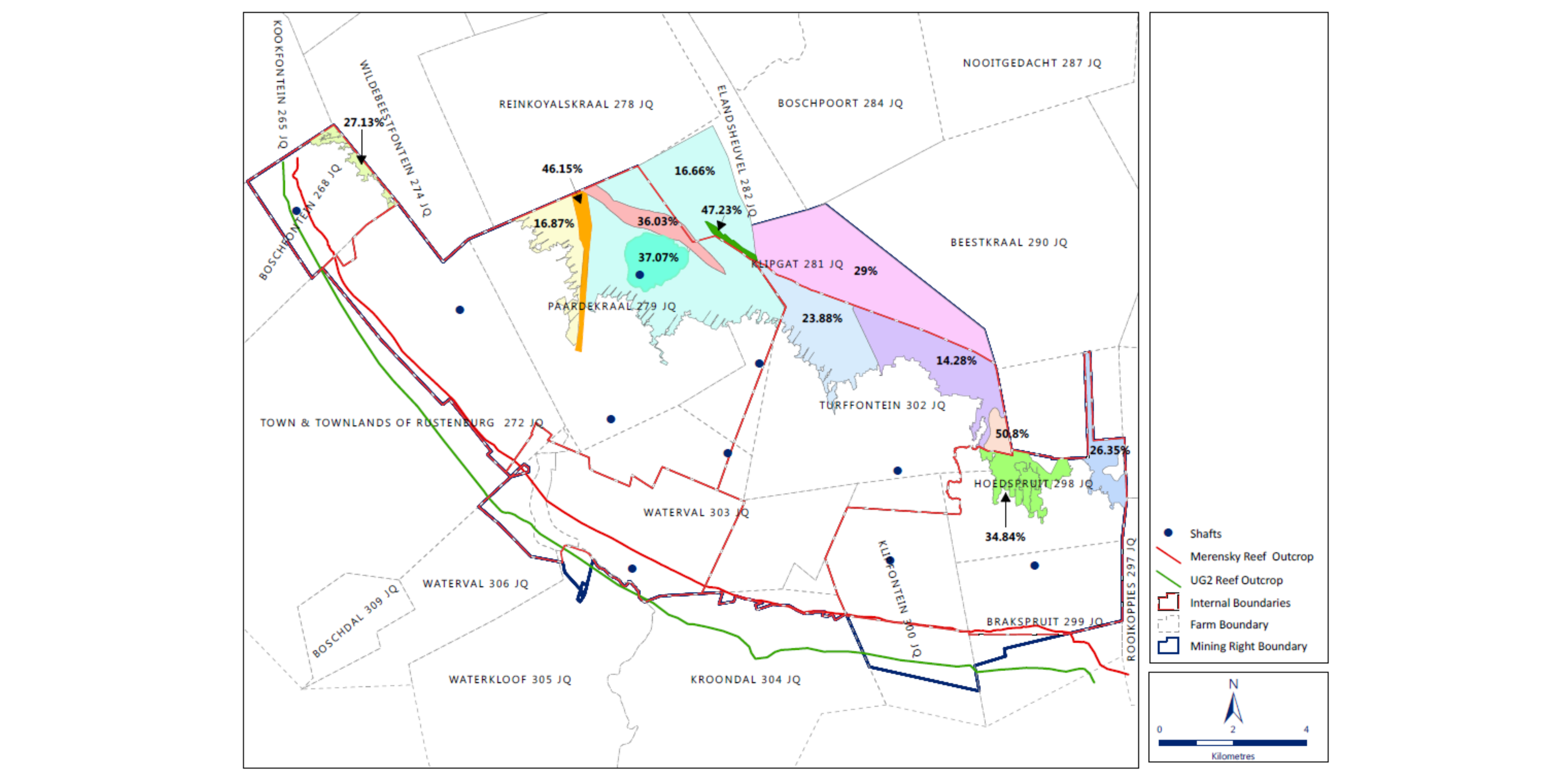
A standardised AAPL Group approach is used to estimate the geological losses for Resources at the Rustenburg Operations. This involves identification and quantification of the geological losses from all possible sources, historic mining, surface exposure and any geophysical and geological exploration data. This ensures that geological losses are determined in a standardised manner once a year. The final geological loss estimates are signed off annually together with the completion of the Geological Structural Model, to ensure the best possible input into the Company's Business and Mine Planning processes. The total geological losses, determined by structural domain, are divided into known and unknown geological losses for appropriate use in mine planning and scheduling. This is defined by similar geological attributes regarding structural characteristics and complexity and/or geological loss feature frequency, size or distribution.

Consideration is given to regional aspects such as facies like pothole reef vs. normal reef, aspects of dip, strike and undulation characteristics. Pothole size, frequency and distribution as well as dyke and or fault characteristics and frequency play a major role when defining areas of similarity. Ground conditions, such as jointing in the hangingwall and/or footwall are also considered. The correct zoning of structural domains and the annual review and revision, if needed, represents an essential step prior to the actual measurements and estimation process. In most instances there is a structural domain defined from historic mining which corresponds to an area to be estimated ahead of mining, but deemed to have similar structural geological characteristics.

The annual reconciliation of geological losses in the historic mining area informs the estimation ahead of mining for short and long term planning.

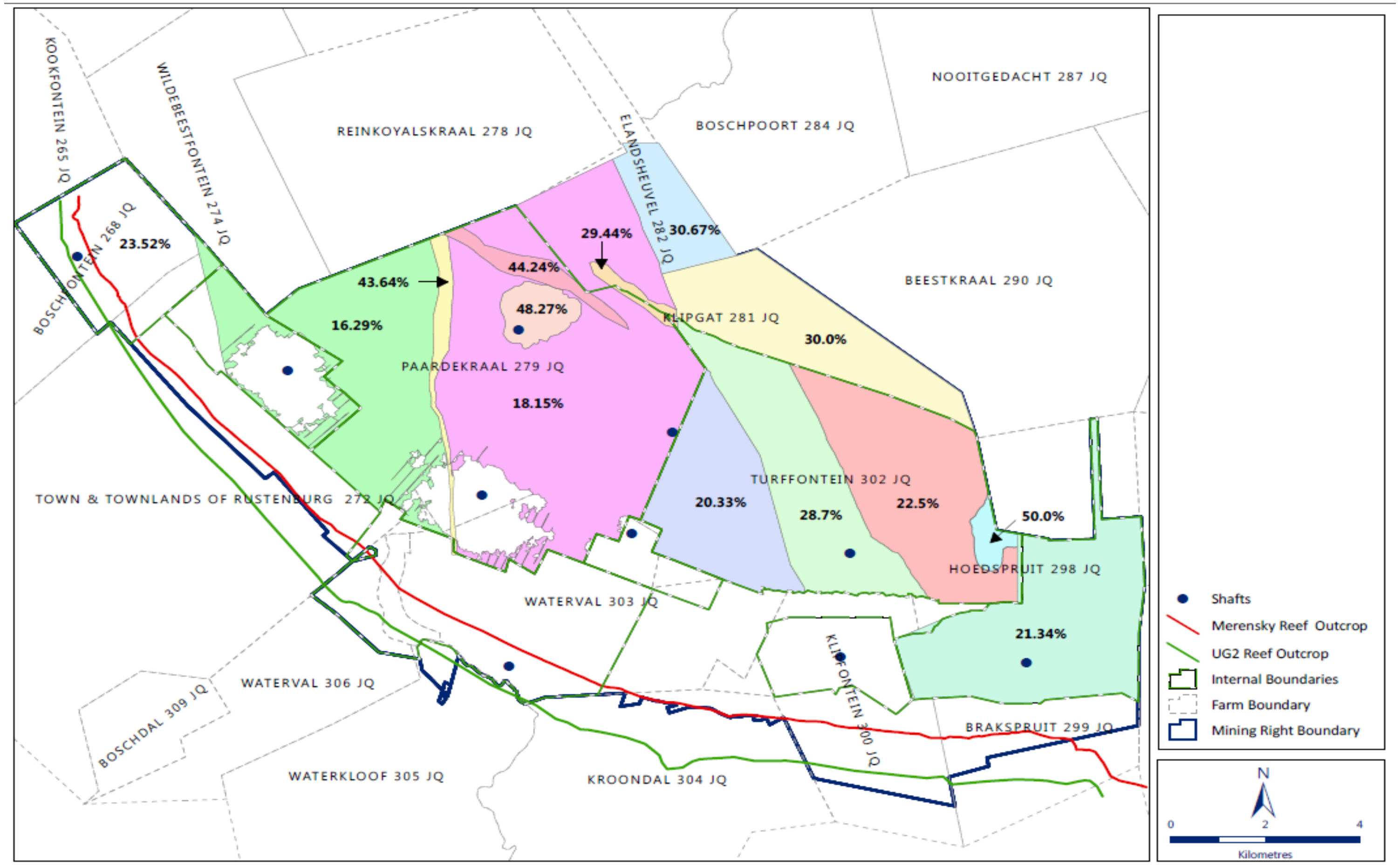
Figure 7.3 and Figure 7.4 show the estimations of 2014 geological losses per geological feature and per structural domain for the Merensky Reef and UG2 Reef respectively in the Rustenburg Operations Lease Area.

Figure 7.3 Geological losses per structural domain for Merensky Reef (December 2013)*



Source: RPM, 2015
*Note: * As issued for 2014 Resource declaration*

Figure 7.4 Geological losses per structural domain for UG2 Reef (December 2013)*



Source: RPM, 2015
*Note: * As issued for 2014 Resource declaration*

7.2.5 Estimation/modelling parameters

All grade and thickness variables were estimated using ordinary kriging utilising Datamine software package.

The optimised estimation parameters were block dimensions, search radii and the minimum and maximum number of samples used for an estimate and took into account drillhole spacing and variogram ranges.

The estimation parameters were defined using a kriging neighbourhood analysis ("KNA") and the variogram models defined by the Merensky and UG2 Geozones as shown in Figure 7.1 and Figure 7.2 respectively. The KNA tested the impact of different estimation parameters on the estimate by interpreting changes in the kriging efficiency and kriging variance.

The Merensky Reef in the poorly (sparsely) and moderately informed area the kriging efficiency and kriging variance reaches stability at a block size of approximately 300 m. Within the Merensky Reef well-informed areas (underground sample sections and drillholes) the kriging efficiency and kriging variance reaches stability at a block size of approximately 100 m.

The UG2 Reef in the poorly (sparsely) and moderately informed area the kriging efficiency and kriging variance reaches stability at a block size of approximately 500 m. Within the UG2 Reef well-informed areas (underground sample sections and drillholes) the kriging efficiency and kriging variance reaches stability at a block size of approximately 125 m.

Search distances for grade and width estimation were based on variogram ranges for each element.

A minimum of seven and a maximum of 20 samples were used for estimation as determined from the KNA. Multiple search passes were used to estimate blocks not populated by the first search pass. The radius of the search increased (1.5 times the variogram range) in the second search pass, while a third search radius was increased so as to cover the entire area. The minimum and maximum number of samples used remained constant, except in the third pass where they increased to 20 and 40 respectively.

The search parameters as applied per estimation Geozone are tabulated in Table 7.5 for the Merensky Reef resource cut grade and UG2 Reef grade.

The East and West Waterval tailings dam estimation parameters were defined using a kriging neighbourhood analysis. The KNA tested the impact of different estimation parameters on the estimate by interpreting changes in the kriging efficiency and kriging variance Ordinary kriging in three dimensions was used, utilising the Datamine software package. The optimised estimation parameters were block dimensions, search radii and the minimum and maximum number of samples used for an estimate, and took into account drillhole spacing and variogram ranges.

Table 7.5 Search parameters used for Main Reef components

Reef	Element	Geozone	Search distance (m)
Merensky	Resource Cut grade	GZ1	1,136.5
Merensky	Resource Cut grade	GZ3	809.5
Merensky	Resource Cut grade	GZ4	760.5
Merensky	Resource Cut grade	GZ6	677.0
Merensky	Resource Cut grade	GZ7	1,091.0
Merensky	Resource Cut grade	GZ8	1,098.0
Merensky	Resource Cut grade	GZ10	1,466.5
Merensky	Resource Cut grade	GZ11	1,250.0
Merensky	Resource Cut grade	GZ12	1,322.0
UG2	Reef grade	GZ1	555.0
UG2	Reef grade	GZ2	729.0
UG2	Reef grade	GZ3	1,789.5
UG2	Reef grade	GZ4	1,812.0
UG2	Reef grade	GZ5	681.0

Source: RPM, 2015

7.2.6 Model validation

After the completion of the Resource estimation exercise a comparison between the combined drillhole and underground sample section database verses the kriged block model was performed. The relationship between the model estimations and drillhole/sample section 4E grade, thicknesses and density were investigated.

All Resource models were validated by:

1) Visual comparisons of the drillhole data and related resource block estimates;

2) Statistical comparison of estimated block model means with the composited data means;

3) The relationship between the Resource model estimations and input data were investigated by the use of histograms, spatial distributions and “Defrango or swath” plots;

4) Analysis of Kriging Efficiency and Kriging Variance values in the block model; and,

5) Resource Cut evaluations were completed over total resource per reef.

7.2.7 Classification

The classification of the Mineral Resource was based on the guidelines of the SAMREC Code.

The basis for the Mineral Resource classification was derived by the use of AAPL’s Group classification process. The following criteria were used for the resource classification:

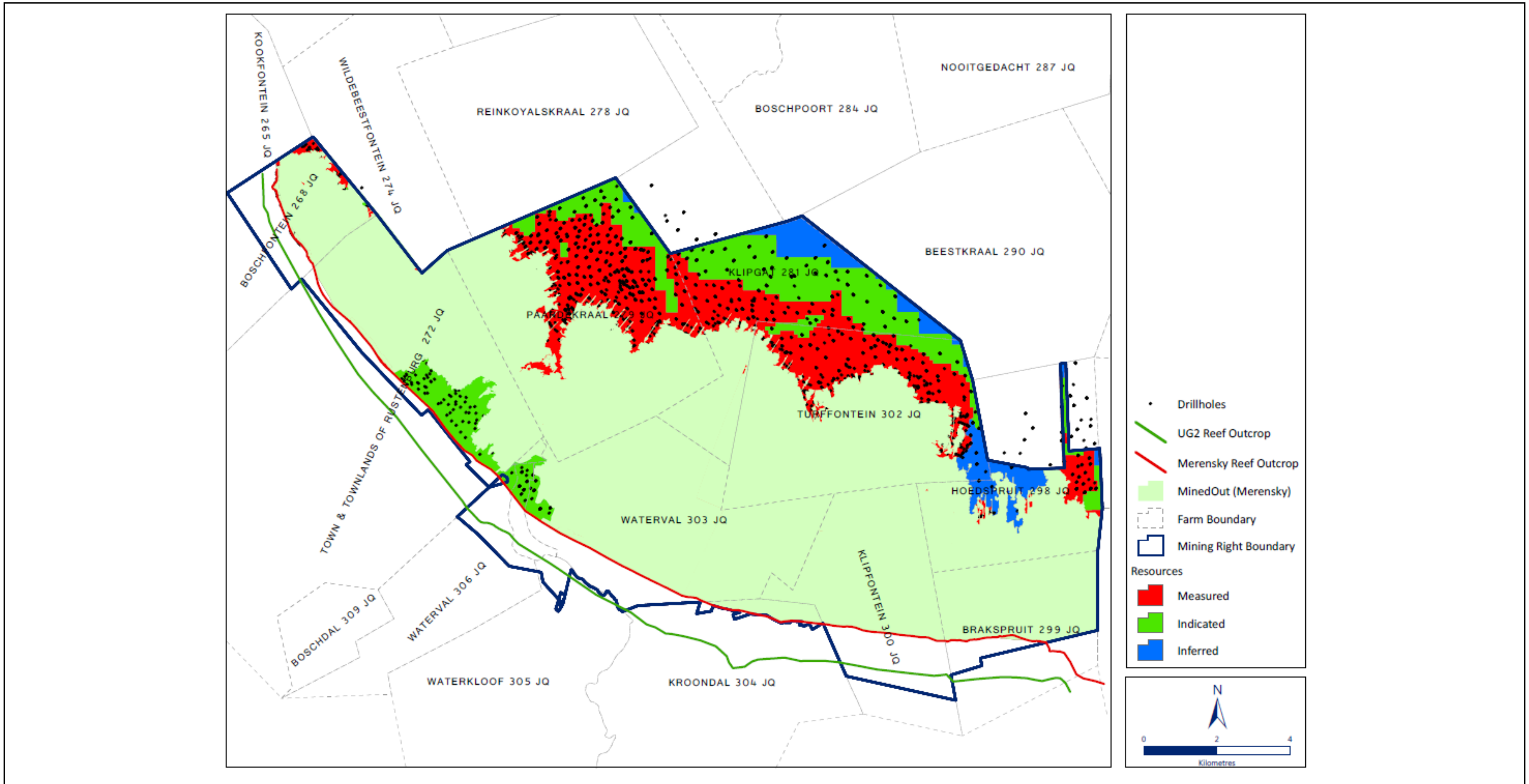
- Statistical considerations:
  - Drillhole distribution
  - Underground sample section distribution
  - Search ellipse

  - Number of samples used in the estimate
  - Regression slope
  - Kriging variance
  - Kriging efficiency; and,
- Geological framework:
  - Aeromagnetic survey
  - Seismic surveys
  - Mining history
  - Facies confidence
  - QAQC confidence
  - Structure confidence
  - Geological loss confidence.

The CP's Resource classification assessment has taken all the above together with risk assessments and regional geological framework in defining the final classification boundaries.

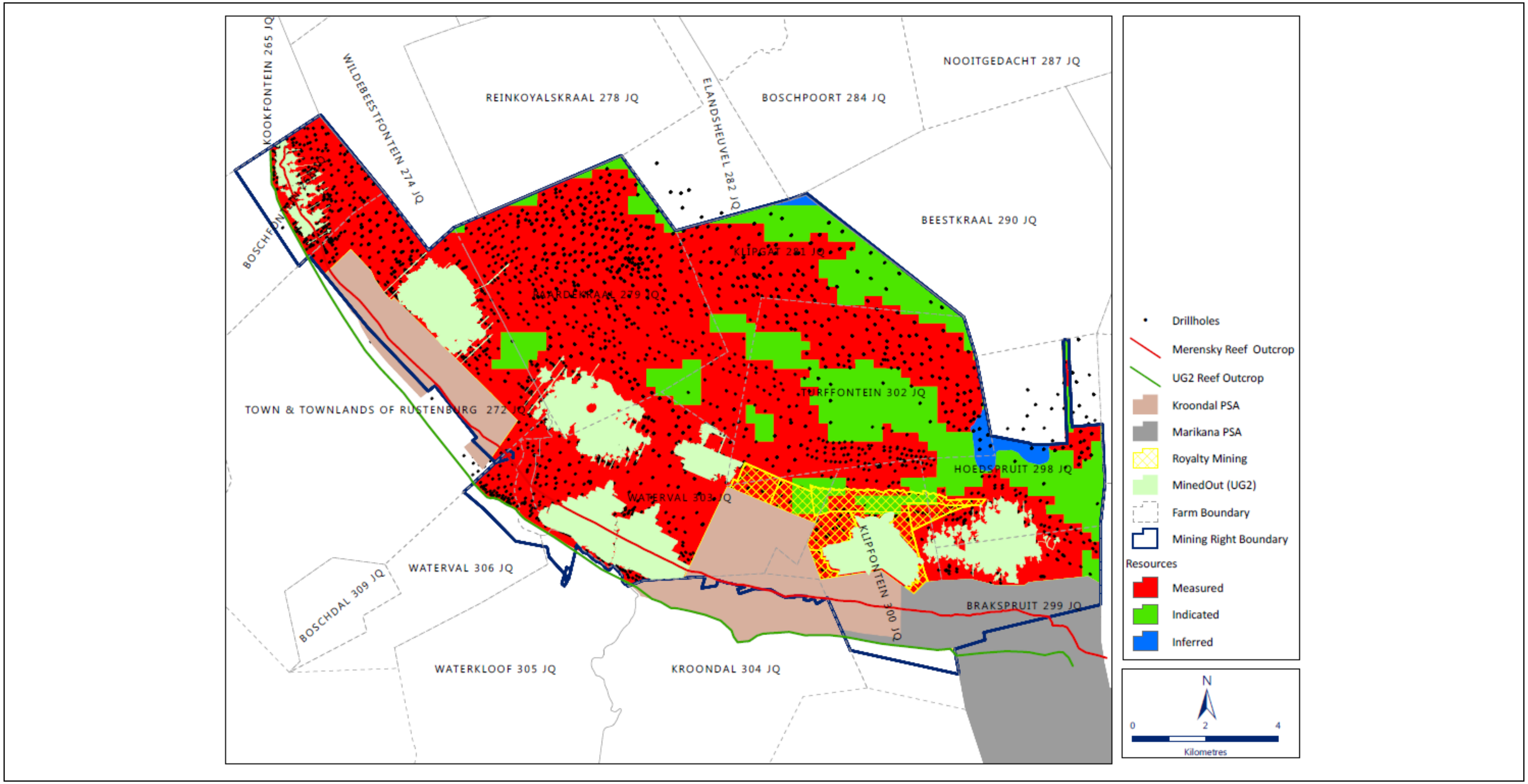
The final resource classification for the Merensky Reef and UG2 Reef are shown in Figure 7.5 and Figure 7.6 respectively.

Figure 7.5 Resource classification 2014 model – Merensky Reef



Source: RPM, 2015

Figure 7.6 Resource classification 2014 model – UG2 Reef



Source: RPM, 2015

7.2.8 Risk analysis

T6B(i)

In general terms the classification of the Mineral Resource takes account of the risk associated with all aspects of the process.

Detailed risks associated with each resource model are highlighted during risk analysis and action is taken to mitigate them. All processes are reviewed and internal audits are carried out on the work completed. Snowden (during its various audits) considered that low to medium level risks are associated with the Mineral Resource in terms of facies definitions, geological loss definitions and changes in mining considerations.

The risks identified during the risk analysis are:

- Orebody planarity – an understanding of the rolling nature of the reef horizons, could result in higher geological losses in the more structurally complex areas;
- Geological loss and structural interpretation – uncertainty in the rolling nature of the reef, as well as the losses associated with potholing and unknown structures could affect the tonnage and content figures;
- Reef Geozone/domain delineation – changes in the definitions of reef domains could impact on the resource cut and ultimate mining width; and
- Waterval tailings dam – risks relating to; hydro-geological failure and in-situ density measurement inaccuracies.

Snowden has undertaken various audits on behalf of RPM and considers that changes in the geological loss, domain and mining width/cut definitions and structural interpretation will not materially affect the overall resource number estimates or confidence and therefore assigns a low to medium risk to these (Snowden, 2015c).

Risk factors considered for the Resource estimation are summarized in Table 7.9 AAPL's Group Standard risk matrix template was used for assessing the risk factors considered. The confidence in reporting the Resource estimation issues were considered when the Resource classification was determined.

Risk ranking is defined by combining probability and consequence categories according to the revised Anglo Platinum risk matrix of prioritised risk ranking. As illustrated in Table 7.6 to Table 7.9.

Table 7.6 Probability categories

Category	Probability
E	Virtual certainty/very common
D	Likely to happen
C	Could happen, possible
B	Rare/unlikely to happen
A	Extremely unlikely/practically impossible, rare

Source: RPM, 2015

Table 7.7 Consequence categories

Category	Percentage error in Mineral Resource/Reserve evaluation	Significance
5	plus 20%	Highest significance, catastrophic
4	10-20%	Very significant, major
3	5-10%	Significant, moderate
2	2-5%	Some significance, minor
1	less than 2%	Insignificant

Source: RPM, 2015

Table 7.8 Risk Probability and Consequence table

		Consequence				
		1	2	3	4	5
Probability	E	11	16	20	23	25
	D	7	12	17	21	24
	C	4	8	13	18	22
	B	2	5	9	14	19
	A	1	3	6	10	15

Extreme = 21 to 25
High = 13 to 20
Medium = 6 to 12
Low = 1 to 5

Source: RPM, 2015

Table 7.9 Lease Area internal SAMREC Resource checklist risk assessment

Area	Risk matrix		Risk rating	
	Probability	Consequence	2014	2015
Drilling techniques	B	2	5	5
Logging	B	2	5	5
Drill sample recovery	B	2	5	5
Other sampling techniques	N/A	N/A	N/A	N/A
Sub-sampling techniques and sample preparation	C	1	4	4
Assay data and laboratory investigations	B	2	5	5
Verification of results	B	2	5	5
Data location	B	2	5	5
Data density and distribution	B	2	5	5
Audits or reviews	B	2	5	5
Mineral rights and ownership	N/A	N/A	N/A	N/A
Exploration work done by other parties	B	2	5	5
Geology	B	2	5	5
Data compositing	B	2	5	5
Relationship between mineralisation and width	B	2	5	5
Diagrams	B	2	5	5
Balanced reporting	A	2	3	3
Other substantive data	B	2	5	5
Historical information of interest about the mine	A	2	3	3
Historic verification of the performance parameters	B	2	5	5
Future work	A	2	3	3
Database integrity	B	2	5	5
Geological interpretation	B	2	5	5
Orebody planarity	B	2	5	5
Reef facies delineation	B	2	5	5
Geological loss estimation	B	2	5	5
Estimation and modelling technique	B	2	5	5
Cut-off grades and parameters	C	1	4	4
Mining factors and assumptions	B	2	5	5
Tonnage factors	B	2	5	5
Classification	B	2	5	5
Audits and reviews	B	2	5	5
Mineralogical and metallurgical testwork	B	2	5	5
Average			**4.7**	**4.7**

Source: RPM, 2015

7.2.9 Audits and reviews

T9A/B(i)(ii), SV12.19

In January 2015, Snowden completed a detailed Mineral Resource and Mineral Reserve estimate audit of Rustenburg Operations (Snowden, 2015c). It was Snowden's opinion that the evaluation and reporting of the Reserves was completed to appropriate standards (Snowden, 2015c). No material errors were identified with the Resource and Reserve estimate and recommended that AAPL can confidently rely on the resource end reserve estimates for Rustenburg Operations LoM scheduled and public reporting.

Snowden has, throughout time, observed continuous improvements to processes, procedures and geological understanding in the Rustenburg Operations (Snowden, 2015c). In addition to above audit, Snowden audits were completed in 2010 and 2011 on the Mineral Resources and Reserves for Rustenburg Operations.

7.2.10 Mineral Resource statement

SV 2.6

The Mineral Resources of Rustenburg Operations are classified, verified, and reported in accordance with the JSE Listings Requirements, industry and professional guidelines. The classifications are based on the SAMREC Code.

Reporting is undertaken by professionals with appropriate experience in the estimation, economic evaluation, exploitation, and reporting of mineral resources relevant to the various styles of mineralisation under consideration. RPM's experience with the various orebodies that it is evaluating and mining spans decades, with the result that RPM personnel have a thorough understanding of the factors important to the assessment of their economic potential.

Mineral Resources are, by definition, exclusive of any diluting materials that might arise as a consequence of the mining method and specific geological circumstances applicable to the mining of that Mineral Resource. Table 7.10 below shows the Mineral Resources estimate for the entire mine property as at 1 October 2015.

Table 7.10 Rustenburg Operations total Mineral Resources inclusive of Mineral Reserves as at 1 October 2015

Orebody	Category	Tonnes (Mt)	4E grade (g/t)	4E (Moz)	Pt grade (g/t)	Pd grade (g/t)	Rh grade (g/t)	Au grade (g/t)	Base metals	
									Cu (%)	Ni (%)
Merensky Reef	Measured	66.5	6.18	13.2	3.96	1.67	0.24	0.30	0.101	0.226
	Indicated	43.0	5.95	8.2	3.77	1.64	0.23	0.30	0.107	0.224
	Inferred	11.0	5.75	2.0	3.61	1.61	0.24	0.28	0.097	0.203
	Total resource	**120.5**	**6.06**	**23.5**	**3.86**	**1.66**	**0.24**	**0.30**	**0.103**	**0.225**
UG2 Reef	Measured	331.9	4.69	50.0	2.57	1.61	0.48	0.04	0.009	0.096
	Indicated	87.1	5.01	14.0	2.71	1.76	0.49	0.05	0.009	0.096
	Inferred	4.3	5.22	0.7	2.80	1.86	0.52	0.04	0.009	0.096
	Total resource	**423.3**	**4.76**	**64.8**	**2.60**	**1.64**	**0.48**	**0.04**	**0.009**	**0.096**
Tailings	Measured	87.6	1.07	3.0	0.64	0.30	0.05	0.09	0.019	0.078
	Indicated	6.6	1.20	0.3	0.70	0.34	0.04	0.11	0.019	0.078
	Inferred	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
	Total resource	**94.2**	**1.08**	**3.3**	**0.64**	**0.30**	**0.05**	**0.09**	**0.019**	**0.078**
4E prill split (as %)										
Merensky Reef					63.8	27.3	4.0	4.9		
UG2					54.6	34.5	10.1	0.8		
Tailings					59.4	27.6	4.4	8.7		

Source: RPM, 2015
Note: No Resource cut-off applied. Totals may not add up due to rounding

It should be noted that 20.9 Mt at 4.95 g/t (3.3 Moz 4E) of UG2 has been excluded from the Transaction, as this has been historically committed to the Kroondal PSA on a royalty basis. Table 7.11 excludes these Mineral Resources and reflects the Mineral Resource base for the Transaction.

Table 7.11 Rustenburg Operations total Mineral Resources excluding royalty ground as at 1 October 2015

Orebody	Category	Tonnes (Mt)	4E grade (g/t)	4E (Moz)	Pt grade (g/t)	Pd grade (g/t)	Rh grade (g/t)	Au grade (g/t)	Base metals	
									Cu (%)	Ni (%)
Merensky Reef	Measured	66.5	6.18	13.2	3.96	1.67	0.24	0.30	0.101	0.226
	Indicated	43.0	5.95	8.2	3.77	1.64	0.23	0.30	0.107	0.224
	Inferred	11.0	5.75	2.0	3.61	1.61	0.24	0.28	0.097	0.203
	Total resource	**120.5**	**6.06**	**23.5**	**3.86**	**1.66**	**0.24**	**0.30**	**0.103**	**0.225**
UG2 Reef	Measured	316.4	4.67	47.5	2.56	1.60	0.48	0.04	0.009	0.096
	Indicated	82.2	5.01	13.2	2.71	1.76	0.49	0.05	0.009	0.096
	Inferred	4.3	5.22	0.7	2.80	1.86	0.52	0.04	0.009	0.096
	Total resource	**402.9**	**4.75**	**61.5**	**2.59**	**1.64**	**0.48**	**0.04**	**0.009**	**0.096**
Tailings	Measured	87.6	1.07	3.0	0.64	0.30	0.05	0.09	0.019	0.078
	Indicated	6.6	1.20	0.3	0.70	0.34	0.05	0.11	0.019	0.078
	Inferred	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
	Total resource	**94.2**	**1.08**	**3.3**	**0.64**	**0.30**	**0.05**	**0.09**	**0.019**	**0.078**
4E prill split (as %)										
Merensky Reef					63.8	27.3	4.0	4.9		
UG2					54.5	34.4	10.1	0.8		
Tailings					59.4	27.6	4.4	8.7		

Source: RPM, 2015
Note: No Resource cut-off applied. Totals may not add up due to rounding.
Reported inclusive of Mineral Reserves

Mineral Resource – Hoedspruit

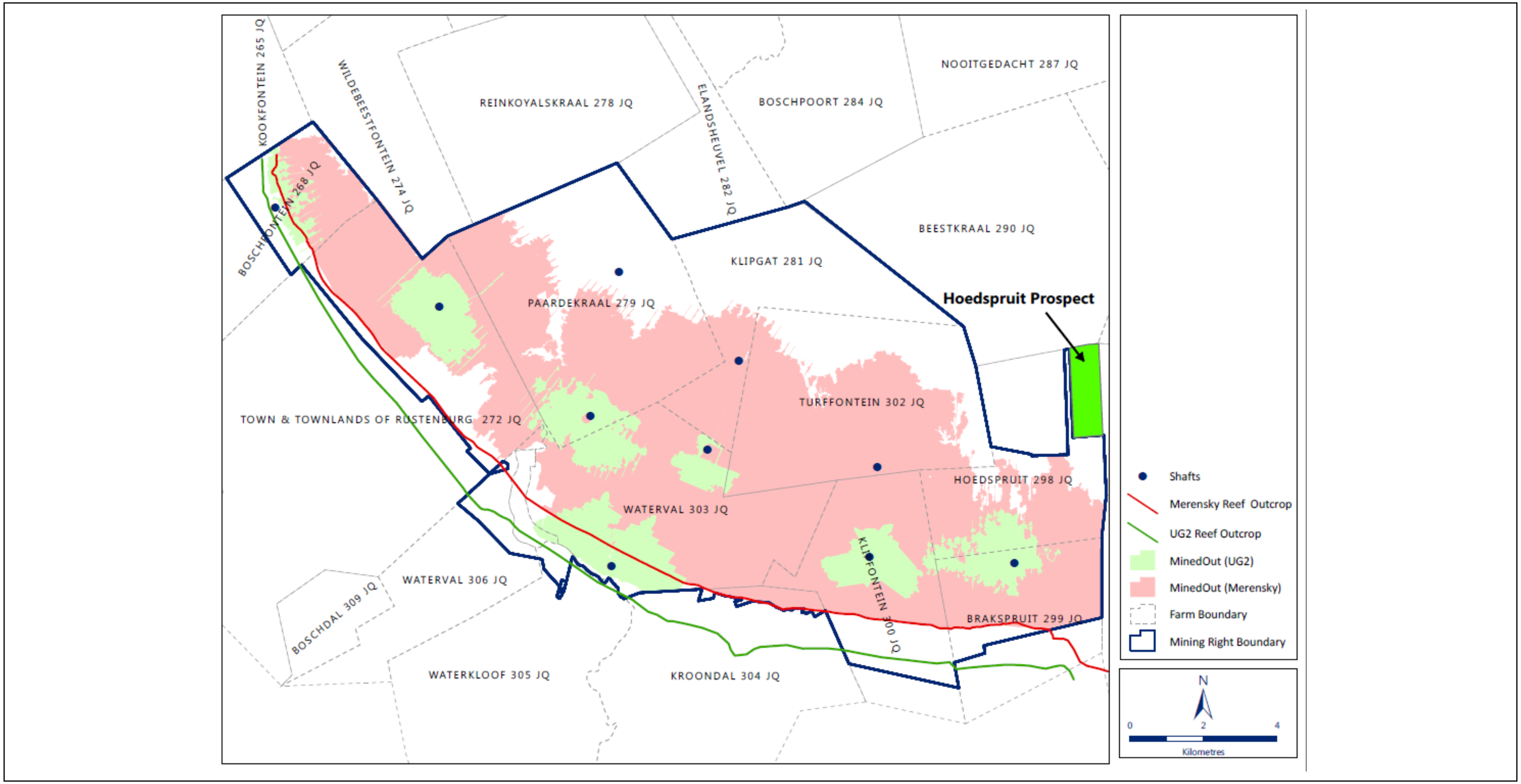
The Hoedspruit Mineral Resource is presented below for the Merensky Reef (Table 7.12 and Figure 7.7). This area does not form part of the Mineral Resources tabulated in Table 7.10 and Table 7.11.

Table 7.12 Rustenburg Operations total Mineral Resources Prospecting Right Area as at 1 October 2015

Orebody	Category	Tonnes (Mt)	4E grade (g/t)	4E (Moz)	Pt grade (g/t)	Pd grade (g/t)	Rh grade (g/t)	Au grade (g/t)	Base metals	
									Cu (%)	Ni (%)
Merensky Reef	Measured	0.6	6.33	0.1	4.05	1.73	0.21	0.34	0.106	0.226
	Indicated	1.8	6.99	0.4	4.39	1.98	0.24	0.37	0.115	0.238
	Inferred	1.6	5.66	0.3	3.47	1.65	0.19	0.34	0.087	0.175
	Total resource	**4**	**6.36**	**0.8**	**3.98**	**1.81**	**0.22**	**0.36**	**0.103**	**0.211**
UG2 Reef	Measured	1.6	4.75	0.2	2.62	1.60	0.49	0.03	0.008	0.101
	Indicated	2.6	4.7	0.4	2.62	1.55	0.49	0.04	0.008	0.104
	Inferred	1.2	4.18	0.2	2.25	1.48	0.42	0.04	0.007	0.099
	Total resource	**5.4**	**4.6**	**0.8**	**2.54**	**1.55**	**0.47**	**0.04**	**0.008**	**0.102**
4E prill split (as %)										
Merensky Reef					62.5	28.5	3.4	5.6		
UG2					55.2	33.7	10.3	0.8		
Tailings					-	-	-	-		

Source: RPM, 2015
Note: No Resource cut-off applied. Totals may not add up due to rounding.

Figure 7.7 Location plot – Hoedspruit Area



Source: RPM, 2015

8 MINE PLANNING, SCHEDULING AND MINERAL RESERVES

8.1 Project outline

T1.4C(i)(ii)

DRA source documents form the basis of Section 8.

Rustenburg Operations is divided into four separate mining areas; Khuseleka, Thembelani, Siphumelele and Bathopele. The four mining areas are divided into a number of Investment Centres, using the Rustenburg Operations adopted naming convention (area, reef type, mine/shaft and level of study) as summarised in Table 8.1.

Siphumelele 2, currently operated as a training shaft, is planned to close in early 2016.

Table 8.1 RPM naming convention for each Investment Centre

Investment Centre definition	Sub-section		Definition
Area	RS	RS	Rustenburg Operations
Reef type	Merensky	MER	Merensky Reef
	UG2	UG2	UG2
Mine	Siphumelele	SIP	Siphumelele mining area
	Thembelani	THEM	Thembelani mining area
	Khuseleka	KHU	Khuseleka mining area
	Bathopele	BATH	Bathopele mining area
Shaft (Bathopele only)	East	East	East Decline
	Central	Central	Central Decline
Level	Level 1	L1	Current mining and projects in execution
	Level 2	L2	Prefeasibility and Feasibility
	Level 3	L3	Conceptual MES

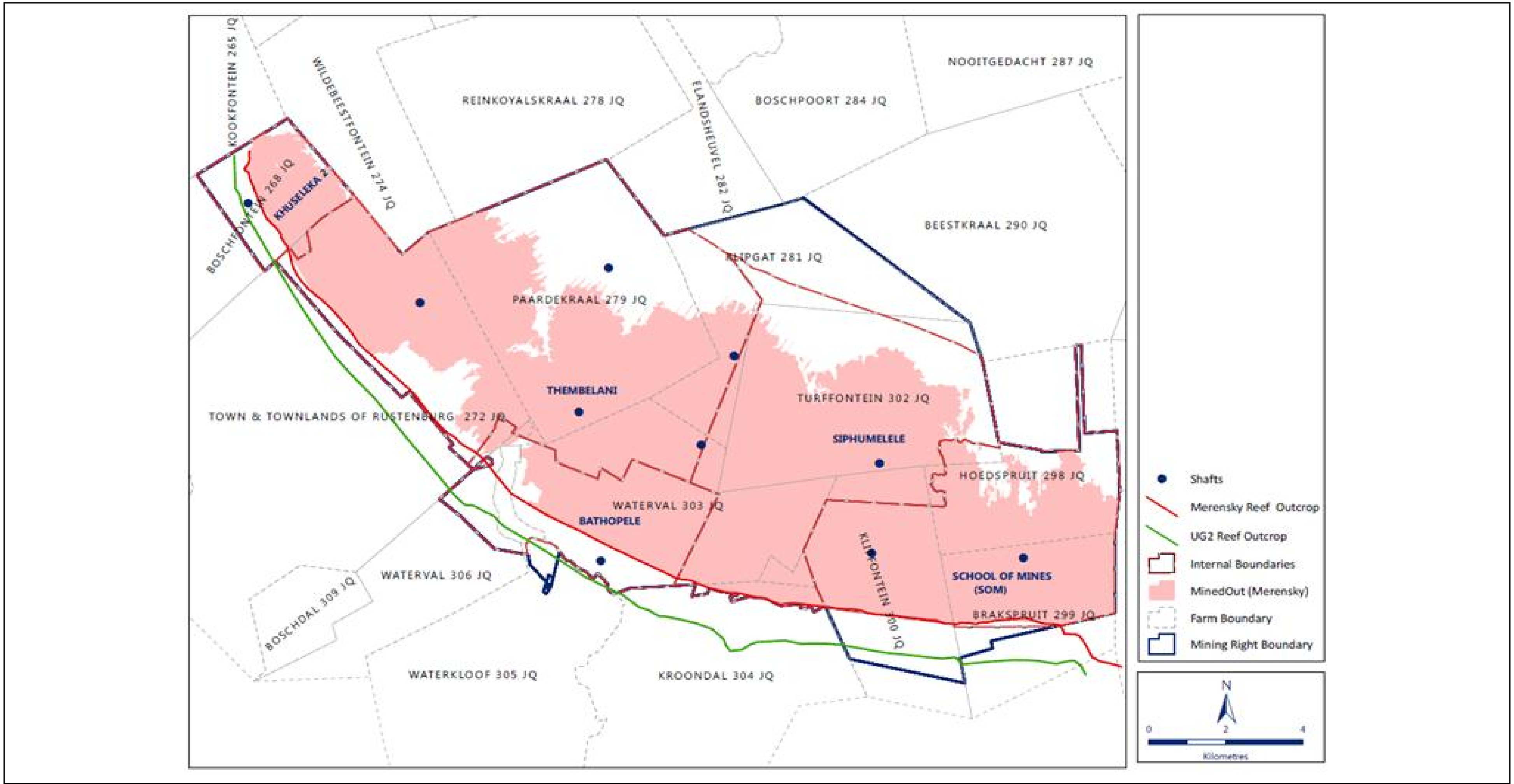
Source: RPM, 2015
Note: MES – Mine Extraction Strategy

Each Investment Centre is categorised as either being:

- Current – maintaining the current production levels;
- Replacement project – replacing depleted reserve; and,
- Expansion project – increasing production levels.

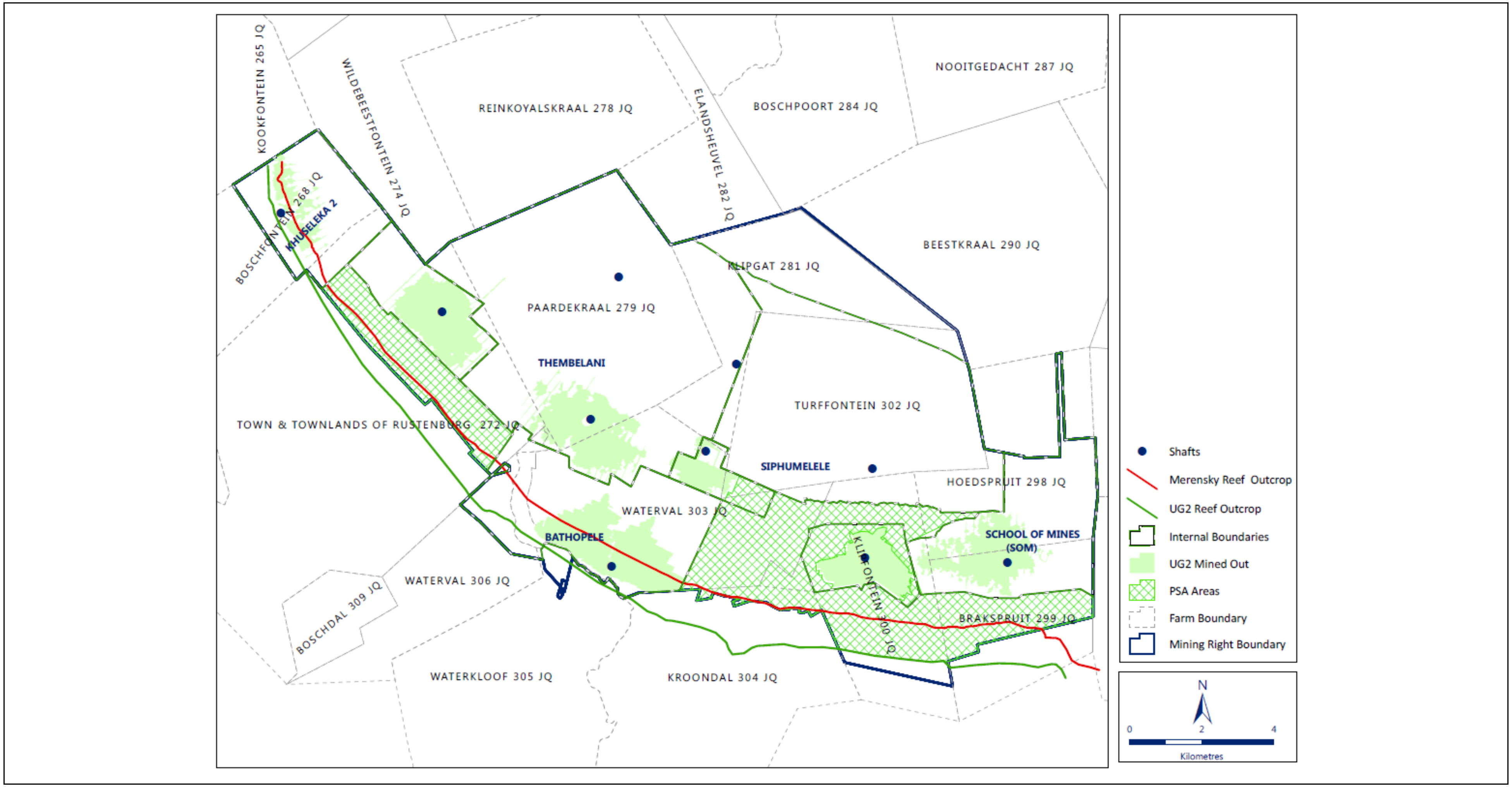
There are nine Investment Centres as summarised in Table 8.2; three at Khuseleka; three at Thembelani Mines; two at the Siphumelele; and one at Bathopele Mine. Figure 8.1 and Figure 8.2 shows the mined out footprint in relation to the Merensky Reef and the UG2, respectively.

Figure 8.1 Plan view showing Merensky Reef footprint



Source: RPM, 2015

Figure 8.2 Plan view showing footprint



Source: RPM, 2015

Each Level (summarised in Table 8.2), is determined by the type of mining study completed on that area:

- Level 1 (L1) represents those areas currently being exploited or projects in execution;
- Level 2 (L2) represents projects in a feasibility study or prefeasibility study; and,
- Level 3 (L3) where conceptual studies have been completed.

Table 8.2 Summary of Investment Centres at Rustenburg Operations

Mine name	Shaft(s)	Reef(s) mined	Planning level
RS MER L1 Siphumelele	Siphumelele 1 Vert #	MER	Level 1
RS MER L1 Thembelani	Thembelani 1 Vert #	MER	Level 1
RS MER L1 Khuseleka	Khuseleka 1 Vert #	MER	Level 1
RS UG2 L1 Bathopele	East and Central Surface Decline Cluster	UG2	Level 1
RS UG2 L1 Thembelani	Thembelani 1 Vert #	UG2	Level 1
RS UG2 L1 Khuseleka	Khuseleka 1 Vert #	UG2	Level 1
RS UG2 L2 Siphumelele	Siphumelele 1 Vert #	UG2	Level 2
RS UG2 L2 Thembelani	Thembelani 1 Vert #	UG2	Level 2
RS UG2 L2 Khuseleka	Khuseleka 1 Vert #	UG2	Level 2

Source: DRA, 2015

8.2 Mineral Reserve estimates – Underground ore sources

T5.4A/B/C(i)-(iii), T5.7C(i), T7C(i)-(v), T8C(i)-(v), SV 2.6

The Mineral Reserve estimates or “MRE” (as at 1 October 2015) for each of the four mines are summarised in Table 8.3 to Table 8.6.

The definition for Cost 1 (as seen below Mineral Reserve estimate tables in this section), is the shaft head operating cost plus allocated Central Services operating cost.

Table 8.3 Khuseleka Mineral Reserve estimate (1 October 2015)

Reserve classification	Tonnes (Mt)	4E grade (g/t 4E)	Ni grade (%)	Cu grade (%)	4E content (Moz)	Prill splits			
						Pt (%)	Pd (%)	Rh (%)	Au (%)
Merensky Level 1									
Proved	2.75	5.35	0.12	0.01	0.47	65.2	26.1	4.3	4.4
Probable	0.45	5.74	0.12	0.01	0.08	64.6	26.7	4.2	4.5
Mineral Reserve	**3.19**	**5.41**	**0.12**	**0.01**	**0.56**	**65.1**	**26.2**	**4.3**	**4.4**
UG2 Level 1									
Proved	3.82	3.87	0.11	0.01	0.48	55.4	33.4	10.5	0.7
Probable									
Mineral Reserve	**3.82**	**3.87**	**0.11**	**0.01**	**0.48**	**55.4**	**33.4**	**10.5**	**0.7**
UG2 Level 2									
Proved	28.45	4.07	0.11	0.01	3.73	55.0	34.0	10.3	0.7
Probable	0.12	4.03	0.11	0.01	0.02	56.1	33.3	10.1	0.6
Mineral Reserve	**28.58**	**4.07**	**0.11**	**0.01**	**3.74**	**55.0**	**34.0**	**10.3**	**0.7**
Merensky and UG2 Combined Level 1									
Proved	6.57	4.49	0.12	0.01	0.95	60.3	29.8	7.4	2.5
Probable	0.45	5.74	0.12	0.01	0.08	64.6	26.7	4.2	4.5
Mineral Reserve	**7.02**	**4.57**	**0.12**	**0.01**	**1.03**	**60.6**	**29.6**	**7.2**	**2.7**
Merensky and UG2 Combined Level 2									
Proved	28.45	4.07	0.11	0.01	3.73	55.0	34.0	10.3	0.7
Probable	0.12	4.03	0.11	0.01	0.02	56.1	33.3	10.1	0.6
Mineral Reserve	**28.58**	**4.07**	**0.11**	**0.01**	**3.74**	**55.0**	**34.0**	**10.3**	**0.7**
Merensky and UG2 Combined Level 1 and Level 2									
Proved	35.02	4.15	0.11	0.01	4.67	56.1	33.2	9.7	1.0
Probable	0.57	5.37	0.12	0.01	0.10	63.2	27.8	5.2	3.8
Mineral Reserve	**35.59**	**4.17**	**0.11**	**0.01**	**4.77**	**56.2**	**33.0**	**9.6**	**1.1**

Source: DRA, 2015

Notes:

1. *No cut-off grade is applied – all Mineral Reserve grades in excess of minimum economic cut-off at Cost 1 definition.*
2. *L1 Reserve as at 1 October 2015 based on nine month forecasted and scheduled depletion of resource from mining face positions of the Mineral Reserve declared on 31 December 2014.*
3. *Economic tail cut applied to the Mineral Reserve Estimate. Scheduled reserve from 1 January 2038 is excluded from the MRE (0.1 Mt at 4.14 g/t 4E).*
4. *MRE for Level 1 Merensky includes ground swap effected between Khuseleka and Thembelani Mines (1.4 Mt at 6.07 g/t 4E).*

Table 8.4 Thembelani Mineral Reserve estimate (1 October 2015)

Reserve classification	Tonnes (Mt)	4E grade (g/t 4E)	Ni grade (%)	Cu grade (%)	4E content (Moz)	Prill splits			
						Pt (%)	Pd (%)	Rh (%)	Au (%)
Merensky Level 1									
Proved	2.12	5.47	0.11	0.01	0.37	64.5	26.7	4.1	4.7
Probable									
Mineral Reserve	**2.12**	**5.47**	**0.11**	**0.01**	**0.37**	**64.5**	**26.7**	**4.1**	**4.7**
UG2 Level 1									
Proved	12.54	4.01	0.11	0.01	1.62	53.5	35.3	10.4	0.8
Probable	3.56	4.08	0.11	0.01	0.47	53.4	35.6	10.3	0.8
Mineral Reserve	**16.10**	**4.02**	**0.11**	**0.01**	**2.08**	**53.5**	**35.4**	**10.3**	**0.8**
UG2 Level 2									
Proved	25.52	4.04	0.11	0.01	3.32	54.0	35.2	10.1	0.8
Probable	4.33	4.37	0.11	0.01	0.61	54.8	34.7	9.7	0.8
Mineral Reserve	**29.85**	**4.09**	**0.11**	**0.01**	**3.92**	**54.1**	**35.1**	**10.0**	**0.8**
Merensky and UG2 Combined Level 1									
Proved	14.65	4.22	0.11	0.01	1.99	55.6	33.7	9.2	1.5
Probable	3.56	4.08	0.11	0.01	0.47	53.4	35.6	10.3	0.8
Mineral Reserve	**18.21**	**4.19**	**0.11**	**0.01**	**2.45**	**55.2**	**34.1**	**9.4**	**1.4**
Merensky and UG2 Combined Level 2									
Proved	25.52	4.04	0.11	0.01	3.32	54.0	35.2	10.1	0.8
Probable	4.33	4.37	0.11	0.01	0.61	54.8	34.7	9.7	0.8
Mineral Reserve	**29.85**	**4.09**	**0.11**	**0.01**	**3.92**	**54.1**	**35.1**	**10.0**	**0.8**
Merensky and UG2 Combined Level 1 and Level 2									
Proved	40.18	4.11	0.11	0.01	5.30	54.6	34.6	9.7	1.0
Probable	7.89	4.24	0.11	0.01	1.07	54.2	35.1	10.0	0.8
Mineral Reserve	48.06	4.13	0.11	0.01	6.38	54.5	34.7	9.8	1.0

Source: DRA, 2015

Notes:

1. *No cut-off grade is applied – all Mineral Reserve grades in excess of minimum economic cut-off at Cost 1 definition.*
2. *L1 Reserve as at 1 October 2015 based on nine month forecasted and scheduled depletion of resource from mining face positions of the Mineral Reserve declared on 31 December 2014.*
3. *Economic tail cut applied to the Mineral Reserve Estimate. Scheduled reserve from 1 January 2042 is excluded from the MRE (0.6 Mt at 4.22 g/t 4E).*
4. *MRE for Level 1 Merensky excludes ground swap effected between Khuseleka and Thembelani Mines (1.4 Mt at 6.22 g/t 4E).*

Table 8.5 Siphumelele Mineral Reserve estimate (1 October 2015)

Reserve classification	Tonnes (Mt)	4E grade (g/t 4E)	Ni grade (%)	Cu grade (%)	4E content (Moz)	Prill splits			
						Pt (%)	Pd (%)	Rh (%)	Au (%)
Merensky Level 1									
Proved	9.18	5.50	0.11	0.01	1.62	63.7	27.9	3.8	4.6
Probable	0.21	4.24	0.11	0.01	0.03	64.0	27.7	3.5	4.8
Mineral Reserve	**9.39**	**5.47**	**0.11**	**0.01**	**1.65**	**63.7**	**27.9**	**3.8**	**4.6**
UG2 Level 2									
Proved	20.64	4.22	0.11	0.01	2.80	53.5	36.1	9.6	0.8
Probable	13.12	4.18	0.11	0.01	1.76	53.6	36.1	9.5	0.8
Mineral Reserve	**33.76**	**4.21**	**0.11**	**0.01**	**4.56**	**53.5**	**36.1**	**9.6**	**0.8**
Merensky and UG2 Combined Level 1									
Proved	9.18	5.50	0.11	0.01	1.62	63.7	27.9	3.8	4.6
Probable	0.21	4.24	0.11	0.01	0.03	64.0	27.7	3.5	4.8
Mineral Reserve	**9.39**	**5.47**	**0.11**	**0.01**	**1.65**	**63.7**	**27.9**	**3.8**	**4.6**
Merensky and UG2 Combined Level 2									
Proved	20.64	4.22	0.11	0.01	2.80	53.5	36.1	9.6	0.8
Probable	13.12	4.18	0.11	0.01	1.76	53.6	36.1	9.5	0.8
Mineral Reserve	**33.76**	**4.21**	**0.11**	**0.01**	**4.56**	**53.5**	**36.1**	**9.6**	**0.8**
Merensky and UG2 Combined Level 1 and Level 2									
Proved	29.81	4.61	0.11	0.01	4.42	57.2	33.1	7.5	2.2
Probable	13.33	4.18	0.11	0.01	1.79	53.7	36.0	9.4	0.8
Mineral Reserve	**43.15**	**4.48**	**0.11**	**0.01**	**6.22**	**56.2**	**33.9**	**8.0**	**1.8**

Source: DRA, 2015

Notes:

1. *No cut-off grade is applied – all Mineral Reserve grades in excess of minimum economic cut-off at Cost 1 definition.*
2. *L1 Reserve as at 1 October 2015 based on nine month forecasted and scheduled depletion of resource from mining face positions of the Mineral Reserve declared on 31 December 2014.*
3. *Economic tail cut applied to the Mineral Reserve Estimate. Scheduled reserve from 1 January 2042 is excluded from the MRE (3.5 Mt at 4.08 g/t 4E).*

Table 8.6 Bathopele Mineral Reserve estimate (1 October 2015)

Reserve classification	Tonnes (Mt)	4E grade (g/t 4E)	Ni grade (%)	Cu grade (%)	4E content (Moz)	Prill splits			
						Pt (%)	Pd (%)	Rh (%)	Au (%)
UG2 Level 1									
Proved	41.75	2.78	0.10	0.01	3.73	54.8	33.6	10.8	0.8
Probable									
Mineral Reserve	**41.75**	**2.78**	**0.10**	**0.01**	**3.73**	**54.8**	**33.6**	**10.8**	**0.8**

Source: DRA, 2015

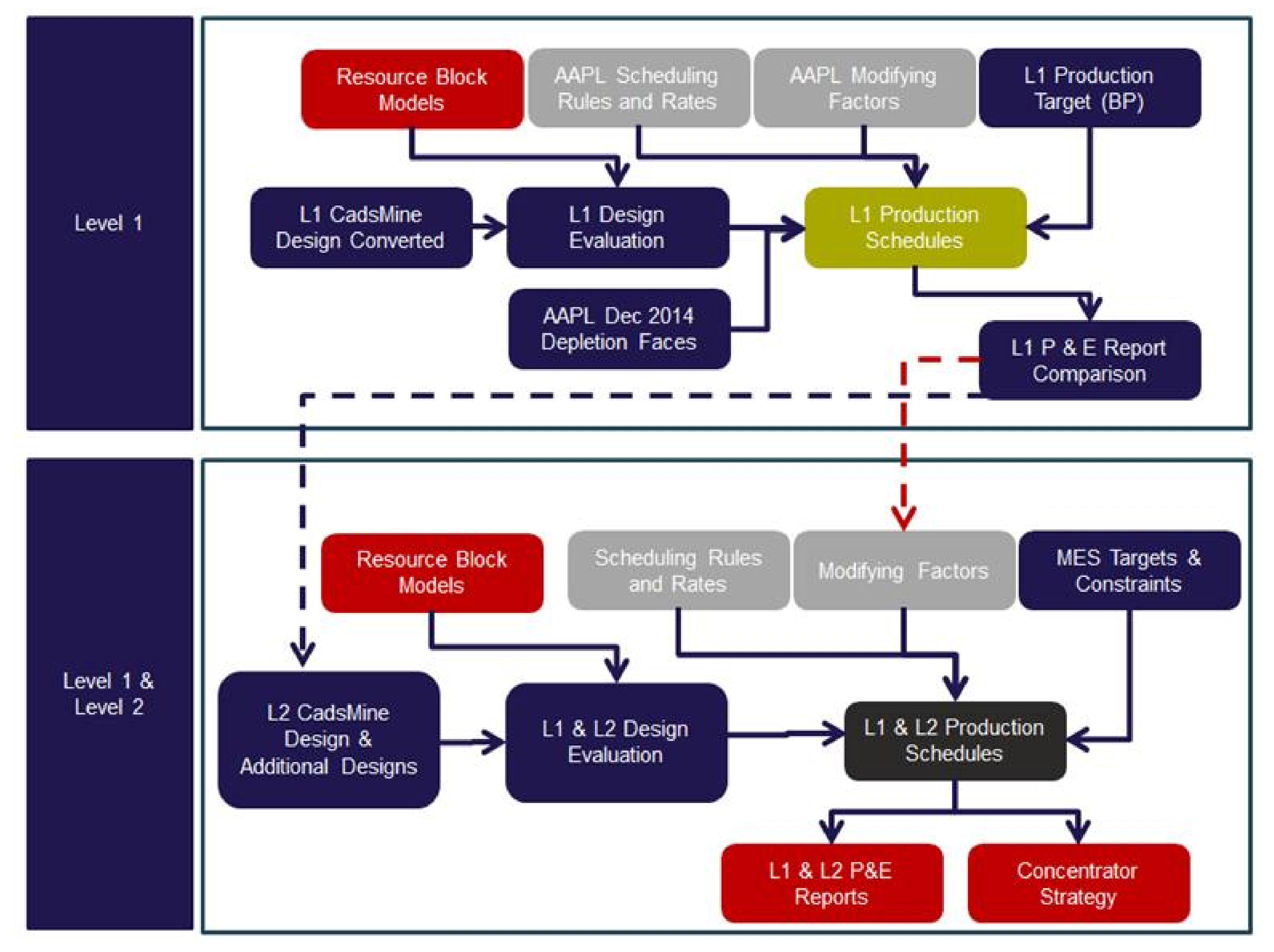
Notes:

1. *No cut-off grade is applied – all Mineral Reserve grades in excess of minimum economic cut-off at Cost 1 definition.*
2. *L1 Reserve as at 1 October 2015 based on nine month forecasted and scheduled depletion of resource from mining face positions of the Mineral Reserve declared on 31 December 2014.*
3. *Economic tail cut applied to the Mineral Reserve Estimate. Scheduled reserve from 1 January 2031 is excluded from the MRE (1.0 Mt at 2.66 g/t 4E).*

Rustenburg Operations Mineral Resources are converted to Mineral Reserves by the application of appropriate modifying factors in accordance with the guidelines of the SAMREC Code using best-practice mine planning processes as outlined in Figure 8.3. Modifying factors are based on historic data obtained from regular surveys and measurements.

Figure 8.3 below illustrates the process followed in the application of the modifying and scheduling parameters for L1 and L2 Investment Centres. The L1 production profiles were reproduced in the Datamine software and the relevant scheduling and modifying parameters applied to the L2 production plans.

Figure 8.3 RPM Mineral Reserve mine planning and reserve estimation process



Source: RPM, 2015
Notes: BP – Business Plan; P&E – Production and Evaluation; AAPL – Anglo American Platinum Limited.

8.2.1 Mineral Resource model used

MRE block models for the Merensky and UG2 reefs (Table 8.7) were developed by RPM.

Table 8.7 Mineral Resource block model parameters

Parameter	Merensky Resource Model	UG2 Resource Model
File name	mer_geo_bm.dm	ug2_geo_bm.dm
File type	Datamine	Datamine
Code compliant	SAMREC	SAMREC
No. of records	50,031	11,296
Model origin X	20200	20000
Model origin Y	-41100	-47000
Model origin Z	-0.5	-0.5
Parent cell size (X, Y, Z)	600 : 300 : 1	52 : 36 : 1

Source: RPM, 2015

The common origin for all reef unit block modelling is:

- Easting (X): 20 000; and,
- Northing (Y): 40 000.

The block size used is 125 m x 125 m for the UG2 block model and 50 m x 50 m for the Merensky 2D block models. Reef thickness, bulk density and metal grades are included for each reef. The zero elevation 2D block model block centroids for each reef are projected onto the basal wireframe surfaces for the UG2 and for the Merensky to locate the resultant block models in 3D space. The 2D resource was converted into 3D space containing the relevant model attributes such as density, PGE grade, base metal grades, resource classification, reef widths and geological losses. The original block model files for the different Merensky and UG2 facies were combined to create a single block model planning model for each reef type.

The mineral resource block models were validated and reported using standard checks:

- Visual examination of block model;
- Missing and negative value analysis;
- Overlapping and gaps within model;
- Verify model contains structural and 3D spatial data;
- Report resource and validate against official resource tables;
- Depletion of surfaces; and,
- Validation of grade tonnage curves.

There were no material errors found in converting the resource block model files to mine planning files. The resource block models are regularised to the smallest sub-cell size and converted to a 2D vertically extruded model. This is done to ensure that all wireframes contained within the design intersect the block model and are correctly evaluated. All ancillary geo-statistical fields and non-supporting quality fields were removed from the Datamine block model to improve the speed of processing.

The UG2 and Merensky resource block model has a field indicated as *"Resource Cut*". It is compiled by taking the channel width of the resource and diluting it to a minimum mining height to ensure extraction of the reef. If the channel width value is above the minimum mining height an additional 10 cm footwall dilution is applied in the cut to achieve the *"Resource Cut"*.

The dilution widths, densities and grades of the other strata cuts for footwall and hangingwall material are included in the block models to evaluate off-reef development and off-reef stoping.

8.2.2 Modifying factors

SV 2.7

The AAPL Group standard mine planning and Mineral Reserve estimation methodology is used for RPM's underground mines. These standards have been developed over many years and provide a consistent, auditable and best practice approach to underground mine planning and scheduling:

- Known geological losses include major faulting and known IRUP, potholes and other major geological structures. These areas are identified by geological boundaries and are excluded from the mine planning process;
- Major pillars for regional stability and/or the protection of surface infrastructure are excluded from the mine schedule;

- Other mining losses are applied in the mine planning process by discounting the available mineable area (tonnes and metal content) by the combined percentage of:
  - Unknown geological losses include smaller faults, IRUP and potholes that, from historical mining practice are known to exist, but whose location has not been determined.
  - Mining losses including internal support pillars and other mining losses;
- Dilution is additional low grade material added to the Mineral Resource in the mining process that increases tonnage and lowers the mined grade, comprising:
  - Minimum mining width - the mining width at which the reef can be safely mined (typically assessed over the last three years production results). The minimum mining width is applied by adding allowance for additional low grade footwall and hangingwall to the Mineral Resource “best cut” mining widths.
  - Stoping over-break into the hangingwall and footwall – any additional tonnage from rock falls and poor mining practices. The stope over-break increases the mined tonnage and lowers the mined grade.
  - An allowance for winch chambers and excavations mined in the stope footwall and/or hangingwall.
  - At the Bathopele Mine, the hangingwall is mined above the main dip conveyors;
- Mine call factor. The mine call factor (“MCF”) is the ratio of the 4E metal recovered at the concentrator (plus metal in residue), i.e. “accounted for” to the 4E metal calculated to be contained in a stope block based on the mine’s survey face sampling, i.e. “called for”. The reserve MCF is based on the prior year’s average MCF for each Investment Centre and reef type; and,
- Waste stored underground. At the Bathopele Shaft, some waste rock is separated from the blasted UG2 reef and stored in old mining areas.

Table 8.8 shows a summary of the modifying factors applied for each mine and reef type.

Table 8.8 Modifying factors for Rustenburg Operations Mineral Reserve estimate

Investment Centre	Losses				Additional waste dilution				Reef to concentrator (%)	Waste to concentrator (%)	MCF (%)
	Geology (%)	Mining (%)	Off Reef (%)	RIF/RIH (%)	Overbreak (%)	ASG, Cubby and Redev (%)	Other impacts (%)	Reef development (%)			
RS MER L1 Siphumelele	9.3	13.0	3.2	0.7	2.8	6.9	-	2.3	100.0	-	94.0
RS MER L1 Thembelani	13.8	7.5	2.0	0.1	4.3	8.8	-	2.3	100.0	-	98.0
RS MER L1 Khuseleka	12.9	17.0	4.6	0.1	10.4	6.9	-	1.2	100.0	-	98.0
RS UG2 L1 Bathopele	0.3	0.0	3.8	0.0	25.7	0.7	-	1.6	98.0	2.0	100.0
RS UG2 L1 Thembelani	14.3	16.6	2.0	0.2	5.6	10.2	-	2.3	100.0	-	100.0
RS UG2 L1 Khuseleka	17.2	34.1	2.4	0.7	7.8	8.8	-	0.9	100.0	-	98.0
RS UG2 L2 Siphumelele	23.3	34.1	2.4	0.7	7.6	9.3	-	3.5	100.0	-	100.0
RS UG2 L2 Thembelani	14.6	17.9	2.1	0.2	5.8	11.2	-	2.4	100.0	-	100.0
RS UG2 L2 Khuseleka	19.5	34.2	2.4	0.7	7.6	9.0	-	3.0	100.0	-	98.0

Source: RPM, 2015
Note: Redev – Redevelopment; RIF/RIH – Reef in footwall/ Reef in hangingwall

Mine planning staff use industry standard software and well documented mine design parameters to develop short and long term schedules. Modifying factors are generally included in the planning software as input parameters or actual designs. The mine plans are scheduled monthly for three years and annually thereafter. All L1 areas are designed to a high level of detail showing all on-reef and off-reef development, stope blocks (monthly or annually) and regional pillars.

Process and tailings modifying factors and constraints are discussed in Section 9 and Section 10 respectively.

The modifying factors used in the CPR were guided by the Rustenburg Operations BP15 planning modifying factors and related approved technical support documents for each reef type and Investment Centre. In conjunction with the approved planning parameters, the L1 BP15 production schedules were used for alignment of the L1 CPR production profiles using the process illustrated in Figure 8.3. The BP15 planning parameters were calculated based on benchmarking against survey actuals for the previous two years. The planning parameters were collated per reef type and Investment Centre for the previous two year period to determine the approved BP15 planning parameters. The resulting modifying factors were reviewed by DRA and were found to be appropriate for production scheduling. The applied modifying factors for the Resource to Reserve conversion, are considered to be in line with historic targets/achievements at Rustenburg Operations.

8.3 Mineral Reserve estimates – surface ore sources

SV 2.6

The MRE, as at 1 October 2015, for TSF surface ore sources are summarised in Table 8.9 to Table 8.12.

Table 8.9 Klipfontein TSF Mineral Reserve estimate (1 October 2015)

Reserve classification	Tonnes (Mt)	4E grade (g/t 4E)	Ni grade (%)	Cu grade (%)	4E content (Moz)	Prill splits			
						Pt (%)	Pd (%)	Rh (%)	Au (%)
Klipfontein TSF									
Proved									
Probable	4.20	1.21	0.08	0.02	0.16	58.0	29.3	8.2	4.6
Mineral Reserve	**4.20**	**1.21**	**0.08**	**0.02**	**0.16**	**58.0**	**29.3**	**8.2**	**4.6**

Source: DRA, 2015

Table 8.10 Waterval East TSF Mineral Reserve estimate (1 October 2015)

Reserve classification	Tonnes (Mt)	4E grade (g/t 4E)	Ni grade (%)	Cu grade (%)	4E content (Moz)	Prill splits			
						Pt (%)	Pd (%)	Rh (%)	Au (%)
Waterval East TSF									
Proved									
Probable	11.36	1.00	0.07	0.02	0.37	62.9	28.3	5.2	3.8
Mineral Reserve	**11.36**	**1.00**	**0.07**	**0.02**	**0.37**	**62.9**	**28.3**	**5.2**	**3.8**

Source: DRA, 2015

Table 8.11 Waterval West TSF Mineral Reserve estimate (1 October 2015)

Reserve classification	Tonnes (Mt)	4E grade (g/t 4E)	Ni grade (%)	Cu grade (%)	4E content (Moz)	Prill splits			
						Pt (%)	Pd (%)	Rh (%)	Au (%)
Waterval West TSF									
Proved	77.56	1.00	0.07	0.02	2.49	62.9	28.3	5.2	3.8
Probable									
Mineral Reserve	**77.56**	**1.00**	**0.07**	**0.02**	**2.49**	**62.9**	**28.3**	**5.2**	**3.8**

Source: DRA, 2015

Table 8.12 Total TSF Mineral Reserve estimate (1 October 2015)

Reserve classification	Tonnes (Mt)	4E grade (g/t 4E)	Ni grade (%)	Cu grade (%)	4E content (Moz)	Prill splits			
						Pt (%)	Pd (%)	Rh (%)	Au (%)
Total TSF Sources									
Proved	77.56	1.00	0.07	0.02	2.49	62.9	28.3	5.2	3.8
Probable	15.56	1.06	0.07	0.02	0.53	61.3	28.6	6.1	4.0
Mineral Reserve	**93.12**	**1.01**	**0.07**	**0.02**	**3.02**	**62.6**	**28.3**	**5.3**	**3.8**

Source: DRA, 2015

Notes:

1. *No cut-off grade is applied to TSF surface ore sources.*
2. *Reserve as at 1 October 2015 based on nine month actual survey assured depletion of surface TSF ore sources from remaining surface ore sources as declared on 31 December 2014.*
3. *Tail cut applied to the Mineral Reserve Estimate for the surface TSF ore sources. Klipfontein TSF from 1 January 2017 is excluded from the MRE. Waterval East and West TSF from 1 January 2042 is excluded from the MRE.*

8.4 Mineral Reserve estimates – Total ore sources

SV 2.6

The MRE for total ore sources, as at 1 October 2015, are summarised in Table 8.13 to Table 8.15.

Table 8.13 Total underground ore sources Mineral Reserve estimate (1 October 2015)

Reserve classification	Tonnes (Mt)	4E grade (g/t 4E)	Ni grade (%)	Cu grade (%)	4E content (Moz)	Prill splits			
						Pt (%)	Pd (%)	Rh (%)	Au (%)
Merensky L1 + L2									
Proved	14.04	5.46	0.11	0.01	2.47	64.1	27.3	4.0	4.6
Probable	0.66	5.26	0.12	0.01	0.11	64.5	27.0	4.0	4.5
Mineral Reserve	**14.70**	**5.45**	**0.11**	**0.01**	**2.58**	**64.1**	**27.3**	**4.0**	**4.6**
UG2 L1 + L2									
Proved	132.72	3.67	0.11	0.01	15.67	54.3	34.7	10.3	0.8
Probable	21.13	4.20	0.11	0.01	2.85	53.8	35.7	9.7	0.8
Mineral Reserve	**153.85**	**3.74**	**0.11**	**0.01**	**18.52**	**54.3**	**34.8**	**10.2**	**0.8**
Total Reserve									
Proved	146.76	3.84	0.11	0.01	18.13	55.7	33.7	9.4	1.3
Probable	21.79	4.23	0.11	0.01	2.97	54.2	35.4	9.5	0.9
Mineral Reserve	**168.55**	**3.89**	**0.11**	**0.01**	**21.10**	**55.5**	**33.9**	**9.4**	**1.2**

Source: DRA, 2015

Table 8.14 Total surface TSF ore sources Mineral Reserve estimate (1 October 2015)

Reserve classification	Tonnes (Mt)	4E grade (g/t 4E)	Ni grade (%)	Cu grade (%)	4E content (Moz)	Prill splits			
						Pt (%)	Pd (%)	Rh (%)	Au (%)
Total TSF Sources									
Proved	77.56	1.00	0.07	0.02	2.49	62.9	28.3	5.2	3.8
Probable	15.56	1.06	0.07	0.02	0.53	61.3	28.6	6.1	4.0
Mineral Reserve	**93.12**	**1.01**	**0.07**	**0.02**	**3.02**	**62.6**	**28.3**	**5.3**	**3.8**

Source: DRA, 2015

Table 8.15 Total Mineral Reserve estimate as at 1 October 2015, for underground and surface ore sources

Reserve classification	Tonnes (Mt)	4E grade (g/t 4E)	Ni grade (%)	Cu grade (%)	4E content (Moz)	Prill splits			
						Pt (%)	Pd (%)	Rh (%)	Au (%)
Merensky L1 + L2									
Proved	14.04	5.46	0.11	0.01	2.47	64.1	27.3	4.0	4.6
Probable	0.66	5.26	0.12	0.01	0.11	64.5	27.0	4.0	4.5
Mineral Reserve	**14.70**	**5.45**	**0.11**	**0.01**	**2.58**	**64.1**	**27.3**	**4.0**	**4.6**
UG2 L1 + L2									
Proved	132.72	3.67	0.11	0.01	15.67	54.3	34.7	10.3	0.8
Probable	21.13	4.20	0.11	0.01	2.85	53.8	35.7	9.7	0.8
Mineral Reserve	**153.85**	**3.74**	**0.11**	**0.01**	**18.52**	**54.3**	**34.8**	**10.2**	**0.8**
TSF									
Proved	77.56	1.00	0.07	0.02	2.49	62.9	28.3	5.2	3.8
Probable	15.56	1.06	0.07	0.02	0.53	61.3	28.6	6.1	4.0
Mineral Reserve	**93.12**	**1.01**	**0.07**	**0.02**	**3.02**	**62.6**	**28.3**	**5.3**	**3.8**
Total Reserve summary									
Proved	224.32	2.86	0.10	0.02	20.63	56.5	33.0	8.9	1.6
Probable	37.35	2.91	0.09	0.02	3.49	55.3	34.4	9.0	1.4
Mineral Reserve	**261.67**	**2.87**	**0.10**	**0.02**	**24.12**	**56.4**	**33.2**	**8.9**	**1.5**

Source: DRA, 2015

Notes:

1 *L1 Reserve as at 1 October 2015 based on nine month forecasted and scheduled depletion from MRE as declared on 31 December 2014.*

2 *Economic tail cut applied to the Mineral Reserve Estimate.*

3 *Tailings Surface Ore Sources Reserve as at 1 October 2015 based on nine month actual survey measured depletion of surface TSF ore sources from remaining surface ore sources as declared on 31 December 2014.*

8.5 Mineral Reserve estimates – Reconciliation

T1.3C(i), T8C(vi), SV 2.6

The MRE (excluding royalty ground) changes from 31 December 2014 (AAPL) to 1 October 2015 (CPR) are summarised in Table 8.16 and Table 8.17.

Table 8.16 Underground Mineral Reserve sources reconciliation

Reserve classification	Tonnes (Mt)	4E grade (g/t 4E)	4E content (Moz)
Historic Reserve – Rustenburg Mines, as at 31 December 2014 (AAPL)			
Proved	70.7	3.7	8.4
Probable	4.3	4.3	0.6
Mineral Reserve	**75.0**	**3.7**	**9.0**
Less Level 1 Depletion (1 January 2015 to 30 September 2015)			
Proved	-5.0	3.8	-0.6
Probable			
Mineral Reserve	**-5.0**	**3.8**	**-0.6**
Plus change in economic tail cut			
Proved	6.5	2.4	0.5
Probable	-0.1	4.3	-0.0
Mineral Reserve	**6.4**	**2.4**	**0.5**
Level 1 Reserve as at 1 October 2015 for CPR, incorporating changes above			
Proved	72.1	3.6	8.3
Probable	4.2	4.3	0.6
Mineral Reserve	**76.4**	**3.6**	**8.9**
Plus Level 2 Reserve as at 1 October 2015 for CPR			
Proved	74.61	4.1	9.84
Probable	17.57	4.2	2.39
Mineral Reserve	**92.19**	**4.1**	**12.23**
Rustenburg Operations (L1+ L2) as at 1 October 2015 for CPR, incorporating new Reserve above			
Proved	146.8	3.8	18.1
Probable	21.8	4.2	3.0
Mineral Reserve	**168.6**	**3.9**	**21.1**

Source: DRA, 2015

Table 8.17 Surface ore sources reconciliation

Reserve classification	Tonnes (Mt)	4E grade (g/t 4E)	4E content (Moz)
Historic Reserve – Rustenburg Mines (AAPL 31 December 2014)			
Proved			
Probable	20.9	1.06	0.7
Mineral Reserve	**20.9**	**1.06**	**0.7**
Less Level 1 Depletion (1 January 2015 to 30 September 2015)			
Proved			
Probable	-3.6	1.3	-0.1
Mineral Reserve	**-3.6**	**1.3**	**-0.1**
Plus Other Changes			
Proved			
Probable	-1.8	0.7	< -0.1
Mineral Reserve	**-1.8**	**0.7**	**< -0.1**
Level 1 Reserve as at 1 October 2015 for CPR, incorporating changes above			
Proved			
Probable	15.6	1.1	0.5
Mineral Reserve	**15.6**	**1.1**	**0.5**
Plus Waterval West, as at 1 October 2015 for CPR – New Reserves			
Proved	77.6	1.0	2.5
Probable			
Mineral Reserve	**77.6**	**1.0**	**2.5**
Rustenburg Operations (L1+ L2), as at 1 October 2015 for CPR, incorporating new Reserve above			
Proved	77.6	1.0	2.5
Probable	15.6	1.1	0.5
Mineral Reserve	**93.1**	**1.0**	**3.0**

Source: DRA, 2015

8.6 Mining

8.6.1 Mining methods

Khuseleka, Thembelani and Siphumelele

The stoping method on the Merensky Reef and the UG2 Reef at Khuseleka, Thembelani and Siphumelele is conventional scattered breast mining. This method incorporates small in-stope pillars and regional pillars to maintain stability of the workings. It also allows for greater flexibility in ore exploration and the negotiation of geological structures. It involves a grid of pre-development with breast mining; whereby dip pillars are left permanently unmined.

Typically, a long cross cut is developed from the shaft position to a point 30 m to 40 m in the footwall of the reef. Haulage drives are then developed on either side. As shown in Table 8.18 and Figure 8.4, the haulage drive (typically 3.2 metres wide or "mW" x 3.4 metres high or "mH") is developed in the footwall and parallel to the strike direction of the reef. This forms a typical "half level"

Cross cuts (3.2 mW x 3.4 mH) are established about 200 m apart and developed towards the reef. A material bay and travelling way are developed up to intersect the reef. A raise (1.5 mW x 2.9 mH) is developed along the reef plane to intersect the raise in the level above. Typically, raises are 240 m long. Ore passes (box holes) are developed from the cross cut to the raise. Haulage dimensions allow airflow of up to 110 cubic metres per second ("m^3/sec") at a velocity of 7 m/s.

Once the raise is established, it is stripped and ledged in preparation for stoping. Stope panels are 32 m long. Each panel is mined in a direction sub-parallel to strike. Pneumatic rock drills are used to drill blast holes in the stope face. Blasted ore is moved down the face to a strike gully. A strike scraper moves the ore to the centre gully where it is scraped to an ore pass, or tips directly into an ore pass.

The hangingwall is supported using a combination of rock bolts and timber support, installed after each blast. In-stope pillars are cut (typically 14 m to 15 m long x 3 m wide). The effective advance per blast is about 0.9 m. Each panel is blasted between 11.7 and 13.7 times per month. Regional pillars (15 m on strike by 30 m on dip) are located midway between each raise line. Each panel is mined towards the raise and stopped at the regional pillar. The base case schedules use the production rate assumptions outlined in Table 8.18.

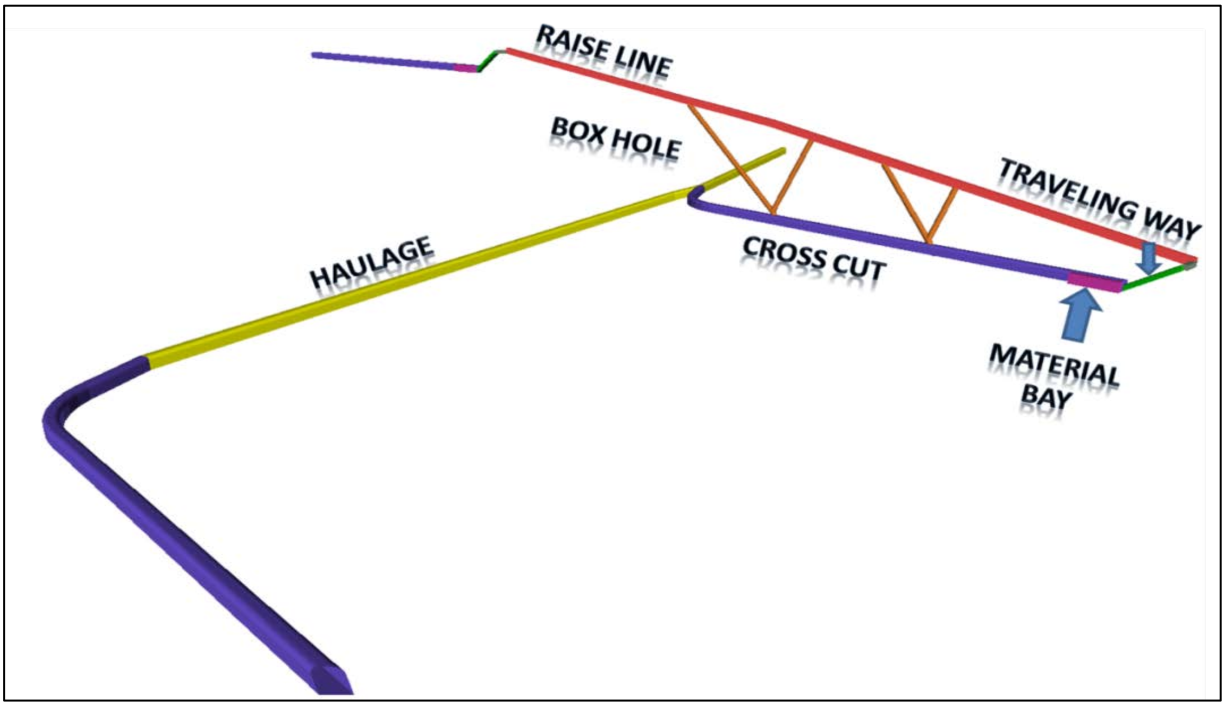
Ideally, the overall mining sequence is an underhand configuration with the top panels leading, to reduce the formation of remnants during final mining stages. Due to potholes and re-establishing face, the mining sequence is not always possible. Therefore overhand configurations (bottom panels leading) are allowed in certain cases. For the deeper mining sections, mining towards the biggest solid avoids the formation of higher stressed remnant areas. This strategy is particularly used for the Merensky Reef sections on all stoping levels.

Table 8.18 Stope productivity assumptions

Half Level ("HL") summary	Unit	Khuseleka	Thembelani	Siphumelele
m^2 per stope raise line per month	m^2	1,400	1,280	1,750
m^2 per ledging raise line per month	m^2	240	230	220
No. of stope raise lines in production per HL	no.	2	2	2
No. of ledging crews per HL	no.	1	1	2
Stope and ledge m^2 per half level per month	m^2	3,040	2,790	3,940
Ore tonnes per stoped area	t/m^2	4.71	4.64	4.72
Ore tonnes per stope panel per month	tpm	1,650	1,485	1,653
Ore tonnes per stope raise line per day (average)	tpd	287	258	359
Ore tonnes per stope raise line per day (maximum)	tpd	497	506	602
Ore tonnes per half level per month (stoping)	tpm	13,199	11,881	16,533
Ore tonnes per half level per month (ledging)	tpm	1,131	1,067	2,078
Ore tonnes per half level per month	tpm	14,598	13,223	18,875
Ore tonnes per half level per day (average)	tpd	635	575	821
Ore tonnes per half level per day (maximum)	tpd	1,100	1,127	1,374

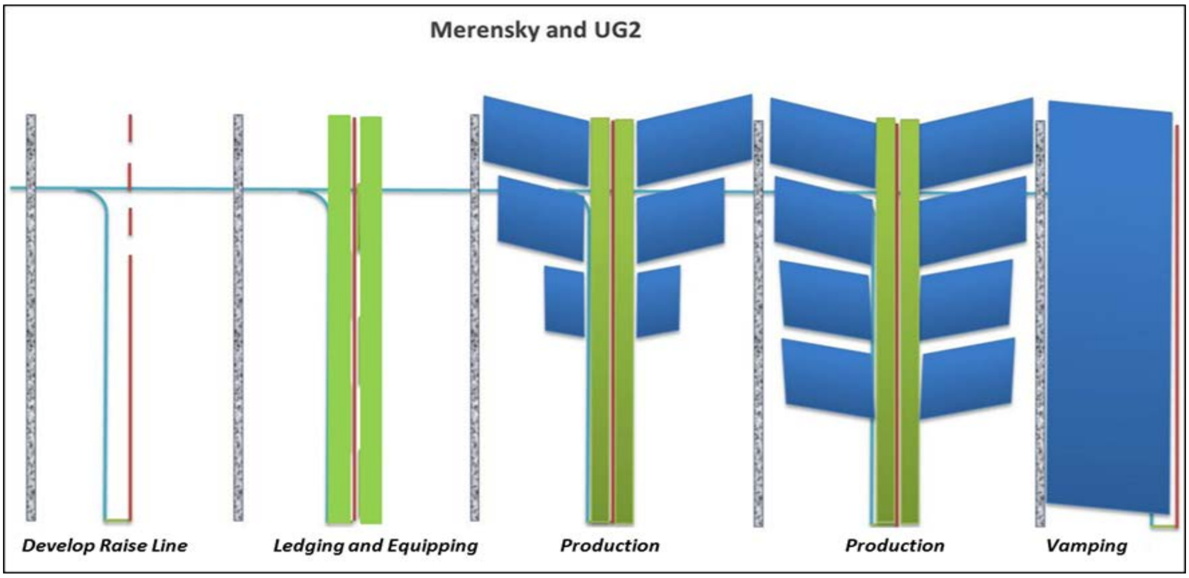
Source: DRA, 2015
Note: t/m^2 – tonnes per square metre; tpd - tonnes per day; tpm – tonnes per month

Figure 8.4 Schematic showing typical footwall development and the on-reef raise



Source: DRA, 2015
Note: Not to scale

Figure 8.5 Plan view of typical half level layout and stope activity sequencing



Source: DRA, 2015
Note: Not to scale

Bathopele

Bathopele is a mechanised operation mining the UG2 reef. Current operations are at depths between 40 m and 350 m below surface with a planned depth of 515 m. The average dip of the reef is 9° and as a result, bord and pillar is the mining method used. Regularly spaced pillars support the middling to surface and are designed not to yield or fail. The protection of surface structures such as buildings, roads and railway lines is achieved by ensuring the pillars are capable of supporting the overburden. Where the normal pillar configuration does not provide the necessary support additional pillars are designed.

Minimal development is required to prepare for mining. Development is often on-reef and comprises roadways for ore transport and travelling ways for mine personnel. Excavation of roadways is combined with ore production. Mined out stopes serve as transport routes. Mobile mechanised mining equipment is used at Bathopele.

The overall face configuration is typically carried underhand, where the upper most strike sections lead the remainder. Up-dip mining is carried out when dictated by geotechnical conditions. Low profile ("LP") equipment is used in bord and pillar stoping and extra low profile ("XLP") equipment in breast mining. XLP stoping contributes about 11% of the area mined.

The ore body is accessed by the East and Central Decline systems which feed a common 4,000 t capacity surface silo. The East Decline is on the true dip of 9° to Strike drive 10 and thereafter at an apparent dip of 8°. The Central Decline is at an apparent dip of 8.5°. The declines generally follow the reef. Where reef rolls or potholes and other geological features are encountered some off-reef mining is required to maintain gradients that can be negotiated by the mobile equipment and dip conveyors.

The decline comprises five separate barrels to Strike 15 and seven barrels below. In the seven barrel decline cluster the centre three barrels are for mechanised equipment travel, the dip conveyor and services (compressed air, service water, potable water, power and pump lines). Two barrels are used for intake ventilation and two barrels for return airways.

8.6.2 Geotechnical considerations

Weathering

Oxidised or weathered rock is commonly found close to surface and affects a small part of some of the operations. Oxidised reef is usually left in-situ as the alteration of the minerals makes processing difficult. The approximate rock mass weathering depth is 36 m, but some preferential weathering is located approximately 50 m deep.

Faults

Normal and reverse faults occur randomly in the mining area. The faults generally displace the reef from a few millimetres to a few metres. Poor ground conditions are associated with faults and the areas immediately adjacent to their contact which occasionally affect mining operations. Where the Merensky Reef is mined, significant faulting occurs in the form of faults parallel to the Bushveld primary igneous layering. This type of faulting is normally associated with the bottom of the Boulder Bed and the top or/bottom of the Footwall Marker, where slips occur parallel to the reef plane. The footwall marker, located approximately 12 m below the Merensky Reef horizon, is a reactivated thrust fault with variable displacement across the area, from a few millimetres to 12 m or more in places. The gouge infilling varies in thickness from a few millimetres to 5 cm.

<u>Khuseleka</u>

The Hex River fault cuts the sequences in a north-south direction with a dip to the west of 70° to 90°. The fault has a variable displacement in common with many of the “growth faults” in the region. Nine minor faults have been identified at Khuseleka, of which six are trending east to west, with throws varying between 0.6 m and 12 m. Two faults trend in a north-northwest direction, each with a 4 m throw. One fault has a north-south strike, with a 6 m throw.

<u>Thembelani</u>

The Hex River fault cuts the sequences in a north-south direction with a dip to the west of 70° to 90°. The fault has a variable displacement in common with many of the “growth faults” in the region, suggesting that as the magmatic pile accumulated, the displacement per unit varied. It is associated with very poor ground conditions. The fault zone is roughly 40 m wide and consists of several faults. The Small Hex fault, an offshoot of the Hex River fault, is associated with very poor ground conditions. The Dam Fault is projected to intersect the workings on the western side of Thembelani 1 Shaft. It trends northeast to southwest and has a throw which ranges from 1.2 m to 3 m. Low angle structures and general poor ground conditions are associated with this structure.

<u>Siphumelele</u>

The F1 fault at the northern boundary of Siphumelele 1 Shaft, cuts the sequences from east to west with a dip of 80°. It has a displacement of 150 m to 180 m and has a zone of parallel faulting on the up-dip side. The fault zone is roughly 40 m to 50 m. A reverse fault, the Brakspruit fault with a dip of 20° to 30° south, striking at 80° west of north, extends from the eastern boundary of Siphumelele 2 Shaft to the western boundary of Siphumelele 1 Shaft, into Thembelani Shaft area. Minor en-echelon faulting is often associated with poor ground conditions but is usually localised. A 60 m wide shear zone on the western side of the shaft, cuts the sequence in a southeast to northwest direction. The adjacent area on the eastern side has very poor ground conditions.

Bathopele

The Hex River fault cuts the sequences in a north to south direction with a dip to the west of 70° to 90°. The fault has variable displacement in common with many of the "growth faults" in the region. Within the Bathopele Mine boundaries the fault has a displacement of up to 2 m, but it increases with depth. It consists of several faults and the zone of influence can be up to 40 m wide. The fault acts as a fissure which transports surface water into underground workings due to the intersection with the Hex River on surface. It is associated with weathering and very poor ground conditions.

Similarly, the Central fault strikes north-south with a dip to the west of 70° to 90° and has a displacement of 0.3 m to 0.5 m. A third fault zone is up to 60 m wide, trending east to west and results in poor ground conditions. It has displacements of between 0.3 m and 1 m. Within this zone the individual faults have dips between 30° and 80° resulting in blocky ground and wedge formations.

Dykes

Many dykes in the Rustenburg area are strong and competent and do not present a major problem when mining. However, where they exist, ground conditions deteriorate due to sympathetic jointing and infilling along the contact with the host rock. Generally, additional support is required, particularly on the weaker side of the dyke and at the contacts. These dykes can be associated with a displacement of the rock mass along one of the contacts. Where a major dyke occurs, bracket protection pillars are left on either side. When minor dykes are intersected, these are assessed to determine whether mining through them is to be limited or not.

In-situ stress

Historic stress measurements testwork in the BC indicates that:

- High east-west horizontal stresses were measured at Khomanani shaft (close to the current Siphumelele Mine) approximately on reef strike;
- Off-reef vertical stresses are lower than anticipated when applying the overburden weight, with the on-reef vertical stress is slightly larger than anticipated; and,
- Large variations exist in off-reef horizontal stresses.

Seismicity

Siphumelele, Thembelani and Khuseleka have experienced a seismic response to mining in recent years, but with different levels of severity. Across the Western Limb of the BC, mining induced seismicity has been reported and confirmed from the deeper Merensky Reef horizon, but not to any significance on the UG2 Reef horizon.

All shafts are equipped with digital seismic monitoring systems to gather data on dynamic rock mass failure on a continuous basis.

Rock mass quality and support design

The Rock Mass Rating ("RMR") gives a good indication of the quality of the rock mass in mining excavations. The workings at Siphumelele fall within the fair to good class of rock. At Thembelani, the workings fall within the "Poor" to "Good" classes of rock for the Merensky and UG2. At Bathopele, the majority of the workings fall within the "Poor" to "Fair" quality class, confirming that the UG2 rock mass appears to be of poorer quality than at the other shafts.

The design of regional mining spans is based on the following conditions, layouts and requirements:

- Spacing of pillars not to exceed one-half of the mining depth to reduce the possibility of beam failure, the height of the tensile zone, stope collapse or back-break;
- Regional pillars not to be subject to an average pillar stress ("APS") that is higher than 500 mega Pascals ("MPa");
- Regional pillar sizes are determined applying the squat pillar formula and area verified using numerical modelling; and,
- Regional pillars are solid dip pillars to prevent panels from holing or mining past each other. They are located midway between dip raises, incorporating geological losses where possible. The size of the pillars varies with the depth.

At Bathopele, the bord and pillar sections have regularly spaced intact pillars. They support the middling to surface and have Safety Factors exceeding 1.6. The protection of specific surface structures is achieved by ensuring the in-stope pillars support the overburden at Safety Factors exceeding 2, negating the need for regional pillars. Regional stability in the XLP and ultra low profile ("ULP") sections is achieved through planned regional pillars. These regional pillars:

- Are systematically spaced at a distance equivalent to a half of the depth;
- Have a pillar width to stoping height ratio >10:1;
- Limit mining spans to 100 m to prevent back breaks; and,
- Have a safety factor >1.6 applied.

For mining on the Merensky Reef, in-stope pillars use industry standard methods to calculate pillar strengths. At depth, where crush pillars are used, the residual strength is approximately 10 MPa. The crush pillar range starts from approximately 500 metres below surface ("mbs") and extends to approximately 1,400 mbs. Crush pillar sizes are determined according to standard criteria.

At Bathopele pillars are designed with Safety Factors exceeding 1.6, except where LoM excavations such as roadways, workshops, dams and other surface infrastructure are protected. In such cases, a factor of safety of more than 2 is applied.

Ad hoc pillars are left due to difficult mining conditions (e.g. potholes) or where panels hole into other mined out areas.

The overall face configuration is underhand, where the upper most panels in a stope lead the remainder of the panels (to reduce the formation of remnants during the final mining stages). For the deeper sections, mining is towards the biggest solid to avoid the formation of higher stressed remnant areas. Sequential mining of raise lines towards the boundaries (and towards increasing depths) allow mining towards solid at depth. An optimum lead or lag between panels of 15 m is designed.

The mining impact on two townships overlying the Bathopele UG2 was recently assessed. The investigation concluded that the risk of experiencing any surface impact due to the existing mining is very low. The factor of safety ("FOS") and "pillar run potential" analyses confirmed the very low potential for individual pillar behaviour to influence the overall mining horizon or the overburden sufficiently to cause surface subsidence.

Monitoring confirms that the mine workings and the overburden between the workings and the townships have been stable over the last four to six years, following the mining of the specific areas.

Support

Support systems are an integrated design, which fulfil the support requirements of the different working areas. They are different for each mine and governed by the following factors:

- Stratigraphy of the immediate hangingwall;
- Geological structures such as joints or partings;
- Mining depth which influences the stress regime i.e. concentrations around excavations;
- Stress fracturing and closure rate;
- The presence or lack of seismicity; and,
- Zones of influence of support units.

Thembelani and Khuseleka

The stope support methodology is based on critical rock mass and support parameters, and takes into account the rock mass condition, depth of mining, zones of support influence, stable hanging wall spans between adjacent support units and incorporates fallout thickness. Stope support requirements are in agreement with design criteria of a 1.4 m fallout thickness.

Grout packs are an integral part of the support system together with pre-stressed elongates, Camlok props, in-stope bolts and safety nets. Permanent support will consist of 150 mm to 180 mm diameter pencil sticks on a 2.0 m x 1.5 m spacing installed at a maximum distance of 4.3 m from the face. The back area support will consist of grout packs installed at 10 m x 4.0 m spacing, at a maximum distance of 16.0 m from the face.

In-stope bolting, consisting of a 0.9 m Hydrabolt installed on a maximum 1.5 m x 1.5 m pattern will be considered as part of the stoping strategy. The installation of 1.2 m resin bolts at 60° to the hangingwall is on trial. In-stope bolts have not formed part of the support because they did not penetrate the expected fall out thickness and are therefore considered as additional support to work together with the in-stope nets.

Bathopele

To support the XLP face area, 1.6 m coupling resin bolts suspend the weight of the fall-out-thickness. Based on a grid spacing of 1 m on strike and 2 m on dip the FOS is 1.9.

To support the intermediate and back area, the dead-weight of rock up to the height of the tensile zone is supported by 180 mm mine poles which accounts for any elastic closure as a result of the mined out span. The support resistance is based on the Tributary area for a single mine pole spaced 1.3 m apart on dip and 2.4 m apart on strike. Based on a 25 m panel span, the calculated height of the tensile zone is 2.29 m.

The conventional bord and pillar face area is supported using suspension, where the intermediate and back areas are supported by carrying the dead-weight of the rock up to the height of the tensile zone. The required support resistance for the face area is calculated using the fall-out-thickness of 1.2 m. To support the face area, 1.6 m coupling resin bolts suspend the weight of the fall-out-thickness. Based on a grid spacing of 1 m on strike and 2 m on dip, the support Factor of Safety is 1.9. To support the intermediate and back area, the dead-weight of rock up to the height of the tensile zone is carried using 180 mm pre-tensioned mine poles. The height of the tensile zone was determined for a panel span of 30 m. Support consists of 180 mm diameter mine poles on a grid spacing of 2.4 m on strike and 1.3 m on dip.

8.6.3 Mining method mine design criteria

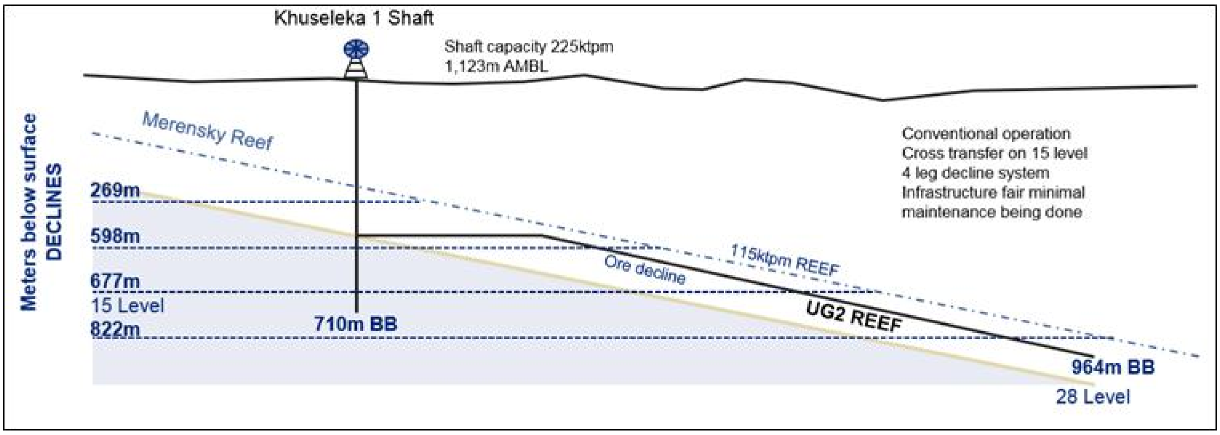
8.6.4 Infrastructure

Khuseleka

Khuseleka 1 Shaft (as shown in cross section in Figure 8.6) is a vertical shaft and decline system with capacity to extract 200 ktpm of ore plus waste rock. The calculated production output of the shaft is approximately 225 ktpm. The maximum planned production of 200 ktpm is within the design capacity of the shaft.

The reef horizons at Khuseleka are accessible from the vertical shaft system extending from surface to 15 Level. A decline has been developed from the vertical shaft to 28 Level. Because the Merensky Reef is mined out above 18 Level all Merensky Reef mining is concentrated in the decline section. UG2 mining is undertaken from 10 Level to 15 Level.

Figure 8.6 Cross-sectional schematic of the Khuseleka access infrastructure



Source: BBE, 2015

Khuseleka 2 Shaft is a decline system previously used for production but no longer in use and is planned to be permanently de-commissioned by the end of 2015.

<u>Khuseleka – current ventilation arrangement</u>

The mine is uncooled and ventilated with 720 kg/s air. The Merensky and UG2 reefs provide separate ventilation districts but share up and downcast shaft facilities as well as area specific shaft station infrastructure. Shaft infrastructure consists of two downcast and two upcast shafts:

- Khuseleka Main Downcast (“DC”), 7.6 m diameter equipped;
- Khuseleka 26 Level DC system, consists of three 3.8 m diameter raise drillholes (“RBHs”);
- Khuseleka 1 UG2 Upcast (“UC”), 5.5 m diameter unequipped shaft; and,
- Khuseleka 2 UC (Merensky), 5.0 m diameter unequipped shaft.

The upcast shafts are all equipped with fan stations that include standby and diesel driven emergency units as follows:

- Khuseleka 1 UC shaft has a trifurcated drift with three centrifugal fans. Two fans operate, with the third fan out of operation. An emergency diesel fan is installed; and,

- Khuseleka 2 UC shaft system has an underground fan station. Three fans are installed of which two operate and one is a full duty standby. The emergency diesel unit is out of operation.

A surface refrigeration system including a bulk air cooler ("BAC"), is located on Khuseleka "26 Level DC shaft". The plant operated briefly in 2011, but has not operated since, and has not been maintained. The installation incorporates ice coils with the intention to facilitate load shifting during peak demand periods. The ice making capacity is 5 MW; the same refrigeration machine can provide 8 MW chilled water cooling during off-peak periods.

Khuseleka – future ventilation requirements

Ventilation systems for the selected years were modelled to determine air temperatures, flow rates, heat loads and cooling requirements. The selected years are:

- Current (2015), mining Merensky and UG2 L1 and production 1.8 Mtpa;
- 2022; UG2 L2 production 2.2 Mtpa; Merensky and UG2 L1 mined out; and,
- 2027; mining the extremities of the UG2 L2 mining area; production 2.1 Mtpa.

In addition, 2015 is used to calibrate the 'current mine' conditions against the results of the Phase 1 study using existing shafts and infrastructure.

In 2022, mining will be concentrated on UG2 L2 between 15 Level and 29 Level with no Merensky or UG2 L1 mining. The model predicts that an air flow of 560 kg/s, supplied via Main shaft and 26 Level "shaft system 2" (three RBHs), will be sufficient to meet the design conditions. The overall ventilation factor, including leakage and commitments, is 3.7 kg/s/ktpm.

At a mean rock breaking depth of 650 m below collar ("mbc") heat sources, including surrounding and broken rock and auto-compression amount to 13.7 MW. Heat is countered by ventilation and no refrigeration is required. The predicted average stope face wet-bulb temperature is 27.6°C.

Air returns on-reef through worked out raises to the UG2 L1 and redundant Merensky infrastructure to K1 and K2 upcast shafts. Two surface fans operate at K1 and two underground booster fans at K2 upcast. In 2022, the fans are predicted to absorb a combined 2.8 MW.

In 2027 mining east and west of the main shaft with production biased to the west requires more ventilation than the east side. Production will be from 15 to 29 Levels at a mean rock breaking depth of 600 mbc. Less air is required than 2022 (450 kg/s) with no additional infrastructure. Heat amounts to 10 MW and is countered by ventilation air.

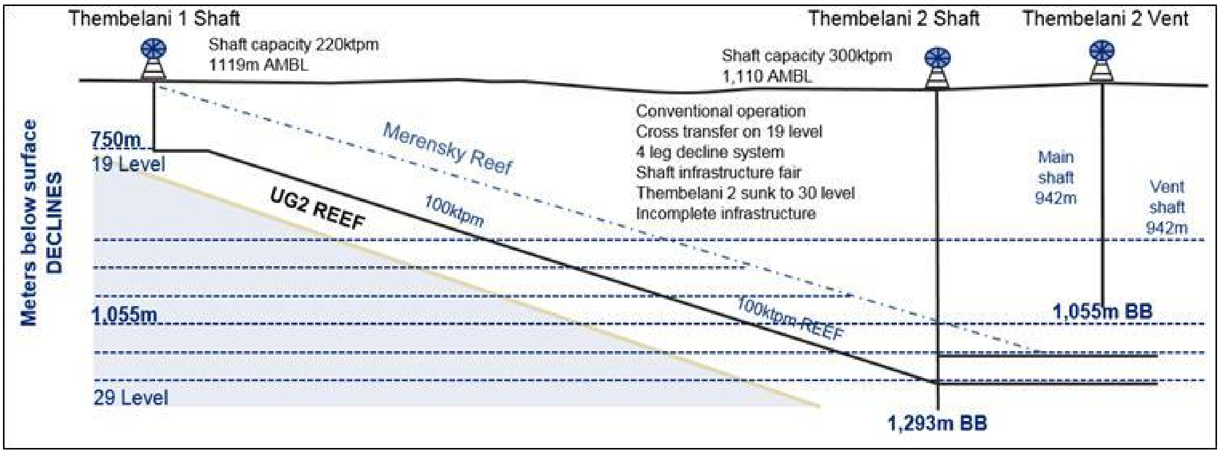
The return strategy remains unchanged. One fan is required at K1 to handle the reduced air flow, in 2022 two fans operate. In 2027 the main fans absorb 2.3 MW.

No additional infrastructure is required other than already been planned and accounted for in the UG2 L2 study.

Thembelani

Thembelani 1 Shaft comprises a vertical shaft from surface to 19 Level and a decline system from 19 Level down to 29 Level as shown in Figure 8.7. The entire shaft infrastructure required for the LoM plan has been developed. Thembelani 2 Shaft extends to 29 Level and is connected to 1 Shaft via a decline system. The planned production rate from the Thembelani Shaft is 180 ktpm compared with its capacity of 220 ktpm.

Figure 8.7 Cross-sectional schematic of the Thembelani access infrastructure



Source: BBE, 2015

Thembelani – current ventilation arrangement

The mine is ventilated with 800 kg/s uncooled air. Merensky and UG2 reefs provide separate ventilation districts but share up and downcast shaft facilities as well as area specific station infrastructure. Shaft infrastructure consists of two downcast and four upcast shafts:

- Thembelani 1 and 2 DC, 8.0 m diameter equipped;
- 14W and 15E UC, 3.1 m diameter RBH;
- Thembelani "UG2" (Thembelani 1) UC, 7.0 m diameter unequipped;
- Thembelani "Merensky" UC, 4.5 m diameter RBH; and,
- Thembelani 2 UC (unused and not equipped with a fan).

Air returns on-reef to dedicated return airways ("RAWs") above the mining horizon. The Merensky RAW feed into Thembelani 'Merensky' UC and the UG2 RAWs feed into 14W and 15E UC shafts and Thembelani "UG2" UC. Current and longer term ventilation planning is modelled using VUMA software. Ventilation systems are in line with the design criteria document. Workplace temperatures are below the AAPL maximum design limit wet-bulb temperature of 25°C.

With the exception of Thembelani 2, upcast shafts are equipped with fans as follows:

- 14W and 15E, bifurcated drifts and two centrifugal fans. Single fans operate with the other as a full duty standby. There are no emergency diesel fans at either site;
- "Thembelani UG2", trifurcated drift fitted with three centrifugal fans. Two fans operate; the third is a full duty standby. Emergency duty is provided by a diesel unit; and,
- "Thembelani Merensky", trifurcated drift fitted with three centrifugal fans; two normally operate. The third unit provides full duty standby. A diesel driven emergency fan is provided.

A 13 MW refrigeration plant is installed at Thembelani 2 Main Shaft to supply cold water to a BAC. The installation was completed and commissioned in 2011 but was not used.

Thembelani – future ventilation requirements

Ventilation systems for the selected years are modelled to determine air temperatures, flow rates, heat loads and cooling requirements. The selected years are:

- Current (2015), Merensky and UG2 L1 with production of 1.8 Mtpa;
- 2030; UG2 L2 production 1.8 Mtpa; Merensky and UG2 L1 will be mined out; and,
- 2039; mining extremities of the UG2 L2 mining area; production 1.8 Mtpa.

In addition, 2015 calibrates the "current mine" conditions against results of the Phase 1 study using existing shafts and infrastructure.

In 2030, mining of UG2 L2 will be between 21 and 29 Levels with no Merensky or UG2 L1 being mined, at mean rock-breaking depth of 775 mbc. The model predicts an air flow of 610 kg/s, supplied via Thembelani 1 ("TH1") and Thembelani 2 ("TH2") downcast shafts.

Air returns to TH1 and TH2 upcast shafts via on-reef worked out areas through the UG2 ventilation pillar to Merensky infrastructure. The overall ventilation factor is 4.0 kg/s/ktpm (including leakage and commitments). In 2030, three fans are planned to operate at TH1 upcast and two at TH2, whilst 14 West and 14 East will not be required at this stage.

Heat, including surrounding and broken rock and auto-compression is predicted to amount to 20.5 MW and is countered by ventilation air (14.5 MW) and refrigeration (6.0 MW). TH2 downcast is equipped with a BAC with capacity to supply 12.0 MW. In 2030, one of the two refrigeration machines will operate. Predicted average stope face temperature is 29°C. If maximum wet-bulb temperatures exceed 30.5°C there is the option to increase the BAC duty by operating the second refrigeration plant.

Surface fans operate at TH1 and TH2 UC shafts; total absorbed power for the fans will be 3.1 MW, the cooling plant will absorb 2.0 MW.

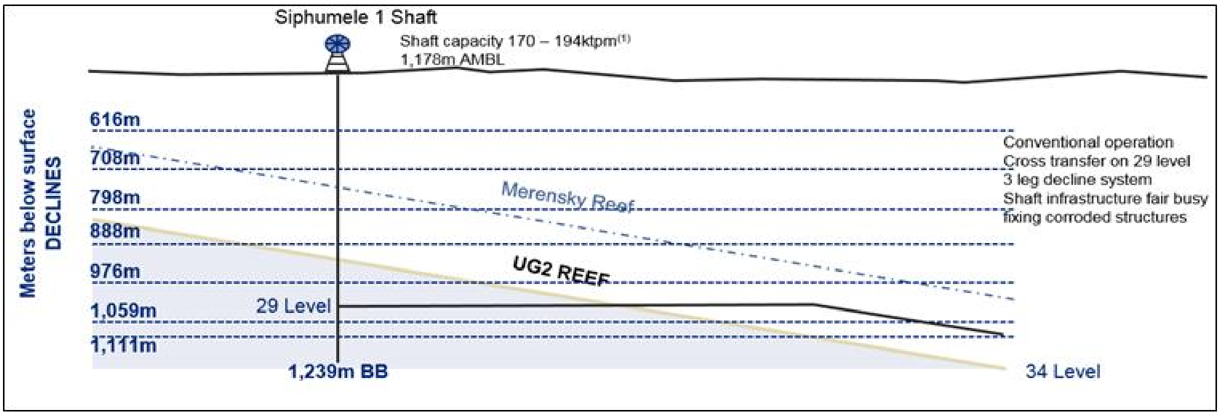
In 2039, production takes place across 5 Levels, 21 Level to 29 Level at a mean rock breaking depth of 775 mbc. Required air flow will reduce to 550 kg/s as mining concentrates on the east of the mine. Air will return on reef via UG2 L1 and Merensky infrastructure to TH1 and TH2 UC shafts. Heat will amount to 20.6 MW and will be countered by ventilation (14.6 MW) and refrigeration (6.0 MW). Absorbed power for the UC fans and cooling system will be 5.1 MW.

Additional infrastructure requirements will be raise line connections as required to pass through the Hex River fault.

Siphumelele

Siphumelele shaft comprises a vertical shaft from surface to 29 Level and a decline to the lowest working level on 34 Level as shown in Figure 8.8. The Siphumelele shaft system has a capacity of 170 ktpm to 194 ktpm compared with the scheduled production rate of 180 ktpm.

Figure 8.8 Cross-sectional schematic of the Siphumelele access infrastructure



Source: BBE, 2015

<u>Siphumelele 1 – current ventilation arrangement</u>

The mine is ventilated with 640 kg/s of which 300 kg/s is cooled. Two downcast shafts extend from surface to 29 Level, an 8.5 m diameter equipped shaft and a 4.4 m diameter "cold hole" fed from a surface bulk air cooler. Intake declines have been developed below reef from 26 Level to 34 Level. Return declines run below reef from 34 Level to the bottom of the 6.2 m upcast shaft on 22 Level which returns to surface.

Average workplace temperatures are currently 29.0°C wet-bulb, although in some remote working places wet-bulb temperatures exceed 32.0°C. Near term ventilation planning is modelled using VUMA software.

The upcast shaft is equipped with a fan station including standby and diesel driven emergency units as follows:

- Trifurcated drift with three centrifugal fans. Two fans operate; the third fan is full duty standby. An emergency diesel fan is installed; and,
- Underground booster fan on 26 Level forces air from the cold hole into the intake decline. The station has one fan and no standby.

The refrigeration system is located on surface at Siphumelele 1 Shaft, with refrigeration capacity of 17.3 MW (9.6 MW feeds the BAC; the balance could be used for cooling service water). Two refrigeration machines are installed, one operates and the other is standby.

<u>Siphumelele 1 – future ventilation requirements</u>

Ventilation systems for the selected years are modelled to determine air temperatures, flow rates, heat loads and cooling requirements. The selected years are:

- Current (2015), mining Merensky at 0.9 Mtpa;
- 2033; UG2 production 2.1 Mtpa and 0.1 Mtpa Merensky; and,
- 2045; mining the extremities of the UG2 production 2.1 Mtpa.

In addition, 2015 calibrates the "current mine" conditions against results of the Phase 1 study using existing shafts and infrastructure.

In 2033, Merensky will be mined on 32 Level East and UG2 between 21 Intermediate and 34 Levels (east and west), with a mean rock-breaking depth at 942 mbc. The ventilation requirement is 980 kg/s supplied via the existing Main shaft and the BAC cold hole. Air returns via the existing upcast shaft and a planned 6.1 m diameter upcast shaft from 21 Intermediate Level to surface. The overall ventilation factor, including leakage and commitments, is 4.8 kg/s/ktpm.

At the mean rock breaking depth heat sources, including surrounding and broken rock and auto-compression amounts to 35.4 MW. Heat is countered by ventilation and 9.6 MW cooling. The predicted average stope face wet-bulb temperature is 28.1°C.

Surface fans operate at both the main and new upcast shafts, the underground booster is not required. Total absorbed power for the main fans is 6.8 MW and the refrigeration plant absorbs 2.2 MW.

In 2045 mining between 21 Intermediate and 34 Levels is planned at a mean rock-breaking depth of 1,040 mbc. Due to increased system resistance air flow decreases to 940 kg/s. No additional infrastructure is required. Heat sources amount to 38.5 MW and can be countered by ventilation air (28.9 MW) and refrigeration (9.6 MW). Predicted average stope face wet-bulb temperature increases to 29.4°C, maximum face wet-bulb is approximately 31.0°C. Absorbed power remains unchanged. Surface fans absorb 7.8 MW and the refrigeration plant 2.2 MW. Spare refrigeration capacity will be installed to cool service water to reduce face temperatures.

The planned 6.1 m diameter upcast shaft from 21 Intermediate Level to surface (750 m in length) is equipped with trifurcated surface fans, two operating one standby. The fans provide 250 m^3/s each at 6.0 kPa. The estimated cost for the trifurcated fan station is ZAR65 M for commissioning in 2020.

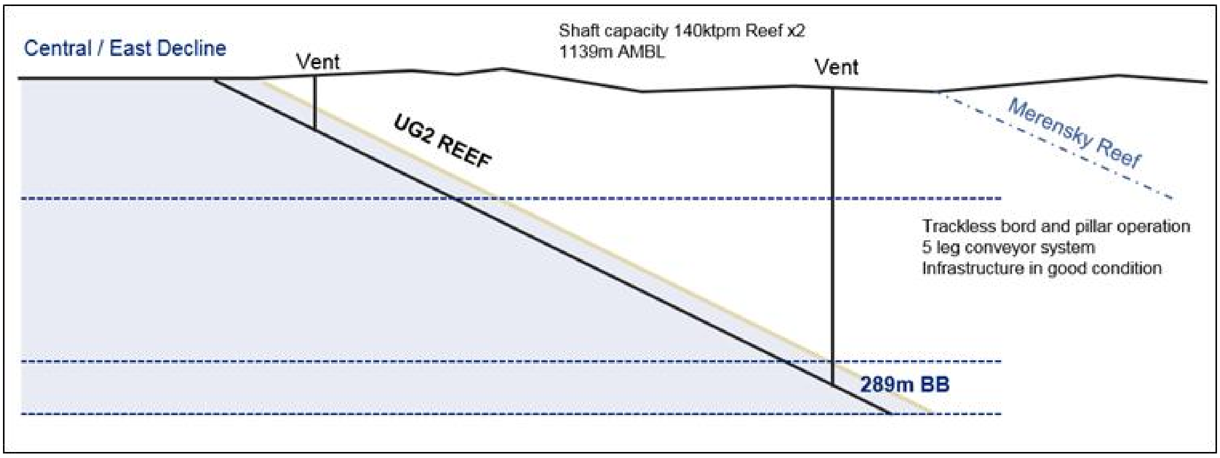
Bathopele

The current Bathopele shaft infrastructure (Figure 8.9) comprises two decline shafts (East and Central) and West Shaft, which is accessed underground from Central Shaft. Development of West Shaft has been stopped. Bathopele is being developed in five phases. Phase 1, 2 and 3 are complete and Phase 4 development commenced in 2009. Phase 5 was approved during 2011 for execution. The Phase 5 project will complete the sinking and equipping of both East and Central shafts to the mine boundary.

Significant capital can be saved by extending the strike drives from the Central Shaft infrastructure through the Hex River fault system to the western boundary of Bathopele Mine. Access into the workings for both men and machinery is via the East and Central Shaft declines.

The mine has a design capacity of 280 ktpm compared to a tonnage profile of 279 ktpm split between the East and Central Shafts.

Figure 8.9 Cross-sectional schematic of the Bathopele access infrastructure (NTS)



Source: BBE, 2015

Bathopele – current ventilation arrangement

There are two shaft systems; East and Central providing separate ventilation districts connected for second escape only:

- East Shaft, air volumes are based on minimum velocity and exhaust dilution for diesel equipment. The shaft carries 460 kg/s, which meets the minimum requirement; and,
- Central Shaft is ventilated with 755 kg/s, 70 kg/s more than required.

In both systems, air returns on-reef to dedicated RAWs above the mining horizon. Current and longer term ventilation system planning is modelled with VUMA software. Ventilation is in line with the design criteria and workplace temperatures remain below the “design” wet-bulb. There is no refrigeration and heat tolerance screening is not required.

Bathopele is serviced by four upcast ventilation shafts:

- East Shaft: bifurcated drift fitted with two centrifugal fans. Two fans are normally operational. Emergency power is provided from the Bathopele central generator;
- Central Shaft: bifurcated drift fitted with two centrifugal fans. One fan is operational with a full duty standby fan. Emergency power is provided from the central generator;
- 3 West Shaft: bifurcated drift fitted with two centrifugal fans. One fan is operational with a full duty standby fan. Emergency power is provided from the central generator; and,
- West Shaft: single operational fan with emergency power provided from the central generator.

Bathopele – future ventilation requirements

The ventilation and cooling infrastructure requirements, including repair and refurbishment, can be met within SIB budget. The exception is the new main fan station required at Siphumelele, with a capital estimate of ZAR65 M in 2019.

8.6.5 Production schedule

Capacities

The capacities of each operating shaft at Rustenburg Operations and the associated concentrators are summarised in Table 8.19.

Table 8.19 Rustenburg Operations infrastructure capacities

Infrastructure	Design capacity (Mtpa)	Peak production rate (Mtpa)	Comments
Khuseleka 1 #	2.70	2.38	
Thembelani 1 #	2.64	2.11	
Siphumelele 1 #	2.33	2.06	
Bathopele Declines (x 2)	3.36	3.33	
SOM (Siphumelele 2 #)	1.38		C&M 2016
Khuseleka 2 #			Permanent closure – end 2015
Thembelani 2 #			C&M
Siphumelele 3 #			Permanent closure – end 2015
Khomanani 1 #			C&M – pumping required
Khomanani 2 #			C&M
Waterval UG2 concentrator	5.4	5.4	
Waterval Retrofit concentrator	7.44	7.21	

Source: DRA, 2015
Note: SOM – School of Mines; C&M – Care and maintenance

Scheduling rates

Typical rates of mining applied to each area are summarised in Table 8.20.

Mining crew productivity assumptions used in the CPR were guided by the BP15 planned production efficiencies. The BP15 production efficiencies were calculated based on benchmarking against survey actuals from January 2012 for a three year period. The historical crew efficiencies were collated per half level (excluding three anomalous extended strike periods) for the three year period to determine the approved BP15 average crew efficiency per mining activity. The BP15 average scheduling rates were scrutinised by DRA and were found to be appropriate for production scheduling for the CPR and in line with historic achievements.

Table 8.20 Mining scheduling rates

Minimum component	CPR
Thembelani	
Stoping	320 m^2/crew/month
Ledging	230 m^2/crew/month
On-reef development	25 m/crew/month
Off-reef development	25 m/crew/month
Khuseleka	
Stoping	350 m^2/crew/month
Ledging	240 m^2/crew/month
On-reef development	25 m/crew/month
Off-reef development	25 m/crew/month
Siphumelele	
Stoping	320 m^2/crew/month
Ledging	220 m^2/crew/month
On-reef development	25 m/crew/month
Off-reef development	25 m/crew/month
Bathopele	
LP stoping	1,950 m^2/crew/month
XLP stoping	2,200 m^2/crew/month
LP ledging	1,350 m^2/crew/month
XLP ledging	780 m^2/crew/month
LP on-reef development	15.6 m/crew/month (cluster)
XLP on-reef development	108 m/crew/month

Source: DRA, 2015
Note: LP – Low profile; XLP – Extra low profile

Using the block models for the Merensky and UG2 reefs provided by RPM, a 2D plan was expanded into 3D containing the relevant fields for; density, PGEs, base metal grades, resource classification and reef widths. The original block model files for the different Merensky Reef and UG2 Reef facies have been combined to create a single block model file to evaluate the Merensky and UG2 designs.

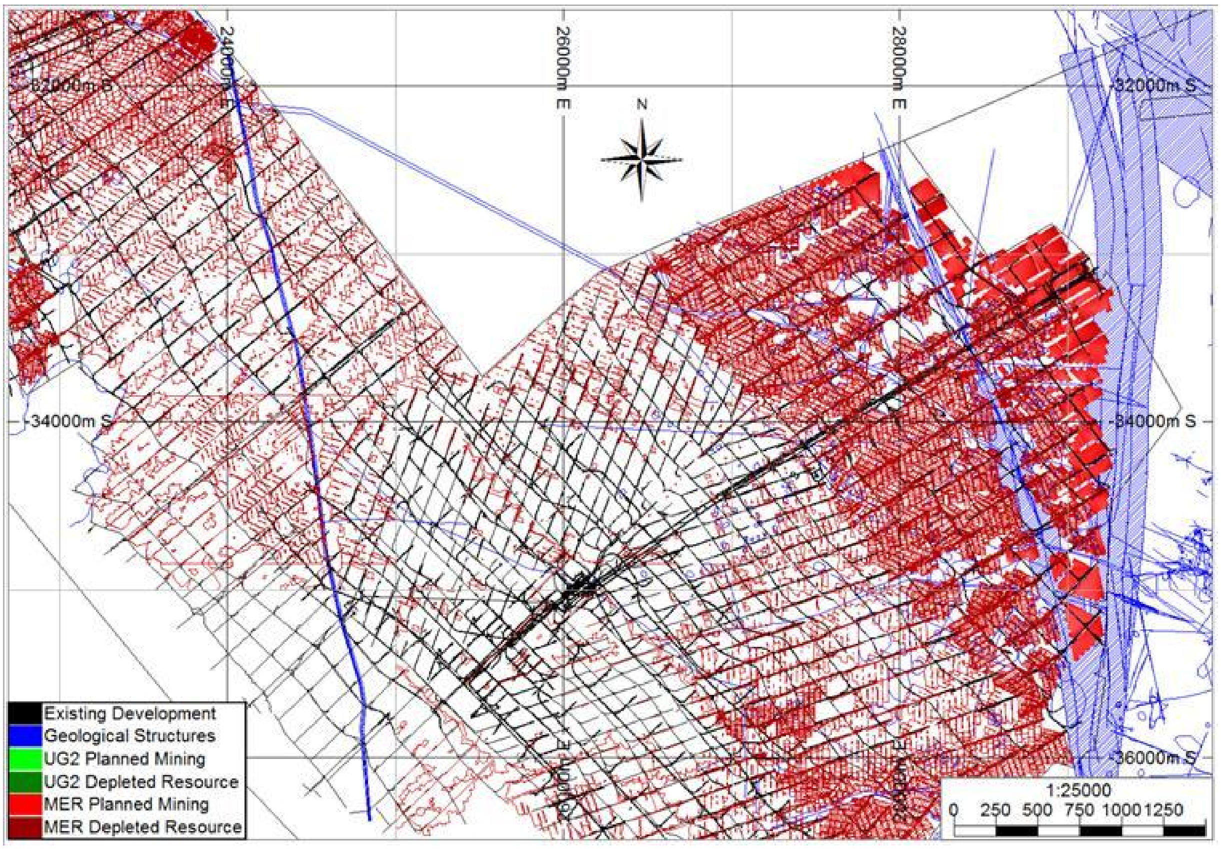
Khuseleka Mine

The design includes the Merensky Reef area from 19 Level to 28 Level as shown in Figure 8.10. The mine is accessed via the Khuseleka 1 vertical shaft and associated decline. The UG2 reef on Khuseleka extends from 10 Level to 28 Level (Figure 8.11) and is accessed from either the current shaft or the decline system. Both the Merensky Reef and the UG2 extraction areas on Khuseleka Shaft do not extend beyond 28 Level due to the decline system which causes logistical constraints, i.e. material to and from working faces, ore transportation and available face time for production.

No ore is excluded due to the pay limit. The resource model includes the geological losses for each designed area evaluated against the block model. Merensky Reef is currently mined from Levels 19 to 28. All Merensky Reef is mined out above 18 Level. On Levels 19 to 21 all waste development is complete and therefore mining is done on the reef plane only. From Level 22 and below, there is a small amount of waste development which constitutes a minor percentage of the overall mined tonnage.

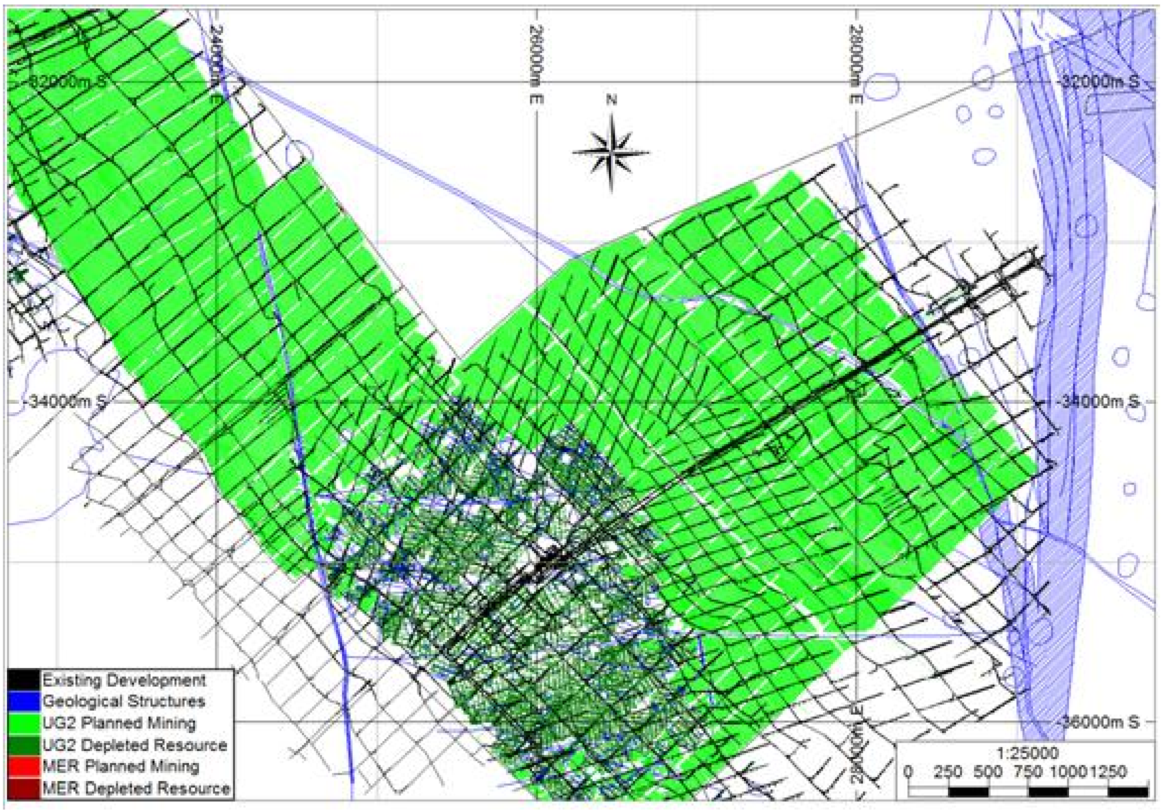
Approximately 3.19 Mt of Merensky Reef with a grade of 5.41 g/t can be mined to produce 555 koz of PGE (4E). Merensky Reef mining is planned until 2024. Annual production of 513 kt is planned for 2016 and decreases thereafter. All Merensky Reef mining is within the "Level 1" boundaries. The Merensky Reef is designed to be mined using the conventional breast stoping method.

Figure 8.10 Khuseleka Merensky stoping (LoM) for L1



Source: DRA, 2015

Figure 8.11 Khuseleka UG2 stoping (LoM) for L2



Source: DRA, 2015

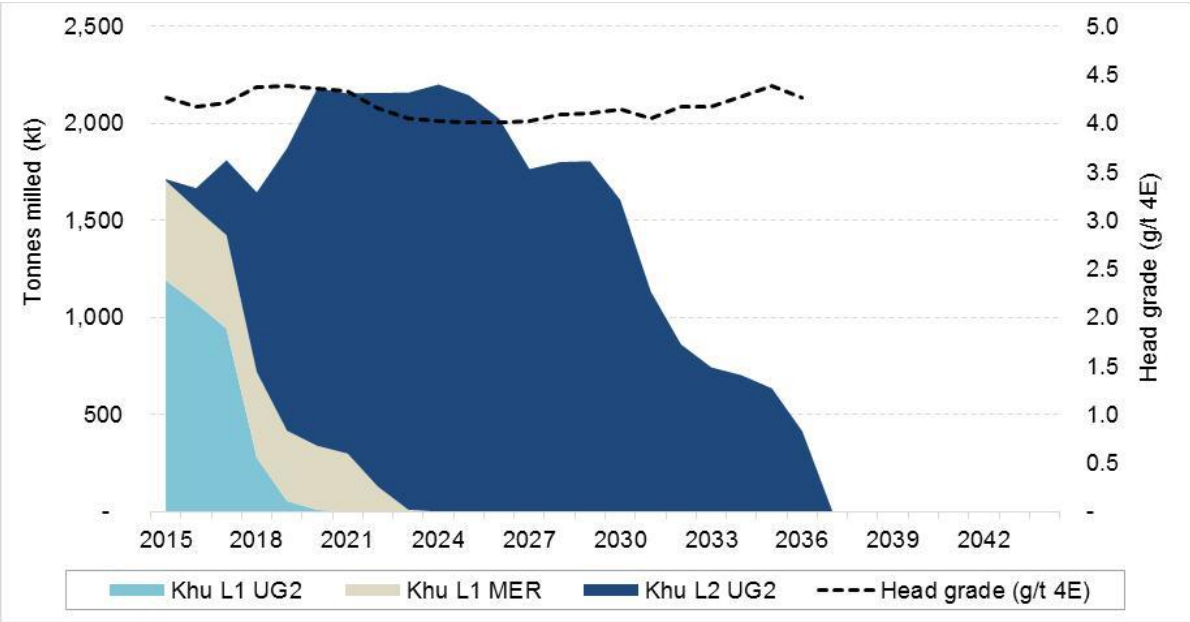
UG2 Reef mining is planned from 10 Level to 28 Level. Initial mining for the L1 plan is restricted from 10 Level to 15 Level. In the L1 schedule 3.82 Mt of ore remains to be mined at a 4E grade of 3.87 g/t to produce 475 koz of contained 4E. The schedule requires a mining rate of 1.2 Mtpa for 2016 with a steady decline from 2017 to the end of the L1 plan area in quarter 1 ("Q1") 2021. The L2 UG2 contains about 28.58 Mt ore at 4.07 g/t 4E containing about 3.74 Moz of PGE (4E). Mining continues from the final L1 positions and builds-up from a start in 2016 of 292 kt to 2.2 Mt in 2022 when steady state production is achieved and maintained until 2027. From 2028 the production rate reduces until 2036, where a second steady state of 360 ktpa is achieved as a result of the extension of Levels 10 to 14.

Levels 10 to 14 extend from the vertical shaft for over 6 km to the northwest, the furthest part having been previously mined from the Khuseleka 2 decline. Khuseleka 2 Shaft is not used as a primary access. Due to the tramming distance there is an ore transfer system on Levels 10 to 13. A high speed tramming system transports ore from transfer ore passes back to the shaft.

Levels 16 to 22 (except 17 Level) are developed from the decline. This is capital development and includes the first three crosscuts either side of the decline. The replacement L1 capital for Khuseleka extends the LoM of the current "Level 1" using the least amount of capital expenditure by utilising the current infrastructure developed to extract the Merensky reef horizon. New secondary footwall infrastructure accesses the UG2 reef horizon.

The Khuseleka production profile (Merensky and UG2 reefs) is summarised annually in Figure 8.12.

Figure 8.12 Khuseleka production profile



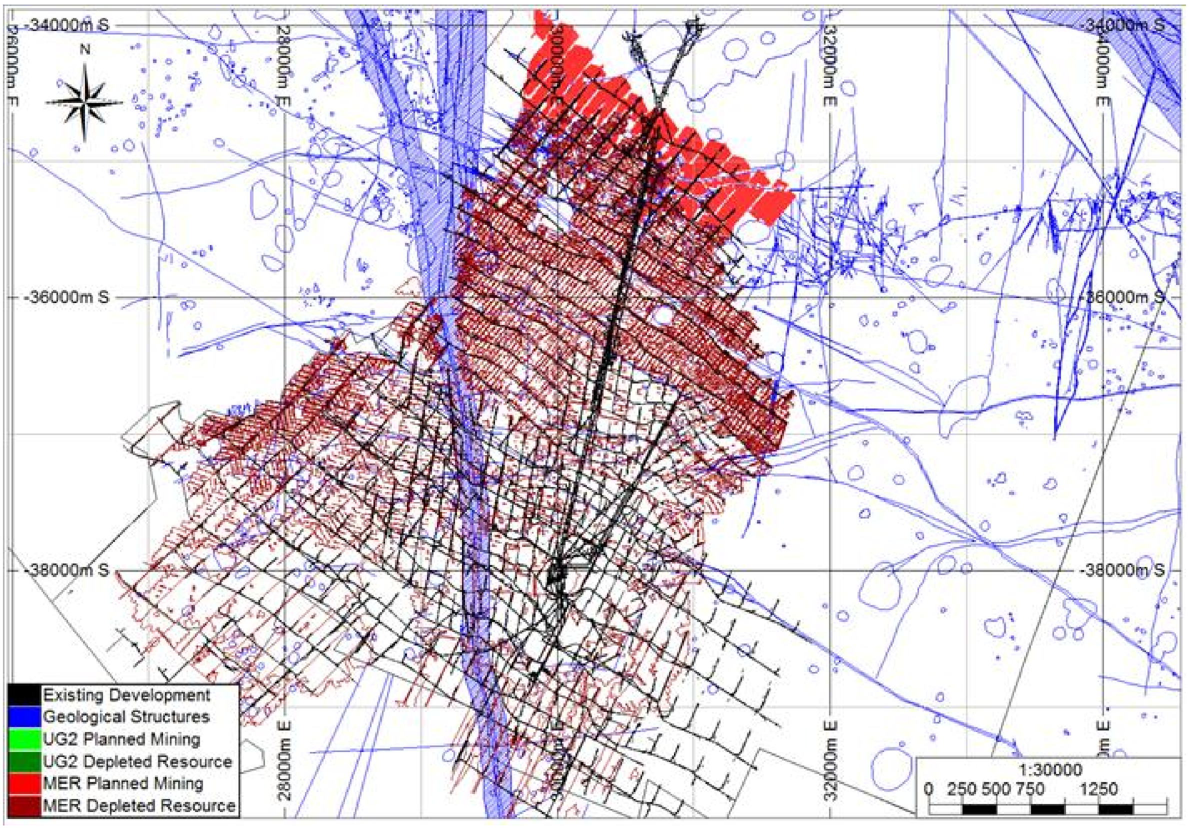
Source: DRA, 2015
Note: Economic tail cut applied

Thembelani

Thembelani produces 150 ktpm of ore consistently for about 28 years with the contribution from Merensky Reef reducing annually. Stoping areas are shown in dark red in Figure 8.13.

The L1 Merensky Reef is rapidly depleting (the current working area produces ore for another seven years). Mining is located on the lower levels serviced by the decline, primarily located on Levels 26 to 29. The current mining section produces about 400 ktpa, which reduces to 350 ktpa in 2018 and ends in 2022. Approximately 2.1 Mt of Merensky Reef will be mined at an approximate grade of 5.47 g/t 4E, delivering 371 koz of PGE (4E).

Figure 8.13 Thembelani Merensky (LoM) for L1

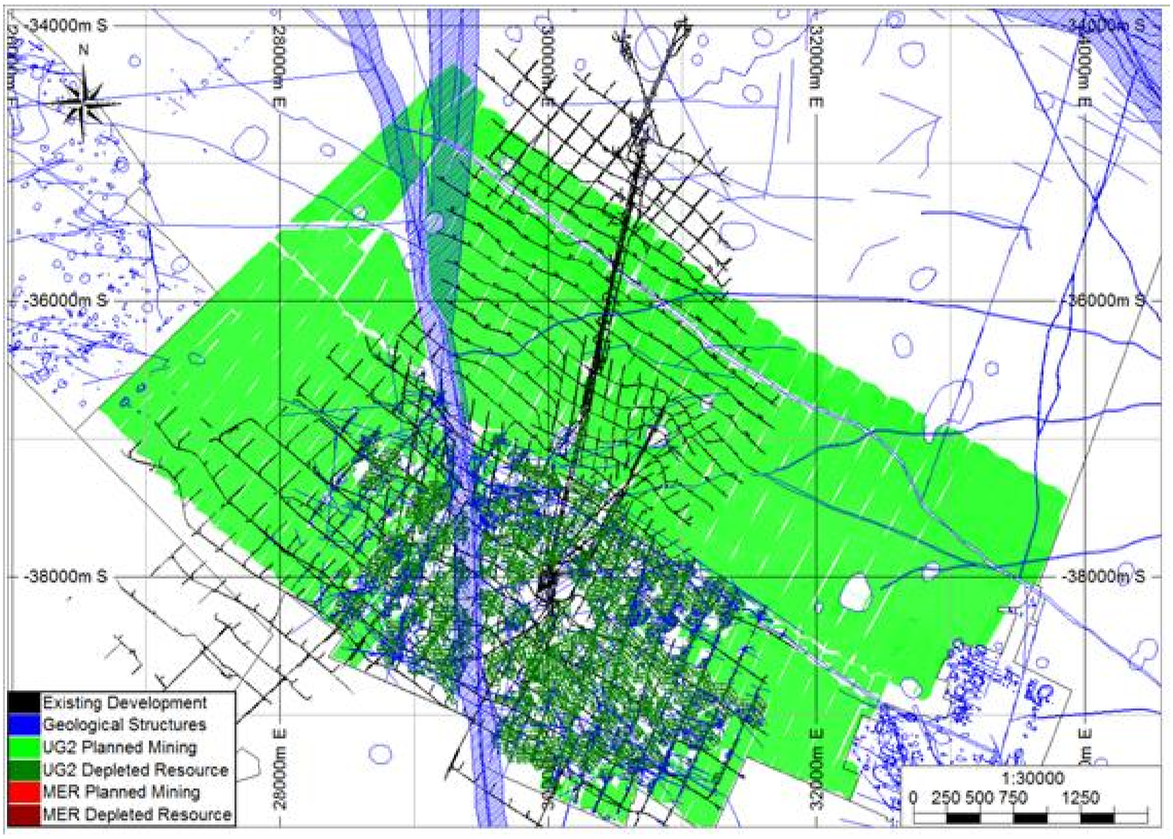


Source: DRA, 2015

UG2 mining at Thembelani (shown in Figure 8.14) will be serviced from the vertical shaft. The UG2 Reef will be mined on levels where Merensky Reef was, or will be mined. UG2 Reef mining is expected to extend to 2044 (without any tail cut). The Level 1 mining has sufficient area to extend mining to 2030 and produce 1.5 Mtpa. The UG2 production rate will increase when Merensky reef mining reduces. Production then increase to 1.8 Mtpa as shown in Figure 8.15.

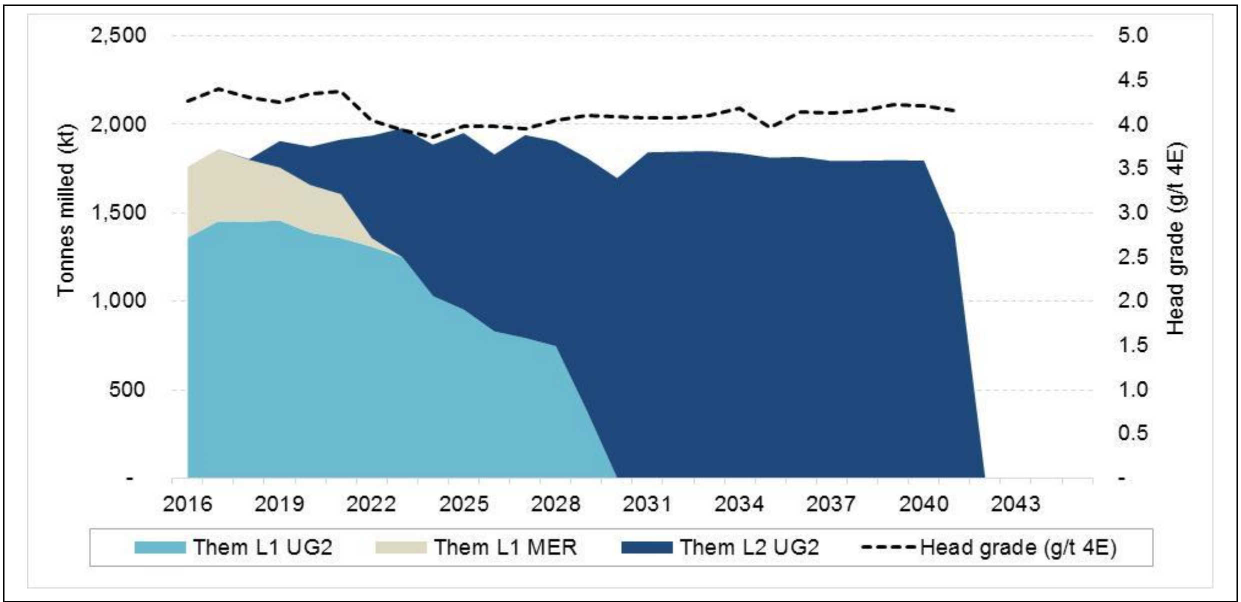
The replacement project for Thembelani L2 UG2 extends the LoM of the current mine using the least capital expenditure by utilising the current Merensky infrastructure to extract the Merensky Reef and developing new secondary footwall infrastructure to access the UG2 Reef.

Figure 8.14 Thembelani UG2 (LoM) for L2



Source: DRA, 2015

Figure 8.15 Thembelani production profile



Source: DRA, 2015
Note: Economic tail cut applied

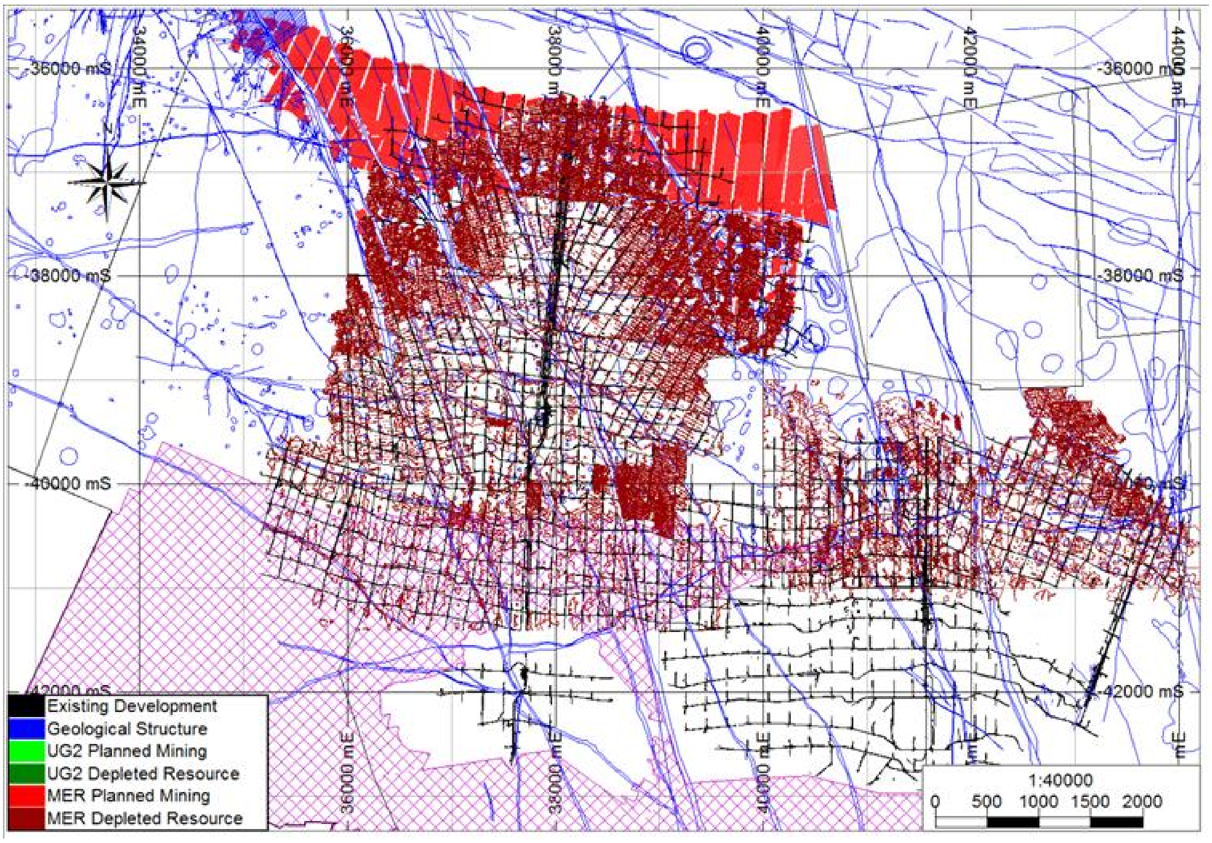
Siphumelele Mine

Merensky Reef is designed to L1 (Figure 8.16) and all UG2 Reefs to L2 (Figure 8.17). Siphumelele produces 180 ktpm at steady state in 2025. Steady state production will be maintained until 2040. From 2041, production declines until 2047 when production ceases (without tail cut). The LoM extends the current L1 plans using the least capital by utilising the current Merensky infrastructure and developing secondary footwall infrastructure to access the UG2 reef horizon.

There are no extensions to the current shafts or decline systems in the L2 plans. Development accesses the UG2 Reef from the current infrastructure. The remainder of the accessible Merensky reserve will be depleted in the L1 production profile.

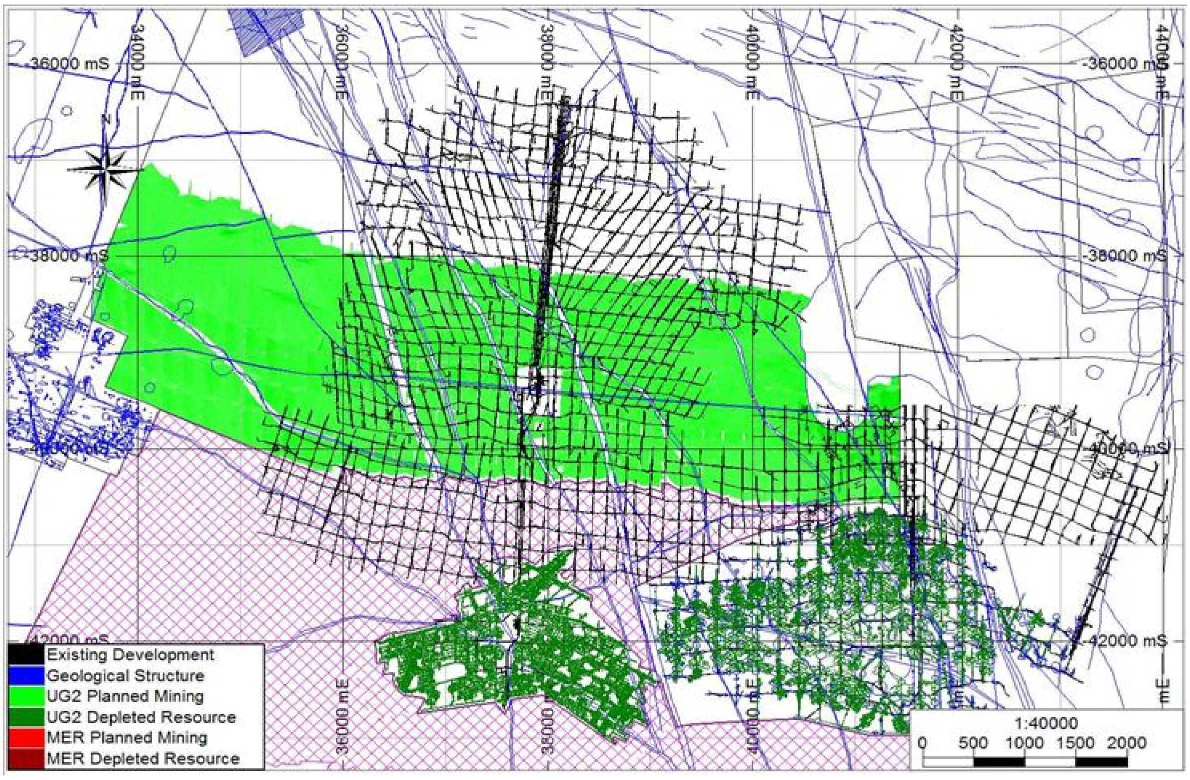
Figure 8.18 shows the annual production schedule.

Figure 8.16 Siphumelele Merensky (LoM) for L1



Source: DRA, 2015

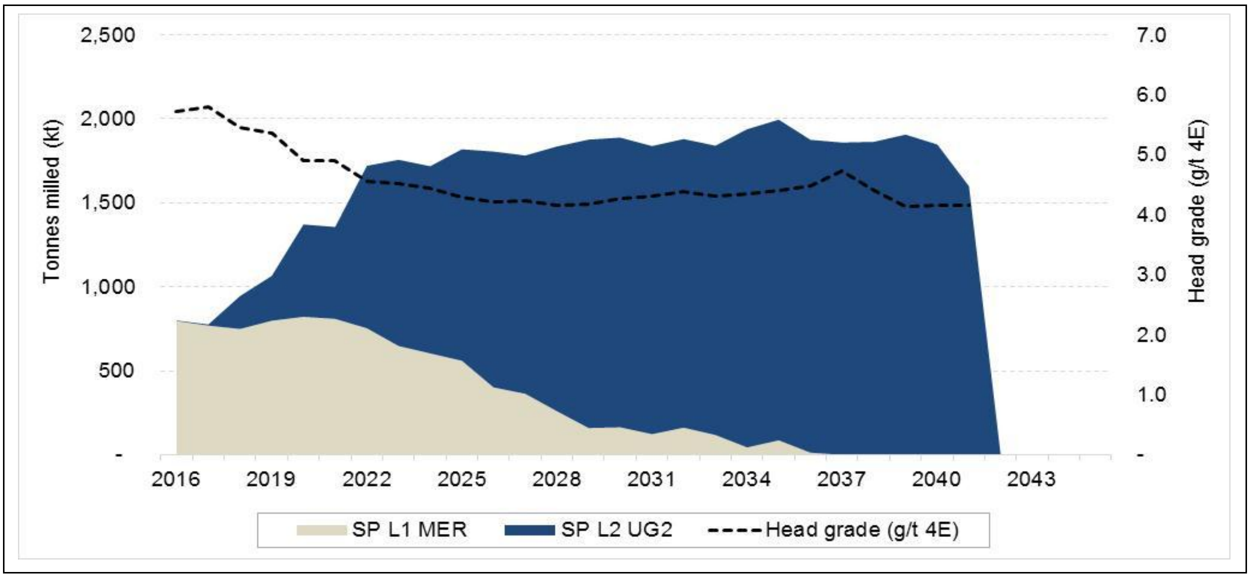
Figure 8.17 Siphumelele UG2 (LoM) for L2



Source: DRA, 2015

UG2 development commences in 2016 with ore production starting in 2018. From 2016 the development and consequent mining of the UG2 will build up steadily over nine years to reach steady state of 180 ktpm in 2025. UG2 mining will initially be near the shaft and the build-up of tonnage is reasonable. Approximately 33.8 Mt of UG2 at 4.21 g/t 4E will be mined.

Figure 8.18 Siphumelele production profile

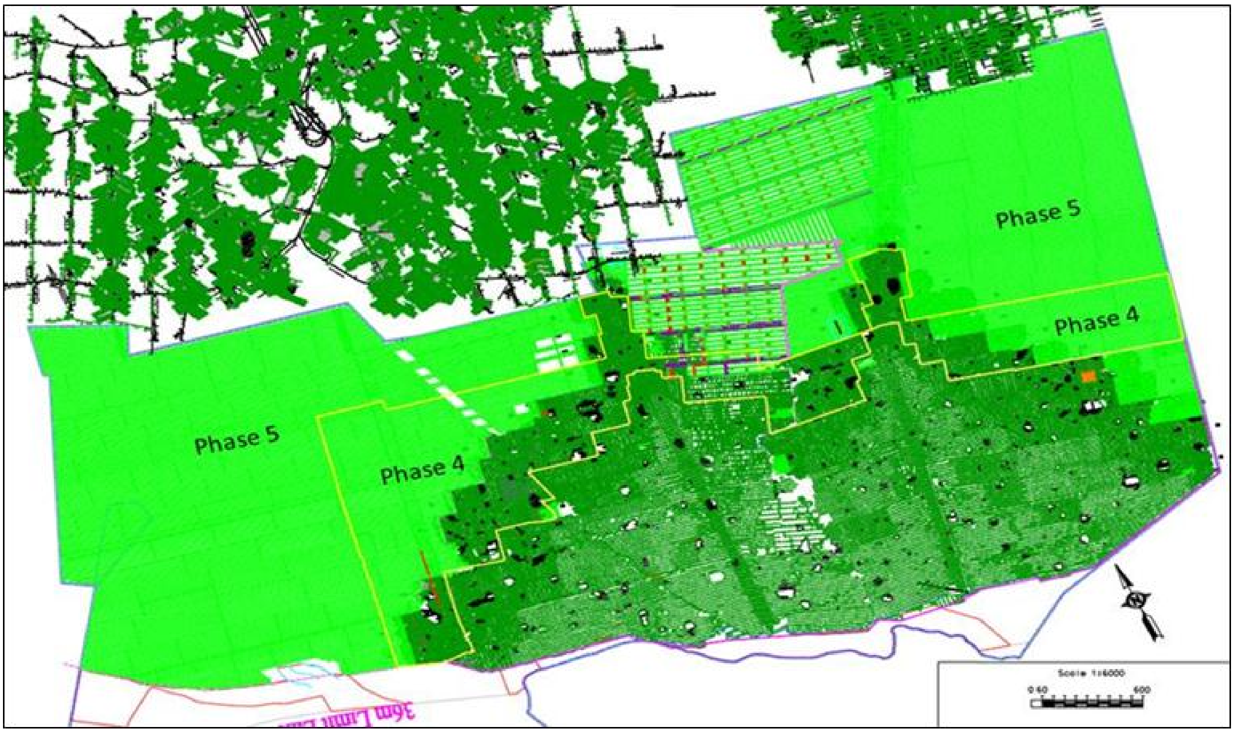


Source: DRA, 2015
Note: Economic tail cut applied

Bathopele

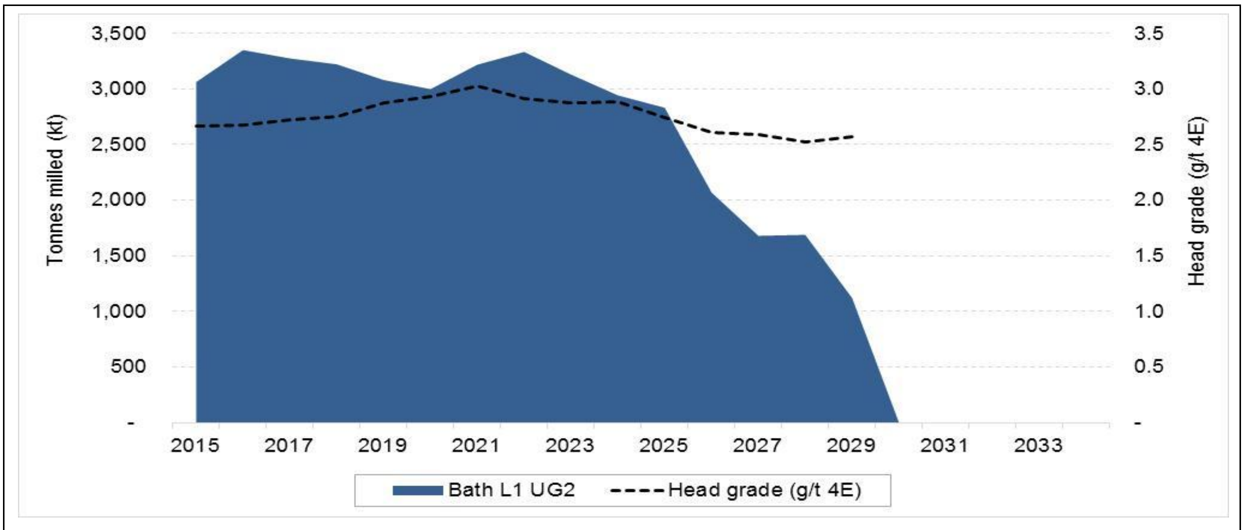
Bathopele exploits resources within the Phase 4 area. Phase 1, Phase 2 and Phase 3 are depleted. The Phase 5 was approved in 2011 and will complete the sinking and equipping of both East and Central shafts to the mine boundary. Production from the Phase 5 area will produce approximately 280 ktpm of UG2 until 2032. Figure 8.19 illustrates the Phase 4 and Phase 5 project areas. Figure 8.20 shows the annual UG2 production schedule.

Figure 8.19 Bathopele UG2 (LoM) for L1



Source: DRA, 2015

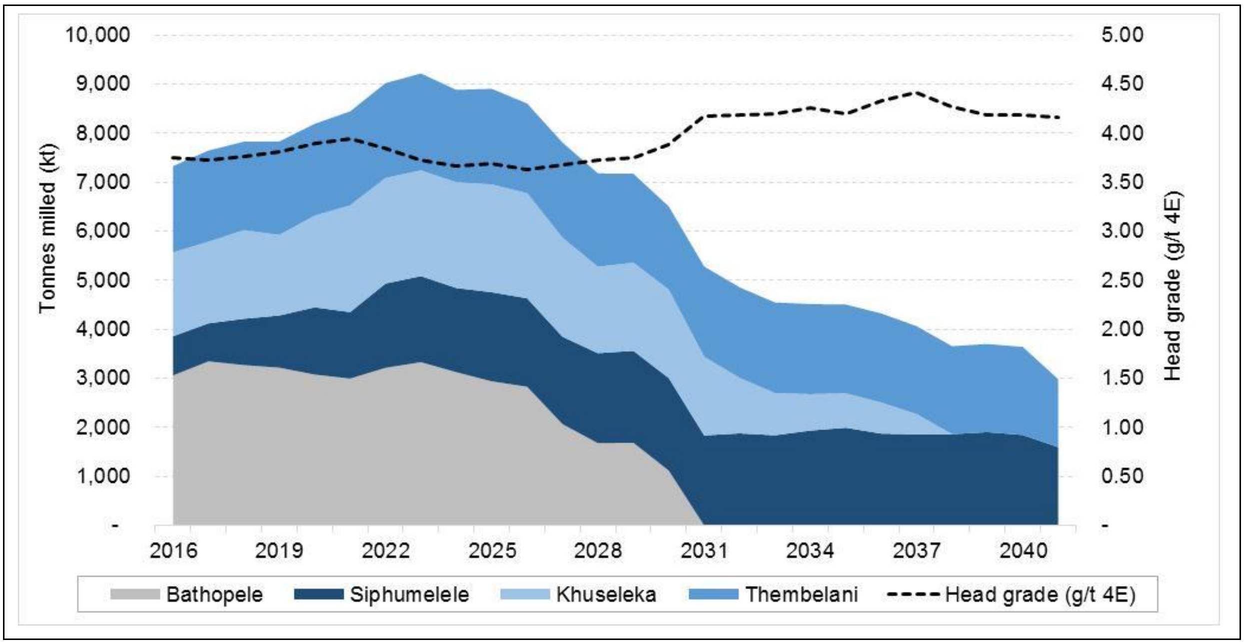
Figure 8.20 Bathopele annual production profile



Source: DRA, 2015
Note: Economic tail cut applied

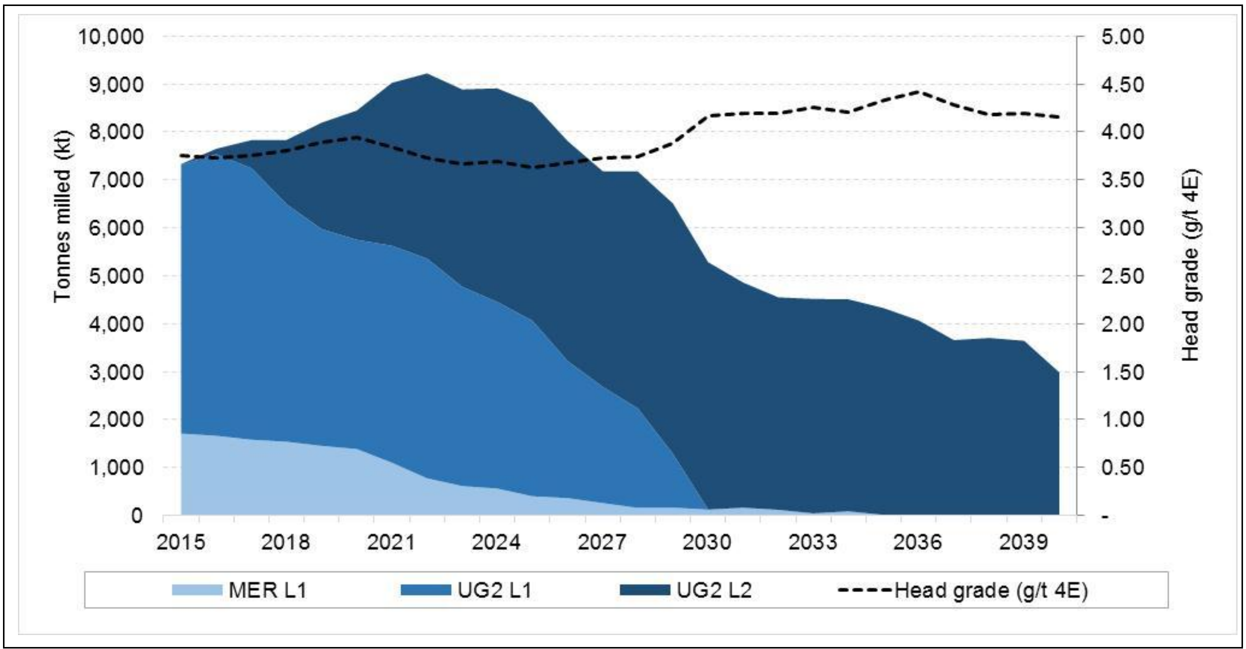
Rustenburg Underground Operations consolidated annual production profiles, over LOM, are shown per Investment Centre in Figure 8.21, and per reef in Figure 8.22. Both these production profiles exclude production from the Waterval and Klipfontein TSF retreatment.

Figure 8.21 Rustenburg Underground Operations consolidated production profile, per Investment Centre



Source: DRA, 2015
Note: Economic tail cut applied

Figure 8.22 Rustenburg Underground Operations consolidated annual production profile, per reef



Source: DRA, 2015
Note: Economic tail cut applied;
No Merensky L2 is mined over the LOM.

8.7 Personnel

Planned labour complement estimates are discussed in Section 14.

8.8 Mining operating expenditure ("opex")

The opex estimate is based on activity-based costing ("ABC"), which recognises that a relationship exists between resource consumption (input costs), primary and secondary activities, and outputs (products and services). Input costs are allocated to products or services through the activities performed. A primary activity is carried out by an entity or resource directly associated with the output produced, whereas a secondary activity provides a support function for the primary activity.

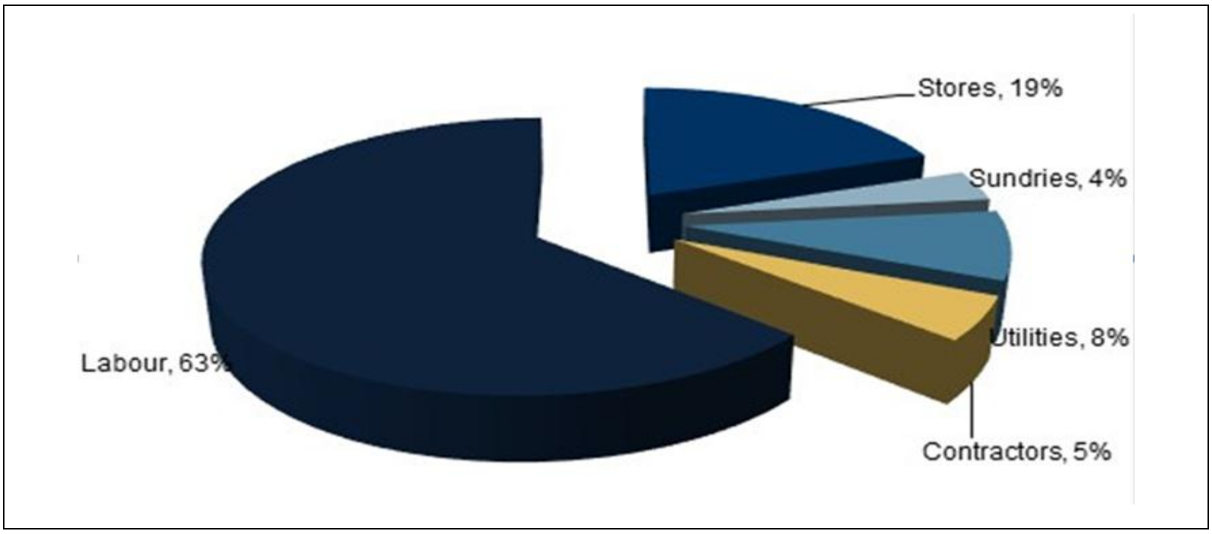
The key is to link an activity/allocation driver to the cost associated with the resource consumed in performing a given activity. An activity/allocation driver is defined as a variable that underpins the cost of a particular activity and relates it to the output.

Total mine operating costs (shaft head costs) comprise the following major LoM expense accounts:

- Labour – salaries and wages;
- Contract mining;
- Stores;
- Utilities; and,
- Sundries.

Figure 8.23 details their respective contributions of the expense areas over the LoM period, with a brief qualitative review of the items that fall within each category provided thereafter.

Figure 8.23 Shaft head operating cost split over LoM



Source: Cyest, 2015

Mine operating costs or shaft head costs comprise the following five cost categories:

- Labour – is the largest individual cost element, representing approximately 63% of the forecasted LoM average operating cost and makes provision for:
  - salaries, overtime, leave pay and incentive bonuses

- allowances related to shift work, skills scarcity, etc
- company pension fund and medical aid contributions
- employee study and bursary allowance;

- Contractors – represent approximately 5% of the average LoM costs and encompass:
  - mining logistics, i.e. reclamation and supervision
  - general and ventilation construction;
- Stores – represent approximately 19% of the LoM average operating cost and includes:
  - all mining consumables required for drilling, blasting, support, cleaning and ore transport operations
  - all process related materials for crushing, milling, flotation, filtration and tailings operations
  - mechanical and electrical maintenance and spares
  - fuels and lubricants
  - health and safety equipment and protective clothing;
- Utilities – represent approximately 8% of the LoM average operating costs and includes:
  - power costs required for hoisting, ventilation, compressed air generation, processing (milling, crushing etc.) and general office and workshop operations.
  - water costs related to process, service and drinking water; and,
- Sundries – represent 4% of the average LoM costs and comprise:
  - corporate expenses related to management fees
  - levies
  - all office and administration expenses related to communications, printing, computers, stationery etc.
  - consultant and professional fees
  - transport, travelling and accommodation
  - group centralised costs.

Overall mining costs are indicated in Table 8.21 for the LoM.

Table 8.21 Forecast mining operating costs and tonnages per mining area (mid-2015 money terms)

Item	Units	Merensky Reef	UG2 Reef
LoM tonnage	kt	14,701	153,859
Mining opex unit cost	ZAR/t	1,270	710

Source: Cash Flow Model, 2015

8.9 Mining capital expenditure ("capex")

Mining capital costs are estimated in the categories of:

- Expansion; and,
- SIB capital.

The total mining capital for the Rustenburg Operations for the LoM is ZAR15.2 B including expansion and SIB capital, as summarised in Table 8.22.

Table 8.22 Total LoM mining capital (mid-2015 money terms, in ZAR M)

Type	Cost (ZAR M)
Mining Expansion	4,367
Mining SIB	10,823
Total mining capital	**15,190**

Source: Cash Flow Model, 2015

8.9.1 Expansion capital

The expansion capital originates from the Bathopele Phase 5 project and the Level 2 UG2 projects. The mine expansion capital budget outlined in Table 8.23 has a total capital cost of ZAR4.4 B, expressed in mid-2015 money terms.

Table 8.23 Mining LoM expansion capital (mid-2015 money terms, in ZAR M)

Year	Value in ZAR M							
	2015	2016	2017	2018	2019	2020	Subtotal	LoM total
Expansion capital cost	41	503	589	754	587	414	2,889	**4,367**

Source: Cash Flow Model, 2015

8.9.2 SIB capital

SIB capital comprises all development, equipment and other capital items required to maintain production at planned levels. The SIB capital for each of the shafts is estimated as a percentage of on-mine cash costs, based on historical ratios. The total mining LoM SIB capital is summarised in Table 8.24.

Table 8.24 Mining LoM SIB (mid-2015 money terms, in ZAR M)

Type	Cost (ZAR M)	SIB rate (%)
Bathopele	2,662	14.9
Siphumelele	3,075	7.4
Thembelani	2,799	7.3
Khuseleka	2,288	7.6
Mining SIB (ZAR M)	**10,823**	**8.5**

Source: Cash Flow Model, 2015

8.10 Economic criteria

T5.7C(ii)

Refer to Section 18: Mineral Asset Valuation. Mining opex and capex are discussed in Section 8.7 and 8.9 respectively.

8.11 Reserve Classification criteria

Proved Mineral Reserves are derived from Measured Mineral Resources. Probable Mineral Reserves are derived from Indicated Mineral Resources. No Measured Mineral Resource has been downgraded to Probable Mineral Reserve on the basis of uncertainty in mine modifying factors.

8.12 Audits and reviews

T9C(i)(ii)

The RPM Mineral Resource and Mineral Reserve are reviewed annually as part of AAPL's internal processes. The last external audit was by Snowden in 2014. No material issues were identified.

8.13 Competent persons and other key technical staff

Refer to Section 22: Competent Person's certificates.

9 PROCESSING

DRA source documents form the basis of Section 9.

9.1 Plant description

T5.5C(i),(iii), (iv)

Four process plants are located at Rustenburg Operations, namely:

- Waterval UG2 concentrator, treating only UG2 ore;
- Waterval Retrofit concentrator, treating a blend of Merensky and UG2 ores. In 2016 this plant will also treat tailings from the Waterval East and West TSF;
- Western Limb Tailings Retreatment plant ("WLTR plant"), treating tailings from the Klipfontein TSF; and,
- Chrome Retreatment Plant ("CRP"). CRP treats UG2 tailings to recover a saleable chromite concentrate.

9.1.1 Waterval UG2 concentrator

The Waterval UG2 concentrator is a 450 ktpm name plate capacity concentrator. The plant has a two-stage milling and flotation circuit ("MF2") configuration with multiple cleaning stages and a final column flotation circuit to reduce chromite in the final concentrate (Figure 9.1).

The process plant comprises the following main circuits:

- Ore receiving;
- Crushing and screening;
- Milling;
- Flotation;
- Concentrate; and,
- Tailings.

The process plant receives UG2 RoM ore from both the Rustenburg and Waterval ore receiving circuits. Ore is fed to primary crushing from the Rustenburg Operations from either a 2,000 t bin or from a 50,000 t stockpile. Bathopele ore is fed to primary crushing from a 5 000 t silo. Crushed ore from both Rustenburg vertical shafts and Bathopele are combined and screened to either the fine ore mill feed silo with a capacity of 11,000 t, or a coarse ore mill feed silo with a capacity of 4,000 t.

The milling plants consist of primary, secondary and mainstream inert grinding ("MIG") milling circuits. The crushed product is milled and floated in a MF2 configured circuit. A single primary mill is operated in closed circuit. A trash and woodchip removal cyclone is installed ahead of the classification screens. Both the cyclone overflow material, after woodchip removal, and cyclone underflow reports to a classifying screen. Screen underflow reports to the primary flotation circuit whilst screen overflow is returned to the primary mill.

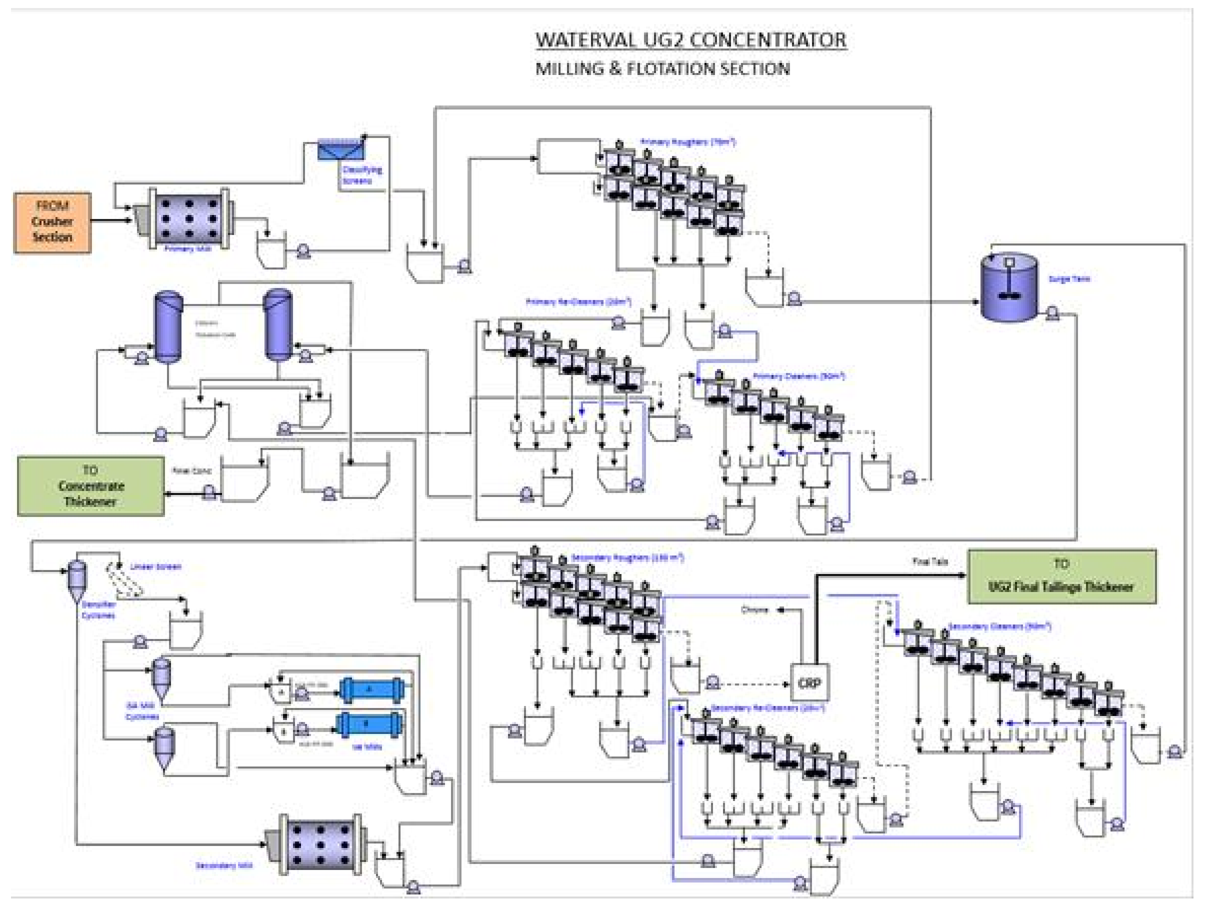
In the primary flotation circuit, the material reports to the rougher cells where the floated material reports as primary concentrate which is fed for further upgrading in cleaning and re-cleaning stages.

The tails from the primary rougher cells are pumped to a single secondary and two MIG mills for further finer grinding and this product reports to the secondary rougher cells.

The low grade tailings from the secondary rougher circuit are pumped to the tailings thickener for chrome recovery in the CRP plant prior to disposal to the TSF.

Final concentrate from the primary and secondary recleaner circuits is upgraded by column flotation. The final flotation concentrate stream from the flotation circuit is thickened and filtered. The responsibility for concentrate extraction and filtration currently resides with the Waterval Smelter.

Figure 9.1 MF2 process flow diagram



Source: RPM, 2015

9.1.2 Waterval Retrofit concentrator

The Waterval Retrofit concentrator consists of two sets of 310 ktpm main stream modules operating in parallel to give a combined plant name plate capacity of 620 ktpm. The Waterval Retrofit concentrator was retrofitted from the Waterval Merensky Concentrator, the oldest of the Waterval concentrators and thus has an added complexity as a result of multiple upgrades.

The plant consists of two MF2 modules in parallel with shared cleaner flotation banks.

The process plant comprises the following main circuits:

- Ore receiving;
- Crushing and screening;
- Milling;
- Flotation;
- Concentrate; and,
- Tailings.

UG2 and Merensky RoM ore are received into a 2,000 t bin and fed to primary crushing. Crushed ore is fed to four mill feed silos. The milling plant consists of primary, secondary and MIG circuits.

The crushed product is milled and floated in a MF2 configured circuit. Two primary mills are operated in closed circuit. A dechipping cyclone is installed ahead of the classification screen. The cyclone overflow material, after woodchip removal, and cyclone underflow reports to a classifying screen. Screen underflow reports to the primary flotation circuit whilst screen overflow is returned to the primary mill.

In the primary flotation circuit, the floated material reports as primary concentrate and is fed for further upgrading in cleaning and re-cleaning stages. A number of processing options are available for the concentrate produced.

The tails from the primary rougher cells are pumped to the secondary milling circuit, each consisting of two secondary and two MIG mills for further finer grinding, with this product reporting to the primary scavenger cells and subsequent product again to the secondary scavenger cells.

The low grade tails from the secondary scavenger circuit are pumped to Area 241 where they are cycloned and thickened before being transferred to the TSF.

Final flotation concentrate from the primary, secondary and tertiary recleaner circuits is fed to two final concentrate thickeners. The responsibility for concentrate extraction and filtration currently resides with the Waterval Smelter.

The concentrator shares multiple services including potable water, process water, fire water, tailings disposal, electrical and MCC buckets with the Waterval Smelter. All of these services need to be separated or a service agreement reached before the plants can be operated as standalone units.

9.1.3 Western Limb Tailings Retreatment plant (“WLTR plant”)

The WLTR plant has 450 ktpm original name plate capacity. Tailings are re-mined from the Klipfontein TSF; it then reports to an adjacent re-mining plant, and is then pumped to WLTR plant for reprocessing.

The process plant is divided into the following main circuits, namely:

- Feed receiving;
- Milling;
- Flotation;
- Concentrate; and,
- Final tailings.

Feed from the Klipfontein re-mining plant is fed to the WLTR plant thickener and pumped to the cyclone cluster for desliming. Milled product is combined with deslimed cyclone overflow and fed to a cyclone cluster for classification. Cyclone underflow is returned to the mill with the overflow fed to the primary flotation circuit.

In primary flotation, the floated material reports as primary high grade concentrate and is fed to flotation cells for further upgrading. An intermediate grade concentrate is upgraded in further cleaning stages. The tailings from the primary rougher cells are pumped to the final tailings thickener before being pumped to the TSF.

Concentrate from the primary flotation circuit together with tailings from the cleaner flotation cells are further processed in the ultra-fine grinding (“UFG”) milling circuit.

Flotation concentrate from the various circuits is fed to the final concentrate thickener prior to being filtered and trucked to the Waterval Smelter.

9.1.4 Waterval Chrome Retreatment Plant (“CRP”)

The CRP treats Waterval UG2 concentrator tailings to recover a saleable chromite concentrate. This plant has two modules each with the capacity to treat 220 ktpm of UG2 tailings (440 ktpm total capacity). Two product streams are realised from the CRP, these being chemical grade Cr_2O_3 greater than 43% with SiO_2 less than 1% and metallurgical grade Cr_2O_3 greater than 40.5% with SiO_2 less than 4%.

The CRP is operated and maintained by Chrome Tech Holdings (Pty) Limited on behalf of RPM. The costs and revenues allocated to this operation have been included in the DTM Cash Flow Model.

9.2 Plant equipment

The equipment in all plants is in good operating condition and well maintained by experienced staff in accordance with RPM’s maintenance procedures. There are signs of wear and corrosion as could be expected with any operating plant, and the costs to cover ongoing repairs are sufficiently allowed for in the operating and SIB cost estimates. Records of maintenance performed are readily available.

9.3 Processing

T5.5A/B/C(i)-(iv)

9.3.1 Operating procedures

All procedures relating to safety, maintenance and operations are in place and used. The systems supporting the procedures are of a high quality.

9.3.2 Sampling procedures

The Rustenburg Operations metal accounting is based on the AAPL Evaluation Standard sampling system. Input tonnage and grades are measured on the primary rougher feed stream and waste is sampled at the tailings thickener feed.

The feed and tails stream samplers, installed at both Waterval UG2 concentrator and Waterval Retrofit concentrator, are continuous in-stream SAMSTAT® samplers. Samples from the continuous samplers are collected over an eight-hour shift. Process control analysis is performed on these samples. The eight hour shift samples are composited into a single daily sample for metal accounting.

Additional routine samples (for plant control purposes) are taken from the following points:

- Primary rougher flotation tailings;
- Primary high grade cleaner tailings; and,
- Secondary cleaner tailings.

As part of the audit plan, an audit of the Rustenburg Concentrator Evaluation function is performed on an annual basis to evaluate the design and effective operation of equipment, systems and controls, providing management with assurance that the key risks associated with the Evaluation function at the Rustenburg Concentrators are managed to an acceptable level. The audits addressed risks relating to:

- Evaluation management and control;
- Mass measurement;
- Plant sampling;
- Sample preparation; and,
- Protocols (quality assurance).

Standard approved Rustenburg Concentrators sample preparation procedures and standard sampling procedures for all samples are well maintained. These procedures are adequate and comply with all approved regulations and internal audits.

9.3.3 Maintenance procedures

Standard approved AAPL maintenance procedures and standards for all major unit operations and equipment are in place, and comply with all approved regulations. Maintenance schedules are in place and typically followed, however in practice, reactive maintenance is still being performed. Maintenance records are readily available at each site. Maintenance is performed either by Rustenburg Operations employees or the OEM and there is currently a specific drive to return the electric overhead cranes to OEM standards.

9.3.4 Power consumption

Rustenburg Operations receive power from Eskom via twelve points of delivery (“PoDs”). The PoDs are referred to as consumer sub-stations. The Eskom distribution is at 88 kV from the Marang main transmission substation (“MTS”). The total notified maximum demand (“NMD”) is 610 MVA.

Power consumption in the primary concentrators is:

- The Waterval UG2 concentrator ranges between 1,800 MWh and 2,100 MWh/month with an average consumption of 1,900 MWh/month; and,
- The Waterval Retrofit concentrator ranges between 2,000 MWh/month and 2,500 MWh/month with an average consumption of 2,300 MWh/month.

9.3.5 Water consumption

The Waterval potable water distribution around Rustenburg Operations is complex. Potable water is supplied mainly by the Rand Water Board ("RWB") which supplies water to all the Rustenburg Operations plants, fire water systems, mines, change houses and living quarters. Control and measurement of all streams are in place.

The process water is shared by the concentrators, smelters and associated mines.

The plant water balance for the current plants is shown in Table 9.1.

Table 9.1 Current plant water balance (2014)

Sources		Concentrator consumption		Discharge and losses	
		RUSTENBURG CONCENTRATOR 2014 WATER BALANCE			
Potable water	414	Total new water used	2,618	Discharge to surface water	349
Non-potable water	0	Total water required	12,521	Seepage losses	174
Waste water	2,204	Recycled and reused	9,903	Evaporation losses	8,760
Surface water	0			Unaccounted or interstitial storage	-6,665
Groundwater used	0				
Rain harvested and used	0				
Totals	**2,618**		**25,042**		**2,618**

Source: DRA, 2015
Note: All values expressed as mega litres per annum.

Municipal grey water

The Rustenburg Municipal Sewerage Plant ("MSP") is owned by the Rustenburg Local Municipality ("RLM") and grey water is supplied to various mines through the Rustenburg Water Services Trust ("RWST"). The trust was established by RLM to facilitate industrial water supply to RPM and Impala.

Treated sewage water ("TSW") is pumped from the MSP discharge sump to the Klipgat dam pump station. At the Klipgat dam pump station the TSW is either discharged into the Klipgat dam directly or treated through a chemical and sand filtration plant. The sand filtration plant is undergoing a control system upgrade that will centralise its control at the UG2 plant. Currently it is operated as a fully automated standalone plant, consisting of a feed tank, eight sand filter units and a discharge tank with five separate distribution pumps.

The current average water usage is shown in Table 9.2.

Table 9.2 Current water consumption

Current end user	Consumption (Ml/day)
UG2 Concentrator	2.5
Retrofit Concentrator	1.5
Smelter	0.8
ACP	0.8
Total	5.6

Source: DRA, 2015

All the water is cleaned through the sand filter plant and any excess water is combined with the process water in either Area 250 or in the Klipgat dam.

Water agreements

Currently RPM is contracted to take 15 mega litres per day ("Mℓ/day") at a current municipal rate of ZAR5.02/m^3 and an additional cost of ZAR2.62/m^3 for the sand filtration plant (total cost of ZAR7.64/m^3) equivalent to ZAR115,000 per day. As of 2015, the take or pay agreement for 15 Mℓ/day is supplemented with a user pay agreement to 20 Mℓ/day.

RPM and RWST have a 25-year contract valid until 2031 based on 15 Mℓ/day take or pay agreement. RPM has agreed to on-supply Sibanye 7 Mℓ/day on similar terms.

Future improvements

As a result of oil contamination and resulting contaminated water, a buffer tank and Dissolved Air Flotation ("DAF") Plant is being installed at the MSP. This will increase the operational cost by ZAR0.30/m^3 and water quality will improve.

9.4 Testwork

T5.5C(ii)

9.4.1 Primary concentrators

The Waterval UG2 concentrator was commissioned in February 2002, with an original nameplate capacity of 400 ktpa. Through process and engineering modifications and enhancements undertaken over the past 12 years, the nameplate capacity has been increased to 450 ktpa, and recoveries improved through the addition of Isamills and other equipment, as well as the CRP.

The Waterval Retrofit concentrator was upgraded to its 620 ktpm nameplate in 2007. The upgrade from the original 360 ktpm Merensky plant was completed to increase throughput capacity, and modify the circuit to accommodate blends of UG2 and Merensky in its feed without compromising metallurgical recovery. Isamills were added to the regrind circuit in 2009 to further improve grind and recovery.

All the improvements have been justified through testwork.

9.4.2 CRP

The CRP was designed with the capacity to treat 400 ktpm final flotation tailings from the UG2 concentrator, and deliver an overall chromite product yield of minimum 10% (concentrator primary mill feed mass basis).

Although the CRP has reached its name plate capacity in terms of tonnes treated, it has not achieved its design yield. This is mainly as a result of low feed quality in terms of Cr_2O_3 head grade and the particle size distribution of the final flotation tails being treated.

AAPL Concentrator Technology together with ChromTech (current CRP operator) evaluated options to increase the CRP yield. Pilot plant testing demonstrates that by feeding the CRP with a coarser chromite rich stream from the UG2 concentrator prior to secondary milling, the overall chromite product can increase.

This process is called Inter-stage Chrome Recovery (inter-staging). Following chromite recovery, the residual stream is returned to the UG2 concentrator for further processing and PGE recovery.

The testwork has resulted in an approved project to re-route the primary rougher tails to feed the CRP, which is currently in execution and due to be completed in 2016.

9.5 Historical and forecast performance

9.5.1 Production

Historical production results are presented in Table 9.3 and Table 9.4.

Monthly production was relatively constant until 2014, when strikes affected feed to the concentrators. After the resolution of strike action the concentrators have received steady feed resulting in better recoveries and outputs. The production forecast for next 10 years is presented in Table 9.9 and Table 9.10.

Table 9.3 Average five-year historical monthly production for the Waterval Retrofit concentrator

Year	Feed tonnage (ktpm)	Feed grade 4E (g/t)	Concentrate tonnage (tpm)	Recovery 4E (%)	Concentrate grade 4E (g/t)	Tails tonnage (ktpm)	Tails grade 4E (g/t)
2010	374	4.45	8,282	87	175	353	0.59
2011	374	4.09	8,605	88	155	320	0.53
2012	341	4.10	7,356	86	164	288	0.57
2013	346	4.32	7,849	86	163	338	0.63
2014	123	4.35	3,061	86	151	120	0.62
2015 YTD	273	4.34	6,721	86	151	266	0.64

Source: DRA, 2015; RPM, 2015

Table 9.4 Average five year historical daily production for the Waterval UG2 concentrator

Year	Feed tonnage (ktpm)	Feed grade 4E (g/t)	Concentrate tonnage (tpm)	Recovery 4E (%)	Concentrate grade 4E (g/t)	Tails tonnage (ktpm)	Tails grade 4E (g/t)
2010	377	3.27	6,578	85	158	371	0.52
2011	354	3.38	6,480	86	153	340	0.47
2012	346	3.24	5,695	85	155	335	0.52
2013	335	3.29	6,281	84	148	328	0.54
2014	217	3.01	4,331	84	127	213	0.51
2015 YTD	360	3.01	7,035	85	131	353	0.49

Source: DRA, 2015; RPM, 2015

9.5.2 Recoveries

Recoveries between 2013 and 2014 were negatively affected by intermittent feed as a result of prolonged strike action and the impact of Section 54 stoppages on mining volumes.

During 2015, the concentrators have had a steady feed and recoveries have normalised.

LoM forecasts are based on 89.0% PGE recovery from Merensky Reef and 84.7% from the UG2 Reef. The tailings recovery is based on 35% PGE recovery at the Waterval Retrofit concentrator and 31% at WLTR plant.

The recoveries for the Waterval Retrofit concentrator are determined by the blend proportions of UG2 and Merensky ores. In 2014, a blend of 36% UG2 RoM was maintained, compared to 2013 – 28% UG2 blend; and 2012 – 27% UG2 blend.

Mass balances, utilising appropriate operation data have been undertaken by RPM staff and are considered adequate.

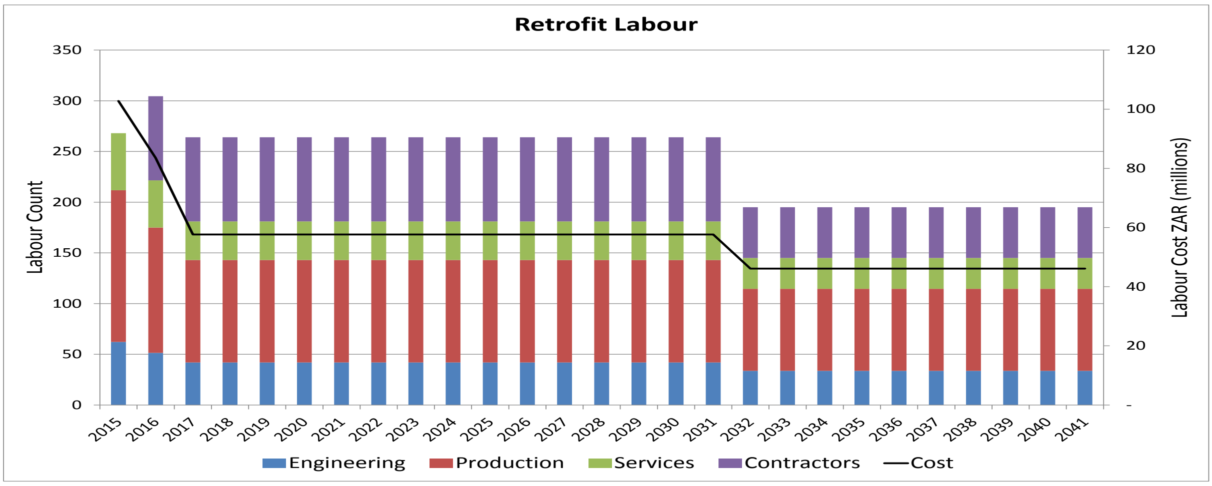
9.5.3 Labour

The labour philosophy for the concentrators is based on utilising a high percentage of unskilled or semi-skilled personnel in the Waterval Retrofit concentrator with both the UG2 Concentrator and WLTR plant employing increased levels of skilled personnel. As a result, the labour complement for Waterval Retrofit concentrator is higher than the UG2 Concentrator and WLTR plant.

Due to the short life of operations at WLTR plant, the current labour complement is maintained until the plant closure and no optimisation is planned. The labour complement of WLTR plant is currently similar to that of the contractor model. Skilled and semi-skilled labour with minimum qualifications set at matric will be phased in resulting in a reduction in the number of job categories and levels.

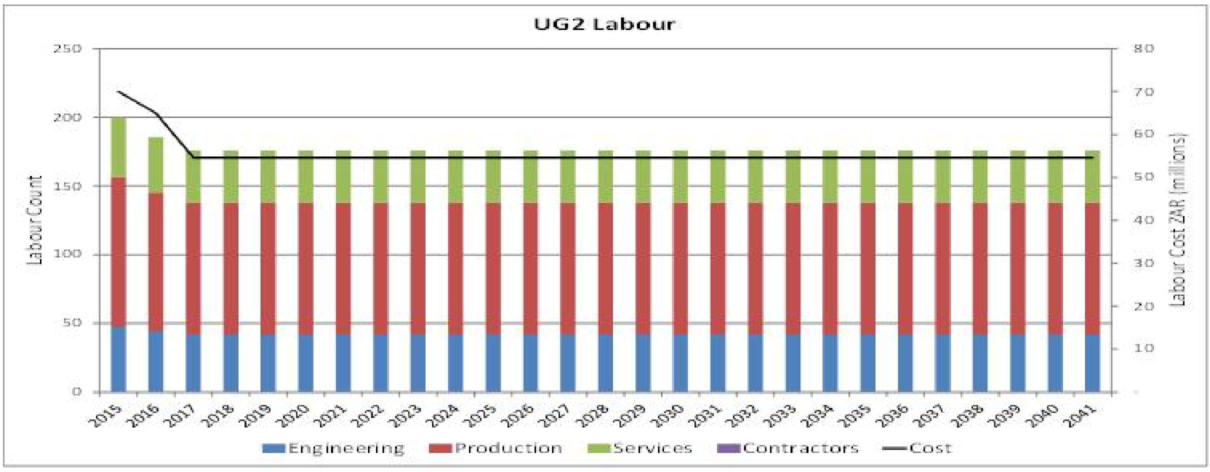
The LoM labour profiles for each plant are shown in Figure 9.2 to Figure 9.4.

Figure 9.2 Retrofit – Annual labour complement and cost



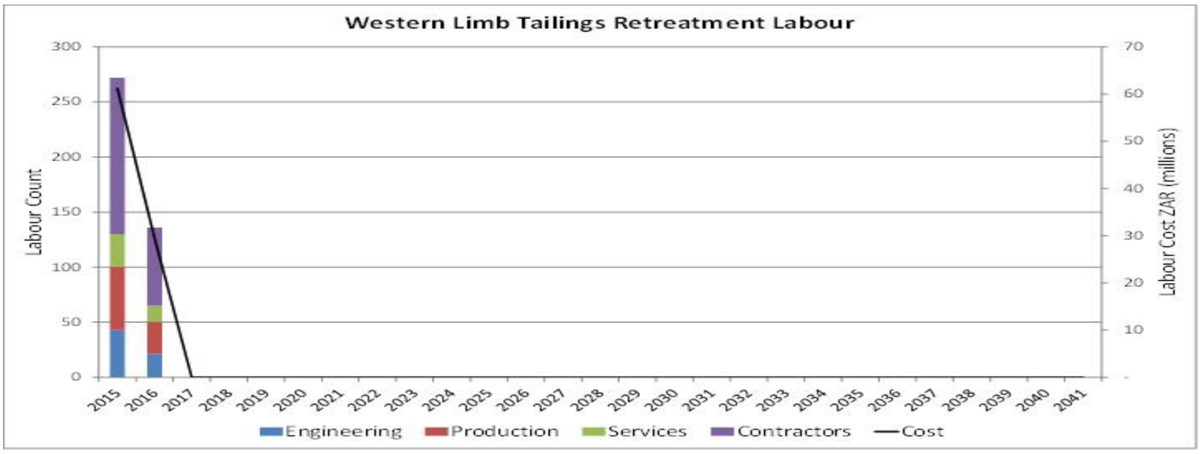
Source: DRA, 2015

Figure 9.3 Retrofit – Annual labour complement and cost



Source: DRA, 2015

Figure 9.4 UG2 Plant – Annual labour complement and cost



Source: DRA, 2015

9.6 Operating costs

T5.5C(iv)

9.6.1 Historical operating costs

Overall plant operating costs increased from 2010 to 2013 (Table 9.5 to Table 9.8) principally due to increases in the stores, labour and utility costs. There was a substantial increase in the 2014 unit costs as a result of prolonged strikes in the Rustenburg area. The reduction in unit costs during 2015 indicates stable operating conditions and fair management of the process plants.

Table 9.5 Historical Waterval Retrofit concentrator operating cost

Year	Tonnes processed (Mtpa)	Operating cost for year (ZAR M)	Operating cost per tonne (ZAR/t)	Metallurgical services (ZAR/t)	Total unit cost (ZAR/t)
2010	4.48	373	83	10	93
2011	4.48	438	98	12	110
2012	4.10	434	106	14	120
2013	4.15	511	123	9	132
2014	1.48	310	210	18	228
2015 YTD	2.46	370	151	8	159

Source: DRA, 2015; RPM, 2015

Table 9.6 Historical Waterval UG2 concentrator operating cost

Year	Tonnes processed (Mtpa)	Operating cost for year (ZAR M)	Operating cost per tonne (ZAR/t)	Metallurgical services (ZAR/t)	Total unit cost (ZAR/t)
2010	4.53	367	81	10	91
2011	4.25	426	101	12	113
2012	4.15	421	101	14	115
2013	4.02	436	109	9	118
2014	2.60	364	140	18	158
2015 YTD	3.24	386	119	8	127

Source: DRA, 2015; RPM, 2015

Table 9.7 Average Waterval Retrofit concentrator total unit operating cost per category

Category	Process cost (ZAR/t)					
	2010	2011	2012	2013	2014	2015 YTD
Labour	15	16	20	24	64	30
Stores	32	38	39	47	57	48
Utilities	26	32	37	40	58	48
Contractors	-	1	1	1	8	7
Sundries	10	11	9	11	23	18
Met services	10	12	14	9	18	8
Plant cost	**93**	**110**	**120**	**132**	**228**	**159**

Source: DRA, 2015; RPM, 2015

Table 9.8 Average Waterval UG2 concentrator total unit operating cost per category

Category	Process cost (ZAR/t)					
	2010	2011	2012	2013	2014	2015 YTD
Labour	12	16	15	19	28	17
Stores	39	48	48	53	66	57
Utilities	21	27	31	35	44	41
Contractors	0	1	0	0	1	0
Sundries	9	9	7	2	1	4
Met services	10	12	14	9	18	8
Plant cost	**91**	**113**	**115**	**118**	**158**	**127**

Source: DRA, 2015; RPM, 2015

9.6.2 Planned operating costs

Forecast operating costs for the Waterval Retrofit concentrator include the treatment of tailings, at an average rate of approximately 3.42 Mtpa (Table 9.7).

As planned milled volumes increase for both primary concentrators, plant efficiencies improve, resulting in concomitant lower process unit costs.

Table 9.9 Ten-year Waterval Retrofit concentrator planned operating costs (mid-2015 money terms)

Year	Tonnes processed (Mtpa)	Operating cost per annum (ZAR M)	Unit operating cost (ZAR/t)
FY2016	1.92	423	220
FY2017	2.25	407	181
FY2018	2.44	413	169
FY2019	2.46	441	179
FY2020	2.80	454	162
FY2021	3.05	463	152
FY2022	3.63	485	134
FY2023	3.79	491	130
FY2024	3.50	480	137
FY2025	3.52	481	137

Source: DRA, 2015; RPM, 2015.

The unit cost decrease over the period FY2022 to FY2025 is due to the Merensky Mineral Reserve depletion. Only the finely disseminated tailings are treated, which reduces power, labour, stores and sundry costs (Table 9.9).

Forecast operating cost for the Waterval UG2 concentrator is based on treating RoM to design capacity (Table 9.10). The recent PFS work undertaken has reduced the planned labour complement.

Table 9.10 Ten-year planned Waterval UG2 concentrator operating costs (mid-2015 money terms)

Year	Tonnes processed (Mtpa)	Operating cost per annum (ZAR M)	Unit operating cost (ZAR/t)
FY2016	5.40	626	116
FY2017	5.40	614	114
FY2018	5.40	613	114
FY2019	5.40	613	113
FY2020	5.40	611	113
FY2021	5.40	610	113
FY2022	5.40	608	113
FY2023	5.40	607	112
FY2024	5.40	608	113
FY2025	5.40	608	113

Source: DRA, 2015; RPM, 2015

9.7 Concentrator SIB costs

Rustenburg Operations has a detailed SIB capital project pipeline plan to 2018 for its concentrator plants. The list of projects was interrogated and adjusted where deemed appropriate. Major SIB projects include: repairs on the final tails MCC and pump house, relining of the pollution dam and repairs to the Merensky pollution dam. Adjusted SIB capital estimates were used as the forecast for the next three financial years. After 2018, no SIB capital for the concentrator plants is allowed for, as these costs are normal expenses in the operating cost model.

Table 9.11 represents an annual summary for the concentrator plants. The base date for SIB capital cost estimate is January 2015. All costs are constant 2015 and no escalation factors are applied. The costs and prices for SIB capital are derived from information within internal databases, supplier quotations and information obtained directly from Rustenburg Operations. The SIB capital cost estimate accuracy is at the required level for a PFS.

Table 9.11 SIB cost summary of concentrators (mid-2015 money terms)

Concentrator	SIB capital value (ZAR M)			
	2015	2016	2017	2018
Waterval UG2 concentrator	12	35	23	20
Waterval Retrofit concentrator	4	12	10	9

Source: DRA, 2015; DTM, 2015

9.8 Concentrator capital costs

No step-up or initial capital will be spent over the LoM on process infrastructure, with SIB capital covering major or partial plant process replacements/modifications.

Capex of ZAR22 M is planned for concentrate handling and sampling between the Waterval Smelter and concentrators. However this cost will not be incurred as the Sale and Toll Treatment of Concentrate agreement entered into between Sibanye and RPM adequately covers the evaluation of concentrate content.

9.9 Risk assessment

T6C(i)

In DRA's opinion, the Rustenburg Operations approach to PGE processing carries low risk as well established proven technology is used in all flowsheets and management have considerable experience. The primary concentrators have been in operation for more than 20 years.

10 TAILINGS MANAGEMENT

DRA, ERM and SRK source documents form the basis of Section 10.

10.1 Introduction

The Waterval complex has seven TSFs namely: Waterval East, Waterval West, Klipfontein, Hoedspruit, Paardekraal Central, Paardekraal PK4 and Paardekraal PK5 (Figure 10.2).

Only the Paardekraal and Hoedspruit TSF facilities are currently actively receiving tailings. The Klipfontein TSF is being re-mined using hydropower sluicing by Fraser Alexander (Pty) Limited ("Fraser Alexander") and is retreated in the WLTR plant before deposition on the Hoedspruit TSF. This Klipfontein tailings resource will be depleted by end of July 2016.

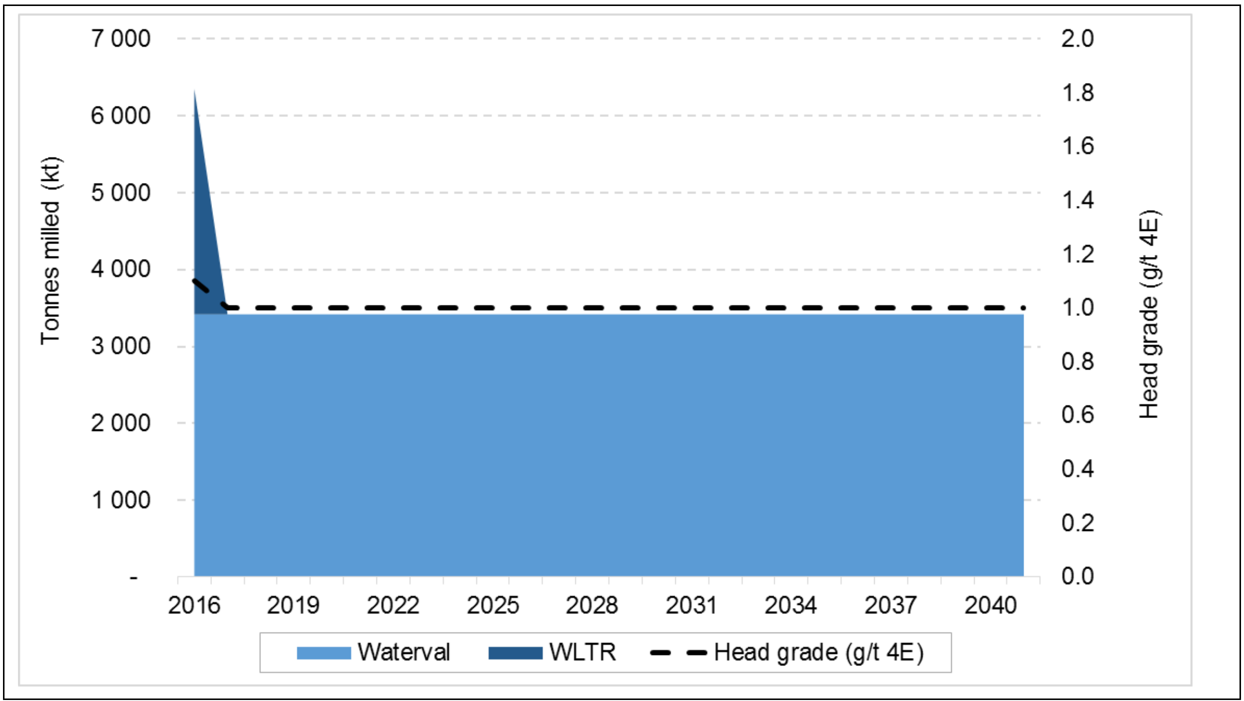
The Waterval East and Waterval West dams will be re-mined, again using hydro power, by Fraser Alexander as part of the Waterval tailings project starting in 2016. Re-slurried tailings will be treated in one of the two Waterval concentrators and tailings deposited onto the existing active Paardekraal TSF Complex.

The terms Hoedspruit TSF and Hoedspruit Tailings Complex are used interchangeably in the CPR, specifically in Section 10.

10.2 Current operations

The WLTR plant was constructed to reprocess previously stockpiled tailings residue from the Klipfontein TSF. Processing of dormant Klipfontein tailings is due to end at WLTR plant in July 2016 but reprocessing of the Waterval East and West TSFs at the Waterval Retrofit concentrator is planned to commence in January 2016. The LoM tailings treatment production profile is shown in Figure 10.1.

Figure 10.1 Rustenburg Operations tailings treatment production profile



Source: DRA, 2015
Note: Economic tail cut applied

The process involves the hydro power sluicing of the existing TSFs and the processing of resultant slurry at the WLTR plant. The re-slurried tailings gravitate to a low lying catchment area, where it is initially screened and then pumped to the WLTR plant. The tailings slurry is cycloned to split the fines and coarse fractions. The coarse fraction is pumped to the milling circuit from the cyclone underflow. The WLTR plant extracts available PGEs using a similar process to the Waterval concentrators but excludes the crushing stage. All tailings generated are pumped and deposited on the Hoedspruit TSF.

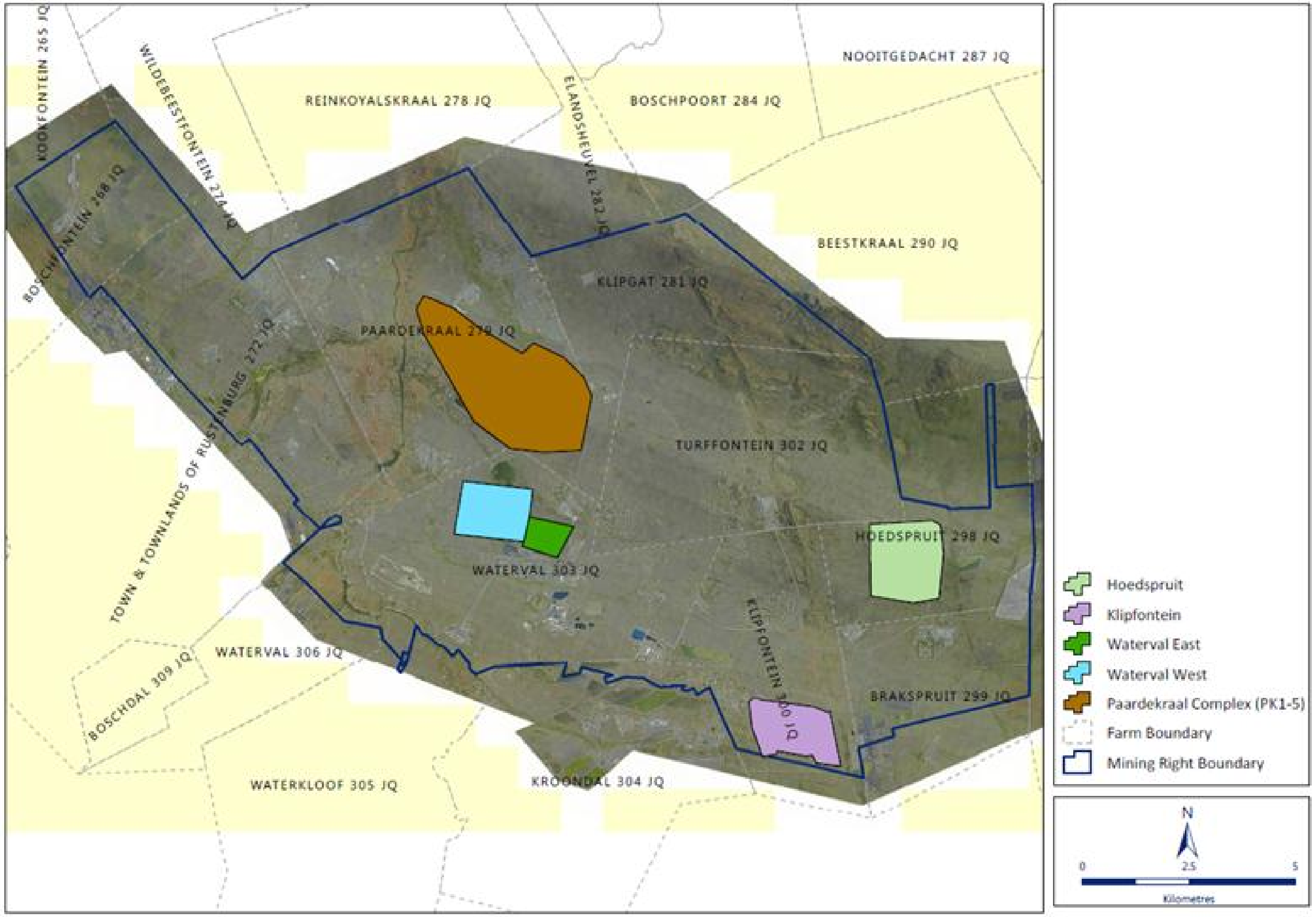
The Waterval East and Waterval West dams will also be re-mined, again using hydro power, by Fraser Alexander as part of the Waterval tailings project starting in 2016. Re-slurried tailings will be treated in one of the two Waterval Retrofit concentrator modules and tailings deposited onto the existing active Paardekraal TSF Complex.

The reprocessing of tailings is estimated to provide 46 koz of platinum in 2016. Thereafter, tailings retreatment operations are a steady supplier of 24.5 koz per annum of low-cost platinum.

The Paardekraal complex receives milled slag and tailings from the Waterval Retrofit and Waterval UG2 concentrators as well as slag from the Waterval Smelter. Slag is introduced through the Waterval Retrofit concentrator tailings handling system and an agreement will be concluded between Sibanye and RPM to dispose of smelter slag. The monitoring and pumping facility is in place and will be operated by Fraser Alexander.

Rustenburg Operations has an existing agreement in place to sell current tailings from the Waterval Retrofit and the Waterval UG2 concentrators to Platinum Mile. Platinum Mile processes the current tailings streams and Rustenburg Operations receives a 50% profit share from Platinum Mile.

Figure 10.2 Location of Rustenburg Operations tailings storage facilities



Source: Modified from SRK, 2014

10.2.1 Paardekraal Tailings Complex

The Paardekraal Tailings Complex consists of three tailings dams; Paardekraal Central, Paardekraal PK4 and Paardekraal PK5. In 2007, the increase in the tailings deposition rate was above the acceptable rate of rise that could be accommodated by the Paardekraal Central Dam. The newest of the three dams, PK5, received first tailings in 2007.

Paardekraal Central TSF:

- Consolidation of the Phase 1, 2 and 3 Paardekraal TSFs began in 2001 and the complex is now operated as a single dam;
- The penstock decants water from the top of the TSF directly into Klipgat return water dam;
- Horizontal or vertical curtain drains have been installed at Phases 1 and 3 to control the phreatic surface thereby ensuring the stability of the outer face of the TSF;
- Blockages in the curtain drains has resulted in seepage. Seepage cut-off trenches have been installed along the northern flank to manage this seepage. Rodding and jetting under high pressure has been implemented at all TSFs to minimise blockages in future;
- The pool and wet beach areas on the Paardekraal Central TSF are well maintained to assist with the suppression of dust; and,
- Deposition onto the dam is curtailed with deposition now at PK4 and PK5. The majority of the top of the dam is being sprayed with a dust suppressant and constitutes weather capping (spray put onto the tailings to bind the material).

Paardekraal PK4 TSF:

- Commissioned in February 2007;
- Located to the west of the Paardekraal Central TSF;
- Forms part of the total Paardekraal TSF complex; and,
- Vertical curtain drains are installed as deposition progresses.

Paardekraal PK5 TSF:

- Commissioned in April 2008;
- Located to the east of the Paardekraal Central TSF;
- Forms part of the total Paardekraal TSF complex; and,
- Vertical curtain drains are being installed as deposition progresses.

The Paardekraal Complex has a possible deposition capacity of 264 Mt as shown in Table 10.1.

Table 10.1 Paardekraal Central possible deposition strategy

Period	Volume (in ktpm)			
	PK Central	PK4	PK5	Total
January 2016 to December 2025	250	440	160	**850**
January 2026 to March 2030	280	410	160	**850**
April 2030 to April 2039	340	350	160	**850**
May 2039 to November 2041	330	330	190	**850**

Source: SRK, 2014

There is sufficient capacity in the Paardekraal tailings dam to accommodate all tailings from the planned production profile as confirmed by SRK (SRK, 2014).

Should additional capacity be required going forward, the following options exist:

- Hoedspruit tailings dam with capacity of 102 Mt (potential expansion is also possible); and,
- Waterval West tailings dam with capacity of 77 Mt post 2041 when the tailings retreatment is completed.

10.2.2 Paardekraal TSF and costs

Paardekraal TSF planned operating costs are shown in Table 10.2.

Table 10.2 Paardekraal TSF planned operating costs

Description	Operating costs (ZAR M)				
	2015	2016	2017	2018	2019
Fraser Alexander operations	18.7	20.6	22.7	25.1	27.4
SRK monitoring	0.5	0.5	0.6	0.6	0.7
Paardekraal Central					
Piezocone testing	2.0				
New elevated penstock	3.0	3.0			
Paardekraal PK4					
Vertical curtain drain fees	0.2	0.2	0.2	0.2	0.2
Vertical curtain construction	3.6	3.9	4.3	4.8	5.3
Step-in berm		1.7			
Paardekraal PK5					
Vertical curtain construction	2.5	2.8	3.1	3.4	3.7
Step-in berm		1.0			
Total Paardekraal opex	**30.4**	**33.6**	**30.7**	**33.8**	**37.2**

Source: SRK, 2014; DRA 2015

10.2.3 Hoedspruit Tailings Complex

The second active TSF, the Hoedspruit Tailings Complex was commissioned in 2003 with a footprint area of 598 ha. It caters for the deposition of re-processed tailings from the WLTR plant until 2016, re-processed tailings material from other local TSFs and for potential future TSF requirements if the Paardekraal TSF complex reaches its terminal height.

The WLTR plant re-treats the Klipfontein TSF material. WLTR plant tailings are delivered to the Hoedspruit TSF. The Klipfontein TSF will be depleted by mid-2016.

Hoedspruit TSF is the last large scale surface TSF that will be constructed at Rustenburg Operations. Together with the existing Paardekraal TSF, the designed Hoedspruit TSF has sufficient deposition capacity for the LoM for the entire Rustenburg Operations Lease Area.

Hoedspruit TSF was originally conceived, (and design studies completed) to be double its current size. At the time WLTR plant was built, AAPL, had the option to lease the adjacent land from the Royal Bafokeng Nation ("RBN") and essentially could double the size of the Hoedspruit TSF. This option was however not pursued at the time because of costs and "excess to requirement" issues, but this could be revisited if necessary. Hoedspruit TSF's original sizing was based on criteria to impound close to 1 billion tonnes on the Hoedspruit site. This would allow for potential future retreatment of the existing Paardekraal TSFs through the WLTR plant (or other concentrators) and deposit on an extended Hoedspruit footprint.

Hoedspruit TSF current and planned operating costs are shown in Table 10.3.

Table 10.3 Hoedspruit TSF planned operating costs

Description	Operating costs (ZAR M)	
	2015	2016F
Fraser Alexander Operations	6.0	6.7
SRK monitoring	0.4	0.5
Step-in berm construction	-	-
Raising pipelines	-	-
Total Hoedspruit opex	6.4	7.1

Source: SRK, 2014

10.3 Operational management, water and dust control

DRA visited the operational TSF sites and have reported that all the TSF facilities are in good operating condition and well maintained by experienced staff. The TSF facility conditions are continually monitored as part of Fraser Alexander operational responsibilities and the approved professional engineers for the facilities are SRK who are retained for the ongoing monitoring and DMR annual reporting. The costs to cover ongoing repairs are sufficiently allowed for in the operating and SIB cost estimates. Records of maintenance performed are readily available.

Over the 2013 to 2014 period, the Paardekraal TSF became drier than normal due to the protracted strike action, resulting in dust entrainment during high wind events. While there are other regional dust sources leading to frequent exceedance of legal standards/guidelines, wind-blown dust is generated from all Rustenburg Operations TSFs, the main source being Paardekraal. The situation was exacerbated by the strike that started in late 2013 and ended in mid-2014 which lowered the production rate and resulted in low slurry deposition rates at Paardekraal TSF; consequently the TSF was not able to be kept wet as per normal operating conditions due to the lower water volumes being deposited.

A three staged dust management plan has partially been implemented at Paardekraal, namely:

1) The first stage involved weather capping (chemical-based) of the central compartment of the TSF. This stage commenced in July 2014 and was completed in September 2014;

2) This was followed by altering the deposition strategy to deposit tailings on Paardekraal TSF Phases 4 and 5 to maintain a wet beach; and,

3) A longer term solution of applying netting and vegetation on the Paardekraal Central TSF compartment has commenced.

The intent is to minimise future wind-blown dust by ensuring that at any given time all the TSF open surfaces (both on slopes and the top) prone to strong winds are under control, i.e. slopes are revegetated, dormant surfaces are weather capped and top active areas are kept wet through rotational deposition of slurry and watering of top step-ins with a combination of irrigation and water trucks.

A ZAR4 M provision for weather capping was included in the Mine Budget 2014 for chemical capping. The budget for stages 2 and 3 has been included in the Fraser Alexander operating cost of the Paardekraal TSF.

10.4 Water Use Licencing and water management aspects

RPM was issued with an Integrated Water Use Licence ("IWUL") for all of its TSF complexes in March 2012 (WUL no. 03/A22H/ACGIJ/926; File No. 16/2/7/A210/C5). Under the licence RPM is required to manage all authorised water uses in terms of the WUL conditions and GN704 of 1999.

Klipgat Dam is a return water dam and is the largest process water storage facility at the Waterval operation. Even though Klipgat Dam is a tailings return water dam, water is received from multiple sources including excess water from mining operations and TSW. Klipgat Dam water sources include TSF return water from:

- Paardekraal PK4 TSF;
- Paardekraal Central TSF;
- Paardekraal PK5 TSF;
- Waterval East TSF (rainwater run-off only, as this TSF is no longer in active use); and,
- Waterval West TSF (rainwater run-off only, as this TSF is no longer in active use).

Currently all excess water from Rustenburg Operations is pumped to the Klipgat or Hoedspruit return water dam but the return pumping facility for reuse of return water at the Rustenburg Operations mine shafts is only from the newly installed stormwater dams. The use of return water at the shafts may become necessary if an extended dry period is experienced. Uncontrolled pumping of mining water to the return water dams has the potential to result in spills. Increased re-use of return water and tailings slurry density optimisation have further reduced the volume of return water overflows. No spillages from the return water dams were observed in the last three years (AAPL Integrated Water Management Plan Annual Update – September 2014).

Water management on the TSFs is well controlled with the supernatant pool located centrally around the decant towers. The TSFs also conform to the statutory freeboard requirements. Six monthly audits are performed by independent consultants to ensure compliance with respect to operating procedures and all legal requirements.

Currently Hoedspruit processes approximately 540 kt of re-mined platinum tailings from the Klipfontein TSF complex per month. This material is a mixture of Merensky, UG2 and slag tailings. The Hoedspruit TSF is situated north of Siphumelele 2 shaft within the Hoedspruit stream 1:100 flood line. Exemption from Regulation 704 has been approved by DWA. The TSF penstock decant towers have been sized to remove a 1:100 year storm/flood from the TSF within 10 days.

10.4.1 Clean water diversions

Clean run-off is diverted by the embankment of access roads around all older TSFs. Storm water trenches have been constructed along the top of the Klipfontein TSF. At Hoedspruit TSF a cut-off drain to the south, west and north of the TSF diverts the 1:50 year storm event away from the TSF complex. Drop structures and liners are used for erosion protection. Run-off is diverted around the Klipgat and Paardekraal Phase 1 return water dam in the respective river diversions which have been designed to cater for the 1:100 year flood peak.

10.4.2 Dirty water collection

A system of underdrains and solution trenches collects seepage water around all TSFs which is then pumped or gravitated back to the return water dams or to the process water circuit in the case of Waterval TSF. All side-slope runoff is contained within toe paddocks at all the TSF and in storm water trenches at Paardekraal Central, PK5 and along the top of the Klipfontein TSF. All the trenches flow to the return water dams. At Hoedspruit a storm water diversion around the south eastern corner of the TSF and return water dam diverts storm water and seepage from the Siphumelele 3 shaft to the return water dam.

10.4.3 Slag disposal

Slag is currently stockpiled north of the Waterval smelter within the Rustenburg Operations Lease Area. It is recovered by Blastrite (Pty) Limited for use as an abrasive in sand blasting operations; and also sent to the Rustenburg Operations concentrators after milling for deposition onto the TSFs. Management of the slag is in terms of the MPRDA and authorised in the EMP. It is included in the IWWMP and IWULA in terms of water quality management aspects.

10.4.4 Tailings closure considerations

T5.2C(iv)

The 2014 closure cost assessment (SRK, 2014) was reviewed. Two assessments were provided: namely the day of assessment (“DOA”) refers to the liability associated with the current infrastructure on the day of the assessment; and end of LoM refers to the liability associated with the current infrastructure at the end of the LoM.

It is assumed that the Klipfontein TSF (being retreated) and Waterval East and Waterval West TSFs would have been retreated during the life of the operation and no additional costs will be incurred at the end of LoM. The only costs applied by SRK are for the top surface tailings scarification and revegetation costs on the final TSF landform. Certain water management and ongoing monitoring and maintenance costs are included in the closure estimates.

Klipfontein TSF

This facility is currently being retreated at the WLTR plant, from where the tailings are deposited onto the Hoedspruit TSF. Once the dam has been removed it is planned to mine the shallow reef below the dam using open pit mining techniques. The implication of this is that at closure, the TSF as well as approximately 90% of the footprint would have been removed. The remaining 10% of the footprint will require remediation. The DOA estimate is ZAR11.3 M.

Waterval TSF

Although no recovery has yet begun, current planning is that this facility will also be retreated at the Waterval Retrofit concentrator. As re-mining has not commenced, this dam will be rehabilitated for DOA as for the Paardekraal and Hoedspruit TSFs. The DOA estimate for Waterval East and West was ZAR9.1 M.

Paardekraal TSF

The current planning is that no reprocessing of this TSF complex will occur, with the dam remaining in place at closure. Therefore, the closure provision that has been made for this TSF is for vegetating areas not yet covered. The revegetation of the slopes is ongoing and there is limited backlog requiring costing for DOA. For the LoM assessment it is assumed that there is no backlog and all that will be required will be rehabilitation of the top areas. The LoM cost for Paardekraal Central, PK4 and PK5 is ZAR31.3 M for top surface revegetation.

Hoedspruit TSF

The current planning is that no reprocessing of this TSF will occur, with the dam remaining in place at closure. Therefore, the closure provision that has been made for this TSF is for vegetating areas not yet covered. The revegetation of the slopes is ongoing and there is limited backlog requiring costing for DOA. For the LoM assessment it is assumed that there is no backlog and all that will be required will be rehabilitation of the top areas. The LoM cost for Hoedspruit is ZAR13.5 M.

11 ENGINEERING INFRASTRUCTURE

T5.6A/B/C(i)-(iii)

DRA source documents form the basis of Section 11.

The infrastructure supporting each mine shaft and the concentrator plants within the Rustenburg Operations include the supply of electrical and emergency power, the supply of water services (including potable, effluent and process water), fuel storage and supply, compressed air supply, workshops, stores, roads, a rail network, various offices and change houses and accommodation facilities.

The Asset package of the Rustenburg Operations is shown in Table 3.1. RPM will continue to own and operate the Waterval Smelter, ACP, BMR, PMR and the new Western Limb Distribution Centre ("WLDC") (all shown in blue) and these facilities are excluded from the Rustenburg Operations and the sale to Sibanye.

Apart from the PMR, each of the operations being retained by RPM has dedicated electrical substation and switchyard infrastructure. The PMR is currently being fed from the Rustenburg Compressor Consumer substation which also feeds various mining loads. The separation from the Rustenburg Operations is currently been executed by RPM and a new indoor consumer substation will be built for the PMR close to the Rustenburg Compressor Consumer substation. The new substation will be supplied by the same 6.6 kilo Volt ("kV") and 11 kV feeds that currently supply the PMR from the Eskom side of the compressor substation via three existing overhead lines ("OHL"), comprising two 6.6 kV and one 11 kV OHLs.

11.1 Power infrastructure

11.1.1 Power supply

Power is supplied to the Rustenburg Operations by Eskom, the local supply utility. The Eskom 400 kV Marang Main Transmission Station ("MTS") supplies power to 12 consumer substations at the Rustenburg Operations. At the consumer substations the voltage is stepped down to either 6.6 kV or 11 kV and distributed via a combination of cabling and OHLs to the various onsite consumers.

11.1.2 Power distribution and transmission

The current consumer substation supplies the following major loads:

- Mines:
  - surface infrastructure
  - underground infrastructure
  - ventilation and refrigeration
  - air compressors
  - underground mining equipment;
- Concentrators, located close to the substations; and,
- Central Services infrastructure:
  - west 10 air compressors
  - on-mine accommodation
  - workshops and central offices.

11.1.3 Emergency power

Rustenburg Operations have an established emergency procedure in the event of an electrical power interruption, consisting of a prioritised shut down procedure of non-essential activities, in parallel with the start-up procedure for the generator plants to power critical systems including ventilation, dewatering and winders. Emergency ventilation is achieved by diesel-driven fans.

The generating plant consists of six diesel generators producing 3 MW each (installed in 2011) and four diesel 1.8 MW turbine powered generators (installed in 1989) supplying the Khuseleka, Khomanani, Siphumelele and select consumer substations, to ensure the safety and protection of underground mine personnel and equipment. Thembelani Mine is fed from the generators stationed at Khomanani Mine.

The electrical, control and instrumentation works of the old diesel generators were recently upgraded, but it is a concern that mechanical spares may not be available and that it may not be possible to repair these generators, should there be serious mechanical breakdown. The new set of six generators was only commissioned during 2013 and 2014. The units are all in good condition and well maintained as per RPM maintenance procedures.

11.1.4 Power supply forecast

The electrical power supply network has sufficient capacity for the LoM requirements. Table 11.1 shows the existing capacities and forecast loads at the consumer substations.

Table 11.1 Installed capacity vs. future power requirements

Consumer substation	Actual MD (March 2015)	Contractual NMD (MVA)	Installed transformers	7-year peak MVA	Installed capacity for standard supply (MVA)	Total installed capacity for premium supply (MVA)	Forecast future MD (MVA)
Communition (Retrofit concentrator)	30.05	105	4 x 40MVA, 88/11kV	69.2	120	160	33
Plats (Central Logistics)	3.39	16	3 x 10MVA, 88/6.6kV	6.9	20	30	4
Paardekraal (6th Point) (Khomanani 1&2, Thembelani 1) *	33.237	53	4 x 20MVA, 88/11kVA	43.7	60	80	38
Incline-Boschfontein (7th Point) (Khuseleka 2) **	19.64	40	3 x 20MVA, 88/11kV	26.7	40	60	21
Shaft (Townlands) (Khuseleka 1)	20.00	33.6	3 x 20MVA, 88/6.6kV	22	40	60	25
Turffontein (Siphumelele)	34.78	38	2 x 20 MVA, 88/6.6kV 3 x 20MVA, 88/11kV	48.6	60	100	42
Concentrator (UG2 concentrator)	40.75	48.7	4 x 20MVA, 88/11kVA	52.7	60	80	42
Compressor (West 10)	16.65	41	4 x (2x5)MVA, 88/6.6kV 1 x 20MVA, 88/11kV	22.19	40	60	17
RUSTB – Tailings	19.78	55	4 x 20MVA, 88/11kVA	40.4	60	80	21
Frank (Paardekraal2) Thembelani 2 (New 33kV sub)^	0.02	40	2 x 40 MVA, 88/33kV	2.5	40	80	1

Source: DRA, 2015
Notes:
** Khomanani 1 and 2 shafts are on care and maintenance*
*** Khuseleka 2 shaft is on care and maintenance*
^Thembelani 2 shaft is on care and maintenance
NMD – Nominal maximum demand, MD – maximum demand, MVA – Mega Volt Amperes.

Eskom has stated its intention to upgrade the Marang network from 88 kV to 132 kV, but the user voltage will remain at 11 kV and 6.6 kV. If this materialises then a fault level study will have to be performed to determine if any switchgear needs to be upgraded in the consumer substations.

11.2 Bulk water infrastructure

11.2.1 Water requirements

Potable water

The potable water distribution network feeding the Rustenburg Operations is elaborate. Potable water is supplied by Rand Water Board ("RWB") through the RWB system from the eastern side and the Magalies Water Board on the northern side with a backup supply from the Rustenburg Local Municipality's Bospoort system. The pipelines extend to the mining and processing operations, to fire water systems and for on-site offices, buildings and accommodation facilities. Various third party users are also supplied with water within the Rustenburg Operations water reticulation areas.

Measurement instrumentation at the off-take streams is in place, allowing for monthly volumetric and flow data to be taken, enabling a comparison with readings from the RWB invoice, as a function of the contractual agreement between the various users. There is a good correlation between the sum of the consumers and the RWB invoices.

The loss of the water supply poses a medium risk to Rustenburg Operations and it is recognised that water conservation is an important regional strategy. Sufficient reservoir capacity exists for at least 24 hours of operation.

The average potable water usage for 2015 YTD is shown in Table 11.2.

Table 11.2 Average potable water consumption of the Rustenburg Operations

Current end users	Average 2015 YTD (Mℓ/day)
UG2 Concentrator	0.79
Retrofit Concentrator	0.92
WLTRP & Pump Station	0.58
Siphumelele 1#	1.61
Thembelani 1#	0.53
Khuseleka 1#	0.48
Bathopele #	0.78
Shafts on Care and Maintenance	1.90
Compressors	0.65
Accommodation villages	1.95
Change houses	0.67
Others	0.43
Total	**11.28**

Source: DRA, 2015

11.2.2 Water reticulation

At the shafts, service water for drilling, washing and fire service is stored in surface and underground dams to cater for a minimum of 24 hours of operation. Underground fissure water enters the workings at a relatively low rate of 0.2 m^3 per tonne mined. Excess water from the shafts is transferred to the concentrator plants. Service water is distributed down the shafts to the various workings at a rate of 0.5 m^3 per tonne mined through a series of 150 NB pipes.

Dirty water from the workings is pumped up the decline shafts to the vertical shafts where conical settlers separate the mud and the clear water. These are pumped separately to surface. All shafts have spare pumps to ensure continuity of operations in the event of a pump failure. All pumps and pipes are in a good condition and well maintained and they are suitably sized to cater for current and future requirements.

At the Waterval concentrators, the Klipgat dam (return water dam or "RWD") collects clear water from the drains of the various tailing storage facilities. Makeup water in the form of treated sewage water (grey water) is obtained from Rustenburg Water Services Trust ("RWST") through the RWD. The blended water is pumped back to the concentrators and returned to the process. The reservoirs, pumps pipelines and standby equipment are in good condition and correctly sized for the duty required. The 250 Area Substation (near Waterval Retrofit concentrator) is currently being replaced due to damage from flooding.

11.2.3 Water treatment and sewerage

The Rustenburg Municipal Sewage treatment works was upgraded in 2004 with funds from an external investor, based on a long term agreement between RPM, Impala Platinum and the RWST to guarantee purchasing the treated effluent. This agreement has recently been amended for RPM for a take-or-pay option of 15 Mℓ/day and a user pay arrangement for an additional 5 Mℓ/ day. This source of industrial water intends to supply approximately 50% of the total RPM water requirements and this has the opportunity to significantly reduce reliance on RWB.

All internally generated sewage is treated in Rustenburg Operations sewerage treatment plants. Water quality is verified regularly by the operating contractor. Water from mine operated sewerage treatment plants is returned to the concentrator plant.

11.2.4 Future water availability

Rustenburg Operations has high levels of dissolved salt in the deeper shafts underground water. This has caused incidents of corrosion in the past and is managed by blending with better quality water and flushing.

The conductivity levels and related Total Dissolved Solids ("TDS") readings on all shafts appear to be reasonable, in the 3,000 to 8,000 parts per million ("ppm") range as opposed to the greater than 20,000 ppm readings from 2008 but must be monitored and managed closely to prevent corrosion occurring. The pH levels are all above 7.0, as would be expected, and are not a concern.

Overall water management of the Rustenburg Operations is complex and RWB infrastructure limitations together with environmental and climatic factors mean that current water sources will require careful monitoring and management. The incoming municipal sewage effluent quality and underground water quality require regular monitoring as well as the consumption measurement and accounting system.

11.3 Compressed air

Compressed air is supplied to the Rustenburg Operations via a ring feed system. The ring feed system consists of 10 operational compressors housed in six compressor houses located at the mining operations and other strategic areas. The total and average generative flow rate is 425,000 m^3/h and 42,500 m^3/h respectively. Table 11.3 indicates the supply capacity of the compressors and current peak demands. The current installed compressed air capacity is 147% of shaft peak demand and in the event of a compressor breakdown at a shaft, sufficient air is available from the ring main to continue mining operations.

Table 11.3 Compressed air supply and usage for Rustenburg Operations (2015)

Shaft	Compressor installed	Current supply (m³/hr)	Current shaft peak demand (m³/hr)
Thembelani	Sulzer	36,000	90,000
Khuseleka 1 Shaft	GHH Centac – RX850	37,000 32,000	90,000
Khuseleka 2 Shaft	Centac – RX850 Centac – R800	32,000 32,000	Care and maintenance
Khomanani 1 Shaft			Care and maintenance
Khomanani 2 Shaft	Demag – VK40	38,000	Care and maintenance
West 10	GEC GHH GHH	Currently out of commission 37,000 37,000	
Siphumelele 1 Shaft	Demag – VK125 GHH	113,000 31,000	100,000
Siphumelele 2 Shaft			10,000
Total		**425,000**	**290,000**

Source: DRA, 2015

The WLTR plant and the Waterval UG2 concentrator each have their own dedicated compressed air supply. The WLTR plant has three compressors producing a combined 4,800 m^3/h and the Waterval UG2 concentrator has two compressors producing a combined 2,200 m^3/h. The Waterval UG2 concentrator and Waterval Smelter both have a backup supply connection with the ring main. The RBMR uses compressed air from the ring main and accounts for approximately 9% of total air consumption. The PMR is not connected to the ring feed system. Flow meters record flow rates at the various withdrawal points.

While the compressors are old, they are in good condition, with routine condition monitoring of the ring main piping (annual thickness testing). Pipe lengths near residential areas (formal and informal) and public roads are given additional attention. The installation of Huck fasteners on overland air and water piping running through unsecured areas reduces theft and disruptions in air and water supply.

11.4 Ventilation

The ventilation specialists reviewed the design for a period of three critical LoM years, and also for the UG2 Level 2 production schedules at the various mines. The ventilation design criteria were revised to take into account typical requirements for current and planned expansions.

The changes included modelling ambient temperatures of 20°C/30°C wet and dry-bulb respectively and a maximum stope face wet-bulb temperature of 30.5°C, at the Khuseleka 1, Siphumelele 1 and Thembelani 1 operations. Ventilation planning for Bathopele Mine was also completed and the future requirements catered for.

The ventilation study was conducted based on current, steady state and worst case ventilation conditions. Air temperatures, flow rates, heat loads and cooling requirements are based on current ventilation and refrigeration equipment summarised below:

- Khuseleka Mine is ventilated by two downcast systems and two upcast shafts. Two separate fan installations are used for the Merensky and UG2 areas respectively. Two of the three fans at the UG2 upcast shaft are operable, and an emergency diesel fan is available. The third fan is mechanically sound but does not have installed switchgear. The Merensky upcast systems have two operational fans and one standby. An emergency fan is installed on surface, but is not operational as the diesel motor was removed. The Khuseleka R-134a surface refrigeration plant has a bulk air cooler ("BAC") and has not operated since 2011. The installation incorporates ice coils to facilitate load shifting during peak demand periods. The ice making capacity is 5 MW and can provide 8 MW chilled water cooling during off-peak periods. A 2 MW R-134a underground refrigeration facility is not in use. No additional infrastructure is anticipated for ventilation and refrigeration;

- Siphumelele Mine consists of two downcast shafts, one being the main vertical shaft and the other the fridge-plant vent shaft. The main vent shaft is equipped with a fan station that includes a standby and diesel driven emergency unit. The underground booster fan station consists of a single axial fan which was recently installed but not commissioned;
- Two refrigeration plants are installed at Siphumelele. One operating unit and one unit on standby. The total capacity is 17.3 MW; 9.6 MW feeds only the BAC while 7.7 MW feeds either the BAC or provides chilled underground service water. The chilled underground service water is not currently utilised. An additional 6.1 m diameter, 750 m long upcast shaft from 21 Intermediate Level to surface is planned. It will be equipped with two operating and one standby (trifurcated) surface fans;
- Thembelani Mine is ventilated by two downcast and four upcast shafts. Separate ventilation districts for the Merensky and UG2 reefs are designed. Each of the four fan stations have a standby fan, and two have diesel driven emergency units. Raise line connections for return airways, will be required to pass through the Hex River fault;
- A refrigeration plant is installed at Thembelani 2 Main Shaft with a capacity of 13 MW to supply cold water to a BAC. The installation is currently not being used; and,
- The two shaft systems at Bathopele Mine provide separate ventilation districts which are connected for secondary escape only. Bathopele East has three downcast shafts and one upcast. Bathopele Central has three downcast shafts and three upcast shafts. At each upcast shaft a single fan is operational with a second fan acting as a full duty standby. There are no diesel driven emergency units, but there is sufficient diesel generated power to run a fan for evacuation. In both shafts, air returns to dedicated return airways ("RAWs") above the mining horizon. No refrigeration is required.

The result of the study was the quantification of downcast and upcast flow rates for each mining operation. The capital equipment estimate was generated from this study.

The ventilation specialists also inspected the physical condition of main mechanical components and infrastructure including main fans and refrigeration plant installations at all mining operations. Current ventilation systems, standard procedures and compliance were also reviewed, although physical underground compliance and performance testing of mechanical equipment was excluded. The general condition of the operating ventilation equipment is good. Most of the refrigeration equipment is not in use and these units will require some maintenance prior to recommissioning.

11.4.1 Other piping

DRA have noted that numerous backfill pipelines were clogged up. These are being checked and replaced as part of routine maintenance.

11.5 Logistics

There are various National and Provincial roads, municipal public roads and private roads on the Rustenburg Operations Lease Area, as well as, an extensive rail network.

11.5.1 Roads

Main access roads

Main access roads are tarred and although a few potholes were encountered during the site visit, the roads are in good condition and well maintained.

Arterial roads

Minimal traffic occurs on the sand or gravel secondary roads, and thus these roads remain in good condition and require less maintenance.

Processing plant site roads

Roads are adequately maintained for the frequency and speed of travel for the logistics of trucking concentrate from the current operations. Due to the intensity of use, these roads include several controls, namely intersections, rail crossings, speed bumps and associated parking areas.

Other roads

The gravel and sand roads from the Waterval Village, Klipfontein Village and the various Single Accommodation Villages ("SAVs") and the pathways from numerous informal settlements in the area are used by pedestrians and other road users.

11.5.2 Rail

Except for Bathopele Mine, the shafts, processing plants and stores within the Rustenburg Operations are connected via rail. The rail network consists of 70 km of tracks, 28 level crossings, two steel bridges and three passing loops.

The rolling stock consists of 12 diesel locomotives, over 200 hoppers, various configured wagons and hoppers. Mobile equipment is included as part of the rail assets for logistical support.

The rail network is in good condition, and it is anticipated that no major problems will occur if maintenance is upheld. Stimela Rail Construction maintains the tracks. The maintenance contract is in place until the end of 2016.

The railway telemetry/control system is in place. Additional control system upgrades are being assessed by Rustenburg Operations Central Services.

A Rail Transportation Services agreement is in place with Kroondal Mine to transport ore from its Kwezi Shaft to its Concentrator.

A further Rail Transportation Services agreement is being formulated between RPM and Sibanye to transport material to RBMR, Acid Plant and the WLDC.

11.6 Project services

11.6.1 Surface workshops

Bathopele Mine includes a Trackless Mobile Mining Machinery ("TMMM") workshop with multiple bays for use by the three Original Equipment Manufacturers ("OEMs"). Approximately 287 TMMMs are in operation and require maintenance. Major services take place in a surface workshop, which was recently extended to increase storage space. Both the workshops and TMMMs are in good working condition.

11.6.2 OEM for maintenance services of mobile trackless fleet

Agreements with multiple OEMs for maintenance services of mobile trackless equipment are in place.

11.6.3 Storage facilities

The original main store for the Rustenburg Operations (called Klipfontein Main Stores) has been replaced by WLDC. WLDC is being retained by RPM and provides services to Rustenburg Operations, RPM Process Operations and other RPM operations. In the interim, the WLDC will continue to provide services to the Rustenburg Operations until the Transaction is completed. Thereafter, the operating plan for the Rustenburg Operations will no longer include a central stores function, with the materials being delivered directly to the shafts and concentrators where there is sufficient space in the current stores. There is a laydown area next to the Bleskop exchange yard siding, where bulk items are currently stored.

The stores and laydown areas at the shafts and concentrators are stocked, based on defined procurement process and the inventory of materials. Equipment is stored within an enclosed structure, whilst other items, such as conveyor belting and electrical cabling are protected from the elements on a concrete slab and under a corrugated iron roof. Reagents and chemicals are stored within a bunded area.

11.6.4 Reclamation, salvage yard and waste

Rustenburg Operations reclaims old equipment and components for refurbishment and re-use when possible.

The salvage yard operations are contracted to EnviroServ Waste Management (Pty) Limited (“Enviroserv”) and Riverside Park Trading. Waste generated at the various operations is sorted into industrial, domestic or hazardous categories before being hauled to the salvage yard, located near the WLDC. Hazardous waste includes discarded reagents and contaminated chemicals. A weighbridge is setup at the salvage yard.

Different waste types have price rates for handling and disposal. Industrial waste is sized and sorted into ferrous and non-ferrous components, thin plates or zinc, for sale to scrap yards, at monthly quoted rates. Old copper cabling (greater than 16 mm diameter) is stripped. Wooden waste is given to the community for free. Domestic waste is trucked to the Rustenburg Municipal Landfill. Hazardous waste is taken to the Holfontein Hazardous Waste Landfill.

Domestic waste efficiency was under investigation by Greenfoot Recycling and Waste Management, as a community employment initiative, to reduce the amount of (wet) waste sent to the Rustenburg Municipal Landfill. Plastic, paper and tins are then further sorted and recycled.

11.6.5 Fuel

The centralised bulk fuel storage facility is located at the Klipfontein Main Stores. The capacity of the depot is 0.69 Mℓ filling eight 80 kℓ tanks partially underground, and two underground 23 kilo litres (“kℓ”) tanks. The fuel storage tanks have been upgraded to separate diesel grades.

The receipt of, and dispatch of fuel is managed by Sebokeng Fuels, a Shell-branded distributor. Fuel is sold on a metered rate basis.

Fuel storage facilities are also present at the shafts and concentrators. Khuseleka Mine and Khomanani Mine each have underground storage exceeding 400 kℓ, whilst Siphumelele Mine stores 39 kℓ, Thembelani Mine stores 9 kℓ and Bathopele Mine stores 69 kℓ. Storage capacity at the concentrator and the School of Mines equate to 14 kℓ and 6 kℓ, respectively. Fuel storage of 69 kℓ for the rail locomotives is available at the surface railways loco-shed adjacent to concentrator RoM receiving bins, and transportation is deemed the major consumer of fuel.

These storage facilities aggregate the fuel volume availability to approximately 1.73 Mℓ and the security is adequate.

Similarly to other current shared services, the provision and distribution of fuel may require renegotiation with third party providers.

11.6.6 Safety and security

Security at the Rustenburg Operations follows protocols and delineated procedures. Access to the various operations is controlled at their entrances with security officers in place for employees, contractors, suppliers and visitors.

Biometric clocking systems are operated at the shafts and at all of the concentrators. Access to underground areas is regulated at the lamp and crush and shaft or decline area (the latter at Bathopele Mine) with turnstiles. Access to designated areas on surface at the mines and in the processing plants is also controlled with site specific systems. Access to the fuel storage tanks is also security controlled.

The Waterval Smelter and Waterval Retrofit concentrator are accessed through the same primary security control point. A new personnel access point for the Waterval Retrofit concentrator, separate from the Waterval smelter access will need to be constructed. The Waterval UG2 concentrator has its own dedicated access. A fence separates the Waterval UG2 and Waterval Retrofit concentrator. An internal gate allows for access between the Waterval UG2 and Waterval Retrofit Concentrator. Security at other sections of Rustenburg Operations is subject for upgrade due to lack of future technical and maintenance support. SIB capital has been allocated and quantified for improving perimeter fencing, connection of closed circuit television (“CCTV”) to the existing monitoring system, and the installation of beams to detect trespassing in remote areas, such as at the ventilation fans. Another project comprises the establishment of internal early warning systems in buildings, offices, and at selected access control doors.

11.6.7 Fire protection and services

Fire suppression systems are situated at the various Rustenburg Operations:

- Substations have dry type CO_2 fire extinguishers positioned in key areas;
- TMMM is equipped with an automatic extinguishing system; and,
- Conveyors have fire hose reels, CO_2 extinguishers, and deluge systems.

There are multiple detection systems, such as bearing temperature monitoring, smoke detectors and infra-red detectors all linked to the water deluge system.

The Waterval Retrofit concentrator and the Waterval Smelter complex share fire water holding tanks, pumps and piping.

Depending on the storage capacity and operating requirements of the Waterval Retrofit concentrator, the fire water line could draw water, in the event of an emergency from the potable water line, thus reducing the need for replication and capital equipping.

11.6.8 Emergency services

The Bleskop Hospital is managed by Platmed (Pty) Limited and provides emergency services to Rustenburg Operations, RPM Retained Operations and other third parties. The hospital is licenced as a 180-bed facility with two operating theatres and a four-bed emergency unit (casualty). The hospital has a registered pharmacy (Bleskop) which supplies medication and surgical equipment.

The following services are provided at the Bleskop Hospital:

- General practitioner and nursing services;
- Radiology (there is one x-ray adjacent to the casualty and one x-ray in the occupational health centre);
- Physiotherapy and occupational therapy (Rehabilitation and functional assessment centre); and,
- Administrative services (completion of Reliability, Maintainability and Availability (“RMA”) and Workers Compensation Act documentation and reports).

There is one response vehicle and three ambulances that provide emergency medical services to the Rustenburg Operations. At all times there are Advanced Life Support (“ALS”), Intermediate Life Support (“ILS”) and Basic Life Support (“BLS”) paramedics available to respond to medical emergencies. Back-up is provided by Trauma Rescue (private ambulance services stationed in Rustenburg), Lonmin, Impala and Royal Bafokeng. The paramedics assess patients and all P1 (serious) and P2 patients are transported directly to ER24 at Peglerae Hospital. Only P3 patients are transported to Bleskop Hospital. Peglerae Hospital is a Life Healthcare Hospital.

An integrated disaster management plan which makes use of other local hospitals (Job Shimankana Tabane (public), Peglerae, Ferncrest, Medicare, Impala, Lonmin, Union, Amandelbult) as well as Netcare Hospitals (nationally), is in place and has once dealt with gassings of up to 800 patients.

11.6.9 Communications

Landline, cellular and microwave communications are available at the Rustenburg Operations. Currently, all internet communications at Rustenburg Operations are run through a Central Control System (“CCS”) located at the Hex River offices.

At the operating mines, communication cables in the shaft barrels are in good condition, except at Thembelani 1 Shaft from Level 14 to the lowest level, namely Level 19. The underground communications are sufficient and fully operational. No communications problems were reported at the processing plants.

Currently the railway control room uses two-way radios and CCTV to control the flow of locomotives. Additional control system upgrades for the rail network have been allowed for in the Central Services SIB budget to provide a greater level of accuracy for real-time GPS positioning and monitoring of the proximity of locomotives to one another.

The estimated cost of the future information services is based on discussions with two reputable vendors and considers the number of users and licences, the estimated costs of licences and the cost of application and infrastructure support. ZAR3.2 M (mid-2015 money terms) per month has been allowed for in the Cash Flow Model.

11.7 Employee housing and transportation

Current accommodation exists at the Waterval Village, Klipfontein Village and the seven SAVs. The SAVs are currently underutilised, and therefore two villages are to be closed. A bus service exists for employee transportation. Informal settlements exist on the periphery of Rustenburg Operations; some Rustenburg Operations employees reside in these settlements.

11.8 Overall assessment

All engineering and infrastructural aspects are in place for the current operations. On-site engineering facilities satisfactorily sustain the various activities. Additional supporting infrastructure includes emergency services, clinics and communications and recreational areas.

The operating mining areas, both on surface and underground, and including materials handling, are deemed to be in a good operating condition. The maintenance system in place is appropriate for the equipment used and the conditions encountered.

The Waterval UG2 concentrator, and the associated CRP, the Waterval Retrofit concentrator and the WLTR plant are deemed to be in a good condition with no material areas of concern noted. The experienced staff and the established maintenance procedures ensure that the plants have a high availability for operation. Some corrosion is apparent, but is dealt with under ongoing repairs.

The replacement and refurbishment of engineering equipment as per equipment lifespan has been highlighted and costing for capital equipment and SIB equipment has been quantified.

11.9 Risk assessment

T6C(i)

In DRA's opinion, the established infrastructure carries low risk, and well established contractual agreements for utilities will ensure sufficient supply for the Rustenburg Operations. RPM has sustained relations with the various applicable regulatory departments for power and water requirements, as well as infrastructural obligations for logistical throughput.

12 CAPITAL PROJECTS

DRA source documents form the basis of Section 12.

12.1 Capital expenditure categorisation

Capital expenditure is defined as the cost of establishing the infrastructure necessary to increase production capacity from current level (Level 1) until steady state production capacity is attained. Rustenburg Operations includes the establishment of the necessary infrastructure to expand production capacity from steady-state when applicable. Hence, capex includes the purchase and installation of new equipment and services to equip the new developments required to open up a new reserve. The capital expenditure is based on the assumption that no further capital will be invested in Level 1 workings, other than the Bathopele Phase 5 project in execution.

Capex is categorised based on work breakdown structures (“WBS”) over a capital footprint defined within battery limits, allowing for the itemisation, quantification and costing of the mining development, equipping and construction for the stated scope of works.

Expansion capital is applied by Rustenburg Operations to increase the overall production capacity of a particular operating unit, or establish and new production unit, such as a new mine operation or processing facility. This has been differentiated from replacement capital, which is applied to maintain the overall production capacity of a particular operating unit, such as new decline waste development to access additional mining areas, in order to replace existing production capacity within the operating unit. The three main areas of expansion capital expenditure are for the Level 2 development (metres and cubic metres), shafts infrastructure (including ventilation), and concentrate handling between Smelter and Concentrators.

Rustenburg Operations applies SIB capital for all capital equipment replacement, business improvement, Mineral Reserve development, risk mitigation, and shared infrastructure programs after the initial project execution.

SIB Replacement (“SIB Rep”) Capital is applicable to capital equipment replacement. This estimate is compiled concurrently with the initial project capital estimate. SIB Rep is based on equipment utilisation and covers the systematic replacement of capital assets utilised in the production process.

12.2 Capital rates

The rates for development, equipping and construction have been derived from Rustenburg Operations current working costs rates.

12.3 Capital estimation accuracy and confidence

The forecast capital project costs have been benchmarked from similar operations or from historic data, estimates and cost rates less than twelve months old, and base-dated quotations, resulting in confidence in the input costs.

The capital expenditure estimate for the total Scope of Work (“SoW”) is within the accuracy range required for a Prefeasibility Level Study (“PFS”) of 15%. A 15% allowance has been made for contingencies.

It is to be noted that project insurance has been excluded in the capital estimate and no provision has been allowed for:

- Project Management;
- Engineering, Procurement and Construction Management ("EPCM") costs;
- Financial expenses such as taxes, duties and interest charges;
- Owner's costs; and,
- Mineral rights and the purchase or use of land.

12.4 Capital project management

Capital projects are the responsibility of Rustenburg Operations management and where appropriate consultant services. Several projects form part of the annual rolling Business Plan.

The mining operations to date have taken place using proven technology. However, efficiency will need to be considered in engineering designs for capital projects. Only after this has been achieved, can optimisation take place as a continuous process throughout the LoM, to reduce the capital outlay of future capital projects. The overriding considerations in capital projects for installation and equipping for engineering activities are:

- Safety;
- Maintainability;
- Simplicity;
- Capital effectiveness;
- Operating cost; and,
- Standardisation.

Over and above the compilation of the Bill of Quantities ("BoQ") of the Control Budget Estimate ("CBE"), an emphasis on sensitivities is required, specifically for power consumption, water utilisation and operating cost rates, capital effectiveness and ease of operation.

Equipment selection and all designs for the capital projects take cognisance of:

- Safe and easy access to equipment for maintenance and operation;
- Standardisation of all equipment in the shaft and at the processing facilities;
- Spares availability for sustained operations, maximising equipment availability;
- Cost of initial equipment, and cost of maintenance and operation of the equipment for its lifetime;
- Durability of equipment and machinery for maximum capital value and operational availability;
- Corrosion protection in terms of the required standards and Codes of Practice in order to ensure optimum life of equipment and installations;
- Appropriate specification and quality; and,
- Supplier support.

13 ENVIRONMENTAL CONSIDERATIONS

13.1 Introduction

Rustenburg Operations use various mining methods such as hybrid, bord and pillar, conventional stoping, trackless development and open pit mining.

Environmental considerations (Section 13) is a summary of the Environmental Resources Management Southern Africa (Pty) Limited's ("ERM's") review, titled Project Condor, Environmental, Health & Safety Due Diligence Assessment, Vendor Due Diligence Report, 9 January 2015 ("ERM Report").

13.2 Assumptions and limitations

The ERM report provides a high level assessment of the most pertinent issues related to environmental legal performance, risks and liabilities in order to identify any fatal flaws.

13.3 Key reports for CPR Review

- Project Condor, Environmental, Health & Safety Due Diligence Assessment, Vendor Due Diligence Report, prepared by ERM, dated January 2015 ("ERM Report");
- Anglo American Platinum Social and Labour Plan Rustenburg Section Excluding PSA, dated July 2015;
- Consolidated EMPR, prepared by WSP, dated June 2013;
- Closure Liability Assessment (Report Number 474473/ Rustenburg_2014) prepared by SRK, dated July 2014;
- Rustenburg Platinum Mine - Preliminary Closure Plan (Report Number 435110) prepared by SRK, dated November 2012;
- Integrated Water and Waste Management Plan ("IWWMP") prepared by SRK, dated September 2013;
- Regulation 704 audit of shafts and salvage yard (SRK Report No. 478483/ REV A), dated September 2014; and,
- Regulation 704 audit of the concentrators (SRK Report No. 436845/1), dated April 2014.

The SRK reports have collectively been referenced as "SRK, 2014."

13.4 Legislation and Rustenburg Operations compliance

T5.2A/B/C(i)-(iii)

Table 13.1 lists all permits relevant to Rustenburg Operations, which will be transferred to Sibanye, pursuant to the Transaction.

The MPRDA. The MPRDA is the key legislation governing mining activities within South Africa. It details the requirements and processes which need to be followed and adhered to by mining companies. The Department of Mineral Resources ("DMR") is the competent authority that deals with all mining related applications.

RPM holds converted and new order Mining Rights for the mining area (15,351.8 ha).

As per the requirements of the MPRDA a Social and Labour Plan ("SLP") for the period 2010 to 2015 was submitted to the DMR, and was approved in July 2010. Subsequently an SLP for the period 2015 to 2020 was submitted to the DMR in July 2015 (RPM is still awaiting feedback and/or approval from the DMR).

The RPM Rustenburg Section's original Environmental Management Programme Report ("EMPR") was approved in 1996 in terms of the now repealed Minerals Act, No. 50 of 1991. Subsequently, a number of EMPR addenda were developed and approved for mining and processing activities, and areas that were not included in the original EMPR were incorporated. In compliance with a DMR Directive issued in 2013, RPM has aligned and consolidated all of its approved EMPR addenda into a single document, which was submitted to the DMR in June 2013 (RPM is still awaiting feedback and/or approval from the DMR). Table 1.4 provides details on the EMPR and proposed split process to ensure that relevant sections are split as per retained or transferred sections. The reports have been prepared and are due for submission to the DMR. It is anticipated that this will be undertaken post-finalisation of the transaction.

Regulation 54 Closure Liability Assessments are carried out on an annual basis to fulfil the requirements of the MPRDA, with the latest reviewed assessment being undertaken in July 2014. The next assessment is due to be undertaken during 2015.

Regulation 55 EMPR Performance Assessments (compliance audits) must be undertaken every two years to fulfil the requirements of the MPRDA. No Regulation 55 EMPR Performance Assessments were made available at the time of the review. It is anticipated however that RPM may have been awaiting approval of the consolidated EMPR prior to appointing an external auditor. Until the consolidated EMPR is approved, the original EMPR and relevant approved addenda are to be implemented on site, and Regulation 55 Performance Assessments of these are required to be undertaken.

Rustenburg Operations' closure plans are defined to meet the MPRDA requirements and AAPL Group environmental commitments and standards. For the assets under consideration, a Preliminary Mine Closure Plan ("PMCP") was compiled in 2012, and has been submitted to the DMR (RPM is still awaiting feedback and/or approval from the DMR).

The National Environmental Management Act, No. 107 of 1998 ("NEMA") provides a framework for integrating environmental management into all developmental activities, and is the overarching environmental legislation of South Africa. The recently promulgated EIA Regulations (GNR982, December 2014) serve to regulate the procedure and criteria for submitting, processing and considering decisions for applications for Environmental Authorisation ("EA"). RPM has stated that five EAs have been obtained in terms of NEMA (between 2008 and 2014).

The implications of the NEMA Financial Provision Regulations (GN940 of 2014) should be considered in relation to the assets on care and maintenance, which include Khuseleka 2, Khomanani 1 and 2, and Siphumelele 3 shafts. The Regulations allow for assets to be placed on care and maintenance for a maximum period of five years, after which they need to be closed.

In terms of the EIA Regulations (2014), the mineral rights holder will be required to undertake a Basic Assessment process for decommissioning and closure of the mine, or certain sections of the mine. Liability for environmental degradation remains post-closure.

The National Environmental Management: Air Quality Act, No. 39 of 2004 ("NEM:AQA") is the NEMA management tool for air quality management. GN893 of 2013 provides the list of activities in terms of Section 21(1)(a) for which an Atmospheric Emissions Licence ("AEL") is required in terms of the Act. This notice further establishes minimum emission standards for the listed activities. It is unclear whether activities at Rustenburg Operations required permits in terms of the now repealed Atmospheric Pollution Prevention Act, No. 45 of 1965 (for listed activities which commenced prior to 2004) and whether any permits were obtained, or whether current activities require licensing in terms of NEM:AQA and whether licenses have been obtained. It is likely that Rustenburg Operations would require an AEL for the smelting operations and the refinery, but this requires confirmation.

The National Environmental Management: Waste Act, No. 59 of 2008 ("NEM:WA") serves to protect public and environmental health by providing measures for the prevention of pollution and ecological degradation related to waste management. GN921 of 2013 provides definitions for activities which require a Waste Management Licence ("WML"). Considering the extent of RPM, it is likely that the Project would require a WML but this requires confirmation.

The National Waste Information Regulations (GN R625 of 13 August 2012) regulate the collection of data and information for the national Waste Information System. Regulation 5 requires any person conducting an existing activity listed in Annexure 1, to be registered on the South African Waste Information System ("SAWIS") (www.sawic.org.za). As set out in Table 13.1, a number of SAWIS registration certificates have been obtained, and are to be transferred to Sibanye, pursuant to the Transaction.

The NEM:WA also provides for national norms and standards for the remediation of contaminated land and soil quality (GN331 of 2014). The full extent of soil contamination at RPM is not well understood, especially in relation to these standards. A soil contamination assessment should be completed to determine the risks and to establish the potential liability, although this is not required immediately.

The National Water Act, No. 36 of 1998 ("NWA") regulates all matters relating to inland water resources. The lead authority is the Department of Water and Sanitation ("DWS"), previously the Department of Water Affairs ("DWA"). Section 21 of the Act lists water uses for which authorisation is required from the DWS. Regulation GN704 of 1999 provides regulations for the use of water for mining and related activities with the intention of further protecting water resources.

RPM was issued with an Integrated Water Use Licence ("IWUL") in terms of Section 21 of the NWA in March 2012 (WUL no. 03/A22H/ACGIJ/926; File No. 16/2/7/A210/C5). Following a review of the IWUL in 2012, several errors were noted and the then DWA was consulted. AAPL submitted an application in July 2012 to amend specific conditions within the RPM IWUL but to date have received no feedback from the DWS. RPM's approved 2012 IWUL authorises water uses applying to both the retained operations, and to the operations to be transferred. An application to split this IWUL into two IWULs is pending. Once split, those water uses which are specific to the mining and concentrating operations will be transferred as necessary. A Water Use Licence Application (WULA) has been submitted for the Hex River undermining project and a further IWULA is to be submitted to authorise additional water uses not covered in the 2012 approved IWUL – this amendment application was due for submission at the end of 2015, but this is likely to be delayed pending the IWUL split process.

The approved IWUL requires annual external audits to be undertaken to determine compliance with the IWUL. According to ERM (January 2015), external audits were conducted in September 2013 and July 2014 and submitted to DWS as required. These audit reports were not made available for review.

An IWWMP was compiled for the Rustenburg Operations in 2004. It is required that these plans are updated annually and submitted to the DWS. The most recent update of the IWWMP is dated September 2014.

The purpose of the **National Environmental Management: Biodiversity Act, No. 10 of 2004** is to provide for the management and conservation of South Africa's biodiversity within the framework of NEMA. A survey of the RPM mineral right area in 2012 concluded that approximately 30 Red Data species may be found in the area. A Biodiversity Management Plan has been provided in the consolidated EMPR.

The **Hazardous Substances Act, No. 15 of 1973** ("HSA") aims to control substances that may cause injury, ill health, or death through their toxic, corrosive, irritant, strongly sensitising or flammable nature. RPM has included commitments, in the consolidated EMPR, to handle hazardous substances in the manner as prescribed in the HSA.

The **National Heritage Resources Act, No. 25 of 1999** serves to protect and manage South African heritage and cultural resources. In compliance with legislation, RPM commissioned an archaeological assessment for their lease holding in 2005. No sites of archaeological or cultural significance were identified within the Rustenburg Operations Lease Area. Management of the sites and chance finds has been addressed in the consolidated EMPR.

Table 13.1 lists all permits currently held by RPM and which will be transferred to Sibanye.

Table 13.1 Permits held by RPM that will be transferred to Sibanye

Permit/licence name and reference	Applicable legislation	Comment
Original RPM-RS EMPR, bearing EMPR Ref No, ME 061-97, 1996 (applicable to both the Sale Right and the Retained Right – please see discussion in comment sections re: removal of provisions applicable to the Retained Right). And the following amendments/ addendums to this Original EMPR, all of which are specific to the Sale Right • RPM-RS UG2 Phase 1 Project; • RPM-RS UG2 Phase 2 Project; • Boschfontein UG2 Phase 2 Project – Boschfontein West; • RPM-RS Western Limb Tailings Retreatment Plant; • Waterval Concentrator Retrofit Project; • Hoedspruit 298 JQ; • Boschfontein 11 Decline Shaft; • Turffontein Refrigeration Plant Expansion; • Boschfontein Open Shaft Mine; • Intermediate Shafts Project; • Boschfontein Mini Mine; • RPM-RS Lower Mine Project; • RPM-RS Deeps Project; • Vent Shafts; • Chromite Recovery Plants; • Waterval Mine Phase 4; and, • Waterval Retro E-Feed Project (in application phase, not yet approved).	Minerals Act/MPRDA	The Original RPM-RS EMPR and the 17 amendments/ addendums which have been approved, as well as the one (1) pending amendment/addenda application, govern the environmental management of the mining and concentrating operations to be transferred to Sibanye. The Original RPM-RS EMPR, however, also includes obligations which are specific to RPM's interests in the pooling and sharing arrangements at Kroondal and Marikana with Aquarius Platinum South Africa (Pty) Limited (PSA Areas) i.e. the Retained Right. An impending consolidation process is to be undertaken to remove the obligations which are specific to the PSA Areas to attach to the Retained Right (see further below).
2013 RPM Alignment and Consolidation EMPR for the Rustenburg Section, bearing DMR Reference number NW30/5/1/2/3/2/1/082 EM. [Note: This consolidated EMPR has not yet been approved by the DMR.]	MPRDA	The 2013 RPM Alignment and Consolidation EMPR for the Rustenburg Section was submitted pursuant to a directive issued by the North West Region of the DMR, requesting the submission of an EMPR in line with the requirements of the MPRDA, by 30 June 2013. The 2013 RPM Alignment and Consolidation EMPR for the Rustenburg Section was submitted in the prescribed timeframe. As discussed above, the Original RPM-RS EMPR and all the addenda/amendments thereto are now considered to be a NEMA environmental authorisation under the "One Environmental System". Accordingly, the Original RPM-RS EMPR, pending the second consolidation process (described in the next row) will be transferred to Sibanye, pursuant to the transaction. The 2013 RPM Alignment and Consolidation EMPR for the Rustenburg Section is likely to be withdrawn given that it includes obligations which are specific to the PSA Areas/Retained Right. A separate consolidation process

Permit/licence name and reference	Applicable legislation	Comment
		(described in the next row) is impending to prepare a consolidated EMPR that will be entirely specific to the Sale Right and a separate consolidated EMPR that will be entirely specific to the Retained Right.
Two reports have been prepared for purposes of obtaining two separate consolidated EMPRs, namely: • The RPM: Rustenburg Section carved out operations Consolidated EMPR, bearing Project No. 47440 and dated September 2015, being in respect of the Sale Right; and • The consolidated EIAR and EMPR-PSA Operations, bearing Project No. 710.26001.00005 and dated August 2015, being in respect of the Retained Right.	MPRDA NEMA	In respect of the first report, which is entirely specific to the Sale Right to be transferred to Sibanye: • This report will be submitted to the DMR as a dual MPRDA section 102 amendment application and NEMA amendment application to request the consolidation of all commitments from the underlying approved Original RPM-RS EMPR and addendums/ amendments thereto, which are specific to the mining and concentrating operations (the dual application is needed because of the shift to the One Environmental System); • This dual application will then delink the consolidated EMPR from the historical Mining Rights held by RPM and link it to the Sale Right; and • Once consolidated, this EMPR will transfer to Sibanye, pursuant to the transaction. In respect of the second report, which is entirely specific to the mining operations in respect of the Retained Right: • This separate consolidation will be submitted as a dual MPRDA section 102 amendment application and NEMA amendment application to request the consolidation of all commitments from the underlying approved Original RPM-RS EMPR and addenda/ amendments thereto (specific to the PSA Areas/ Retained Right), which are specific to the mining operations undertaken at the PSA Areas (the dual application is needed because of the shift to the One Environmental System); and • This dual application will then delink the consolidated EMPR from the historical Mining Rights held by RPM and link it to the Retained Right. The Retained Right will not be transferred, but will continue to be held by RPM.
Environmental authorisation bearing Ref No. NWP/EIA/241/2007, granted on 4 May 2008.	NEMA	The environmental authorisation authorises any development activity, including structures and infrastructure, where the total area of development is, or intended to be 20 ha or more. The authorised activity consists of the construction of 28 ventilation shafts along with eight refrigeration plants, and, an additional upcast shaft and four downcast shafts.
Environmental authorisation bearing Ref No. NWP/EIA/103/2012, granted on 1 August 2013.	NEMA	The environmental authorisation authorises the decommissioning of the Frank Concentrator and associated infrastructure located on portion 53 of the farm Waterval 306 JQ.
Environmental authorisation bearing Ref No. NWP/EIA/18/2013, granted on 27 November 2013	NEMA	The environmental authorisation authorises the storage and handling of dangerous goods in containers with a combined capacity of 340 cubic metres as part of the warehousing, distribution and supply chain facilities, and the expansion of a railway line and a new siding outside the reserve of an existing railway line.

Permit/licence name and reference	Applicable legislation	Comment
Environmental authorisation bearing Ref No. NWP/EIA/79/2012, granted on 13 August 2013.	NEMA	The environmental authorisation authorises the decommissioning of the RPM tar pits.
Environmental authorisation bearing Ref No. NWP/EIA/12/2014, granted on 11 December 2014.	NEMA	The environmental authorisation authorises the decommissioning of Klipfontein Concentrator and associated infrastructure.
Two environmental authorisations applications in relation to prospecting right applications have been submitted by RPM to the DEA. These applications remain pending.	NEMA	The corresponding basic assessment reports are currently being reviewed by the DMR. No prospecting activities are currently taking place, pending the outcome of the aforementioned applications.
Integrated Water Use Licence, bearing licence number 03/A22H/ACGIJ/926 and file number 16/2/7/A210/C5, dated 6 March 2012.	NWA	The IWUL authorises several water uses in terms of section 21 of the NWA. These water uses are as follows – section 21(a): taking water from a watercourse; section 21(c): impeding or diverting the flow of water in a watercourse; section 21(j): altering the bed, banks, course or characteristics of a watercourse; and section 21(g): disposing of waste in a manner which may detrimentally impact on a watercourse. The IWUL authorises both water uses which apply to the Retained Processing Operations and Waterval Smelter Complex (to be retained by RPM), as well as water uses that relate to the mining and processing operations. An application will be made in terms of section 50(1) of the NWA to split the IWUL into two separate licences, reflecting two holders, and splitting the water uses required by RPM for the operation of the Retained Processing Operations and Waterval Smelter Complex (to be retained by RPM), and for the remaining authorised water uses for the mining and concentrating operations. An amendment application to the IWUL was intended to be submitted at the end of 2015 to the DWS in order to authorise additional water uses not included in the initial IWUL. These water uses are as follows – section 21(c) and (i): river diversion on Klipfonteinspruit and river crossing on Klipgatspruit; section 21(e): the use of process water for gardening at Waterval UG2 concentrator gardens, and the use of stormwater run-off from dam 3 to irrigate the PMR gardens; and section 21(g): storage and disposal of water in Turffontein refrigeration plant evaporation ponds, and storage and disposal of water at Khuseleka 1/Thembelani 2 refrigeration plant earth evaporation pond. This pending amendment application may be placed on hold pending the IWUL split process.
Application for an IWUL for the undermining of the Bathopele Mine, bearing file number 16/2/7/A210/C5. This application is currently pending.	NWA	This IWUL relates to the future expansion project which requires underground mining within a 100 m vertical distance of the Hex River at the proposed 3W Mining Block. This IWUL remains pending. No undermining has, however, taken place in the 3W Mining Block while the application is pending. Although this IWUL has not yet been approved, RPM follows up on a regular basis with the Department of Water and Sanitation.

Permit/licence name and reference	Applicable legislation	Comment
Section 20 ECA permit bearing reference 12/9/11/P121, granted on 18 June 2009.	ECA	The section 20 permit authorises the closure and rehabilitation of the RPM landfill.
SAWIS registration certificate, bearing Ref No. D01324-01 and dated 19 March 2013.	NEMWA	Registration Certificate is in respect of waste activities undertaken at "Anglo American Platinum Rustenburg Concentrators".
SAWIS registration certificate, bearing Ref No. D01553-01 and dated 26 March 2013.	NEMWA	Registration Certificate is in respect of waste activities undertaken at "Hazardous Waste Generator" [Bathopele Mine].
SAWIS registration certificate, bearing Ref No. D01540-01 and dated 26 March 2013.	NEMWA	Registration Certificate is in respect of waste activities undertaken at "Rustenburg Platinum Mines – Khomanani 2".
SAWIS registration certificate, bearing Ref No. D01541-01 and dated 26 March 2013.	NEMWA	Registration Certificate is in respect of waste activities undertaken at "Rustenburg Platinum Mines – Khomanani 1".
SAWIS registration certificate, bearing Ref No. D01539-01 and dated 26 March 2013.	NEMWA	Registration Certificate is in respect of waste activities undertaken at "Rustenburg Platinum Mines – Khuseleka 2".
SAWIS registration certificate, bearing Ref No. D01689-01 and dated 27 March 2013.	NEMWA	Registration Certificate is in respect of waste activities undertaken at "Rustenburg Platinum Mines – Khuseleka (1 & 2)".
SAWIS registration certificate, bearing Ref No. D01538-01 and dated 26 March 2013.	NEMWA	Registration Certificate is in respect of waste activities undertaken at "Rustenburg Platinum Mines – Siphumelele 1".
SAWIS registration certificate, bearing Ref No. D01691-01 and dated 27 March 2013.	NEMWA	Registration Certificate is in respect of waste activities undertaken at "Rustenburg Platinum Mines – Thembelani 1".
SAWIS registration certificate, bearing Ref No. D01668-01 and dated 27 March 2013.	NEMWA	Registration Certificate is in respect of waste activities undertaken at "RPM Central Salvage Yard".
SAWIS registration certificate, bearing Ref No. D00946-01 and dated 6 December 2012.	NEMWA	Registration Certificate is in respect of waste activities undertaken at "WLTR Concentrator".
SAWIS registration certificate, bearing Ref No. D01668-01 and dated 27 March 2013.	NEMWA	Registration Certificate is in respect of waste activities undertaken at "RPM Central Salvage Yard".

Source: RPM, 2015

13.5 Decommissioning and closure liabilities

T5.1A/B/C(i), T5.2C(iv)-(v)

A closure cost estimate for Rustenburg Operations is updated annually, in line with the International Financial Reporting Standards ("IFRS") of the International Accounting Standards Board and South African Statements of Generally Accepted Accounting Practice. RPM divides its closure liability into two categories namely decommissioning and restoration costs. These are defined as follows:

- **Decommissioning costs:** Costs pertaining to the removal of plant and infrastructure and the rehabilitation of the surface following demolition. Decommissioning costs include footprint rehabilitation (backfilling, top soiling, profiling and vegetating) at the shafts, concentrators, offices etc; and,

- **Restoration costs:** Costs pertaining to the rehabilitation of areas impacted on by mining, outside of infrastructure footprint. Restoration costs would involve groundwater remediation, rehabilitation on tailings dams and waste rock dumps etc.

The July 2014 assessment of the closure estimate was reviewed. In this assessment, two closure estimates are assessed:

- A Day of Assessment ("DOA") cost which estimates the cost to close the current infrastructure on the day of assessment; and,
- A LoM cost which estimates the cost to close the current infrastructure at the end of the LoM.

The DOA assessment completed in 2014 estimated closure costs of ZAR758 M (2014 money terms) for the Rustenburg Operations. The LoM estimate for the site is significantly lower than the DOA estimate as it is based on the assumption that certain rehabilitation activities will be completed prior to the end of LoM. No detailed closure budget and plan exists for the full ZAR195 M difference between DOA and LoM estimate to be spent over the LoM, although the site has typically spent around ZAR7.5 M per annum.

AAPL uses the LoM cost to calculate the contributions to the Platinum Producers Environmental Trust ("PPET") and the DOA estimate (together with a contingency, Preliminary and Generals and VAT – as prescribed by the DME closure guideline) in order to define the level of financial guarantees it has in place to meet its closure obligations with the DMR. For the financial guarantees, AAPL makes provision for the difference between the provision in the PPET and the final DOA cost.

Following the environmental review undertaken by ERM, the 2015 closure estimate report was finalised by SRK. The updated DOA cost of ZAR801 M (mid-2015 money terms) was used in the Cash Flow Model.

13.6 Environmental risks/comments

T6C(i)

The existing site environmental risks are associated with proposed rehabilitation processes and financial provision, applicable to the Closure Plan. Other risks would be indicated by Regulation 55 Performance Assessments (compliance audits) in terms of the MPRDA, but these were not available for review at the time of compiling the report.

13.6.1 Loss of soil and land capability (low risk)

There could be insufficient topsoil/ growth material to meet the closure commitments around final land use. A cover materials investigation needs to be undertaken to determine if sufficient cover material with suitable physical characteristics is available within the boundaries of the mine. This Reclamation Materials Handling Plan was due for completion by December 2014, but was not made available for review. Heavy metals and sustainability issues might also need to be resolved, but there is sufficient time prior to closure to explore and resolve these concerns.

Although closure is only likely at the end of the century, RPM has adopted a pro-active stance towards managing the mine with the closure objectives in mind. The philosophy of this approach is that long term liability will be reduced if existing and future impacts are minimised during the active life of the mine. A Preliminary Mine Closure Plan ("PMCP") has been compiled to assist in managing the operation with the closure objectives in mind. The PMCP was compiled in 2012 and has been submitted to the DMR (Rustenburg Operations is still awaiting feedback and/or approval).

13.6.2 Groundwater (low risk)

Based on records of a flood event in 2014, there is a risk of underground flooding at Khuseleka 1, Siphumelele 1 and 2, and Thembelani 2 during high intensity rainfall events. Rehabilitation works undertaken in 2006/2007 and 2014 may have reduced the likelihood and/or rate of future ingress to the underground workings but this has not been tested.

The water monitoring program at Rustenburg Operations indicates that the quality of groundwater within the shallow aquifer exceeds South African National Standards ("SANS") and/or RPM-R/S limits within certain areas of the Mining Right. The sources of the water quality impacts have been identified as the TSF, Waste Rock Dump ("WRD"), underground operations and workshops (e.g. at Bathopele Mine). RPM has in place a Water Action Plan ("WAP") which will assess the necessity for, and feasibility of, groundwater remedial measures.

An allowance for a period of three years of post-closure groundwater monitoring is made in the RPM 2014 Closure Liability Assessment. It is anticipated however that an extended period (up to 20 years) of monitoring of groundwater will be required.

13.6.3 Surface water (low risk)

Routine reviews of RPM compliance against GN704 conditions since 2003 have demonstrated continual improvement in surface water management over time.

13.6.4 Water uses (moderate risk)

The approval of the amendment to the IWULA and IWWMP submitted to DWS is still pending.

13.6.5 Air quality (low risk)

Dust generated from the WRD crushing related activities (operated by third party contractors) has resulted in community complaints. Rustenburg Operations has established procedures to manage the issue. Dust mitigation measures are the responsibility of the third party contractors in terms of commercial agreements in place. Wind-blown dust is also generated from RPM's TSFs, mainly Paardekraal. A three stage dust management plan has been partially implemented for Paardekraal, with ZAR4 M already having been spent on chemical capping.

13.6.6 Waste management at closure (low risk)

It is anticipated that 812,000 m^3 of contaminated material (soils) will require disposal at a hazardous waste disposal facility at closure. The current closure plan assumes that a designated facility would be constructed within 20 km of Rustenburg Operations to take the full total 812,000 m^3 from the Rustenburg Operations site. Should this option not be considered viable, disposal to Holfontein (eastern Gauteng), or another licensed hazardous waste facility, would be required. The full extent of contaminated soils (as hazardous materials) has not been accounted for and closure costs for the removal and disposal of these has not been incorporated into closure costing.

The current closure plan assumes that 1,277 m^2 of asbestos containing material would require removal at closure. No detailed asbestos inventory has been compiled, so this could be an underestimate. In addition the costs of disposal for asbestos containing material are not specifically included in the closure plan. ERM estimates that the area of asbestos containing sheeting material is closer to 72,000 m^2.

13.7 Conclusions

Clarification is required as to whether Rustenburg Operations requires licences in terms of NEM:AQA and NEM:WA. Audits indicating compliance with the EMPRs and the IWUL will indicate general compliance and implementation of these authorisations. These audits have not been made available for review but it is assumed that they have been undertaken.

Based on site observations, discussions with relevant personnel, and a review of all relevant documentation, environmental considerations are managed well for the scale and age of the assets and only a few material issues were identified, with the site having developed or commenced with the implementation of plans for the majority of the issues identified.

13.8 Summary of material environmental issues and associated risks

T6C(i)

Aside from the compliance with legislation which requires clarification, a high level summary of the potential material issues associated with environmental considerations is shown in Table 13.2. A summary of material environmental opportunities is shown in Table 13.3. These additional costs and opportunities are not included in the Cash Flow Model.

Table 13.2 Summary of material environmental issues and associated risks

Issue	Description	Risk
Clean and dirty water management	Additional measures to comply with GN 704 of the NWA (clean and dirty water separation) to be implemented between 2015 and 2025.	ZAR20.0 M based on indicative NPC for recommended actions as per GN704 audits.
Underground Flooding	Risk of underground flooding at Khuseleka 1, Siphumelele 1 and 2 as well as Thembelani 2 during high intensity rainfall events, potentially resulting in production loss if maintenance of surface excavations and underground water management systems is not undertaken according to plan.	None – base case rehabilitation budget of ZAR7.5 M includes surface excavation maintenance. Underground water management part of operational budgets.
Disposal of contaminated soils	Transport and disposal of contaminated soils to a licensed hazardous waste facility (such as Holfontein) will be required at closure. Costs in the closure model considered the establishment of a local waste facility which resulted in a lower estimate.	ZAR187.2 M increase in NPC.
Removal and disposal of asbestos at closure	The current closure plan assumes that 1,277 m^2 of asbestos containing material would require removal at closure. It is likely that this figure is understated. A conservative estimate would be to increase the area to 72,000 m^2.	ZAR8.7 M increase in NPC.
Thembelani 2 closure cost	The costs for closure of the Thembelani 2 shaft are not included within the RPM 2014 closure liability assessment as it is still in a project phase and on care and maintenance currently. However the infrastructure is in place and will have to be removed. The same costs for Thembelani 1 have been assumed.	ZAR34.1 M increase in NPC.
Additional groundwater monitoring	Government regulations only require three years of water monitoring post production, however mines typically need to conduct more extensive monitoring programs. Based on similar mines nearing closure, 20 years monitoring is assumed.	ZAR51.5 M increase in NPC for 17 additional years monitoring.

Issue	Description	Risk
Groundwater contamination	There are indications that total dissolved salt limits may exceed permit limits prior to the end of production. There is a high level of uncertainty as to what Government may require prior to issuing a closure certificate. The worst case scenario would involve monitoring, capture, treatment and release of the contaminated water using an active water treatment process.	ZAR302.7 M increase in NPC in worst case scenario.
Indirect costs to deliver the closure project	The costs to complete the closure project (e.g. project management, security, mobilisation/demobilisation) are not included within the current 2014 RPM closure liability assessment costs but are likely to be incurred. 20% has been assumed which is less than the 32.24% factor required by Government for closure guarantees which are conservative.	ZAR270.3 M increase in NPC.

Source: ERM, 2015
Note: NPC – Net present cost

Table 13.3 Summary of material environmental opportunities

Issue	Description	Risk
Opportunity to offset demolition costs with scrap value	Costs of demolition for the infrastructure at closure could be recouped based on scrap value for certain assets, particularly the concentrators and logistical services.	Potential decrease in NPC.
Opportunity to transfer infrastructure to third parties at closure	2014 Closure Liability assessment assumes training facilities, houses, hospitals and a school will be handed over to third parties at closure although no avoidance of demolition costs is included in the model (as per Government regulations). However, this can be added back to the Cash Flow model. See p. 15 of RPM 2014 closure liability assessment for details.	Potential decrease in NPC.

Source: ERM, 2015
Note: NPC – Net present cost

14 HUMAN RESOURCES

DRA source documents form the basis of Section 14.

14.1 Introduction

Sibanye will operate Rustenburg Operations and implement a combination of Sibanye and RPM policies and procedures (“P&Ps”) in the short term, with a conversion to Sibanye P&Ps in the medium to long-term. Day-to-day management is delegated to the operations team appointed by Sibanye.

14.2 Board of Directors

The Sibanye Board of Directors (“Board”) oversees and protects shareholders’ interests with company management reporting to the Board. The Sibanye board of directors, consists of 13 members. The Board comprises the non-executive Chairperson, the Chief Executive Officer (“CEO”), the Chief Financial Officer (“CFO”) and 10 other non-executive directors. The board meets on a quarterly basis, retains full and effective control over the Company and monitors the executive management.

14.3 Sibanye Platinum executive team

The Sibanye Platinum executive team will oversee the assets and provide leadership over the Rustenburg Operations management team.

14.4 Rustenburg Operations management

Rustenburg Operations management comprises nine individuals, as shown in Figure 14.1 and Figure 14.2.

14.5 Labour model

Rustenburg Operations form part of Sibanye’s operations in South Africa. Local labour, tax and immigration laws apply. The majority of the unskilled and semi-skilled labour is sourced locally. Most positions are filled with South Africans. The current conditions of employment, role profiles and rates apply to Rustenburg Operations. No significant change is foreseen as the present labour structures are utilised and optimised (where applicable). Housing or housing allowances are available to staff.

Adequate training facilities and staff are available at the various human resource development (“HRD”) centres. Contractors are governed in terms of the “contractor toolkit”, relevant policies and procedures.

14.6 Labour requirements

The HR requirements are based on an activity and departmental structure basis. It is based on the typical RPM departmental structures and aligned with the current RPM structures and benchmarked against current labour complement estimates. The ore production and development schedules were derived from mine designs and schedules, using Mine 2-4D planning software and EPS and used as a basis to determine the appropriate (planned) labour requirements.

The outputs are based on technical design parameters from the mine design criteria, and various labour "blueprints", driven by appropriate key drivers and aligned with the proposed Mine Extraction Strategy ("MES") to deliver planned steady state RoM ore.

The organisational design is based on the assumption that Rustenburg Operations is a stand-alone operation to ensure that all services and skills required for operating the planned mining facility are included in the organisational structures and labour cost calculations.

The organisational structures are based on Rustenburg Operations being an "owner mining" type operation as opposed to a "contractor mining" operation.

14.6.1 Methodology

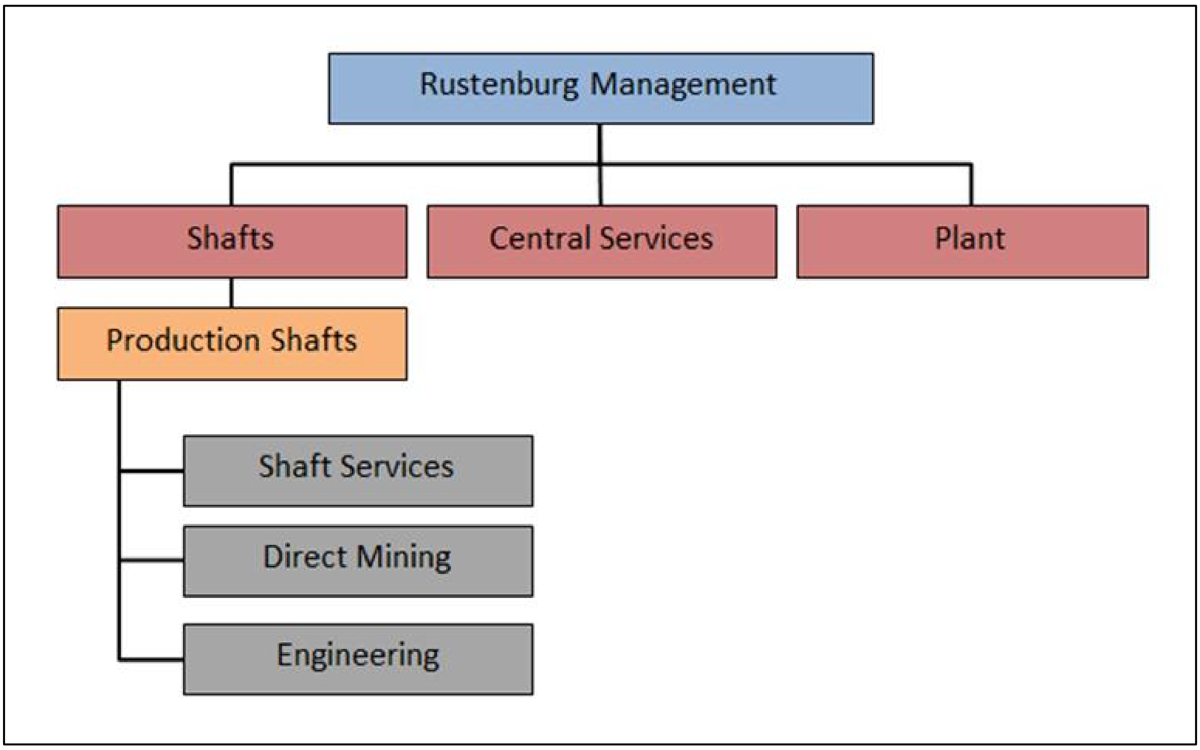
The overall organogram structure is developed to include all those departmental areas required to achieve sustainable steady state production and satisfy any legal and regulatory requirements. The proposed structures and labour complement are based on an analysis of the following:

- Consultation with Rustenburg Operations and RPM management;
- Mining design criteria; and,
- Legal and statutory appointments.

14.6.2 Operating philosophy

A high level organisational structure is shown in Figure 14.1.

Figure 14.1 High level organisational structure



Source: DRA, 2015

The key components of Figure 14.1 can be split into the following sub-divisions:

- Services:
  - Rustenburg Management
  - Rustenburg Central Services;
- Shafts:
  - Direct Mining
  - Shaft Services
  - Engineering; and,
- Plant/ processing.

A hybrid operational structure is proposed at the Rustenburg Operations – a flat structure at Head of Department ("HOD") level, with hierarchical structures below. The management committee is represented primarily by HODs.

The current workforce is sufficiently staffed (should all positions be fully occupied) to extract and deliver the proposed production profile tonnages to the concentrator plants, for the L1 production profile. During the ramp-up of tonnes delivered to the concentrators in the L2 production profile allowances for the build-up in workforce is planned.

Management

The Rustenburg Operations is under the control of the General Manager who is responsible for all aspects of operations on site (Figure 14.2).

The planned site structure is as follows:

- Management committee chaired by the General Manager and represented by all HODs; and,
- Production managers, responsible for the various operating units (including managers for Siphumelele Mine, Thembelani Mine, Khuseleka Mine and Bathopele Mine). These managers report to the Mine Manager on the management team.

Figure 14.2 Rustenburg Operations management

Source: DRA, 2015

The Rustenburg Operations management are also responsible for all major appointments. All legal appointments and associated responsibilities are addressed by the appointees and select Rustenburg Operations management individuals (Table 14.1).

Table 14.1 Major legal appointments

Position	Appointment	Report to
Mine Manager	Section 4.1	General Manager
Production Managers	Section 3.1 (a)	Mine Manager
Plant Manager	Section 4.1	General Manager
Engineering Manager	Section 7.2	General Manager
Engineers	Section 2.13.1	Production / Plant Manager

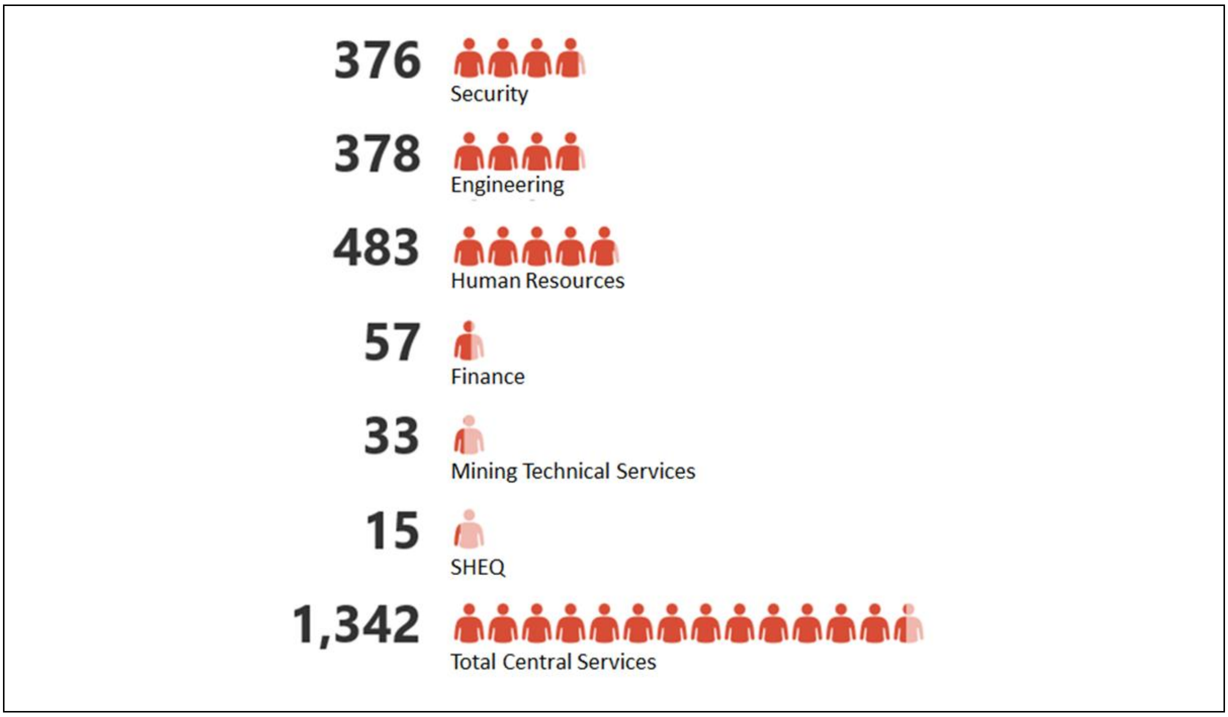
Source: DRA, 2015

Rustenburg Operations has a qualified and experienced production management team responsible for meeting daily production and safety targets. The management structure is similar to other South African underground platinum mines.

Central Services

Historically, Rustenburg Operations was run as separate mines with a centralized services department to serve all the individual mining operations. These service departments served the individual shafts for functions not provided on the shaft. Some of these service departments also facilitated in delivering required services for not only Rustenburg Operations, but RPM as well. The labour estimate in Figure 14.3 relates to planned employee numbers in 2016.

Figure 14.3 Rustenburg Central Services



Source: DRA, 2015

The Central Services department however, including its sub-departments have been rationalised, but are still able to facilitate the same functions as previously for the Rustenburg Operations. The activities that were staffed for the parent company are reduced and only the individuals needed for the Rustenburg Operations were retained.

Central Services labour includes skilled and semi-skilled employees in training, central services engineering, accommodation and other technical aspects not specifically allocated to each shaft complex. These functions include:

- Security;
- SHERQ;
- Mine Technical Services;
- Finance;
- Human Resource Development;
- Human Resource; and,
- Central Services Engineering.

Concentrator labour

Rustenburg Operations operates three concentrators namely; Waterval Retrofit concentrator, Waterval UG2 concentrator and the WLTR plant. The current labour requirements can be categorised as follows:

- Waterval Retrofit concentrator high percentage unskilled or semi-skilled personal; and,
- Waterval UG2 concentrator and WLTRP increased levels of skilled personal.

As a result of these requirements, the labour complement for Waterval Retrofit concentrator is higher than the Waterval UG2 concentrator and WLTR plant. The labour complement of WLTR plant is currently similar to that of a typical plant operating contractor model.

The process production section has four levels:

- Process superintendent;
- Shift supervisor;
- Production operator; and,
- Production assistant.

Engineering labour in the process section has only four levels:

- Engineering superintendent;
- Foremen;
- Artisans; and,
- Artisan assistants.

Mining production labour

Shaft engineering services labour includes skilled and semi-skilled employees required for the maintenance, repair and operation of underground infrastructure, mechanical and electrical equipment, underground mining machinery. These functions include:

- Half level engineering;
- Vertical Shaft operation and maintenance;
- Sub-decline operation and maintenance;
- Electrical reticulation maintenance;
- Pumping system operation and maintenance; and,
- ICT/communications operation and maintenance.

Direct mining labour includes skilled and semi-skilled employees required for the breaking, cleaning and transport or ore from the working places to ore handling systems. These functions include:

- Stoping;
- Development;
- Tramming;
- Logistics;
- Haulage maintenance;

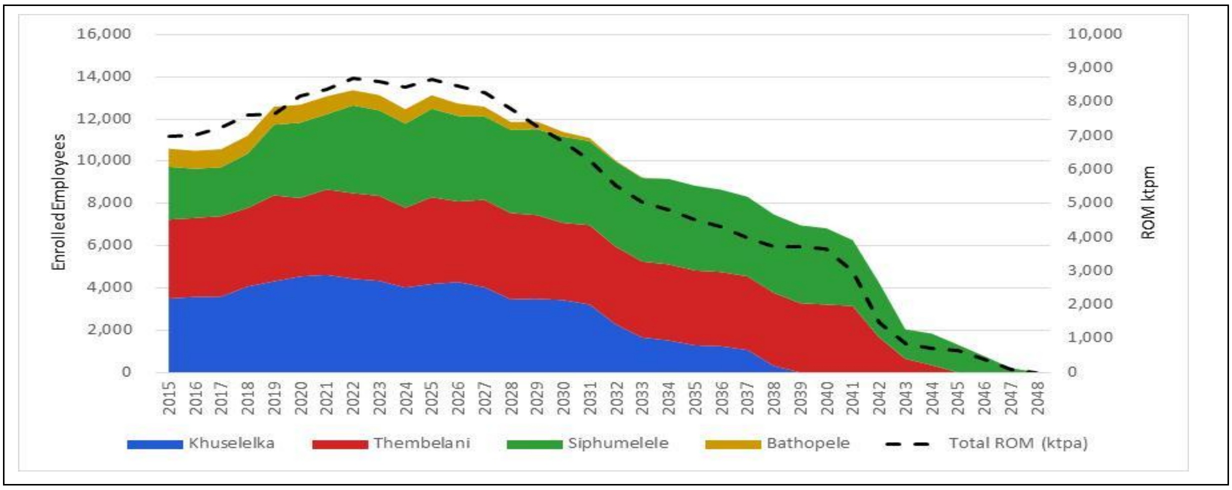
- Construction;
- Reclamation and salvage; and,
- Sweepings.

Shaft technical services labour includes skilled employees in mine planning, ventilation, rock engineering, survey and other technical aspects of the mining operation. These employees require specific skills to perform their work, often requiring some form of tertiary education and training. The global shortage of skilled labour in the mining industry presents a risk to the mine, which is a common risk for most South African mines.

14.6.3 Labour summary

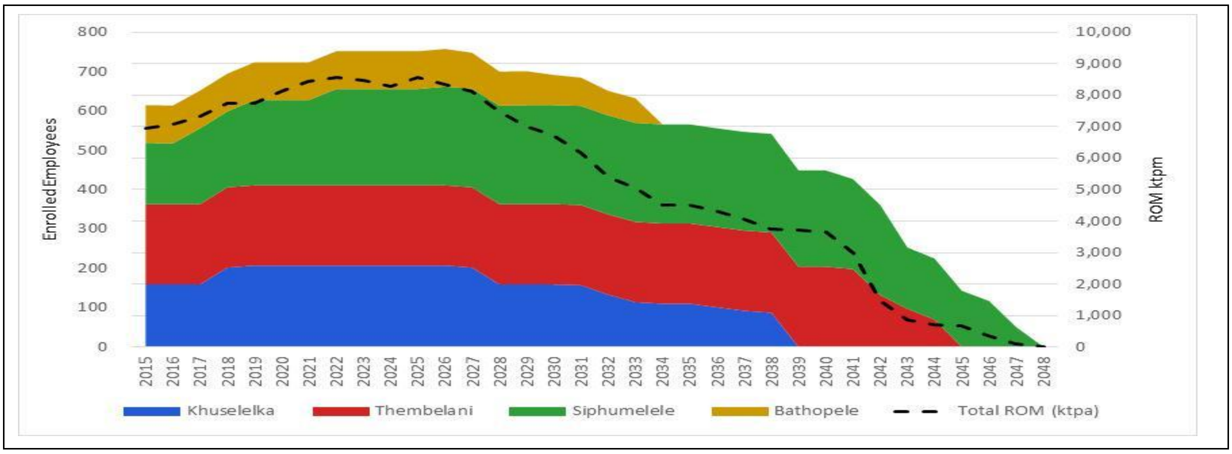
A summary of planned labour complement estimates are shown in Figure 14.4 to Figure 14.8.

Figure 14.4 Combined direct mining labour complement



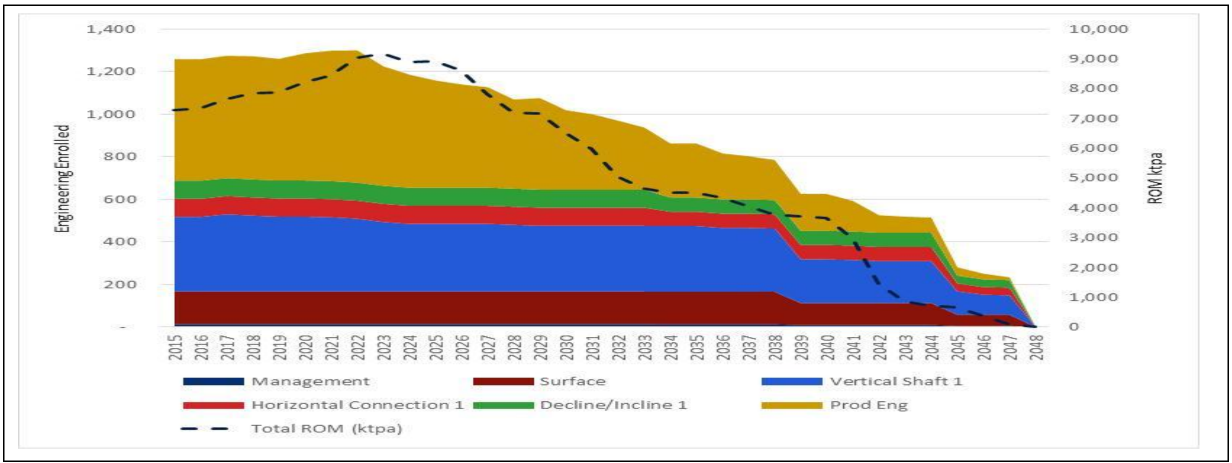
Source: DRA, 2015

Figure 14.5 Combined Shaft Services labour complement



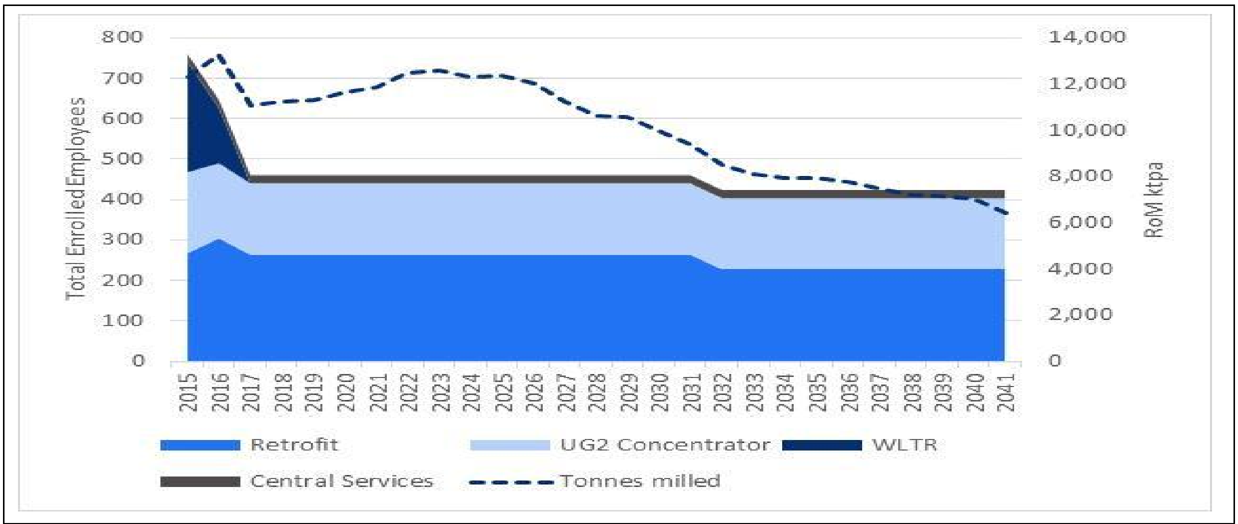
Source: DRA, 2015

Figure 14.6 Combined Engineering services labour complement



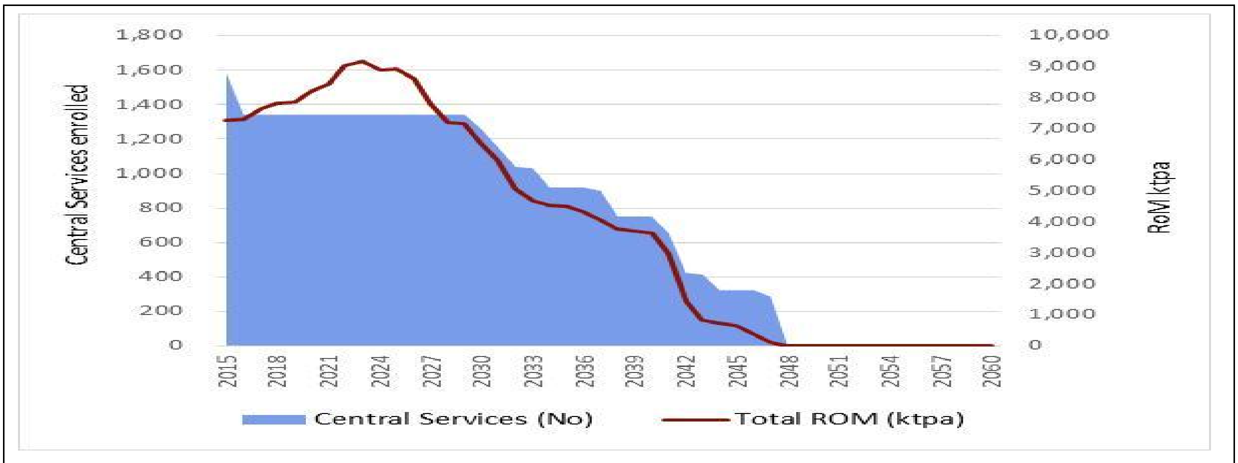
Source: DRA, 2015

Figure 14.7 Combined process labour complement



Source: DRA, 2015

Figure 14.8 Central Services labour complement



Source: DRA, 2015

The Rustenburg Operations planned overall labour estimate for select years, 2016, 2020 and 2030, is shown in Table 14.2.

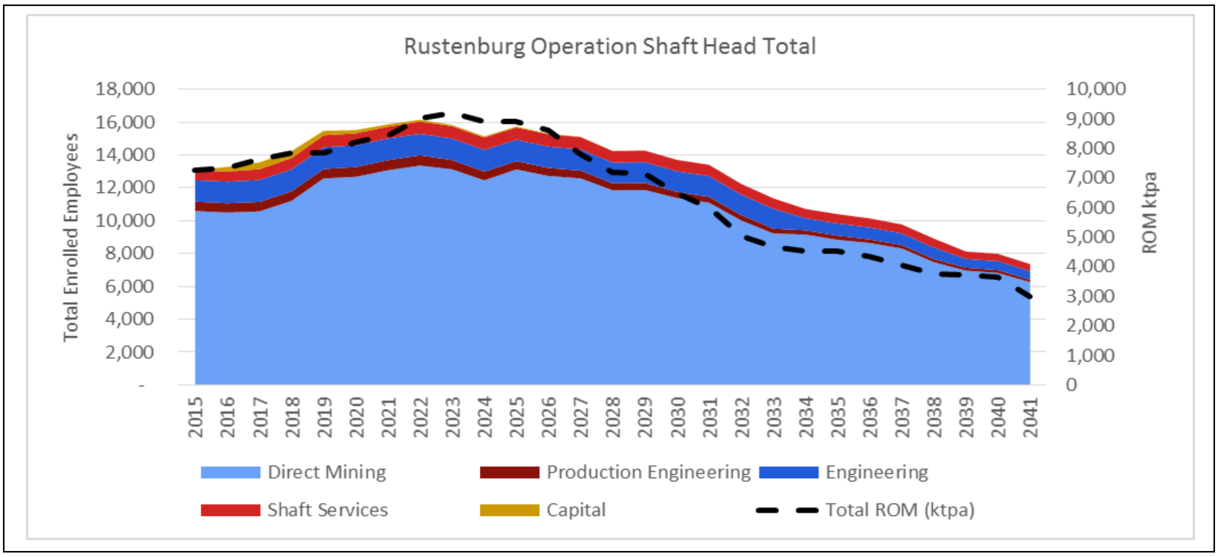
Total shaft head and total operations labour estimates are shown in Figure 14.9 and Figure 14.10.

Table 14.2 Rustenburg Operations – estimated total labour

Cost centre	2016	2020	2030
Shaft head			
Direct mining	10,499	12,679	11,389
Capital	282	195	-
Production engineering	571	598	373
Engineering	1,316	1,328	1,256
Shaft services	614	724	692
Total shaft head employees	**13,282**	**15,523**	**13,709**
Processing			
Waterval Retrofit concentrator	305	264	264
Waterval UG2 concentrator	186	176	176
Western Limb Tailings Retreatment	136		
Concentrator central services	20	20	20
Total concentrator employees	**646**	**460**	**460**
Services			
Total Central Services	1,342	1,342	1,259
Rustenburg management	9	9	9
Care and maintenance	83	83	83
Total Rustenburg Operations	**15,362**	**17,417**	**15,520**

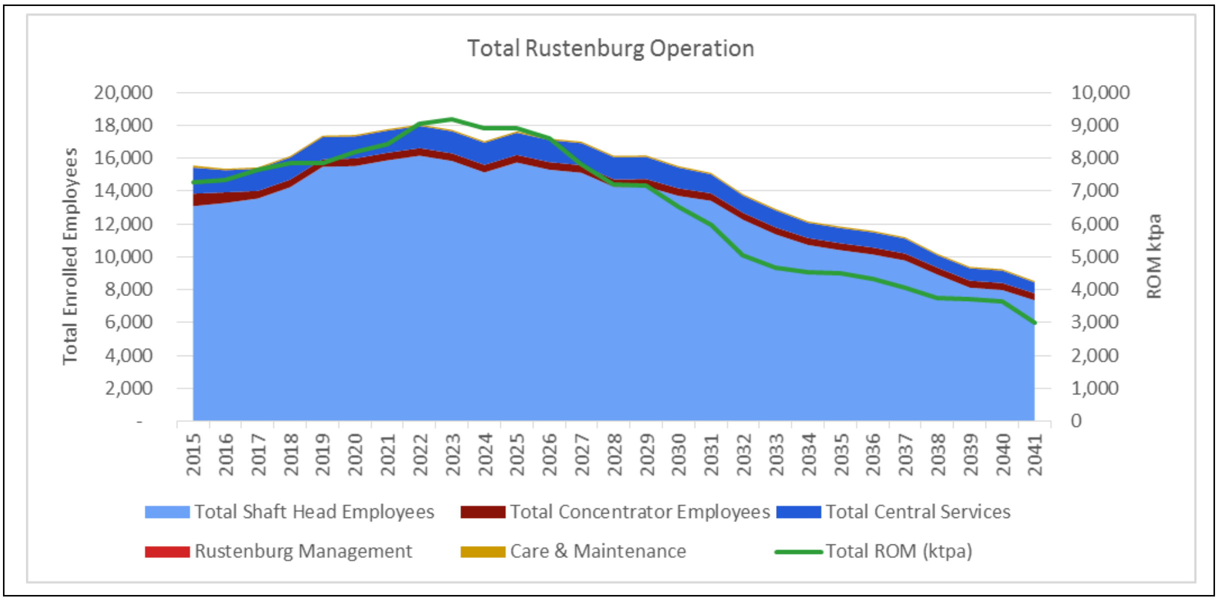
Source: DRA, 2015

Figure 14.9 Rustenburg Operations – Total shaft head employees



Source: DRA, 2015

Figure 14.10 Rustenburg Operations – Total employees



Source: DRA, 2015

14.7 Human Resources (“HR”) policies

Over 42 HR policies are applied at Rustenburg Operations. A total of 51 AAPL Group procedures are also applied (which exclude operations or site specific procedures).

More than 62% of staff uses the living out allowance (a housing allowance received versus making use of accommodation provided on-site).

14.8 Industrial relations

Four trade unions are represented at Rustenburg Operations, the Association of Mineworkers and Construction Union (“AMCU”), the National Union of Mineworkers (“NUM”), the United Association of South Africa (“UASA”), and the National Union of Metalworkers of South Africa (“NUMSA”).

Overall labour representivity is as follows: AMCU has the majority in the Operators Bargaining Unit (70.2%); whilst UASA and NUM are dominant in the Supervisory Bargaining Unit with 42.0% and 34.0% representivity respectively.

The next round of negotiations/bargaining councils will start in March 2016. The current Wage Agreement expires on 30 June 2016.

The relationship between Rustenburg Operations management and the unions is considered to be cordial.

A Section 54 notice is a mine safety stoppage enforced by a DMR inspector, which can be lifted once the remedial actions have been applied by management. There were 10 Section 54’s noted at Rustenburg Operations over the period 1 January 2015 to 31 August 2015. In 2014, there were nine Section 54 stoppages (a year which included a six month strike). In 2013, there were 24 Section 54’s.

The Company is striving to reduce the incidence of Section 54 notices, with trends over the last three years indicating that these are being reduced in a reasonable manner.

14.9 Social and labour plan

This is discussed in Section 15.

15 CORPORATE SOCIAL INVESTMENT ("CSI")

T5.3A/B/C(i)

RPM source documents form the basis of Section 15.

RPM has an updated SLP (period 2015 to 2020) compiled in terms of the requirements of the MPRDA. All CSI information provided herein has been sourced from RPM's SLP.

The SLP has been compiled as a commitment to contribute towards the advancement of socio-economic welfare of South Africans with special focus on the social and economic impact that the operation has on the surrounding communities, as well as rural communities from which migrant labour tends to be drawn. As minerals are non-renewable, the SLP also focuses on managing the impact of eventual downscaling and closure as part of strategic business planning. The SLP makes further provision for the development of historically disadvantaged employees as well as equipping members of the surrounding communities through various different training interventions. The SLP will be amended after the transaction process has been finalised.

The Rustenburg Operations are located in the Rustenburg Local Municipality in the North West Province. The SLP focuses on meeting the needs of the area according to the identified strategic objectives which are to eradicate poverty and decrease unemployment. The approach to community development is based on understanding local contexts and using our core business to promote development. These activities typically involve:

- Developing local procurement and local suppliers;
- Building local capacity;
- Providing access to infrastructure, education and health facilities; and,
- Investing in enterprise and skills development.

Many of the Local Economic Development ("LED") initiatives will be undertaken in partnership with non-governmental organisations ("NGOs"), communities and local governments. LED initiatives in the SLP include:

Infrastructure projects:

- Renovations and extensions of Boikagong and Mfidikoe Primary and Tlhabane West extensions schools;
- To install water borne sanitation infrastructure in Mfidikoe;
- Construction of an access road to Tlapa which will be a graded gravel road;
- Construction of a walkway Bridge between Popo Molefe and Sunrise Park; and,
- Improving of health infrastructure (Mfidikoe and Thekwana clinics).

Education and skills development projects:

- Access to supplementary education digital resources to enhance learner development;
- To support the Department of Education to build content and pedagogical knowledge/capacity of teachers, content knowledge of learners and management capability of school;
- School leadership development through school, circuit and district leadership and management training; and,
- Supply of supplemental, learning and teaching support material.

Income generating projects:

- Tlapa bricklaying support program which will provide training and support for local bricklayers to increase their competence and establish a viable small, medium and micro-sized enterprises ("SMME") business, including skills development;
- Boschfontein sewing project which will support the growth of an existing women-owned sewing business in order to enhance its revenue and sustainability, which will include skills development;
- The Thekwane poultry project which will provide technical support and assistance to the poultry initiative to access new markets as well as provide funds to grow their businesses;
- The Boitekong piggery project which will pair specialist business support partners with the local applicants in order to ensure that sustainability is created for this emerging business. The intention will be to grow the business until they are fully capacitated to pursue business independently; and,
- Glass beads, Phatsima, telemarketing and Ikemeleng youth project which will develop an integrated enterprise development support program that enables the existing businesses to grow into a sustainable business.

Health and social welfare projects:

- Support the expansion of health promotion and disease prevention in collaboration with the North West Department of Health. Expand existing community-based services to support health screening and testing as well as the new initiatives in chronic care in areas such as tuberculosis ("TB"), hypertension and diabetes;
- Supply of emergency patient transport for maternal and obstetrics units at surrounding clinics; and,
- Supporting food banks in Tlapa and Bobuantswa by assisting with the running of the food banks for a period of five years.

15.1 Agricultural development

The SLP makes provision to capacitate and empower cooperatives, emerging farmers and facilitate market access through the Boitekong piggery project and Thekwane poultry project, which will support agricultural development within the area.

15.2 Procurement

The infrastructure projects will result in procurement opportunities for local contractors and all labour will be sourced from host communities. In addition, a strategy has been developed to demonstrate the commitment to increasing local participation by aspiring entrepreneurs in all the areas of operation through the setting of procurement targets.

15.3 Ownership

- The Tlapa bricklaying support program will be 100% owned by the bricklayers from the local community;
- The Boschfontein sewing project program will be 100% owned by the local women owner of the business; and,
- The Thekwane poultry project will be 100% owned by the existing local farmers.

16 OCCUPATIONAL HEALTH AND SAFETY

ERM and RPM source documents form the basis of Section 16.

Health and safety in South Africa is governed by various regulatory bodies in terms of mining and labour legislation. These are well established and, in conjunction with management's operating policies, form the cornerstone of health and safety management.

The Rustenburg Operations policies and performance standards have been developed to meet the Company's sustainable development obligations. The hierarchy of policies and documents is as follows:

- Business principles;
- Safety, Health and Environmental ("SHE") policy;
- Management systems based on the SHE Way;
- Group-wide standards, guidelines and procedures;
- Operational SHE policies; and,
- Operational management systems, safety improvement plans and procedures aligned with OHSAS 18001 and ISO 14001.

16.1 South African legislative context

Occupational Health and safety in South Africa is primarily regulated by two pieces of legislation, the Mine Health and Safety Act 29 of 1996 ("MHSA") enforced by the DMR and the Occupational Health and Safety Act 85 of 1993 ("OHSA") enforced by the Department of Labour.

However, various other legislation regulating specific hazards and/or work as well as general labour legislation may be applicable to work being performed from time to time. These are well established and, in conjunction with management's operating policies, form the cornerstone of occupational health and safety management.

The primary piece of legislation governing occupational health and safety on mines is the MHSA which came into effect on 15 January 1997 and which is amended and updated from time to time. The MHSA and its regulations set the legislative framework for the protection of the occupational health and safety of employees and other persons at, or affected by, mining activity.

Compensation for occupational injuries and diseases is largely regulated by the Compensation for Occupational Injuries and Diseases Act 130 of 1993 ("COIDA") and Rustenburg Operations has an insurance policy in place as contemplated in the COIDA. In some instances, the Occupational Diseases in Mines and Works Act, Act No. 78 of 1973 ("ODIMWA"), governs compensation and medical costs related to certain illnesses contracted by persons employed in mines specifically determined as being controlled in terms of the ODIMWA.

16.2 South African regulatory context

The MHSA is enforced by the DMR which, through its Mine Health and Safety Inspectorate, has established various regional offices under the control of appointed Principal Inspectors of Mines.

Inspectors have wide range of powers including the power to enter any mine, issue any instructions, halt operations, hold investigations and inquires, recommend and impose administrative fines and recommend the criminal prosecution of the employer and/or individuals employees. The issuing of instructions that halt operations is a regular feature of the South African mining environment and has a significant impact on production.

Occupational and primary health care services are made available to Rustenburg Operations employees by a health care service provider at its existing facilities.

The majority of this Section has been sourced from Environmental Resources Management Southern Africa (Pty) Limited's ("ERM's") review, titled Project Condor, Environmental, Health & Safety Due Diligence Assessment, Vendor Due Diligence Report, 9 January 2015 ("ERM Report").

16.3 Organisation and responsibilities

Each mining operation is staffed with a team of Safety Practitioners (a Chief Safety Officer and a number of safety officers depending on the size of the workforce) headed by an environmental, health and safety ("EHS") Manager responsible for implementing the risk-based safety management system, aligned to both OHSAS 18001 standards and the Anglo Safety Way. Health and Safety Agreements are in place with the representative trade unions as well as workplace Health and Safety Representatives who have been elected by the workforce. Rustenburg Operations has an EHS Manager who is responsible for implementing the risk-based safety management system aligned to both OHSAS 18001 standards and the Anglo Safety Way. Rustenburg Operations has a designated senior SHEQ Manager, who provides a high-level role in safety management, specialist advice and guidance to senior management. These teams effectively support day-to-day Health and Safety objectives and plans at the mining operations and ensure that the safety management system is functional and kept appropriate to the risk.

Internal safety inspections are conducted on a daily, weekly and monthly basis by the safety officers. The results of these inspections are entered into IRM.net and are risk assessed as well as analysed for trends.

The Safety Team executes day-to-day functions and ensures that the safety management system is implemented by undertaking regular site audits and inspections. The Safety Team is continuously involved in driving safety interventions through regular inspections, 'walk-abouts' and interactions with the workforce and contractors. This engagement encourages safe behaviours through the Visible Felt Leadership Program.

The sites have formal structures for consultation which involves elected worker representatives who participate in Health and Safety within the area they represent and meet with management as a constituted Health and Safety Committee. These Safety Committees also provide a forum for the discussion and approval of Health and Safety mandatory documentation such as Codes of Practice and Standard Procedures and risk assessments. EHS management forums also include safety meetings, engineering meetings, quarterly meetings and annual management reviews.

16.4 Safety and risk management system

Rustenburg Operations has implemented a Safety Management System which has been developed in line with the standards set out in the Anglo Safety Way as well as the requirements of the international standard OHSAS 18001. OHSAS 18001 certification is held by the four operating mines (Bathopele, Siphumelele, Thembelani and School of Mines), as well as the Concentrators and WLTR plant. The respective mines, WLTR plant and the Concentrators undergo routine audits by the certification body, Bureau Veritas, in order to maintain their certification status.

The latest series of audits were completed in July 2014 and cover the mining operations. The certification body issues reports that identify non-conformity and these non-conformances are logged with IRM.net and are managed to closure of the non-conformances. The certification body has issued current certification to the Standard and maintains surveillance audits of the system, with re-certification every three years. The mines are currently in their third cycle.

There is a formal risk management system that applies to all processes and people on the respective operations, which follows an RPM group wide process and uses risk criteria that are universal to the Company. Records of risk assessments reviewed indicate that there is a representative of management and supervisory involvement in baseline, issue based and continuous risk assessment processes. Risk Management is owned by the respective line management and the responsibilities in managing risk are clear and understood. A database of all risk assessments is maintained on each mining operation and is accessible to key on-site role players through IRM.net. The management system also has a specific dimension where special attention is paid to controls for risks that may have a low likelihood but significant potential consequences.

Every incident has the potential for severe consequences. Health and safety officials investigate all events to identify repetitive behaviour and take remedial actions to prevent events from recurring.

Commentary on public safety interactions resulting from rail operations (level crossings, public encroachment and emergency response capability for derailment) has been excluded from this CPR.

16.5 Contractor management system

Contractor management is performed at the mine through a process of contractor pre-selection and management. Contractors are required to demonstrate their ability to perform the work they are required to do on mine through a process/documentation called “contractors pack”, which requires the contractor to provide safety personnel with a set of information that relates to their capacity to do the job safely. It contains evidence relating to compensation insurance, competency of staff, suitability of tools and equipment to be used and risk assessments of the work which they are to undertake. Contractor leadership is legally appointed by the mines’ general managers (i.e. the “Employer”), who delegates specific responsibilities to assist the Employer as required by the MHSA in his duties to implement the legislated safety (and health) requirements. All contractors are required to undergo induction and medical surveillance prior to the commencement of work on the site. Contractors are subject to audit and inspection by both mine and concentrator Safety Officers and the results of these inspections and audits are recorded on IRM.net, and managed to closure.

Operational budgets are in place for the maintenance and installation of safety controls. An example of this is the radio frequency (“RF”) tagging of all persons who enter the mine and provides a safety and emergency monitoring system at Bathopele Mine.

Third party operated facilities located within the Rustenburg Operations Lease Area, such as waste rock crushers, are excluded from the scope of the contractor management process as these are standalone employers, as indicated in the Occupational Health & Safety Act, No. 85 of 1993 (“OHSA”). These third party contractors do however have an obligation with Rustenburg Operations to comply with its EHS corporate policies, procedures and standards. This includes the reporting of any incidents relating to health and safety in the workplace, the environment, or which impacts on stakeholder relationships for duration of the contract.

16.6 Safety statistics

Based on the available documentation, site observations, and interviews with operational staff, it is evident that the safety management system and EHS improvement projects, established over the years are progressively effective. This is illustrated by a sharp decline in the number of fatalities and injuries (Figure 16.1, Table 16.1 and Table 16.2).

An enhanced focus on risk management and safety has seen an improvement in statistics over the period 2009 to August 2015, reflected in a fatality decline of 9 to 1 employee per annum (2015 YTD), serious injuries from 243 to 86 and lost time injuries from 224 to 93.

Figure 16.1 Year summary of lost time and serious injuries at Rustenburg Operations over the period 2009 to 2015 August YTD

Source: RPM, 2015

Table 16.1 Lost time and serious injuries

Year	Lost time injury*	Serious injury**	Grand total
2009	224	243	467
2010	137	173	310
2011	187	199	386
2012	141	211	352
2013	139	151	290
2014	24	18	42
2015 August YTD	93	86	179

Source: RPM, 2015

*Note: * Lost Time Injury: disabilities lasting up to 13 days. ** Serious Injury: permanent disability or time loss of 14 days or more.*

Table 16.2 Breakdown of lost time injuries for the period January 2015 to August 2015

Breakdown of lost time injuries	Lost time injury	Serious injury	Grand total
Dust	3	2	5
Electricity	-	1	1
Equipment/machinery	3	2	5
Fall of ground	3	8	11
Fall of rock	1	2	3
Falling from height	-	1	1
Falling object	-	1	1
Hand tools/equipment handling	23	24	47
Horizontal trackbound	1	5	6
Inhalation	2	-	2
Lifting equipment	-	1	1
Materials handling	16	8	24
Other	20	4	24
Rolling rock	1	5	6
Slip/trip and fall	20	18	38
Winch and accessories	-	4	4
Total	**93**	**86**	**179**

Source: RPM, 2015

16.7 Emergency response

A mine evacuation plan is maintained and implemented at each of the mining operations. A coordinated Rustenburg Operations wide process is in place to deal with mine emergencies. A mine rescue plan is available for each shaft of the underground operations that indicates the location of all refuge bays and ventilation infrastructure. There are alternative routes providing evacuation through interconnection of workings and there is evidence that this infrastructure is maintained through changes in operations where shafts are placed on “care and maintenance”. Rustenburg Operations has performed a risk assessment on “Irrespirable Atmospheres” to investigate the risk related to safe evacuation of underground workings and found the risk to be ‘high’ according to AAPL’s 5x5 matrix (which assesses the likelihood and consequence of risks). Based on this, the site will need to implement measures to reduce the likelihood, consequence, or both, of an event underground resulting in irrespirable atmospheres. ERM understands that Rustenburg Operations management are considering to provide self-rescue packs to all underground workers (currently these are only available at Bathopele Mine).

Rustenburg Operations has mine-rescue ‘mutual aid’ arrangements with neighbouring mining companies (e.g. Lonmin, Aquarius, Impala) and specialist Mine Rescue support in the region. This consists of underground rescue teams linked to an industry wide mine rescue support infrastructure comprising of the Mine Rescue Services which is a private sector and non-profit organisation that, through the training of volunteers, provides the resources and expertise for an effective emergency service primarily to the mining industry. Regular drills are performed on the mines to verify the effectiveness of the emergency plans.

As at this report date, RPM policies and procedures are being implemented in the short and medium term.

Fire-fighting equipment (both fixed and portable) is provided for in plans, and trained volunteer fire and Proto team members are available for response. The demarcation and maintenance of fire-fighting equipment was verified during site visits.

16.8 Training

A variety of EHS related training is provided to employees within the business at both corporate and site level.

As part of the training process an introduction to EHS management and Safety Online is provided upon induction at the site. The nature of further training is dependent on the specific roles and responsibility of the individual; specific activities require training in order to authorize personnel with a permit to work.

From a health and safety point of view, the requirement for H&S training is detailed in the Mine Health and Safety Act 29 of 1996. Each employee receives EHS induction training upon employment which is repeated annually. Other EHS related training includes:

- Visible Felt Leadership ("VFL") training;
- A1 to A4 safety training;
- Training of safety representatives;
- Re-training of employees who have been dialogised with an occupational disease;
- Refresher courses on Personal Protective Equipment ("PPE") use;
- Dangers of particular health risks, etc.;
- Ongoing awareness training, including toolbox talks; and,
- Training of first aiders.

16.9 Current primary health and safety risks

A tabulation of current primary health and safety risks is shown in Table 16.3.

16.10 Future considerations

Rustenburg Operations employees will continue to be exposed to hazards such as noise, dust, fire, tramming, people transportation, high walls, working on heights, explosions, occupational hygiene issues, materials handling and transportation. Vigilant monitoring and re-focusing on leading indicators is in place to ensure hazards are managed so that they remain within an acceptable level.

Rustenburg Operations management are aware of the potential impacts of HIV/AIDS and tuberculosis and noise induced hearing loss on its employees and will proactively manage this concern going forward.

Furthermore, Rustenburg Operations is currently focussing on personnel safety and a reduction in production stoppages associated safety indiscretions.

Table 16.3 Primary health and safety risks

Issue	Description	Financial Impact on Valuation
Underground flooding	There is a risk of underground flooding at Khuseleka 1, Siphumelele 1 and 2 as well as Thembelani 2 during high intensity rainfall events based on a flood event in 2014, potentially resulting in production loss if maintenance of surface excavations and underground water management systems is not undertaken according to plan.	None – base case rehabilitation budget of ZAR7.5 M includes surface excavation maintenance. Underground water management part of operational budgets.
Noise induced hearing loss (NIHL) claims	The mine is currently implementing a mitigation plan which includes progressive upgrades to the rock drill inventory, training and PPE provision.	Allocation of ZAR13.2 M on for rock drill upgrades reported in cost budgets. ERM was not able to verify this.
Section 54 and 55 enforcement notices	A number of Section 54 and 55 enforcement notices issued by the Inspectorate due to fatalities, serious incidents and non-compliances over the past years stopped operations which affected the production profile. The site implements a number of measures to reduce this risk.	None. Foregone revenue in 2013 was estimated at ZAR730 M. These incidents affected efficiency and production rates in the past and are therefore already factored into future production profiles.
Serious and lost time injuries	290 lost time and serious injuries occurred in 2013. Rustenburg Operations estimates the costs of these incidents at an average of ZAR50,000 per injury for lost time, retraining and administration.	None – ZAR14.5 M cost for 2013. These incidents affected efficiency and production rates in the past and are therefore already factored into the future production profile
Irrespirable atmosphere risk reduction	Rustenburg Operations conducted a risk assessment which showed the current practices result in a high risk exposure to irrespirable atmospheric conditions underground if an accident occurred. Only Bathopele has self-rescue packs and 12,562 additional packs would be required at other mines at a cost of ZAR4,200 each.	ZAR53.0 M required in 2014/ 2015.
Explosives magazine security	Infrastructure and security are insufficient with the result that integrity of the Explosives Magazine facility is compromised.	ZAR3.4 M for security upgrades required in 2015.
Refrigeration plant preventive maintenance	Capacity and capability gaps have contributed to a backlog in the preventive maintenance program which could lead to a breakdown of the refrigeration plant and production loss.	ZAR3.5 M additional spend required in 2014/2015.
Rail transport safety	Updates to the GPS dual tracking control system are required to prevent derailments and level crossing incidents resulting in loss of bulk chemical containment.	ZAR11.0 M for additional upgrades (ZAR9 M included in 2014 budget).

Source: ERM, 2015

17 PGE MARKETS

T5.8A/B(i), SV 2.18

SFA (Oxford) source documents form the basis of Section 17.

17.1 Background on PGEs

The PGEs, or platinum-group metals, are a group of metals comprising platinum, palladium, rhodium, iridium, ruthenium and osmium. These metals have similar physical and chemical properties and tend to occur together in the same mineral deposit. The usefulness of PGEs is determined by their particular chemical and physical properties. Certain of these properties are shared by other metals, but it is the unique combination of properties that makes the PGEs valuable in their end-markets. The PGEs have high and specific catalytic activity, high thermal resistance, are chemically inert, biocompatible and are hard but malleable for forming into shapes.

All the PGEs are constantly subject to risks of substitution from cheaper alternatives, but in most applications their unique properties render them relatively secure. The high cost of PGEs inevitably drives efforts to use lower quantities through thrifting, thereby reducing the loadings in applications.

In terms of the PGE refinement process, ore extracted from the mine site is beneficiated, generally on site (as occurring at Rustenburg Operations), resulting in the production of a PGE product known as PGE concentrate. This concentrate is then further processed through a smelting and refining process, and the end result is refined metals, from which the PGEs can be separated out and sold to their individual markets.

17.1.1 Platinum, palladium and rhodium usage by sector

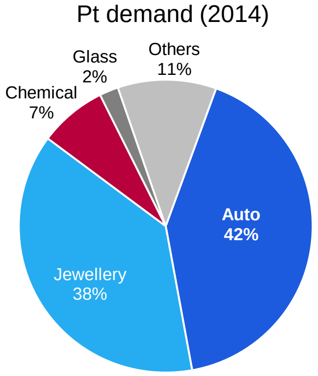
The combustion of fuel in a motor vehicle engine produces pollutant emissions of hydrocarbons (“HC”), oxides of nitrogen (“NO_x”), carbon monoxide (“CO”) and particulate matter (“PM”). An increasing focus on environmental pollutants and regulatory changes imposing environmental standards have led to the widespread use of catalytic converters in automobiles to reduce emissions and thereby improve air quality. PGEs have a unique set of properties that convert exhaust pollutant emissions to harmless compounds, and accordingly have been the main metals used in catalytic converters to date.

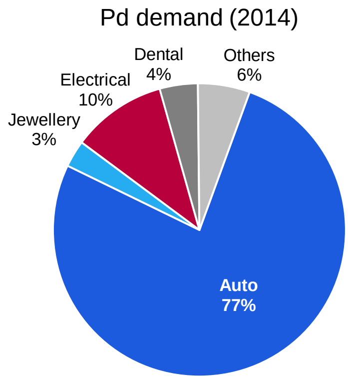
Platinum is particularly effective at catalysing the oxidation of CO and HC under oxygen-rich conditions, specifically with diesel engines. Platinum and palladium are equally effective under the conditions found in a gasoline engine, where there is a balance between oxidants and reductants in the exhaust gas, and are generally used in combination, with relative proportions dependent on the relative costs of the two metals. The clean-up and reduction of sulphur in diesel has, since 2006, allowed palladium to be used in diesel catalytic converters. Owing to its lower price, palladium has substituted for platinum in both types of combustion engine and now makes up approximately 84% of most gasoline catalysts and greater than 30% of diesel catalysts in Europe (2014) for passenger cars and light commercial vehicles. Nonetheless, palladium infiltration into diesel passenger cars has matured as Euro 6 legislation has increased the loadings of platinum relative to palladium. Rhodium is used specifically to catalyse the reduction of NO_x to nitrogen in both gasoline and some diesel powertrains.

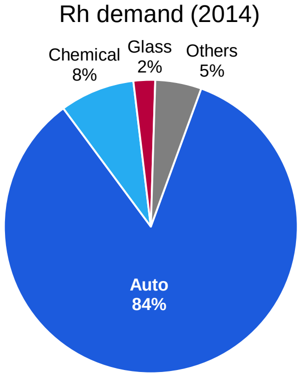
Platinum, palladium and rhodium demand, by sector, is shown in Figure 17.1.

Figure 17.1 Platinum, palladium and rhodium demand sectors

Platinum demand	Palladium demand	Rhodium demand
• Autocatalyst (primarily for diesel engines) • Wide range of jewellery	• Autocatalyst (primarily for gasoline-powered on-road engines) • Electrical components	• Autocatalyst • Glass • Chemicals







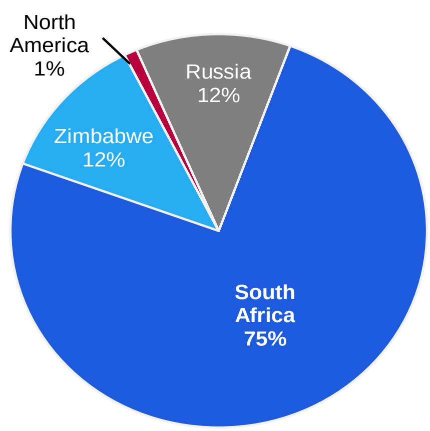
Source: SFA (Oxford), 2015
Note: The rhodium pie chart does not sum to 100% due to rounding

Despite their high cost, platinum and palladium face no foreseeable competition in this area. Several other metals are good oxidation catalysts in other environments, but do not have the thermal durability and resistance to poisoning necessary, in autocatalytic conditions.

17.1.2 Mineral Reserves and mineral resources

The majority of PGE resources are located in South Africa, which accounts for approximately 75% of global PGE resources. The PGE Mineral Resources (inclusive of Mineral Reserves) of dedicated PGE producing countries are highlighted in Figure 17.2. Mineral Resources (inclusive of Mineral Reserves) of dedicated PGE producers, excluding PGEs produced as a result of nickel and copper mining, are highlighted on an operating unit basis (not attributable) in Figure 17.3. Combined, Rustenburg Operations have resources delineated at 89 Moz and higher than average in-situ grade of 5.00 g/t 4E PGE.

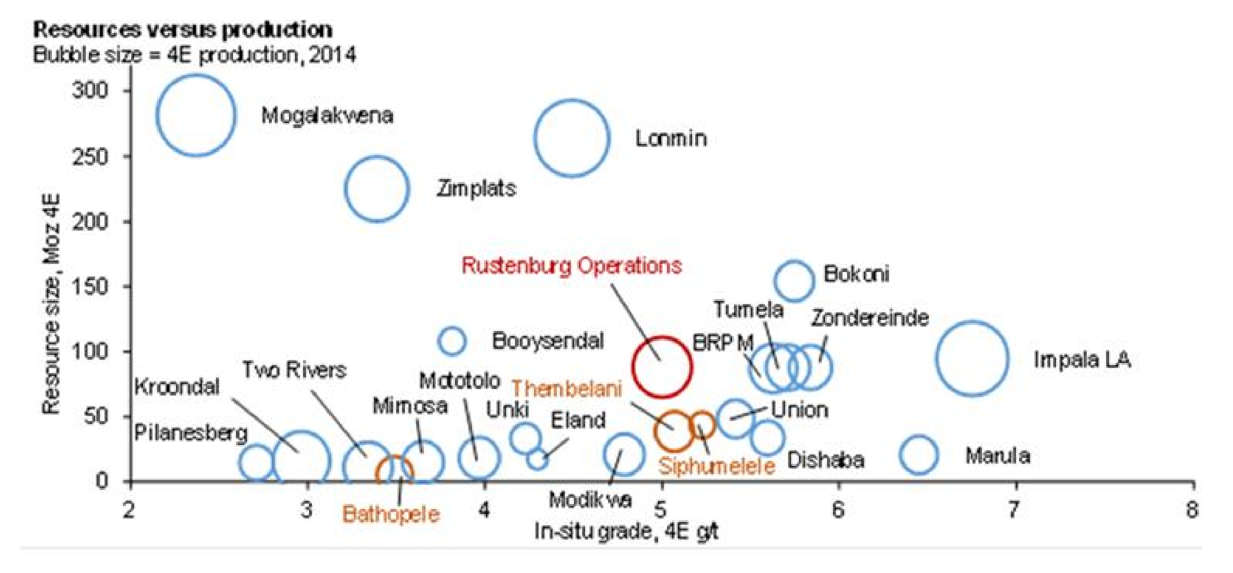
Figure 17.2 Global producer Mineral Reserves and mineral resources (4E)



Country	4E Moz
South Africa	1,610
Zimbabwe	260
Russia	260
North America	30

Source: SFA (Oxford), 2015
Note: Producer resources are inclusive of reserves

Figure 17.3 Resources vs. production (4E)



Source: SFA (Oxford), Company reports
Note: Resources are 100% (not attributable); inclusive of reserves and inferred resources 2014; and production is adjusted to calendar year 2013.

17.2 Demand

17.2.1 Demand drivers: Automotive industry

Tailpipe emissions legislation

The automotive industry is the primary demand driver for platinum, palladium and rhodium. All three metals are used in autocatalysts to cut harmful emissions from vehicles and improve air quality.

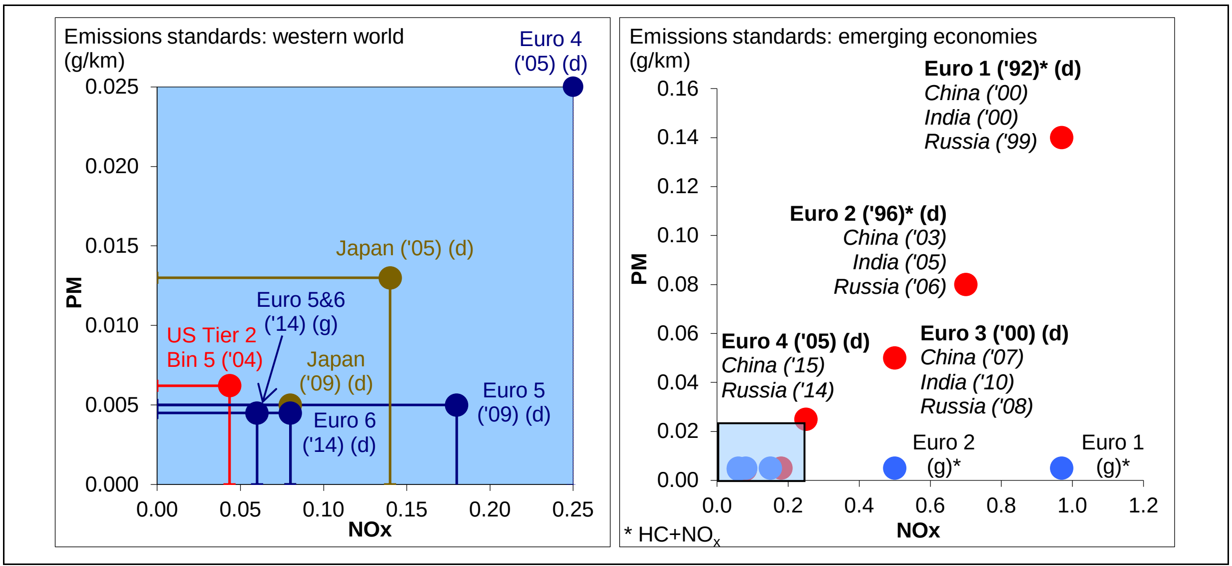
Vehicle exhaust emission controls began in the US in 1975 using PGE-containing catalysts on light-duty vehicles. Over 85% of all new on-road vehicles sold globally each year are now fitted with catalysts containing PGEs. Light-duty European emissions legislation (Euro 6) is currently being implemented in Europe. These standards narrow the gap between diesel and gasoline light-duty vehicle standards and strengthen on-board diagnostic ("OBD") requirements. Some of the most significant changes to come with Euro 6 are focussed on real-world driving testing and the introduction of new test cycle procedures; these are expected to be fully implemented within the 2017 to 2020 timeframe.

Emerging economies' car markets are forecast to continue to expand and to catch up with EU/US emissions legislation best practice, with a corresponding increase in PGE demand.

The rate of adoption of stringent diesel and gasoline emissions standards is strongly determined by the availability of low sulphur fuel. Globally, there is limited refining capacity to produce lower sulphur fuel and this is delaying emissions legislation compliance.

Development of emissions standards are shown in Figure 17.4.

Figure 17.4 Development of emissions standards for the western world and emerging economies



Source: SFA (Oxford).
Note: Euro 6a, 6b and 6c is part of the Euro 6 emissions standards, g = gasoline and d = diesel. PM – Particulate matter.

Vehicle production

Total global vehicle production reached approximately 90.8 M vehicles in 2014. This represented an increase of approximately 2.4 M vehicles from approximately 88.4 M vehicles produced globally in 2013, and an increase of 28 M vehicles from 62 M vehicles produced in 2009.

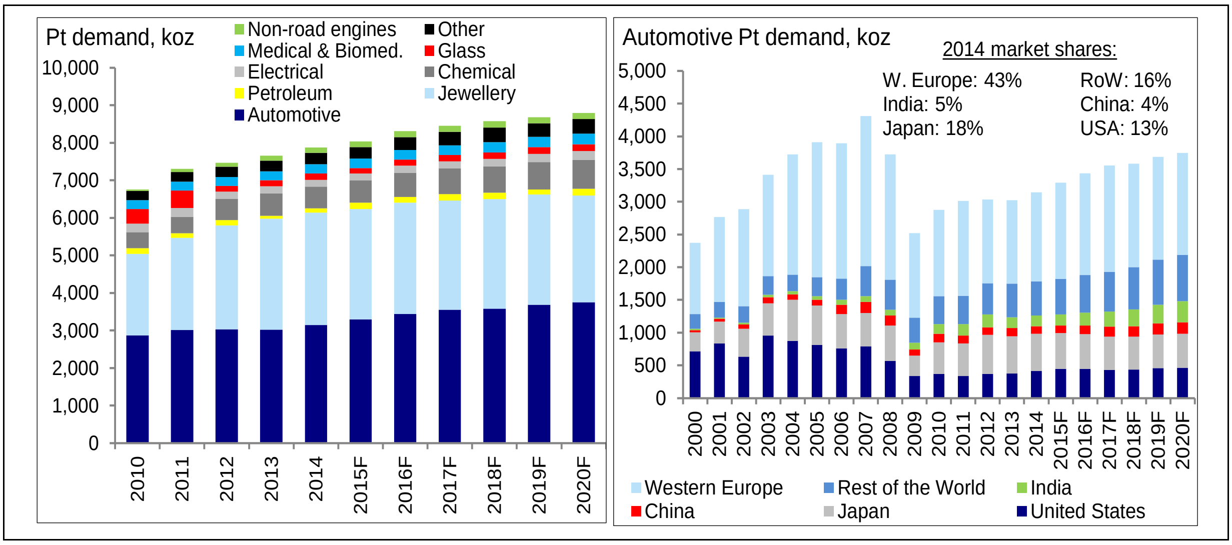
The growth potential in autocatalyst demand from increasing vehicle ownership is noted when comparing China with the US. Currently, vehicle ownership per capita in China is approximately 9% of that in the US, with estimated values of 29% of the US levels in 2030. While no other regions are likely ever to reach current US vehicle ownership levels, significant growth in the autocatalyst market can be expected as car ownership in Asia rises. China is expected to lead the sales growth over the next five years, accounting for 46% of the rise in sales during this time. India is expected to record the highest growth over the next five years, with year-on-year growth rates in double-digits beyond 2015.

Much of the growth in the next three years should result from the ongoing recovery and increased demand since 2008. However, growth, particularly from emerging economies, as well as inelastic demand growth from the roll-out of stringent exhaust emissions standards worldwide, should increase platinum, palladium and rhodium requirements/consumption.

17.2.2 Platinum demand

SFA (Oxford) estimates that demand for platinum will continue to be dominated by the automotive and jewellery industries, and consumption will continue to grow through the 10-year period ending in 2020 (Figure 17.5).

Figure 17.5 Platinum demand (2010 to 2020F) and automotive platinum demand (2000 to 2020F)



Source: SFA (Oxford).
Note: The 2014 market shares do not sum to 100% due to rounding

Automotive industry demand

Future growth in platinum demand will be greatest from diesel cars in India, light commercial vehicles in the rest of the world ("RoW") and heavy-duty diesel ("HDD") in the RoW and Western Europe. Cars in Western Europe, with its high diesel share and stringent emissions standards, stand out as the main contributor to demand, albeit with no growth likely over the next decade and a degree of downside risk from the fallout of the VW crisis and costs to get small vehicles to comply with real-world driving standards. Any substantial threats to this market would offset the expansion anticipated from elsewhere. Growth in India is reliant on a rising diesel share and emissions legislation catch-up requiring cleaner fuel, as well as higher vehicle production. Of the three metals used in autocatalysts, platinum is the most geographically concentrated, with Western Europe its dominant market.

Jewellery demand

Jewellery currently represents over one-third of the platinum market, and in the past has provided protection against falling prices. China now dominates the market for platinum jewellery and fabricator purchasing is price sensitive, with stronger demand during platinum price dips and vice versa. However, despite lower prices, Chinese platinum jewellery consumption is currently decreasing, and in 2014 was estimated at 1.96 Moz. China's economy, for several years the engine of platinum jewellery market growth, is slowing significantly and higher ongoing sales will be more difficult to achieve. China's near-term growth is slower than elsewhere. The downgrading of GDP forecasts and the decline in the number of marriage registrations mean there is a potential decrease in China's jewellery growth.

SFA (Oxford) estimates that global platinum jewellery consumption will continue to remain relatively steady over the coming years cushioned by the resilience of the long-established markets. In 2014, Japan was the second-largest market after China, at 337 koz, with Western Europe at 222 koz and North America at 229 koz (Figure 17.6). These three established markets together comprised 789 koz (26%) of the 2,994 koz total platinum jewellery market in 2014.

Figure 17.6 Platinum jewellery demand (2000 to 2020F)

Source: SFA (Oxford)

The growth of the Indian market remains key for platinum jewellery and is driven by stronger demand for couple bands and male jewellery. Overall retail sales growth in India has increased by 25% in 2014, with platinum jewellery availability increasing by 10% to over 900 stores in more than 75 cities.

In December 2014, the Platinum Guild International ("PGI") launched a new bridal campaign, Platinum Evara, with initial key partners in 83 stores, and plans to increase this by 59% to 132 stores in 2015. This campaign has provided high expectations for all stakeholders, offering an additional opportunity for retailers and a new product category for platinum in India.

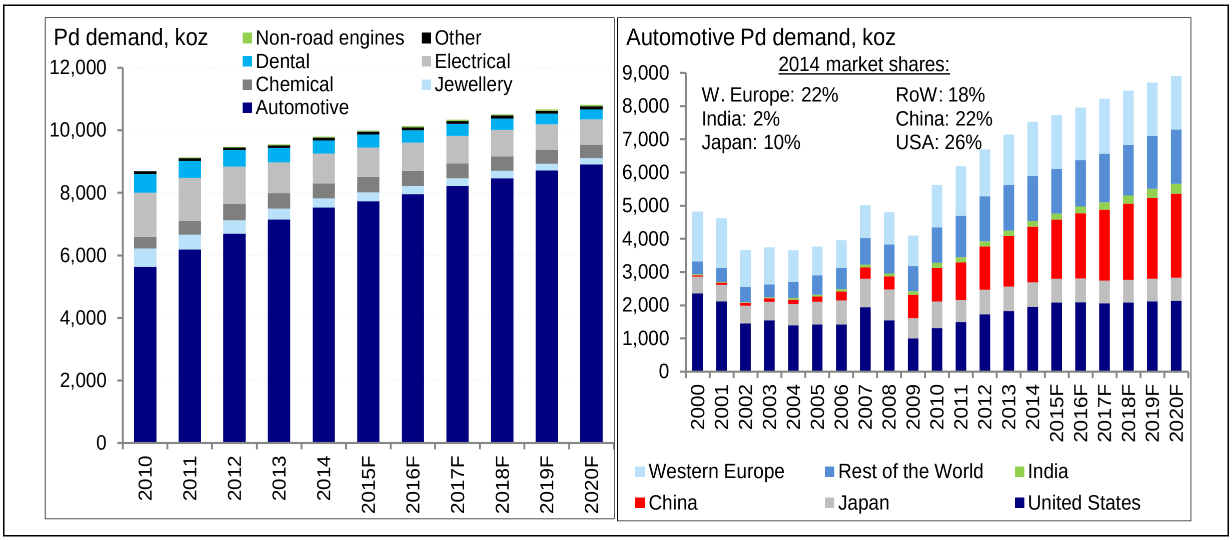
Other uses

Platinum tooling is also utilised in the manufacture of speciality glass (including flat-screen televisions and monitors) and glass fibre (2% of 2014 demand), and in catalysts in chemical synthesis (7%) – principally nitric acid for fertilisers and silicones across a range of sectors. Platinum is also used in oxygen sensors for better fuel control in gasoline and diesel vehicles, catalysts for fuel cell vehicles, and in the oil refining sector (1%).

17.2.3 Palladium demand

Palladium is considered an autocatalyst metal. SFA (Oxford) expects that, for the 10-year period ending 2020, palladium demand will continue to rise year-on-year, primarily driven by the automotive industry, but with its other demand sectors showing decline (Figure 17.7).

Figure 17.7 Palladium demand (2010 to 2020F) and automotive palladium demand (2000 to 2020F)



Source: SFA (Oxford)

Automotive industry demand

Automotive demand for palladium was affected by declining auto sales during the financial crisis, but has quickly recovered. Palladium was less affected than platinum by the automotive downturn, as Chinese vehicle sales, favouring palladium-rich gasoline cars, continued to grow while sales in the developed world fell or were stagnant. In addition, in most Western markets government scrappage schemes temporarily increased sales of small gasoline cars at the expense of diesel vehicles' share of the European car market. Furthermore, palladium has gained a greater share of the diesel market through initially price-induced and then technology-induced (Euro 5) substitution, though this has now stabilised.

Use of palladium in autocatalysts is forecast to increase by some 16% over the next five years. Although the pace of demand growth from Chinese vehicle sales is slowing, it is set to accelerate in the RoW from higher vehicle numbers and the roll-out of tighter emissions legislation.

In the US, led by California, local exhaust ventilation ("LEV-3") low-emission vehicle requirements represent an 80% cut in criteria pollutants, mainly HC and NO_x, along with a 90% reduction ultimately in particulate matter. It is very stringent legislation, some 90% more stringent than Euro 6, while the US Environmental Protection Agency ("EPA") is implementing only a 70% reduction in particulate matter elsewhere. In order to achieve the cuts in criteria pollutants, LEV-3 legislation will lead to higher palladium loadings in autocatalysts.

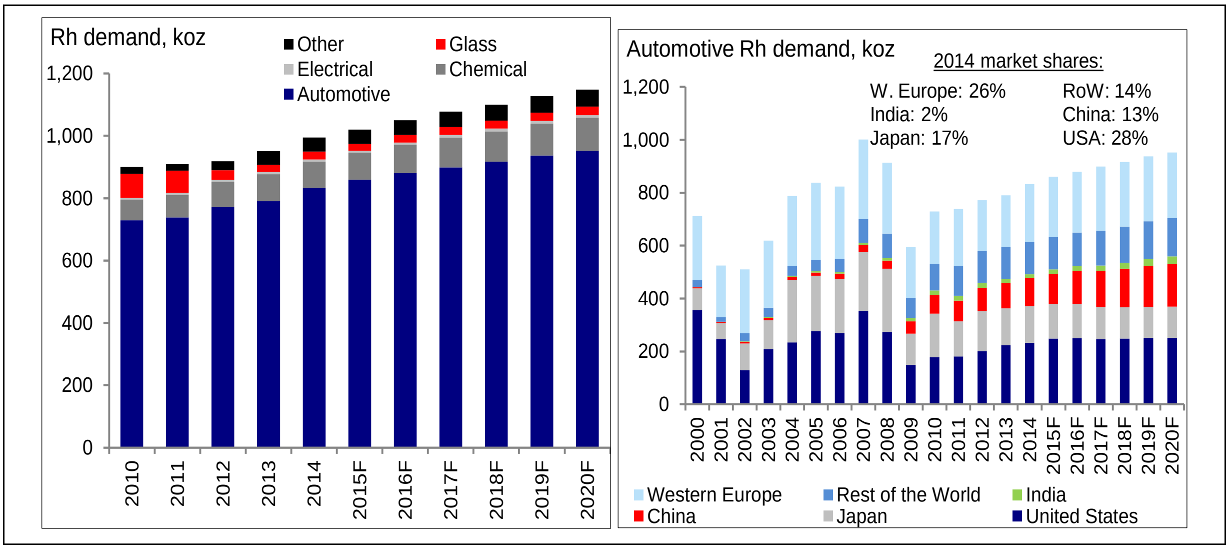
Other uses

Palladium is used extensively in electronic components (10% of demand in 2014) owing to its specific properties of high electrical conductivity and durability. It is used extensively in the conductive pastes of multi-layer ceramic capacitors ("MLCCs"). The palladium price spike in 2000 led to partial substitution to nickel-based MLCCs, but the complexity and proliferation of consumer electronic equipment has meant that more MLCCs are used per unit of equipment, partially offsetting this price-induced demand destruction. However demand in electrical applications is set to decrease in the long-term.

17.2.4 Rhodium demand

Rhodium is used mainly in the automotive industry and remains the most effective catalyst at removing tailpipe NO_x. Rhodium and automotive demand is shown in Figure 17.8.

Figure 17.8 Rhodium demand (2010-2020F) and automotive rhodium demand (2000-2020F)



Source: SFA (Oxford)

Automotive industry demand

Automotive industry demand for rhodium increased by approximately 43 koz year-on-year to approximately 833 koz in 2014 and is forecast to rise steadily over the next five years, by approximately 2% per annum, especially as the imperative to reduce NO_x emissions from all gasoline and diesel vehicles increases. The price spike to over US$10,000/oz in 2008 forced fabricators to reduce catalyst loadings and even replace some rhodium with palladium in three-way catalysts. However, there is little demand so far for significant substitution back to rhodium from palladium.

Other uses

Rhodium's other main uses, comprising approximately 16% of demand in 2014, are a mixture of chemicals (84 koz), tooling in the glass industry (25 koz), electronic components (7 koz), and some plating in the jewellery industry.

PGE catalysts (including rhodium) are used in the production of nitric acid. Catalyst gauzes can contain a mixture of platinum, rhodium and palladium, and last between three and 12 months.

In the glass sector, a variety of products including crucibles, linings and stirrers may contain anywhere between 5% to 22% rhodium to manufacture display glass, plasma glass, flat glass and glass fibre.

17.2.5 Recycled PGEs from vehicle catalysts

Palladium recycling has grown by over nine times the levels of 2000, with an average growth rate of 20% per annum over the period 2000 to 2014. Palladium recycling now represents approximately 26% of all supply and is estimated to have risen by 7% to 2.29 Moz in 2014, with autocatalysts accounting for 79% of recycled palladium material.

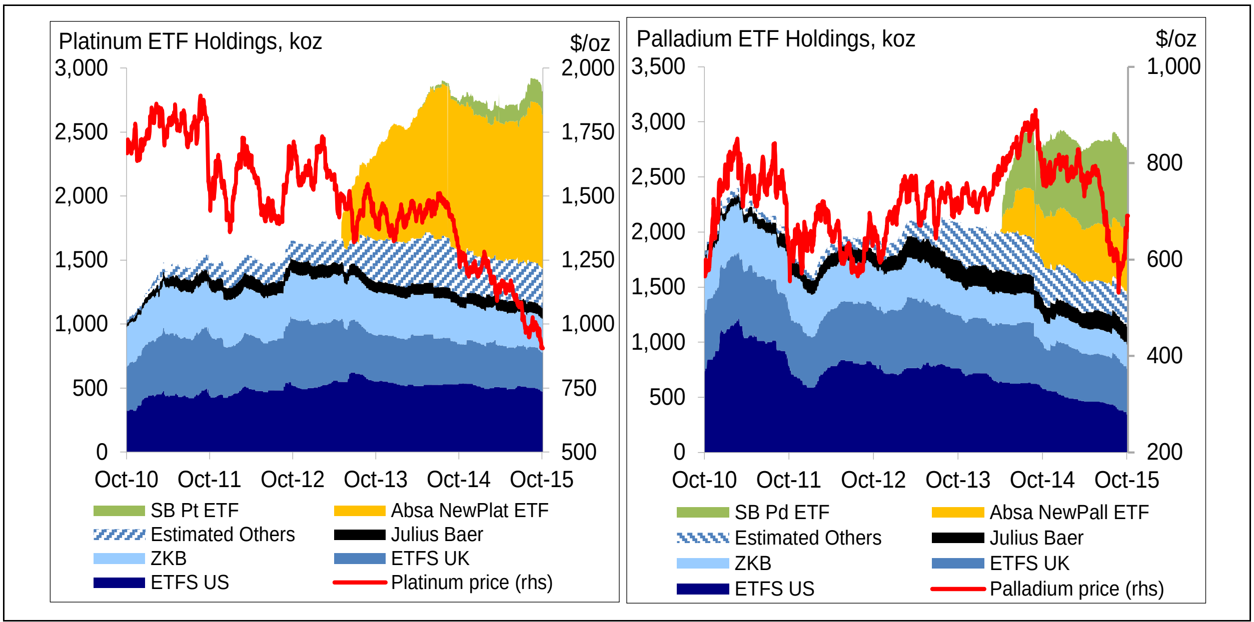
In the medium to long term, there are large quantities of vehicle catalysts that could be recycled in the next few years. Palladium supply will continue to dominate catalyst returns in the medium term, as the majority of catalysts secured by collectors will be palladium-rich from scrapped gasoline vehicles in the US.

The market is currently seeing a pick-up in platinum from secondary sources as diesel cars that became popular in the late 1990s and early 2000s begin to be scrapped. Nonetheless, secondary supplies of platinum are unlikely to overwhelm the market with supply growth from South Africa limited.

17.3 Investment

Investment is considered a factor in price determination of PGEs, with an estimated 2.0 Moz of platinum and 2.3 Moz of palladium futures contracts on the Tokyo Commodity Exchange ("TOCOM") and the New York Mercantile Exchange ("NYMEX") at the end of 2014. Platinum has also been trading on the Shanghai Gold Exchange since 2003. Loco Zurich is reasonably liquid where over-the-counter contracts are traded, but holdings and trading are not transparent. Speculators mostly trade inter-bank on London morning and afternoon fixes. Platinum and palladium holdings are shown in Figure 17.9.

Figure 17.9 Platinum and palladium ETF holdings (May 2010 to May 2015)



Source: ETF Securities, Zürcher Kantonalbank (ZKB), SFA (Oxford)

PGE investments range from simple holdings of bullion bars and coins to complex investment vehicles, such as exchange traded funds ("ETFs") and the futures markets.

Investments, along with global stocks, are treated as above-ground stocks that are not absorbed as an end-use but could be either allocated or returned to the market, depending on price levels and investor strategy. In addition, the recent proliferation of ETF products using physically backed platinum and palladium has widened the investment appeal of PGEs, with almost 2.8 Moz of platinum and around 2.9 Moz of palladium held in ETFs globally at the end of 2014.

Global platinum ETF holdings added 142 koz in the first eight months of 2015, as robust purchases in South Africa were partially offset by sales from US, UK and Swiss funds. South African funds now hold 1.4 Moz out of the global total of 2.9 Moz.

Following the launch of Standard Bank and Absa's palladium ETFs they saw a rapid accumulation of metal, lifting the funds to a combined 1.2 Moz by the end of 2014 and purchases continued at a slower pace through 2015, taking combined holdings to 1.3 Moz. Investors in the US, UK and Switzerland have been reducing their holdings, selling 153 koz in the first eight months of 2015, leaving global holdings down slightly at just under 2.8 Moz.

With no new ETFs expected in 2015, the outlook for investment is now much harder to predict for both platinum and palladium. The introduction of platinum and palladium ETFs in South Africa enabled investors there to gain direct exposure to the metal price via a domestic fund for the first time, which being denominated in Rands also provided a currency hedge. With the South African funds currently holding 1.4 Moz of platinum and 1.3 Moz of palladium, almost 50% of global ETF holdings in each metal, it is unclear how much more appetite there is for further investment. Additionally interest rates have been low and falling during the last few years, but once that changes investors could adjust their commodity exposure. However, the South African PGE producers came together to establish the World Platinum Investment Council ("WPIC") in 2014 to stimulate investor demand for physical platinum. Its key objective is to provide investors with up to date quarterly research of the platinum market to support informed decisions.

There are two rhodium ETFs which held 104.4 koz at the end of August after 5 koz were sold in 2015.

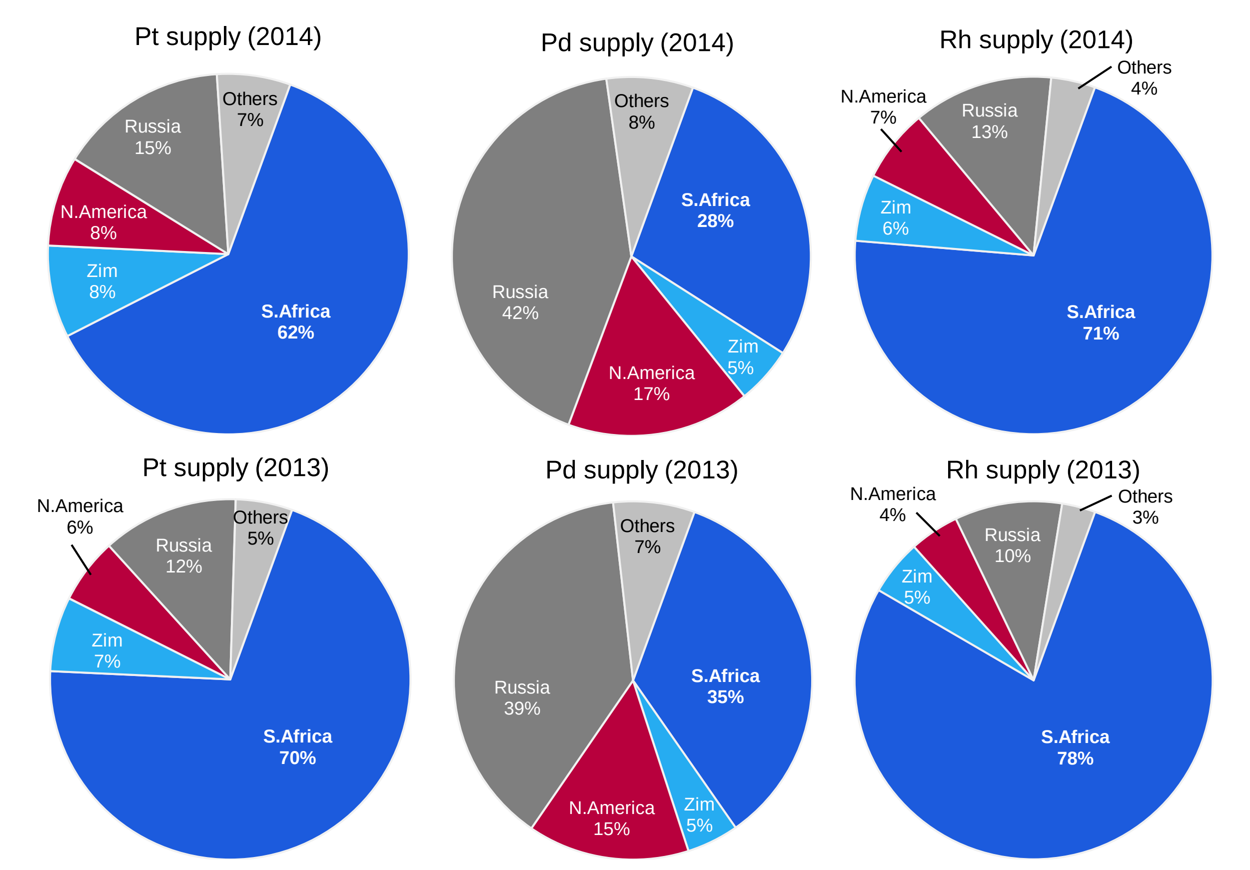
17.4 Supply

In 2014, South African production decreased to 62% of global primary platinum supply (70% in 2013) following the extensive and prolonged strike by mineworkers at many of the country's largest mines. Other key platinum mining regions include Zimbabwe's Great Dyke, the Stillwater Complex in the US and the Sudbury Basin in Canada. Russian PGE supply, with the exception of PGEs produced in the Kondyor, Koryak and Urals regions, is mostly generated as a by-product of nickel mining (from Norilsk Nickel) and is the world's largest source of palladium. Russia is also a significant producer of platinum and rhodium, accounting for approximately 30% of the world's total PGE supply in 2014 (25% in 2013).

South African platinum output is estimated to have dropped by 29% to 3.0 Moz in 2014, with global supply falling by 20% (1.2 Moz). In 2015, a return to full production from the strike-affected mines in South Africa is expected to account for a significant recovery in platinum production.

Platinum, palladium and rhodium supply by country for 2013 and 2014 is shown in Figure 17.10.

Figure 17.10 Platinum, palladium and rhodium supply by country (2013 and 2014)



Source: SFA (Oxford)
Note: The Pd supply chart for 2013 and Rh supply chart for 2014 do not sum to 100% due to rounding

Global output is forecast to improve in 2015, with South African supply returning to a 70% share of the market, although production is expected to fall short of 2013 levels. A number of mines have reported losses from “Section 54 Health and Safety” stoppages, lower grades from increased UG2 mining and a deterioration in ground conditions in recent years.

Production decreased in 2014 owing to an unstable industrial relations climate and declining platinum prices, while inter-union rivalry escalated, leading to strikes and outbreaks of violence, and posed significant downside risk to supply.

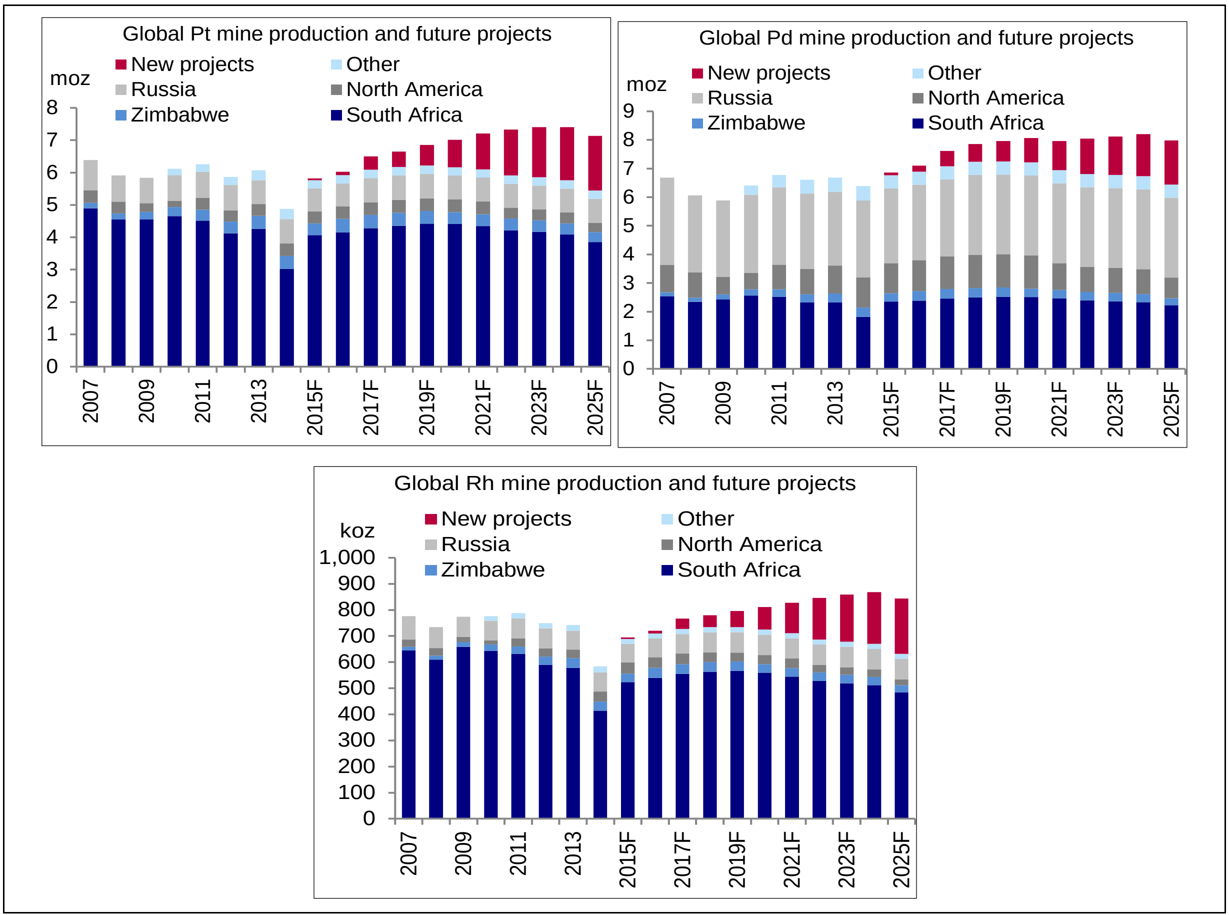
South African mine supply in recent years has been temperamental, with three unprofitable operations mothballed in mid-2012 owing to unsustainably high operating costs, low productivity and exposure to low rhodium prices. At current low rhodium prices, a production basket with a significant yield of base metal by-product components is essential to maximise revenue per tonne hoisted.

17.4.1 South African supply

In South Africa, PGEs occur within a large, layered igneous intrusion called the BC in which more than 70% of the world’s known platinum resources exist. The BC is a basin-shaped intrusion of some 370 km across, with only its rim exposed.

Expected future supply profiles for platinum, palladium and rhodium are shown in Figure 17.11.

Figure 17.11 PGE* mine production and new projects outlook (2007 to 2025F)



Source: SFA (Oxford).
*Note: * Excludes gold production forecasts; planned production profiles based on producer guidance. New projects include probable and possible.*

The BC contains numerous distinct segregated layers formed during repeated fractionation cycles, three of which contain economic concentrations of PGEs. The main PGE-bearing layers, often referred to as “reefs”, are called the Merensky Reef, the UG2 Reef and the Platreef.

The UG2 Reef is observed on the Western and Eastern limbs of the BC and is presently the main target for exploitation, providing 48% of the world’s primary platinum supply (2013). The Merensky Reef is also observed on the Western and Eastern limbs and currently yields 16% of global platinum supply (2013). The UG2 Reef has fast become an increasingly important source of PGEs in recent years as shallow Merensky orebodies deplete. Numerous Merensky Reef shafts now exploit the UG2 Reef, along with several new mines and projects in ramp-up. Both reefs contain valuable copper and nickel by-products, but base metal concentrations are lower in the UG2 Reef.

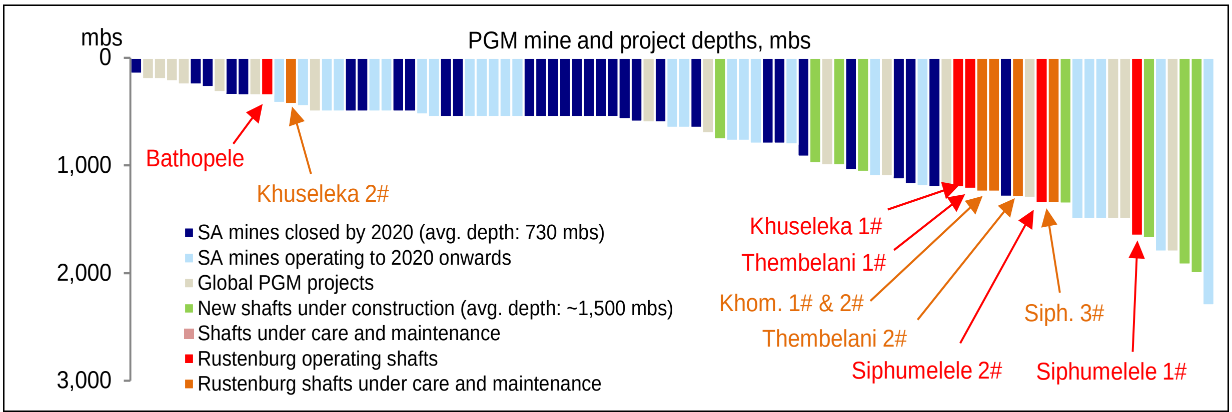
The UG2 Reef also contains chromite, which is of a lower grade than the Lower Group (“LG”) and Middle Group (“MG”) Reefs. The additional cost of extracting chrome concentrate through gravity concentrations during PGE processing is minimal, as the majority of necessary infrastructure is already in place.

There is only a small additional cost to add the rest of the infrastructure to produce the chrome concentrate. Chrome concentrate producers are developing relationships with platinum miners to secure UG2 tailings output because primary sources (layers) of production (LG6, MG1 and MG2) are becoming deeper and more expensive to mine.

The third reef, known as the Platreef, is observed on the Northern Limb of the BC and accounts for approximately 5.6% of the world's platinum supply (2013), with only one mine in operation at present. The Platreef comprises a relatively high concentration of base metals (nickel and copper), with mineralisation occurring over a substantial thickness, and is the focus of a number of exploration projects. The Platreef also has a relatively balanced platinum-to-palladium ratio compared to the platinum-rich Merensky Reef.

Producers in South Africa have a number of challenging operational factors. These include logistical issues such as greater tramming distances in maturing shafts, higher costs associated with mining at increasing depths, pressure from mine safety inspectors, a strong ZAR:US$ exchange rate and rising electricity tariffs. In addition, several projects have incurred delays and now require longer lead times to reach production, thus replacement supply is no longer keeping up with depletion at existing shafts. Consequently, South Africa's share of global production has fallen by 13.6% over the past decade (2013), while expansions at Mimosa and Ngezi have lifted Zimbabwe's share. The depth of Rustenburg Operations shafts and local PGE mines is shown in Figure 17.12.

Figure 17.12 Rustenburg Operations' shaft depths contextualised within the PGE industry

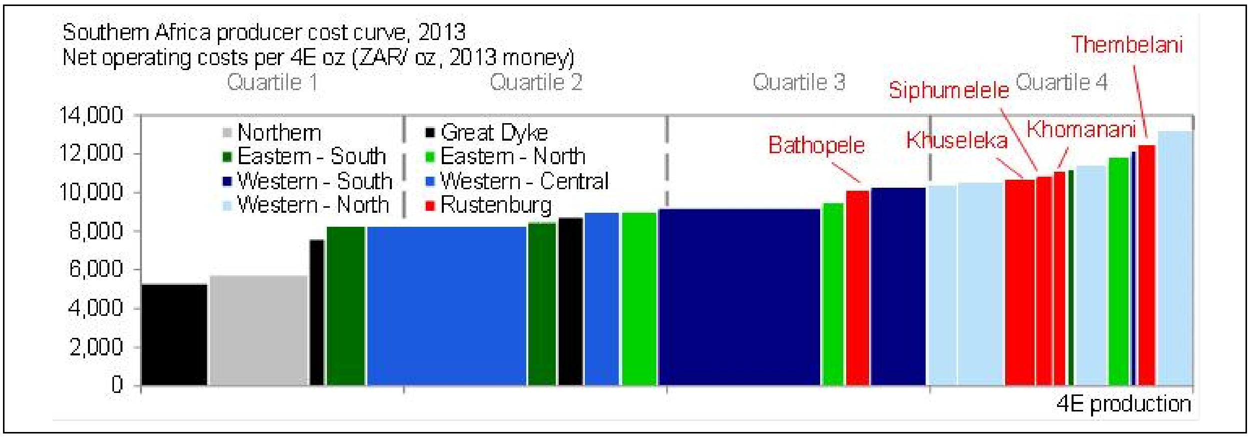


Source: SFA (Oxford); Rustenburg Operations depth data provided by RPM

17.4.2 Supply economics

The cost of platinum mining in South Africa has increased markedly in recent years, as the following cost curve shows in Figure 17.13. From 2005 to 2013, the average net operating cash cost per 4E ounce grew by 18% per annum, and these costs are likely to continue to climb as head grades continue to decline and mining depth increases. Overall, net total cash costs ("TCCs") rose by 23% between 2011 and 2013, while the South African 4E basket price decreased by 3.5% over the same period.

Figure 17.13 South Africa producer cost curve, 2013

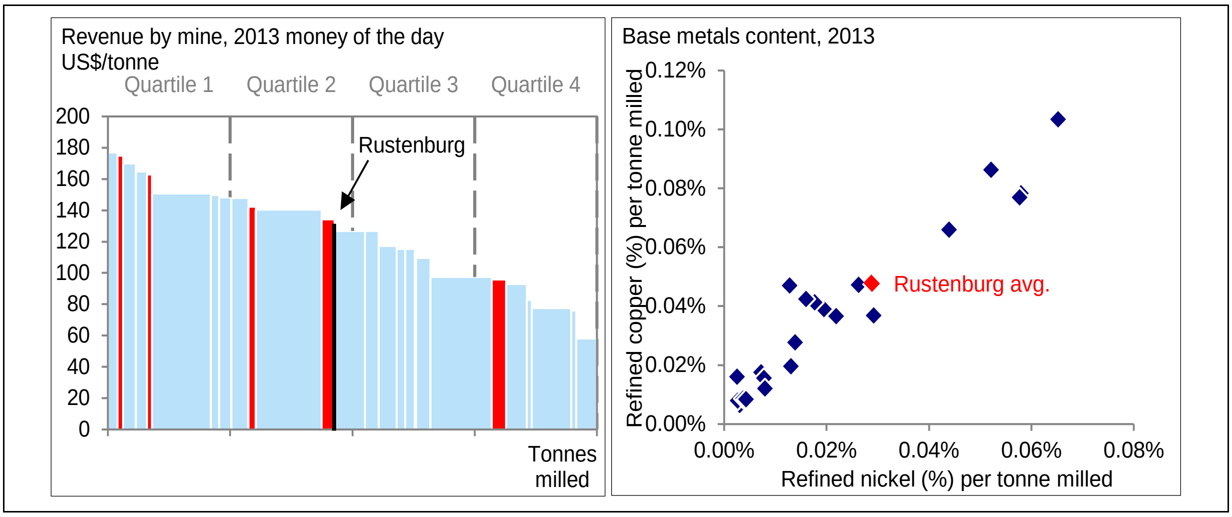


Source: SFA (Oxford), company reports

Notes: Net operating costs refer to total operating costs less revenue from by-product credits (Ni and Cu). 2014 data excluded owing to distortions caused by industrial action. Colour coding corresponds to location (Western, Eastern and Northern Bushveld Complex, South Africa; Great Dyke, Zimbabwe). SFA's cost modelling is based on received prices and exchange rates in 2009, and adjusted to calendar year accounting.

A benchmarking of Rustenburg Operations is shown in Figure 17.14.

Figure 17.14 Benchmarking of Rustenburg Operations (2013)



Source: SFA (Oxford)

In 2013, the Rustenburg Operations combined was positioned in the second quartile on a revenue per tonne basis. Similarly, Rustenburg sits reasonably well with good refined base metals (copper and nickel) relative to most other South African PGE producers.

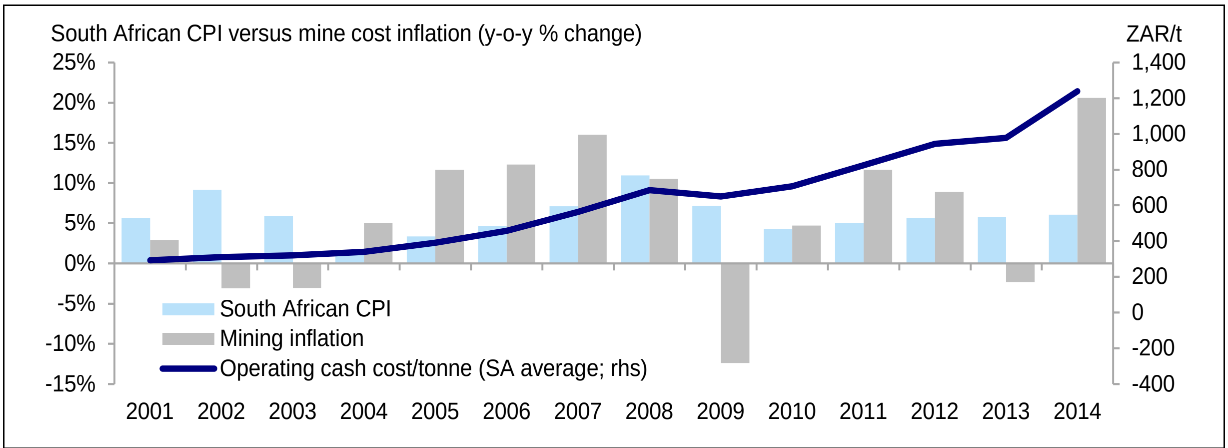
Historically, the platinum price alone was sufficient to cover the cost of mining. Today, the industry is reliant on virtually every dollar generated from the sale of platinum, palladium and rhodium to cover costs, leaving only minor precious metals and base metal by-products to generate a margin. This means that producers have to react to weaker PGE prices in order to limit damage to the balance sheet, and this has involved the closure of high-cost shafts as well as the deferral of important expansion and replacement projects. Although these projects are critical to ensuring a sustainable production profile longer-term in order to maintain a favourable ore mix and cost advantage through economies of scale, cash preservation during a tough economic climate typically takes precedence.

While cost improvement initiatives will remain a priority into 2016, a number of South African specific factors are likely to continue to result in cost increases that could offset the gains made and limit production expansions:

- Mining consumables typically attract higher costs each year, due to either their specialised nature or a reliance on the ZAR:US$ exchange rate;
- Labour costs (which can account for more than 50% of TCCs) also attract annual rises above the South African CPI. Wage settlements of between 8% and 10% are typically reported annually, though in more recent years wage increases have been higher than 10%. The major miners will begin the next wage negotiations in 2016 as current agreements end in June 2016;
- Power (electricity), which accounts for around 5% of PGE producers' TCCs, has attracted increases of 25% in recent years; and,
- The South African Mineral and Petroleum Resources Royalty Act became effective on 1 March 2010, and imposes a royalty levy on revenue, depending on profitability.

Declining production has added to a sharp escalation of cost inflation, typically far exceeding the South African CPI since 2004 (Figure 17.15). Thus many producers are today achieving margins far below those which are considered desirable.

Figure 17.15 South African CPI vs. mine cost inflation (2001 to 2014)



Source: SFA (Oxford), Oxford Economics

17.5 Market outlook

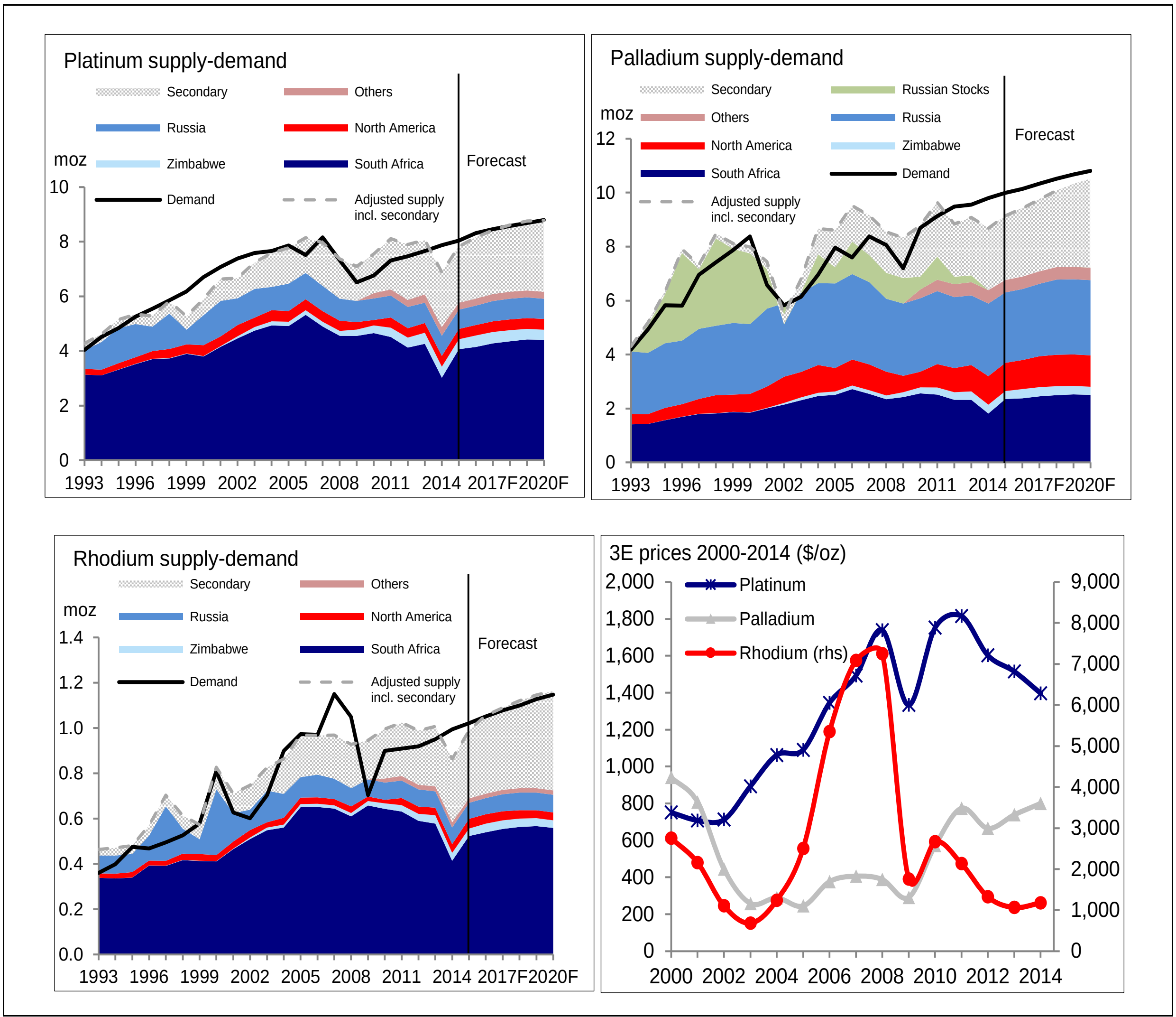
The strike wave that affected the South African platinum industry in the second half of 2012 and through 2014 has altered the outlook for the PGE markets and prices. In recent years, mining companies have experienced above-inflation cost increases (13% average increase year-on-year between 2011 and 2013) and capital investment at many operations has been cut back. By mid-2012, 29% of the industry was loss making on an operating cost basis, while 54% could not afford its capital commitments. The fall-out from recent labour negotiations, with agreed wage increases at an average of greater than 10%, indicates that operating costs will continue to rise.

Primarily as a result of the strikes that took place in South Africa in 2014, global primary supply of platinum is estimated to have decreased by 1.2 Moz (20%) to 4.88 Moz, a level not seen since before 2000.

Global demand for platinum grew to 7.9 Moz in 2014, in part due to a 129 koz increase in automotive demand. Recycling is estimated to have risen by 19 koz in 2014 owing to a reduced incentive to recycle jewellery at lower average year-on-year prices.

The supply demand outlook and price history is shown in Figure 17.16.

Figure 17.16 PGE supply-demand outlook (1993 to 2020F) and price history (2000 to 2014)



Source: SFA (Oxford), planned production profiles based on producer guidance
Notes: Prices are shown in May 2015 real money terms. Platinum and palladium are shown using the left-hand axis scale and rhodium is shown using the right-hand axis scale.

During 2015, SFA (Oxford) expects South African supply to return to trend, following the strikes of 2014. This forecast continues the downward production trend that has been entrenched since 2006. Producers are under significant pressure at current prices and further shaft closures are likely. The basket price is trading below the 50th centile of the cost curve, and mining companies are having to close shafts, raise equity and reduce capital expenditure budgets in order to remain operational.

Autocatalyst demand should increase with the imposition of Euro 6 tailpipe emissions limits (rolled out through 2014 and 2015), affecting light- and heavy-duty vehicles, and new demand arrives from non-road engines with some requiring PGE-containing catalysts to meet Tier 4 emissions requirements.

Diesel cars have been viewed negatively recently, with concerns that real-world driving emissions fall far short of legislated standards, resulting in poorer air quality. However, most automakers consider that diesel will remain a core powertrain, especially with its role in helping to lower all-important fleet-average CO_2 emissions. The central case forecast remains for diesel's share to decline only very slowly over the next few years in Western Europe.

In the long term, a lack of primary supply growth could leave the market severely under-supplied. Recycling is forecast to accelerate as an increasing proportion of scrapped diesel cars with platinum-rich catalysts return to market. However, supply will most likely disappoint and the market will remain in structural deficit; this deficit is forecast to reach critical levels later in the decade as cuts to capital expenditure and severe reserve depletion become evident.

The palladium market has been in fundamental deficit since 2007, excluding Russian stock sales. Demand has grown by up to 2.3 Moz since 2006, despite the financial crisis and contractions in jewellery demand. Supply, meanwhile, has fallen and left the market in deficit by more than 1 Moz before stock in 2014. Over the medium and long-term, supply growth is likely to struggle to keep up with demand requirements. Gasoline catalyst demand from emerging markets and substitution for platinum in diesel catalysts could increase consumption further. On this basis, structural deficits would exist going forward and the market would remain dependent on the above-ground stockpile.

The rhodium market was in deficit in 2014 by up to 130 koz, largely due to the extended strike at South African mines. The price spike of over US$10,000/oz in 2008 forced fabricators to reduce catalyst loadings and even replace some rhodium with palladium in three-way catalysts. Autocatalyst demand in 2014 is therefore estimated to still be 160 koz down on 2007 peak levels, with a full recovery only arriving later this decade. Nonetheless, rhodium is a small market and supply is most heavily exposed to South Africa, so with further cutbacks to supply in prospect, the market could easily swing back into deficit earlier and prices may start to rise from current levels, once the market destocks.

18 MINERAL ASSET VALUATION

18.1 Introduction and scope

SV 2.2

DTM and Snowden source documents form the basis of Section 18.

On 9 September 2015, Sibanye reported the intended acquisition of Rustenburg Operations from RPM, through one of its subsidiaries, Sibanye Rustenburg Platinum Mines (Pty) Limited ("SRPM"). The Transaction has been discussed in Section 1.1 and Section 2.1.

The scope of work for this valuation comprises an independent Valuation of the Mineral Reserves, Mineral Resources and exploration results of the Mineral Asset. Unless explicitly stated, the Valuation and associated information is provided on the basis of 100% of the mineral rights contained in the Mineral Asset, excluding the Kroondal PSA. The value attributable to Rustenburg Operations is based on the corporate structure outlined in Figure 3.2, whereby 100% of the Mineral Asset value is attributable to SRPM.

Snowden has fulfilled the role of CPR collator and peer reviewer, and has placed reliance on several third parties that have undertaken work for each discipline – these parties are noted in Section 2.3 of the CPR. Sibanye commissioned Snowden to undertake this collation in September 2015. Mr John Miles (DTM) is responsible the overall Valuation of the Mineral Asset and has undertaken the Cash Flow Approach for the Valuation. Snowden has undertaken the Market Approach for the Valuation.

The compilation of this CPR is based on technical and financial data gathering undertaken between 1 October 2014 and 9 December 2015. The Report Date is 9 December 2015; and the Valuation Date is 1 October 2015.

Unless otherwise stated, all tables and figures in Section 18 are derived from the DTM Cash Flow Model.

The United States dollar ("US$") and South African Rand ("ZAR") are the principal currencies used in this report.

18.2 Sources of information

SV 2.11

The following principal documentary sources of information have been used in the Mineral Asset Valuation:

- Mineral Resource Statement and report, compiled by RPM, 2015;
- Mineral Reserve Statement and report, compiled by DRA, 2015; and RPM, 2015;
- Five year historical production, capital and operating costs, 2010 to 2015;
- DRA Pre-Feasibility Study documentation and review of Mineral Assets;
- Identity and tenure report compiled by ENS;
- Institutional market consensus exchange rate and price forecasts;
- Bloomberg, December 2014, SA and US CPI forecast;
- Historical, budgeted and planned Rustenburg Operations capex and opex;
- DTM Cash Flow Model for the financial year Q4 2015 through to FY2041;

- Rustenburg Operations revised financial models, 2014 and 2015;
- Environmental Closure study, compiled by SRK, 2014;
- Environmental Report by ERM, 2015;
- External data – RPM and Rustenburg Operations websites, newsrooms, transaction databases; and,
- Information gathered during site visits and interviews with RPM, Rustenburg Operations and associated subcontractors.

18.3 Identity and tenure

SV 2.3

The identity and tenure of the mineral properties has been discussed in Section 5.1.

18.4 History

SV 2.4

The history of the Company has been discussed in Section 3.1.

18.5 Geological setting

SV 2.5

The Geological setting has been discussed in Section 6.

18.6 Mineral Resources and Mineral Reserves

SV 2.6

The Valuation of the Mineral Asset is based on Probable and Proved Mineral Reserves. No Inferred Resources are included in the DTM Cash Flow Model.

The Mineral Resource base used in the Transaction is shown in Table 18.1. The Mineral Resources have been declared in compliance with the SAMREC Code and have been signed off by Quartus Snyman (RPM), a Competent Person. Additional information regarding the Mineral Resources is available in Section 7.2.10 of this report.

Table 18.1 Rustenburg Operations total Mineral Resources excluding royalty ground as at 1 October 2015

Orebody	Category	Tonnes (Mt)	4E grade (g/t)	4E (Moz)	Pt grade (g/t)	Pd grade (g/t)	Rh grade (g/t)	Au grade (g/t)	Base metals	
									Cu (%)	Ni (%)
Merensky Reef	Measured	66.5	6.18	13.2	3.96	1.67	0.24	0.30	0.101	0.226
	Indicated	43.0	5.95	8.2	3.77	1.64	0.23	0.30	0.107	0.224
	Inferred	11.0	5.75	2.0	3.61	1.61	0.24	0.28	0.097	0.203
	Total resource	**120.5**	**6.06**	**23.5**	**3.86**	**1.66**	**0.24**	**0.30**	**0.103**	**0.225**
UG2 Reef	Measured	316.4	4.67	47.5	2.56	1.60	0.48	0.04	0.009	0.096
	Indicated	82.2	5.01	13.2	2.71	1.76	0.49	0.05	0.009	0.096
	Inferred	4.3	5.22	0.7	2.80	1.86	0.52	0.04	0.009	0.096
	Total resource	**402.9**	**4.75**	**61.5**	**2.59**	**1.64**	**0.48**	**0.04**	**0.009**	**0.096**
Tailings	Measured	87.6	1.07	3.0	0.64	0.30	0.05	0.09	0.019	0.078
	Indicated	6.6	1.20	0.3	0.70	0.34	0.05	0.11	0.019	0.078
	Inferred	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
	Total resource	**94.2**	**1.08**	**3.3**	**0.64**	**0.30**	**0.05**	**0.09**	**0.019**	**0.078**
4E prill split (as %)										
Merensky Reef					63.8	27.3	4.0	4.9		
UG2					54.5	34.4	10.1	0.8		
Tailings					59.4	27.6	4.4	8.7		

Source: RPM, 2015
Note: No Resource cut-off applied. Totals may not add up due to rounding;
Reported inclusive of Mineral Reserves

The Mineral Reserves are listed in Table 18.2. The Mineral Reserves have been declared in compliance with the SAMREC Code and have been signed off by Frank Egerton (DRA), a Competent Person.

Additional information regarding the Mineral Reserves is available in Section 8.2.of this report.

Table 18.2 Total Mineral Reserve estimate as at 1 October 2015, for underground and surface ore sources

Reserve classification	Tonnes (Mt)	4E grade (g/t 4E)	Ni grade (%)	Cu grade (%)	4E content (Moz)	Prill splits			
						Pt (%)	Pd (%)	Rh (%)	Au (%)
Merensky L1 + L2									
Proved	14.04	5.46	0.11	0.01	2.47	64.1	27.3	4.0	4.6
Probable	0.66	5.26	0.12	0.01	0.11	64.5	27.0	4.0	4.5
Mineral Reserve	**14.70**	**5.45**	**0.11**	**0.01**	**2.58**	**64.1**	**27.3**	**4.0**	**4.6**
UG2 L1 + L2									
Proved	132.72	3.67	0.11	0.01	15.67	54.3	34.7	10.3	0.8
Probable	21.13	4.20	0.11	0.01	2.85	53.8	35.7	9.7	0.8
Mineral Reserve	**153.85**	**3.74**	**0.11**	**0.01**	**18.52**	**54.3**	**34.8**	**10.2**	**0.8**
TSF									
Proved	77.56	1.00	0.07	0.02	2.49	62.9	28.3	5.2	3.8
Probable	15.56	1.06	0.07	0.02	0.53	61.3	28.6	6.1	4.0
Mineral Reserve	**93.12**	**1.01**	**0.07**	**0.02**	**3.02**	**62.6**	**28.3**	**5.3**	**3.8**
Total Reserve summary									
Proved	224.32	2.86	0.10	0.02	20.63	56.5	33.0	8.9	1.6
Probable	37.35	2.91	0.09	0.02	3.49	55.3	34.4	9.0	1.4
Mineral Reserve	**261.67**	**2.87**	**0.10**	**0.02**	**24.12**	**56.4**	**33.2**	**8.9**	**1.5**

Source: DRA, 2015

Notes:

1. *L1 Reserve as at 1 October 2015 based on nine month forecasted and scheduled depletion from MRE as declared on 31 December 2014.*
2. *Economic tail cut applied to the Mineral Reserve Estimate.*
3. *Tailings Surface ore sources Reserve as at 1 October 2015 based on nine month actual survey measured depletion of surface TSF ore sources from remaining surface ore sources as declared on 31 December 2014.*

18.7 Modifying factors

SV 2.7

Modifying factors for Rustenburg Operations Mineral Reserves are discussed in Section 8.2. Mining and non-mining related modifying factors have been verified as realistic, and have resulted in an economically viable Proved and Probable Mineral Reserve as defined in terms of clause 32 of the SAMREC Code.

18.8 Valuation approaches and methods

The SAMVAL Code requires that a Competent Valuator must apply at least two valuation approaches in determining a mineral asset valuation. The three generally accepted mineral asset valuation approaches are:

- Cash Flow or DCF Approach:
  - The Cash Flow Approach relies on the "value-in-use" principle and requires determination of the net present value ("NPV") of future cash flows over the useful life of a mineral asset. This approach is used in the valuation of the Mineral Asset;
- Market Approach:
  - The Market Approach relies on the principle of "willing buyer, willing seller" and requires that the amount obtainable from the sale of the mineral asset is determined as if in an arm's-length transaction. The Market Approach followed applies a rand value per in-situ resource tonne determined by analysis of the transactional value of recently traded similar mineral assets. This approach is used in the valuation of the Mineral Asset considered in this report; and,
- Cost Approach:
  - The Cost Approach relies on historical and/or future amounts spent on the mineral asset. This approach is usually applied to early exploration assets and has not been used in the valuation of the Mineral Asset.

18.9 Cash Flow Approach Valuation

T5.7C(ii)-(v), T5.8C(i), SV 2.8

18.9.1 Cash flow model inputs

The cash flow valuation model ("Cash Flow Model") is based on the following forecasts:

- 6E and base metals production;
- Operating costs;
- Capital costs;
- Working capital requirements;
- Consensus 4E and base metal price forecasts with ruthenium and iridium metal prices supplied by SFA (Oxford);
- Exchange rate and economic parameters assumptions; and,
- Current State royalty and income tax rates.

All cost information has been provided in mid-2015 money terms and the original production and cost schedule commenced on 1 January 2015. The Mineral Reserves and Cash Flow Model have been modified to a new start date of 1 October 2015, with discounting from the same date.

The Cash Flow Model runs from Q4 2015 to FY2041, with financial years ending 31 December, and is undertaken in Nominal terms. The results of the Cash Flow Model are presented in both Nominal and Real terms. The NPV is determined from the post-tax, pre-dividend and pre-finance cash flow projections from the Rustenburg Operations.

No Inferred Mineral Resources and only Mineral Reserves are considered in the Cash Flow Model.

LoM production projections

The Cash Flow Model is based on physical projections for mining and processing production provided by DRA for the Bathopele, Siphumelele, Thembelani and Khuseleka production centres and separated by reef type (Merensky or UG2) as well as the planning level. The planning level conforms to RPM's definition for Level 1 and Level 2, where Level 1 represents production that is available from the current infrastructure requiring approved project capital expenditure and derived from Measured and Indicated Mineral Resources.

Planning Level 2 represents production requiring new project capital expenditure but also derived from Measured and Indicated Mineral Resources. Planning Level 2 is supported by a feasibility study or pre-feasibility study level of investigation which is considered an appropriate level of confidence for inclusion in the Cash Flow Approach to the Valuation.

The production and necessary development has been scheduled using appropriate software and the format of the underlying data is given in months for the first three years (2015 to 2017) and thereafter annually. The mining production schedule has been developed from first principles and the following principal production areas/elements have been considered (Table 18.3) as part of the Cash Flow Model.

Table 18.3 Mining schedule areas/elements

Production type	Production element	Units
Area mined	Resource area mined	m^2
	Ledging area mined	m^2
	Stoping area mined	m^2
Face length mined	Ledging face length mined	m
	Stoping face length mined	m
Development	Working cost development metres	m
	Working cost re-development metres	m
	Project capital development metres	m
	SIB capital development metres	m
Ore production	Resource tonnage mined	tonnes
	Ore delivered to concentrator tonnage	tonnes
	4E delivered to concentrator content	g 4E
	4E delivered to concentrator content (post MCF)	g 4E
	Platinum content	oz
	Palladium content	oz
	Rhodium content	oz
	Gold content	oz
	Nickel content	tonnes
	Copper content	tonnes
	Ruthenium content	oz
	Iridium content	oz
	Cobalt content	tonnes
	Chromium content	oz

Source: Cash Flow Model, 2015

In terms of the PGE metals osmium has been ignored from the Cash Flow Model and this is not currently refined and sold. The average prill splits and base metal grades provided as part of the production inputs for the Cash Flow Model are summarised in terms of Merensky ore and UG2 ore are shown in Table 18.4.

Table 18.4 Rustenburg Operations prill splits and base metal grades

Metal	Unit	Merensky	UG2
Platinum	% 4E	64.1	54.3
Palladium	% 4E	27.3	34.8
Rhodium	% 4E	4.0	10.2
Gold	% 4E	4.6	0.8
Total 4E		100.0	100.0
Ruthenium	% 6E	8.0	14.6
Iridium	% 6E	1.6	3.4
Nickel	%	0.114	0.108
Copper	%	0.009	0.010
Cobalt	%	0.013	0.018

Source: Cash Flow Model, 2015

The production tonnages and head grades used in the Cash Flow Model are supported by the Mineral Reserve Statement provided in Section 8.2. Only Proved and Probable Mineral Reserve is included in the Cash Flow Model.

The processing schedule reflects RoM ore production from the Investment Centres outlined in Table 8.2 (Section 8.1) and processed at the Waterval Retrofit concentrator and the Waterval UG2 concentrator as well as tailing dump re-treatment. Tailings re-treatment currently comprises the separate WLTR plant that has limited remaining life, whilst the extensive Waterval tailings, are planned to be processed through the Waterval Retrofit concentrator, utilising spare capacity from the treatment of RoM. In addition to the mining production areas tabulated in Table 18.3, the following process parameters have been used as inputs to the Cash Flow Model, as shown in Table 18.5.

Table 18.5 Processing schedule elements/areas

Production type	Production element	Units
Process production	Concentrate tonnage	tonnes
	Platinum recovered	oz
	Palladium recovered	oz
	Rhodium recovered	oz
	Gold recovered	oz
	Nickel recovered	tonnes
	Copper recovered	tonnes
	Ruthenium recovered	oz
	Iridium recovered	oz
	Cobalt recovered	tonnes
	Chromium recovered	oz

Source: Cash Flow Model, 2015

All recovered content is assumed equivalent to metal produced for revenue purposes, while chromium content is used in the assessment of offtake penalties and for CRP head feed. The metals are contained in a concentrate that is being delivered to RPM's refining and smelting facilities. The concentrate is delivered in a slurry form from the Waterval processing facilities to the adjacent RPM Waterval smelter complex.

In addition to the RoM and tailings re-treatment facilities a CRP is operated by a third party to recover a chromite concentrate from the UG2 concentrator tailings. The production of the CRP has been modelled to include this as a contribution to net revenue for the Rustenburg Operations.

The DRA production projections commence 1 January 2015 but only the projections commencing 1 October 2015 have been used as part of the Cash Flow Model to respect the model start date of 1 October 2015. The modified schedule does not account for any differences between forecast and actual production for the period 1 January 2015 to 30 September 2015.

Actual RoM production for the period January 2015 to September 2015 is 4% higher in terms of tonnes processed and 3% lower in terms of 4E metal contained in concentrates, than reflected by the original schedule. Production at Thembelani has been lower than planned but the overall shortfall has been reduced by positive variances at other shafts. The overall shortfall in tonnes and recovered ounces compared to the LoM RoM tonnage and recovered ounces of 168.6 Mt and 18.0 Moz is not material and the use of the original projections from 1 October 2015 are considered to be still appropriate.

Metal prices and fiscal assumptions

Commodity price forecasts for platinum, palladium, rhodium, gold, nickel, copper and cobalt as well as for the ZAR/US$ exchange rate have been taken from an institutional consensus forecast as at August 2015. The consensus forecast comprises 17 institutions that have provided price forecasts between July 2015 and August 2015 and provides nominal metal prices for the next five years (2015 to 2019) and a long term real price in mid-2015 money terms. The median consensus price forecast has been used as an input to the Cash Flow Model. The prices for ruthenium and iridium have been provided by SFA (Oxford). The metal price and exchange rate assumptions from the consensus forecast are shown in Table 18.6.

Table 18.6 Price and exchange rate assumptions (Real)

Metal	Unit	2015	2016	2017	2018	2019	LT
Platinum	US$/oz	1,173	1,224	1,317	1,407	1,389	1,500
Palladium	US$/oz	778	813	862	875	827	850
Rhodium	US$/oz	1,118	1,371	1,772	1,822	2,296	1,750
Gold	US$/oz	1,194	1,170	1,197	1,173	1,183	1,200
Ruthenium*	US$/oz	58	58	58	58	58	58
Iridium*	US$/oz	500	500	500	500	500	500
Nickel	US$/lb	6.23	7.11	7.39	7.70	7.81	8.16
Copper	US$/lb	2.69	2.69	2.87	3.05	2.87	2.95
Cobalt	US$/lb	13.6	13.2	12.9	12.7	12.3	11.9
Exchange rate	US$1:ZAR	11.98	11.92	11.83	11.44	11.51	11.93

Source: ICF, 2015
*Note: * Price forecast from SFA (Oxford), 2015*

The exchange rate and US denomintated metal prices for 2015 are recognised as different to the current exchange rate and spot prices. However in ZAR terms the metal prices are more comparable with the consensus 2015 price for platinum and palladium some +3% and -2% to current prices respectively. The current rhodium price in ZAR terms is significantly lower than the 2015 consensus price, but this is compensated for by a stronger ZAR gold price. Overall the weighted 4E consensus basket price is some 5% higher than current prices. The consensus price forecast projects a long term 4E basket price that is some 20% higher, in ZAR terms, than that forecast for 2015. The long term 4E basket price has been applied in the Cash Flow Model from 2020 onwards.

A nominal cash flow forecast has been undertaken commencing 1 October 2015 using an assumption for US CPI of 2.3% and SA CPI of 5.6% (Bloomberg, Dec 2014). Inflation has been applied to prices and costs from 2016 onwards. The ZAR/US$ exchange rate was modelled according to these assumptions for CPI assuming purchasing power parity.

Purchase and toll treatment of concentrate

The net revenue in the Cash Flow Model is based on the terms and conditions of the sale and toll treatment of concentrate agreement entered into between Sibanye and RPM for the concentrate generated by the Rustenburg Operations. The agreement principally comprises purchase of concentrate ("PoC") terms and conditions for all metals modelled in the Cash Flow Model to end Dec 2018 followed by toll treatment terms and conditions for the 4E metals (platinum, palladium, rhodium and gold) for a further eight years to end Dec 2026. During the toll treatment period the remaining metals (nickel, copper, ruthenium, iridium and cobalt) will continue to be subject to PoC terms and conditions. For the purposes of the Cash Flow Model, the toll treatment period terms and conditions have been continued beyond 2026 for the LoM.

The terms and conditions have been modelled in the Cash Flow Model including a provision for the application of penalties for specific gravity, chromite content and a minimum concentrate grade. The payment terms for PoC concentrate treatment are assumed as 105 days. The payment terms for the toll treatment of platinum, palladium, rhodium and gold are assumed as 110 days comprising 90 days for the metal to be made available by RPM to Sibanye, 15 days for the sale of the metal by Sibanye and an allowance of 5 days for the longer delivery time for rhodium.

Although there is an upper limit to the metal delivered in concentrate according to an annual schedule for 4E metals over the duration of the agreement, the production forecast in the Cash Flow Model is below this limit.

18.9.2 Operating expenditure ("opex")

Estimates of operating costs have been developed and provided by Cyest for the Investment Centres discussed above, according to the LoM schedule commencing 1 January 2015. The operating costs estimates have been developed in mid-2015 money terms. Cost categories with cost subdivisions are shown in Table 18.7.

Table 18.7 Cost categories with cost sub-divisions

Cost categories and cost categories	
Labour	
Allowances	Housing
Transport for employees	Incentives and bonuses
Education and training	Medical contributions
Employer contributions	Salaries and Wages
Stores	
Mechanical and electrical spares	Materials – process, chemicals, auxiliary, other
Drill steel costs	Other non-primary and adjustments
Explosives	Other supply chain costs
Fuels and lubricants	Support
Health and safety equipment	Tyre expenses
Logistics	
Sundry Expenses	
Administration fees	Insurance
ASSU operations office	Retrenchment expenses
AIDS contributions	Other office expenses
Corporate fees and levies	Other sundry expenses
Environmental rehabilitation cost	Services, maintenance and rentals
Equipment hire	Supply chain costs
External and group security	Shared services
IT SLA	Transport expenses
HR strategy and expenses	Transport of concentrate
Contractors	
Contract mining – open pit	Non-mining contractors
Contract mining – underground	Secondary support
Utilities	
Compressed air	Water
Power	Other

Source: Cyest, 2015

The operating costs used in the Cash Flow Model have had real escalation applied to the categories of labour and utilities to account for anticipated above SA CPI inflation increases to wages and utilities respectively. For labour and utilities real inflation of 2.5% and 7% respectively has been assumed for three years from 2016 to 2018. This results in a long term escalation factor applied to the source costs for labour and utilities of 1.08 and 1.23 respectively. A summary of the Cash Flow Model operating costs for 2016 (first full production year), 2017 and 2018 is given in terms of cost category and Investment Centre in Table 18.8 and Table 18.9, excluding and including real terms inflation.

Table 18.8 Operating expenditure by cost category (ZAR M)

Cost category	Value in ZAR M					
	Mid-2015 money terms			Real		
	2016	2017	2018	2016	2017	2018
Labour	3,267	3,301	3,445	3,348	3,468	3,710
Stores	1,152	1,198	1,225	1,152	1,198	1,225
Sundry expenses	203	203	214	203	203	214
Contractors	418	440	439	418	440	439
Utilities	392	394	407	420	451	499
Shaft head cost	**5,433**	**5,536**	**5,731**	**5,542**	**5,760**	**6,087**
Labour	175	139	139	180	146	150
Stores	400	407	411	400	407	411
Sundry expenses	130	130	130	130	130	130
Contractors	0	0	0	0	0	0
Utilities	344	345	346	368	395	424
RoM processing	**1,049**	**1,021**	**1,026**	**1,078**	**1,078**	**1,114**
Tailings processing	468	216	216	480	230	238
Processing	**1,517**	**1,237**	**1,242**	**1,557**	**1,308**	**1,352**
Overhead	1,377	1,387	1,393	1,395	1,424	1,451
Total operating costs	**8,327**	**8,161**	**8,366**	**8,494**	**8,493**	**8,890**
Unit opex	**Unit costs in ZAR/t**					
Mining	740	720	730	760	750	780
Processing (excl. tailings)	140	130	130	150	140	140
Overhead	190	180	180	190	190	190
RoM operating costs	**1,070**	**1,030**	**1,040**	**1,100**	**1,080**	**1,110**
Total operating costs*	**610**	**740**	**740**	**620**	**770**	**790**

Source: Cash Flow Model, 2015
*Note: * Total operating costs includes tailings and processing costs and additional tailings tonnages*

Table 18.9 Operating expenditure by Investment Centre (ZAR M)

Cost category	Value in ZAR M					
	Mid-2015 money terms			Real		
	2016	2017	2018	2016	2017	2018
Bathopele	1,342	1,378	1,343	1,359	1,413	1,396
Siphumelele	1,125	1,150	1,240	1,152	1,205	1,332
Thembelani	1,486	1,513	1,486	1,519	1,580	1,587
Khuseleka	1,480	1,496	1,662	1,513	1,562	1,773
Shaft head cost	1,049	1,021	1,026	1,078	1,078	1,114
RoM processing	1,049	1,021	1,026	1,078	1,078	1,114
Tailings processing	468	216	216	480	230	238
Processing	1,517	1,237	1,242	1,557	1,308	1,352
Overhead	1,377	1,387	1,393	1,395	1,424	1,451
Total operating costs	**8,327**	**8,161**	**8,366**	**8,494**	**8,493**	**8,890**
Unit opex	**Unit costs in ZAR/t**					
Mining	740	720	730	760	750	780
Processing (excl. tailings)	140	130	130	150	140	140
Overhead	190	180	180	190	190	190
RoM operating costs	**1,070**	**1,030**	**1,040**	**1,100**	**1,080**	**1,110**
Total operating costs*	**610**	**740**	**740**	**620**	**770**	**790**

Source: Cash Flow Model, 2015
*Note: * Total operating costs includes tailings and processing costs and additional tailings tonnages*

The principal cost is labour which represents 61% of Shaft head costs and 48% of total costs. Power represents 7% of total costs and is the principal element of the utility cost category. Explosives and concentrator reagents are the main consumables of the stores cost.

Overhead costs include Central Services, management, group centralised costs ("GCC") and other indirect costs ("OIC"). Central services costs include production services such as centralised railways and engineering workshops, and non-production services such as accommodation and protection services. GCC includes shared services such as IT, accounting and employee services. OIC includes costs such as share based payments, audit fees, and guarantee charges.

The overall impact of the real escalation applied in the Cash Flow Model is to increase costs by 6% above the base costs of which mining is increased by 7% and processing by 6%. The LoM average unit cost is ZAR1,170/t RoM of which mining, processing and overhead comprise ZAR810/t RoM, ZAR150/t RoM and ZAR210/t RoM respectively. Total LoM unit operating cost including the processing of tailings is ZAR780/t (RoM plus tailings).

Mining, processing and overhead operating costs are discussed in detail in Section 8.7 and Section 9.6 and the section above respectively.

18.9.3 Capital expenditure ("capex")

Capex estimates have been provided by DRA and Cyest and reported in the Cash Flow Model according to the principal categories of Project capital and SIB capital. For mining, Project capital comprises infrastructure capital provided by DRA and capital development provided by Cyest. Capital development is for waste development necessary to replace productive capacity up to the first three crosscuts on each new half level. SIB capital includes capital required for business continuity and not included in the above classification. All processing, TSF and overhead capital estimates have been provided by DRA. A summary of the capital costs included in the Cash Flow Model including contingencies is shown in Table 18.10 and Table 18.11.

Table 18.10 Real capital cost by cost category (ZAR M)

Cost category	Value in ZAR M				
	LoM	2015	2016	2017	2018
Mining capex					
SIB capex	10,823	129	542	553	566
Project capex	4,367	41	503	589	754
Mining total capex	**15,190**	**170**	**1,045**	**1,142**	**1,320**
Processing capex					
SIB capex	124	17	47	32	28
Project capex	22	-	22	-	-
Processing total capex	**147**	**17**	**69**	**32**	**28**
Overhead SIB capex					
SIB capex	1,227	16	80	54	47
Project capex	-	-	-	-	-
Overhead SIB capex	**1,227**	**16**	**80**	**54**	**47**
Total SIB capex	12,174	161	669	639	641
Total Project capex	4,389	41	525	589	754
Grand total capex	**16,564**	**203**	**1,194**	**1,228**	**1,396**

Source: Cash Flow Model, 2015

Table 18.11 Real capital cost by Investment Centre (ZAR M)

Cost category	Value in ZAR M				
	LoM	2015	2016	2017	2018
Bathopele	3,715	91	367	325	349
Siphumelele	4,395	18	235	283	305
Thembelani	3,821	29	158	176	228
Khuseleka	3,259	33	285	357	438
Mining	15,190	170	1,045	1,142	1,320
Processing	147	17	69	32	28
Overhead	1,227	16	80	54	47
Total capital cost	**16,564**	**203**	**1,194**	**1,228**	**1,396**

Source: Cash Flow Model, 2015

Mining SIB capital represents 7.8% of shaft head costs. Mining project capital totals ZAR4,367 M and is scheduled each year until 2028 with over 55% expended in the first five years. The level of contingency contained in the Project capex is 15%. Mining SIB capital is scheduled evenly during production with a maximum not exceeding 10% of shaft head costs in any one year. SIB capital is not planned for the two years prior to the end of mine life. Processing capital costs, Project capital and SIB, are only planned to end 2018 and according to the schedule above. DRA has made an allowance for continued SIB capital for processing, as part of operating costs.

Overhead SIB capex provides for ongoing costs associated with maintenance of the centralised facilities such as potable water supply, railways and railway control systems, security and security systems, road repairs, and the supply of water and compressed air. Overhead SIB capital costs have been planned, similarly to mining SIB, until the last two years of production and represent 3.5% of overhead operating cost overall, and not exceeding 6% in any one year.

Mining, processing and overhead capital costs are discussed in detail in Section 8.7, Section 9.8 and the section above respectively.

18.9.4 Mineral royalties and taxes

State royalties have been determined according to the requirements of the Royalty Act. The Royalty Act includes different rates for unrefined and refined metals according to the following formula.

- Royalty rate (Unrefined) = 0.5 + [EBIT/(Gross sales x 9)] x 100 with a maximum of 7%; and,
- Royalty rate (Refined) = 0.5 + [EBIT/(Gross sales x 12.5)] x 100 with a maximum of 5%.

The agreement between Sibanye and RPM includes a PoC treatment period whereby concentrate is sold to RPM followed by toll treatment of the 4E metals such that the refined 4E metals are available for sale by Sibanye. The mineral royalty payment has been modelled in the Cash Flow Model by using the unrefined royalty rate calculation during the PoC treatment period (to end-2018) and the refined royalty rate calculation for the toll treatment period (the remainder of the LoM after 2018). The toll treatment of concentrate is limited to the 4E metals, but as these comprise over 95% of the payable revenue the refined royalty rate calculation has been applied to all metals for simplicity.

The average mineral royalty percentage reflected in the Cash Flow Model is 2.1% of revenue.

In addition to the State mineral royalty, a royalty is payable to the Royal Bafokeng Nation (“RBN”) for the rights to mine and recovery of minerals from certain mining areas.

The corporate tax rate in South Africa is 28% and all capital expenditure is deducted for tax purposes in the year that it is incurred. Unredeemed capital balances are allowed to be carried forward. There is zero starting unredeemed capital balance in the Cash Flow Model.

Secondary tax on companies (“STC”) in South Africa has been replaced by a dividend tax from 1 April 2012 which is not applicable at a company level and has therefore been excluded from the Cash Flow Model.

The revenues and all costs reflected in the Cash Flow Model are stated to be excluding value added tax (“VAT”).

18.9.5 Working capital

Debtors' for the various commodities were determined using the payable days discussed in Section 18.9.1 (Sub-section: Purchase and toll treatment of concentrate) and principally comprise 105 days for PoC treatment and 110 days for toll treatment of concentrate. Payment terms for all creditors' are assumed as 30 days. A working capital starting balance of ZAR2,223 M was provided by Rustenburg Operations. Changes in the projected working capital requirements per period have been modelled using the Nominal Cash Flow Model. The results reported for the Real Cash Flow Model reflect the de-escalated changes in working capital derived from the Nominal Cash Flow Model.

18.9.6 Discount rate and basis of valuation assumptions

The nominal discount rate has been determined according to the weighted average cost of capital ("WACC") with the cost of equity calculated using the capital asset pricing model ("CAPM") method. An average cost of debt of 8% has been provided by Sibanye as well as gearing of 20%. The principal assumptions used to calculate the cost of equity include assumptions for a risk free rate of 8%, a market premium of 6% and a beta of 1.37. The beta value represents a 20% premium to the industry average of South African traded platinum producers over the last seven years of 1.14. The WACC determined discount rate is calculated as 14.1% (nominal) and 8.0% (real) assuming SA CPI of 5.6%.

The valuation of the Mineral Asset is undertaken on a 100% stand-alone basis. The free cash flow, post-of tax and mineral royalties, but before any interest and financing costs, was discounted to determine a NPV for the entity using the discount rate provided above. The valuation date used for discounting is 1 October 2015.

18.9.7 Other considerations

Mining companies are required to make a financial provision for environmental closure and rehabilitation. A closure cost of ZAR801 M (mid-2015 money terms) from the updated closure liability assessment prepared by SRK in 2015 was used in the Cash Flow Model. The outstanding balance is funded from the forecast cash flow, assuming a starting trust fund balance of ZAR284 M provided by RPM. More details on environmental closure and rehabilitation are provided in Section13.5.

A corporate social responsibility charge equivalent to 1% of the after tax operating cash flow has been included as an additional cost in the Cash Flow Model.

18.9.8 Abridged Cash Flow Model

An abridged report of the Nominal and Real Cash Flow Model on a LoM basis incorporating the assumptions discussed above for production, revenue and cost is shown in Table 18.12 and Table 18.13.

Table 18.12 Abridged Cash Flow Model, 2015 to 2041 (Nominal)

Component	Unit	Total	2015 Q4	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025/34	2035/44*
RoM tonnes	Mt	168.6	1.8	7.3	7.6	7.8	7.9	8.2	8.4	9.0	9.2	8.9	65.4	26.9
Tailings tonnes	Mt	93.1	1.3	6.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	34.2	23.9
Milled tonnes	Mt	261.7	3.1	13.7	11.1	11.3	11.3	11.6	11.9	12.5	12.6	12.3	99.6	50.8
6E recovered	Moz	22.48	0.24	0.98	0.96	0.99	1.01	1.07	1.12	1.17	1.15	1.10	8.65	4.03
Basket price	ZAR/oz	25,331	10,034	11,075	13,349	14,284	15,312	17,062	18,031	18,989	19,916	20,962	27,294	42,396
Net revenue	**ZAR M**	**562,703**	**2,599**	**11,165**	**12,424**	**13,695**	**15,159**	**17,709**	**19,655**	**21,430**	**22,023**	**22,294**	**232,270**	**172,278**
Shaft head cost	ZAR M	278,784	1,381	5,853	6,424	7,168	8,056	8,591	9,223	10,034	10,456	10,609	118,278	82,712
Concentrator cost	ZAR M	69,211	389	1,645	1,459	1,592	1,718	1,830	1,943	2,082	2,206	2,314	28,131	23,903
Overhead cost	ZAR M	75,271	361	1,473	1,588	1,708	1,805	1,920	2,039	2,181	2,311	2,425	29,984	27,475
Total operating cost	**ZAR M**	**423,267**	**2,131**	**8,970**	**9,471**	**10,469**	**11,579**	**12,341**	**13,206**	**14,297**	**14,974**	**15,348**	**176,392**	**134,090**
Project capital	ZAR M	5,729	41	555	657	888	731	543	523	463	355	272	702	0
SIB capital	ZAR M	22,709	161	706	713	755	807	857	898	995	1,024	1,057	10,223	4,513
Total capital cost	**ZAR M**	**28,438**	**203**	**1,261**	**1,370**	**1,644**	**1,537**	**1,400**	**1,421**	**1,458**	**1,379**	**1,329**	**10,925**	**4,513**
CF after capex	ZAR M	110,998	265	934	1,584	1,583	2,044	3,969	5,028	5,675	5,671	5,617	44,953	33,675
Royalties	ZAR M	13,998	42	160	238	244	239	406	534	599	627	625	5,449	4,835
Income tax	ZAR M	27,767	62	217	377	375	505	998	1,268	1,432	1,430	1,416	11,255	8,434
Other	ZAR M	2,133	6	28	37	42	47	67	81	91	91	91	846	706
WC changes	ZAR M	2,223	651	-677	-367	-253	-617	-800	-536	-466	-135	-47	-143	5,614
FCF (100%)	**ZAR M**	**69,322**	**806**	**-148**	**564**	**668**	**635**	**1,698**	**2,609**	**3,088**	**3,388**	**3,438**	**27,260**	**25,314**
DCF (at 14.1% DR)	**ZAR M**	**13,310**	**799**	**-132**	**442**	**459**	**382**	**895**	**1,206**	**1,251**	**1,203**	**1,070**	**4,568**	**1,163**

Source: Cash Flow Model, 2015
Note: CF – Cash flow; WC – Working capital; FCF – Free cash flow; DCF – Discounted cash flow; DR – Discount Rate
** LoM end is 2041. Working capital extends to 2042*

Table 18.13 Abridged Cash Flow Model, 2015 to 2041 (Real)

Component	Unit	Total	2015 Q4	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025/34	2035/44*
RoM tonnes	Mt	168.6	1.8	7.3	7.6	7.8	7.9	8.2	8.4	9.0	9.2	8.9	65.4	26.9
Tailings tonnes	Mt	93.1	1.3	6.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	34.2	23.9
Milled tonnes	Mt	261.7	3.1	13.7	11.1	11.3	11.3	11.6	11.9	12.5	12.6	12.3	99.6	50.8
6E recovered	Moz	22.48	0.24	0.98	0.96	0.99	1.01	1.07	1.12	1.17	1.15	1.10	8.65	4.03
Basket price	ZAR/oz	12,432	12,432	12,432	12,432	12,432	12,432	12,432	12,432	12,432	12,432	12,432	12,598	12,207
Net revenue	**ZAR M**	**274,849**	**2,599**	**10,573**	**11,141**	**11,630**	**12,191**	**13,486**	**14,174**	**14,635**	**14,242**	**13,652**	**106,936**	**49,590**
Shaft head cost	ZAR M	136,791	1,381	5,542	5,760	6,087	6,478	6,542	6,651	6,852	6,762	6,497	54,422	23,816
Concentrator cost	ZAR M	32,659	389	1,557	1,308	1,352	1,382	1,393	1,402	1,422	1,427	1,417	12,771	6,840
Overhead cost	ZAR M	34,927	361	1,395	1,424	1,451	1,451	1,462	1,470	1,490	1,495	1,485	13,608	7,834
Total operating cost	**ZAR M**	**204,377**	**2,131**	**8,494**	**8,493**	**8,890**	**9,311**	**9,398**	**9,523**	**9,763**	**9,683**	**9,399**	**80,802**	**38,489**
Project capital	ZAR M	4,389	41	525	589	754	587	414	377	316	229	166	390	0
SIB capital	ZAR M	12,174	161	669	639	641	649	652	648	680	662	647	4,762	1,363
Total capital cost	**ZAR M**	**16,564**	**203**	**1,194**	**1,228**	**1,396**	**1,236**	**1,066**	**1,025**	**996**	**892**	**814**	**5,152**	**1,363**
CF after capex	ZAR M	53,908	265	884	1,420	1,344	1,643	3,022	3,626	3,876	3,667	3,440	20,982	9,738
Royalties	ZAR M	6,628	42	151	214	208	192	309	385	409	405	383	2,538	1,392
Income tax	ZAR M	13,468	62	205	338	318	406	760	914	978	925	867	5,255	2,439
Other	ZAR M	1,021	6	27	33	36	38	51	58	62	59	56	391	205
WC changes	ZAR M	-1,294	651	-641	-329	-215	-496	-609	-387	-318	-87	-29	-84	1,250
FCF (100%)	**ZAR M**	**31,498**	**806**	**-140**	**506**	**567**	**511**	**1,293**	**1,882**	**2,109**	**2,191**	**2,105**	**12,714**	**6,953**
DCF (at 8.0% DR)	**ZAR M**	**13,310**	**799**	**-132**	**442**	**459**	**382**	**895**	**1,206**	**1,251**	**1,203**	**1,070**	**4,568**	**1,163**

Source: Cash Flow Model, 2015
Note: CF – Cash flow; WC – Working capital; FCF – Free cash flow; DCF – Discounted cash flow; DR – Discount Rate;
** LoM end is 2041. Working capital extends to 2042.*

18.9.9 Net present value ("NPV")

NPV, internal rate of return ("IRR") and payback time are typically used as indicators of project performance and for valuation using the Cash Flow Approach. As the Rustenburg Operations form an operating mine and there is no initial capital investment required, NPV is considered the most appropriate indicator of economic performance for this Mineral Asset. The discounted free cash flow in the Cash Flow Model, and as summarised, reflects a NPV of ZAR13,310 M for 100% of the Mineral Asset, using a discount rate of 8.0% (Real) for the production of some 168.6 Mt at a grade of 3.9 g/t 4E for some 21.1 Moz of 4E metals over a LoM period of 26 years.

The Level 1 resources that are supported by currently approved project capital expenditure represent a ZAR7,810 M component of NPV (that includes ZAR2,223 M in initial working capital). These Level 1 resources represent some 76.4 Mt at a grade of 3.6 g/t 4E for some 8.9 Moz of 4E metals produced over a 12 year period. The Level 2 UG2 resources therefore represent an improvement in NPV of ZAR5,500 M for an additional 92.2 Mt at a grade of 4.1 g/t 4E for some 12.2 Moz of 4E metals, and an extension to the mine plan of 14 years. The Level 2 projects represent additional Mineral Reserve to that declared as at 31 December 2014. See Section 8.5.

The average platinum price and 6E basket price in the Cash Flow Model is ZAR17,430/oz (Pt) and ZAR12,430/oz (6E) respectively. The sensitivity of the NPV of the cash flow analysis to discount rate is shown in Section 18.9.10.

18.9.10 Sensitivity analysis

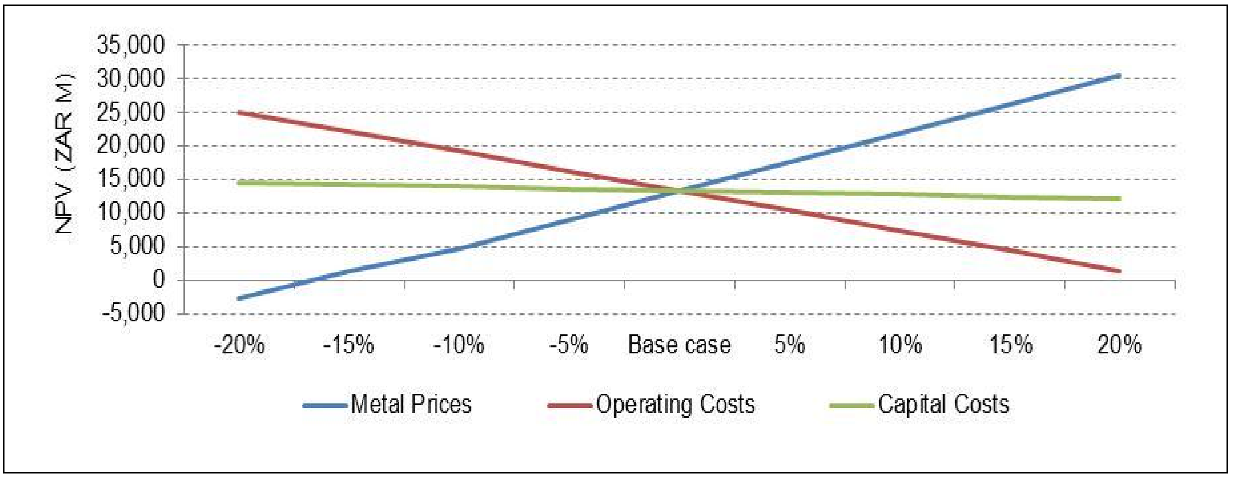
The cash flow analysis presented in Table 18.12 was subjected to a high level sensitivity in terms of NPV for the principal components of metal price, operating cost and capital cost. The results of this sensitivity analysis at the base discount rate of 8.0% (real) are reported in Table 18.14 and Figure 18.1.

Table 18.14 High level sensitivity analysis

Sensitivity range	Value in ZAR (M)		
	Metal prices	Operating expenditure	Capital expenditure
-20%	-2,780	25,110	14,470
-15%	1,220	22,150	14,170
-10%	4,680	19,190	13,900
-5%	8,980	16,220	13,600
Base case	**13,310**	**13,310**	**13,310**
5%	17,590	10,350	13,010
10%	21,910	7,380	12,710
15%	26,230	4,400	12,410
20%	30,550	1,270	12,100

Source: Cash Flow Model, 2015

Figure 18.1 Sensitivity analysis



Source: Cash Flow Model, 2015
Note: DR – Discount rate

The Cash Flow Model is most sensitive to metal prices including the US$:ZAR exchange rate and secondly to operating costs. The Cash Flow Model is least sensitive to capital cost changes, as capital costs are less than 10% of total costs and the Mineral asset is an ongoing operation. The NPV (at 8.0%) reduces to zero when metal prices are 16% below base case commodity price assumptions. The NPV reduces to zero when operating costs are 23% higher than that of the base case

The sensitivity of the base case NPV to discount rate is shown in Table 18.15.

Table 18.15 Sensitivity to discount rate

Discount rate (Real)	Base case value (ZAR M)
7.0%	14,630
Base case at 8.0%	**13,310**
9.0%	12,250
10.0%	11,270
11.0%	10,410

Source: Cash Flow Model, 2015

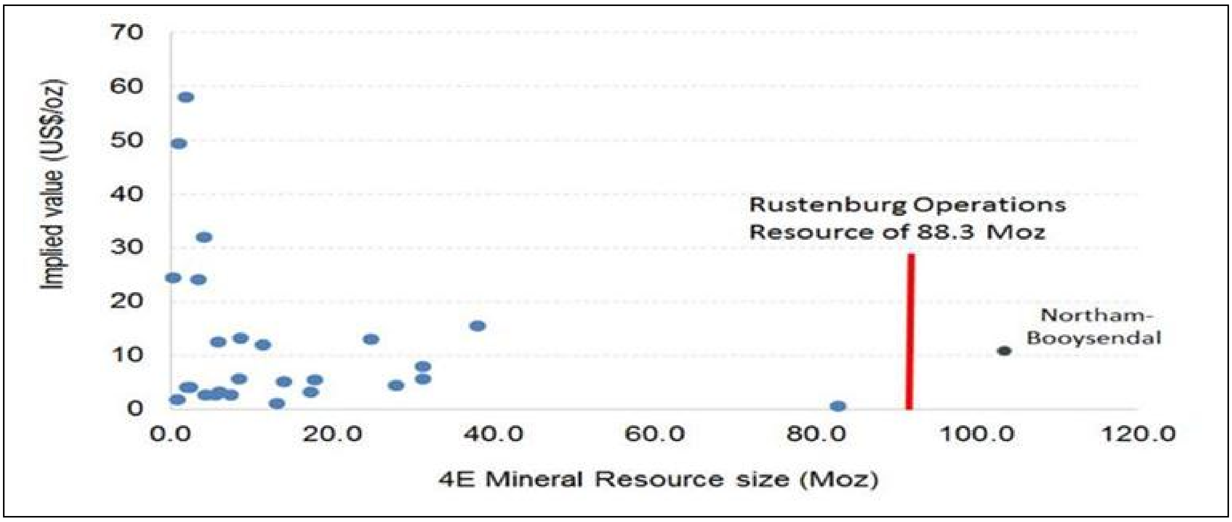
18.10 Market Approach Valuation

SV 2.8

The second valuation method for Rustenburg Operations production and development properties is based on the Market Approach using comparable transactions. The Market Approach relies on the principle of "willing buyer, willing seller" and assumes that the amount received from the sale of the asset is determined on an arm's length basis. The methodology follows comparison of the asset under consideration to relatively recent asset transactions with similar characteristics. This approach is generally based upon a monetary value per unit of Mineral Resource, or where available, Mineral Reserve.

The relative infrequency of recent platinum transactions, particularly of operating assets, necessitates the use of data extending back to August 2007. Snowden has reviewed several historical transactions which can broadly be divided into two groups, namely transactions relating to pre-production assets (27 transactions were considered) that primarily comprise Mineral Resources only, and operational transactions that include both Mineral Resources and Mineral Reserves (eight transactions were considered). The implied values per Mineral Resource unit for the pre-production transactions are illustrated in Figure 18.2. The average implied value for Mineral Resources associated with pre-production assets is US$12.03/oz.

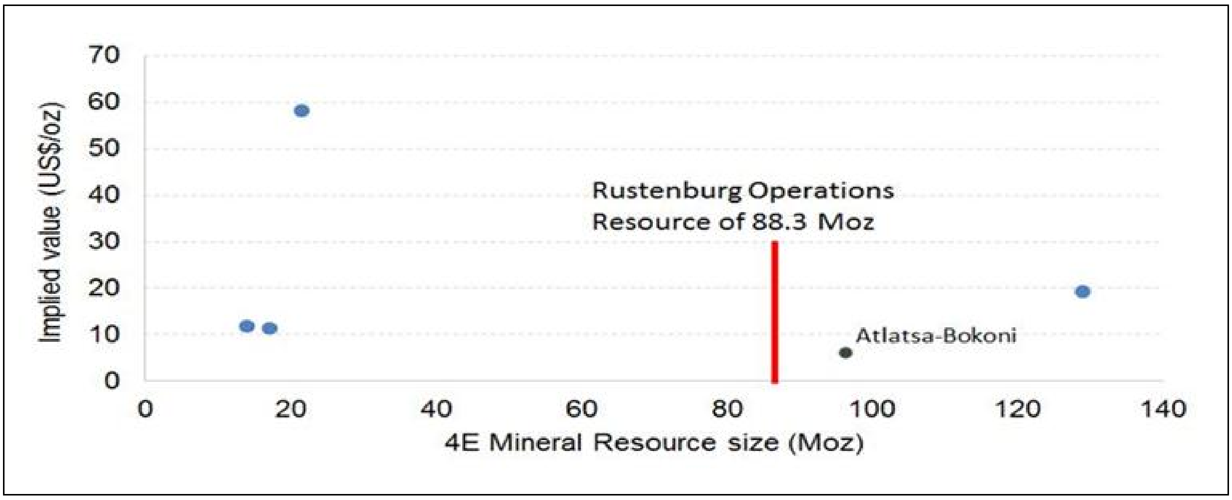
Figure 18.2 Implied unit values for pre-production PGE mineral assets/ transactions



Source: Snowden, 2015d

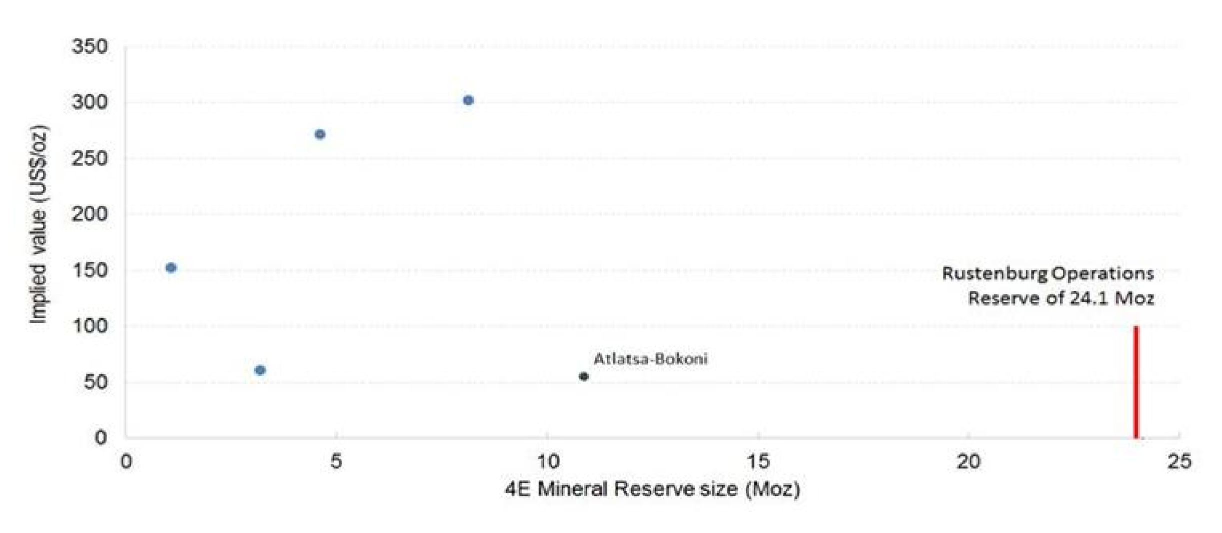
In total, eight historic transactions relating to operating assets were evaluated. However, of these, three were not considered comparable as the transactions included related parties and share "buy backs" and thus are not considered "arm's length" transactions. On the basis of the transaction value for the remaining five transactions, the implied value for the Mineral Resources and Mineral Reserves are illustrated in Figure 18.3 and Figure 18.4 respectively.

Figure 18.3 Implied Mineral Resource unit values for operational PGE mines/ transactions



Source: Snowden, 2015d

Figure 18.4 Implied Mineral Reserve unit values for operational PGE mines/ transactions



Source: Snowden, 2015d

Due to the limited number of comparable operating asset transactions, as well as the fact that most transactions were completed in significantly different PGE market conditions (2007 to 2010) to those experienced today, a further comparison to current market trading multiples has been undertaken. This process has determined the current enterprise value ("EV") for the larger JSE listed PGE companies, defined as a company's market capitalisation and debt, minority interests and preferred shares; less total cash and cash equivalents, as at 1 October 2015. Mineral Resources and Mineral Reserves were used to determine an implied EV US$ per ounce of PGE. The EV determination was based on information obtained from Bloomberg (2015) and confirmed by Snowden; and is shown in Table 18.16 below.

Table 18.16 Listed PGE mining companies' EV and implied Resource/ Reserve values

Listed mining company	Enterprise Value (US$ M)	Attributable 4E Moz		EV per Resource ounce (US$/oz)	EV per Reserve ounce (US$/oz)
		Resources	Reserves		
Northam	1,296.2	194.4	19.2	6.67	67.69
RB Plats	537.2	32.0	7.1	16.76	75.22
Lonmin	537.5	179.1	42.4	3.00	12.68
Implats	2,254.8	368.0	46.2	6.13	48.81
AAPL	5,587.0	919.3	206.0	6.08	27.12

Source: Bloomberg, 2015
Note: EV – Enterprise Value, as at 1 October 2015; Northam – Northam Platinum Limited; RB Plats – Royal Bafokeng Platinum Limited; Implats – Impala Platinum Holdings Limited; AAPL – Anglo American Platinum Limited; RS – Rustenburg Section/ Rustenburg Operations

As would be expected, there is a wide range in unit values as these numbers depend upon a variety of factors, including:

- Stage of development (early stage inferred resources, drill-indicated resources or measured resources) ;
- Geographic location within the BC (Western, Eastern or Northern limbs);
- Primary reef type (Merensky, UG2 or Platreef);

- Depth and attitude of the deposit (underground or open pit);
- Quality and grade of the resource;
- Expected size of the deposit;
- Likely metallurgical recoveries;
- Location (type of infrastructure available, including other processing plants in the area);
- Income tax and royalty structure;
- Third party interests in the property, including BEE interests;
- Level of technical study (scoping study, pre-feasibility study, feasibility study, etc.);
- Mining Rights and Prospecting Rights, IWULAs, and other rights granted;
- Long term price outlook for PGE; and,
- Exploration potential, etc.

18.10.1 Implied value for the Rustenburg Operations

In spite of a relatively wide range of unit values presented above, a narrower range has been selected by identifying historical transactions with similar attributes.

Snowden notes that when valuing mineral assets based on implied Mineral Resource values (including both pre-production and operational assets), which contain a large Mineral Resource (Figure 18.2 to Figure 18.3), typically above 25 Moz, the implied US$/oz values range between US$0.60/oz and US$19.10/oz, with an average value of US$9.20/oz. Snowden is of the opinion that the Rustenburg Operations is most comparable to the Atlatsa – Bokoni transaction, with an implied value of US$6.21/oz, due to a comparable resource size and similar PGE prices at the time of the transactions. Furthermore, this value is also aligned to the current EV per mineral resource trading multiples current observed on the JSE listed companies.

The range of implied Mineral Reserve values is between US$55.09/oz and US$302.09/oz with an average value of US$168.13/oz. Importantly, the range of transactions considering Mineral Reserves is limited and Snowden notes that the Rustenburg Operations contain almost double the Mineral Reserves of the next largest historical transaction on a Mineral Reserve basis. Similar to the reason(s) above, Snowden is of the opinion that the Rustenburg Operations is most comparable to the Atlatsa – Bokoni transaction, which contains the largest Mineral Reserve base with an implied value of US$55.09/oz, which is broadly in line with the currently observed EV per Mineral Reserve ounce trading multiples.

Sibanye Gold – RPM transaction

On 9 September 2015, Sibanye reported the intended acquisition of Rustenburg Operations from RPM, through one of its subsidiaries, SRPM, for an upfront consideration of ZAR1.5 B in cash or shares and a deferred consideration equal to 35% of the distributable free cash flows generated by the Rustenburg Operations over a six year period, subject to a minimum nominal payment of ZAR3.0 B (referred to as “the Transaction”). Sibanye has reported that should there still be an outstanding balance at the end of the six year period, Sibanye has the option to elect to extend the period by a further two years. Any remaining balance at the end of this period will be settled by Sibanye either in cash or shares. The Transaction agreements comprise a sale and purchase agreement, sale and toll treatment of concentrate agreement, use and access agreement and parent company guarantee. The implementation of the Transaction is both subject to and conditional on the fulfilment of conditions precedent customary for a transaction of this nature.

The total Mineral Resource for this Transaction is 88.3 Moz 4E, excluding Royalty ground (Table 18.1). The total Mineral Reserve (including all surface and underground Mineral Reserves, with tail cut applied as at 1 October 2015) is 24.12 Moz 4E (Table 18.2). On the basis of the implied valuation metrics outlined above, Table 18.17 shows the implied and preferred value ranges for the Rustenburg Operations.

Table 18.17 Implied and preferred value ranges for Rustenburg Operations

Component	Unit	Total Resource/ Reserve	Implied value			
			Low	Average	High	Preferred
Mineral Resources						
Mineral Resource estimate	Moz	88.26				
Implied unit value	US$/oz		0.60	9.20	19.20	6.21
Implied value	US$ M		53	812	1,695	548
Implied value*	ZAR M		737	11,295	23,572	7,624
Mineral Reserves						
Mineral Reserve estimate	Moz	24.12				
Implied unit value	US$/oz		55.09	168.13	302.09	55.09
Implied value	US$ M		1,328	4,052	7,280	1,328
Implied value*	ZAR M		18,467	56,362	101,270	18,467

Source: Snowden, 2015d
*Note: * Exchange rate used of US$1:ZAR13.91*

Due to the relatively large Mineral Reserve base associated with the Rustenburg Operations, in comparison to historic transactions, Snowden does not consider the Mineral Reserve implied values to accurately reflect a true value for the Rustenburg Operations. As such Snowden's preferred value range for the Rustenburg Operations is on the basis of an implied Mineral Resource value.

18.10.2 Market Approach Valuation summary

For the reasons contemplated above, comparable PGE properties range between US$6.21/oz Atlatsa – Bokoni transaction (an operating mine) and US$10.95/oz (Northam – Booysendal transaction, pre-production mineral asset), for mineral assets that are comparably similar. An upper and lower in-situ implied value has been calculated using US$10.95/oz and US$6.21/oz respectively, as shown in Table 18.18.

Positive considerations for Rustenburg Operations include the following: it is the world's fifth largest platinum producer; has a long LoM with significant production scalability; developed infrastructure, which supports LoM and stand-alone operations; extension and optionality in the Mineral Asset base; value enhancing chrome recovery and tailings retreatment operations in place; sustainable PoC terms that provide secure off-take for Sibanye; and an experienced management team and labour workforce.

Negative considerations include the following: old shafts and concentrators relative to other platinum operations; it is a mid to high unit cost per ounce platinum producer.

Snowden is of the opinion that Rustenburg Operations is more comparable to the Atlatsa – Bokoni transaction, the Bokoni Mine has a large resource size, a significant Mineral Reserve (although approximately half the size of Rustenburg Operations), developed infrastructure, and similar PGE metal prices at time of transaction.

In real terms, current platinum prices of some US$1,000/oz and exchange rate of approximately US$1:ZAR13.91 are comparable to the prices prevalent at the time of the Atlatsa – Bokoni transaction of July 2009 (US$1,200/oz and exchange rate of approximately US$1 :ZAR8.50) used to support the Market Approach Valuation.

Balancing the positive and negative considerations, whilst comparing to the Northam – Booysendal transaction and Atlatsa – Bokoni transaction, Snowden consider a fair value to be closer to the Atlatsa – Bokoni transaction implied values of US$6.21/oz. A preferred value of US$6.21/oz has been applied to the Mineral Asset value, as shown in Table 18.18.

Table 18.18 Derivation of in-situ Resource unit value in US$/4E oz

Component	Unit	Lower limit	Preferred value	Upper limit
Implied value per ounce	US$/oz	6.21	6.21	10.95
Implied value for Rustenburg Operations	US$ M	548	548	966
Implied value for Rustenburg Operations	ZAR M	7,620	7,620	13,440
Actual Rustenburg Operations transaction, Sept 2015*	US$/oz		3.66	

Source: Snowden, 2015a
*Note: * Transaction added for comparative purposes; rounding applied to ZAR values*
Exchange rate used of US$1:ZAR13.91

A Market Approach value of US$548 M (or ZAR7.6 B) in comparison to the DCF base value of US$957 M (or ZAR13,310 M) is noted, using a 1 October 2015 exchange rate of ZAR13.91:US$1.

18.11 Valuation date

SV 2.9

The compilation of this CPR is based on technical and financial data gathering undertaken between 1 October 2014 and 9 December 2015. The Report Date is 9 December 2015; and the Valuation Date is 1 October 2015.

18.12 Range of Values

SV 2.15

The base case discount rate for the Cash Flow Approach has been determined using a WACC and CAPM methodology. As discussed above, the average performance of South African traded platinum producing companies has been used to determine a beta of 1.37 that supports the nominal and real discount rates of 14.1% and 8.0% respectively and the base case NPV. Using the same set of data for these companies, a minimum and maximum beta value of 0.80 and 1.90 has been determined. Application of these upper and lower beta values results in a lower and upper real discount rate of 5.3% and 10.7% respectively. Applying these discounts to the Cash Flow Model results in a lower and upper NPV of ZAR10,650 M and ZAR17,240 M respectively. The Market Approach results in a lower and upper Mineral Asset value of ZAR7,620 M and ZAR13,440 M respectively. The Cash Flow Approach and Market Approach lower and upper values are shown in Table 18.19.

Table 18.19 Range of values and Concluding Opinion of Value

Valuation approach	Value in ZAR M		
	Lower	Preferred value	Upper
Cash Flow Approach	10,650	13,310	17,240
Market Approach	7,620	7,620	13,440
Valuator's Concluding Opinion of Value	**10,650**	**13,310**	**17,240**

Source: Cash Flow Model, 2015; Snowden, 2015a
Note: Rounding applied to ZAR values

18.13 Valuation summary and conclusions

SV 2.10, SV 2.15

The preferred valuation method is a Cash Flow Approach, considering the detailed planning that has been undertaken to generate projections that reflect the technical and economic parameters and assumptions existing at the date of this report and supported by extensive operating experience. The Cash Flow Model is most sensitive to metal prices including the US$:ZAR exchange rate and secondly to operating costs.

Therefore the Competent Valuator's Concluding Opinion of Value is the preferred value, according to the Cash Flow Approach, of ZAR13,310 M, using a 8% discount rate (real) for the single, fiscal Project entity. The range of values are shown in the table above (Table 18.19) for the Mineral Asset including a lower and upper value of of ZAR10,650 M and ZAR17,240 M respectively. The preferred value is comparable to the Market Approach upper value of ZAR13,440 M.

Key risks associated with the Mineral Asset are discussed in Section 19.

It must be noted that the forecasts of prices and exchange rates, parameters, plans and assumptions may change significantly over time. Should these change materially, the Valuation determined may be significantly different. The Competent Valuator is under no obligation to advise of any change in circumstances after the effective date of this CPR or to review, revise or update the CPR or opinion.

18.13.1 Forward looking statements

Certain sections of this CPR, other than statements of historical fact, contain forward-looking statements regarding RPM.

Although the authors of this CPR consider the expectations reflected in such forward-looking statements are reasonable, no assurance can be given that such expectations will prove to be correct. Accordingly, results may differ materially from those set out in the forward-looking statements as a result of, among other factors, namely:

- Changes in economic and market conditions;
- Changes in the regulatory environment and other State actions;
- Success of business and operating initiatives;
- Fluctuations in commodity prices and exchange rates;
- Business and operational risk management; and,
- Changes in the actual orebody composition versus the plan.

The authors of this CPR are not obliged to update or release any revisions to these forward-looking statements to reflect events or circumstances after the dates of this report or to reflect the occurrence of unanticipated events.

18.14 Previous Valuations

SV 2.12

The Competent Valuator is not aware of any other public valuations prior to the CPR listing.

18.15 Competent Persons and Other Experts

SV 2.13

The following Competent Valuators have performed the Valuation:

- John Miles (Cash Flow Approach); and,
- Vince Agnello (Market Approach).

Principal Competent Persons include the following, with CV summaries appended in Section 22:

- Quartus Snyman (Mineral Resources); and,
- Frank Egerton (Mining and Mineral Reserves; overall CPR).

Site visits were undertaken as follows:

- Quartus Snyman (RPM) – Multiple visits between 2006 and 2015;
- Bill McKechnie (Snowden) – October 2014;
- Vince Agnello (Snowden) – October 2014;
- Frank Egerton (DRA) – July to October 2015;
- Tony Nyakudarika (DRA) – August 2015 and September 2015; and,
- John Miles (October 2014).

18.16 Competent Valuator

SV 2.14

Competent Valuator certificates have been appended in Section 22.

18.17 Identifiable Component Asset ("ICA") values

SV 2.16

No ICA valuation has been undertaken.

18.18 Historic verification

SV 2.17

The projections reflected in the Cash Flow Model have been compared to relevant historical performance from the start of 2013 to date. Key production, parameters, efficiencies and metrics such as tonnes per working cost development metre, stope tramming width, average face advance, MCF, process recovery factor (“PRF”), stoping area mined per employee, development metres per employee and shaft head manpower per tonne mined have been compared to historical performance. The key parameters and metrics have been found to have been planned in accordance with historical performance.

18.19 Marketing and sales

SV 2.18

The market assessment has been discussed in the Section 17 on PGE markets.

18.20 Audits or reviews

T9C(i)(ii), SV 2.19

The Competent Valuator is not aware of any other public audits or reviews prepared by other independent consultants.

18.21 Other considerations

T10A/B/C(i)

The Competent Valuator does not consider there to be any other material information or opportunities affecting the exploration, Mineral Resource and Mineral Reserves associated with the Mineral Asset.

19 RISK ASSESSMENT

T6A/B/C(i)

Snowden has reviewed the risk profile for Rustenburg Operations, as presented in Table 19.1. Many of the risks are beyond Rustenburg Operations management control. The Company is beholden to South African Government legislation and world financial factors, which are currently uncertain.

Table 19.1 Snowden risk assessment of the Mineral Asset

Risk	Risk assessment	Comment
Property, mineral rights and Mineral Resources		
Mining rights	Low	Mineral rights secured by legal licenses.
Mineral Resources	Low	Significant Measured, Indicated and Inferred Resource.
Surface rights	Medium	Negotiations underway/required with select surface rights for infrastructure.
Land restitution	Low	Limited land cases have occurred in the past; two are pending. No significant litigation expected.
Mining and Mineral Reserves		
Mineral Reserves	Low	Only Proven and Probable Reserves included.
Mine schedule	Low-Medium	Based on reasonable efficiencies and development rates.
Mining method	Low	Mining method in alignment with historic and current systems.
Mining equipment scheduling	Low	Equipment scheduling in alignment with historic and current methodologies/actuals.
Geotechnical engineering	Low	Based on proven mining practices and systems.
Ventilation	Low	The current ventilation planning is sufficient for short and medium term planning.
Planned and future Infrastructure	Low	Existing and planned infrastructure is sufficient for current mine plan, with minor updates required.
Capital expenditure and operating costs	Low	Detailed mine capex and opex estimation has been undertaken to PFS level.
Project planning	Low	Existing brownfield site with dedicated project management teams in place/execution to plan needs to be enhanced.
Labour	Low-Medium	Medium and long term labour schedules and productivity to be addressed.
Processing and tailings		
Process feed grades	Low	Moderate to high degree of confidence in Reserve estimates and historical production.
Process feed tonnes	Low	Feed rates are reasonable for installed capacities.
Recovery	Low	Planned recoveries in line with historic and current recoveries.
Current and future infrastructure	Low	Existing infrastructure can/ has performed to expectation.
Capital expansion	Low	Standard plant technologies to be used for current and planned throughput.
Capital expenditure and operating costs	Low	Detailed plant capex and opex estimation has been undertaken to PFS level, with appropriate contingencies applied.

Risk	Risk assessment	Comment
Infrastructure		
Water	Low	Adequate water supply is available is for current and future requirements, but the overall water management needs to be improved.
Power	Low	Sufficient power is available for current usage
Power availability	Medium	Limited regional power generation uncertainty. Rolling power outages frequent in South Africa. Power considerations to be analysed to constantly update standby power requirements.
Roads	Low	Adequate for medium and long-term. Area is easily accessible with well-maintained tarred and gravel roads.
Environmental, health and safety, labour		
Health and safety	Low	Good safety record for RPM, continuous improvement and high targets are expected to be met and/or exceeded.
Environmental	Medium-High	Ongoing management of dust emissions; contaminated water runoff and seepage; non-mineral waste management; hydrocarbon impacts to exposed soils (contaminated/hazardous waste); and clean and dirty water management, need to be addressed in the short and medium term.
Changes in environmental legislation	Low	Marginal changes expected in current national environmental legislation and associated compliance.
Social/community	Medium	The development of informal settlements around Rustenburg Operations needs to be managed as well as expectations of the adjacent local communities.
Skills base	Low-Medium	Appropriately skilled labour complement for planned expansions.
Skills pool	Low-Medium	Global skills shortage.
Economic, business, country and political risks		
Sales revenue (prices)	Medium	Consensus price forecasts and escalation applied.
Exchange rate	Medium	Consensus exchange rate forecast applied.
Hedging	Low	None in place.
Model base date	Low	Base date of all principal costs and commercial decisions reflected as/on one base date.
Labour costs	Medium	Short-term and medium-term wage agreements are in place.
Local raw material costs	Low	Subject to normal commodity price uncertainty.
Power costs	Medium	Eskom escalations have been factored into power costs, however material increases in Eskom prices can be expected in the short term.
Raw material supply	Low	Proven supply chain.
Disruption to business	Low	Local community dependence on operations; general infrastructure well maintained, low in-house/internal disruptions.
Industrial relations	Low-Medium	Major unions in short and medium term contracts with RPM.
Community relations	Low-Medium	Local residents generally supportive of mine; community factionalism; untenable request for locals to be employed exclusively.
Technical and managerial staff	Low	Experienced trained staff. Experienced management on-site and at head office.
Taxation	Low	Stable South African tax environment.

Risk	Risk assessment	Comment
Insurance	Low	Appropriate insurance in place.
Political, social and economic stability	Low	Political and social environment still in development and may quickly change to low-medium risk. Stable fiscal policies in current regime.
Takeover risk	Low	Requires specialised skill-sets and understanding of Bushveld Western Limb environment.
Exchange control and regulations	Low	Stable monetary policy.
ZAR devaluation	Low	Relatively stable monetary policy.
Expansion through acquisitions and exploration.	Low	Limited degree of opportunity for acquisitions. Material opportunities noted on current and adjacent properties for exploration.
Liability risk	Low	High degree of compliance.
HIV/AIDS risks	Low-Medium	Policies in place.

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21 GLOSSARY AND ABBREVIATIONS

T10A/B/C(ii)

21.1 Glossary

Technical term	Explanation
advance strike gulley	A narrow, near horizontal excavation in the direction of strike on the reef horizon that is used to scrape broken ore from the working face back to the original raise.
alkaline	Alkaline rocks have a high content of Na_2O and K_2O relative to the other oxides.
anorthosite	Anorthosite is an intrusive igneous rock characterised by a predominance of plagioclase feldspar (90–100%), and a minimal mafic component (0–10%). Pyroxene, ilmenite, magnetite, and olivine are the mafic minerals most commonly present.
apatite	Apatite is a group of phosphate minerals.
assay	Chemical analysis of a rock or ore samples to determine the proportions of metals.
audit	Verification of the validity of results.
beneficiation	Any process which removes the gangue minerals from ore to produce a higher grade product (concentrate), and a waste stream (tailings).
biocompatible	A material used in surgical implants that is not harmful or toxic to living tissue.
block model	These represent the deposit as a series of cubes of fixed or variable size. Block models are ideal for massive deposits such as copper, gold or iron ore. The block is located in space with an XYZ coordinate system and attributes of the block store mineral information.
bord and pillar	A mining method, where the pillar size is much larger than the mined out area (bord)
box hole	An opening driven upward from a cross cut in order to remove broken ore.
breast mining/stoping	Breast mining/stoping is a method used in horizontal or near-horizontal orebodies, where gravity is not usable to move the ore around.
Camlock prop	A steel mechanical prop, known as the CAMLOK, is used for temporary support in a stope or development end.
care and maintenance	Care and maintenance is a term used in the mining industry to describe processes and conditions on a closed mine where there is potential to recommence operations at a later date. During a care and maintenance phase, production is stopped but the mine is managed to ensure it remains in a safe and stable condition.
catalyst	A substance that increases the rate of a chemical reaction without itself undergoing any permanent chemical change.
channel sample	A method of sampling rock exposures where a regular series of chips are broken along a defined line on the rock face.
chromite	Chromite is an iron chromium oxide ($Fe_2Cr_2O_4$). It is an oxide mineral belonging to the spinel group.
chromitite	Chromitite is an igneous cumulate composed mostly of the mineral chromite. It is found in layered intrusions such as the Bushveld Complex in South Africa and Stillwater igneous complex in Montana.
Competent Person	In terms of the South African Code for the Reporting of Mineral Resources and Mineral Reserves, 2007 (SAMREC), a 'Competent Person' is a person who is a member of the South African Council for Natural Scientific Professions (SACNASP), or the Engineering Council of South Africa (ECSA), or the South African Council for Professional Land Surveyors and Technical Surveyors (PLATO) or any other statutory South African or international body that is recognised by SAMREC. A Competent Person should have a minimum of five years' experience relevant to the style of mineralisation and type of deposit under consideration and to the activity which that person is undertaking.

Technical term	Explanation
Competent Person's Report	A report produced by a CP, typically submitted as part of the listing documents.
Competent Valuator	A person who possesses the necessary qualifications, ability and sufficient relevant experience in valuing mineral assets.
concentrate	Any treatable product bearing payable metals which is obtained from mining and processing the reef(s) in, on and under mineral properties, arising from the process of crushing and flotation whereby the payable metals, including waste are treated in a concentrator before the commencement of the smelting and refining process and which will be filter cake and not slurry.
concentrator	A processing facility which treats ore to produce concentrate (valuable metals) and rejects (tails).
contact (geological)	The surface between two different rock types.
continuous stream sampler	A tool used to collect a small, but representative sample from a stream of flowing solids.
craton	Large, and usually ancient, stable mass of the earth's crust.
Critical zone	Is strongly layered displaying numerous "magmatic cycles", ranging from pyroxenites to norite to anorthosite, with occasional chromitite layers. The top of the critical zone is PGE-rich, and is called the "Merensky reef".
cross-cut	A horizontal underground mining tunnel or excavation that provides access between the foot-wall haulage and the mining horizon.
curtain drain	A trench filled with gravel or rock or containing a perforated pipe that redirects surface water and groundwater away from an area. Also known as a French drain.
cut-off grade	Lowest grade of mineralised material considered to be economically viable to extract.
cyclone	A cyclone is a device to classify, separate or sort particles in a liquid suspension based on the ratio of their centripetal force to fluid resistance.
de-sliming	The process whereby fine and ultra-fine material is removed in the beneficiation process.
dilution	Waste that is co-mingled with ore in the mining process.
dip	The angle that a surface, bedding or structure makes with the horizontal measured perpendicular to strike or down its steepest slope.
dolerite	Dark igneous rock composed of iron and magnesium silicates and minor feldspar.
domain/ domaining	Process whereby the geologist/resource geologist splits out those areas that have similar/the same geological characteristics. The domain is a 3D geologically homogenous zone that has grade continuity and delineates spatial limits for a specific population of grade values.
dunite	A very dense, coarse-grained, olivine-rich, ultra-mafic intrusive rock. It is noted for its low silica content, and contains very little or no feldspar.
dyke	A tabular igneous intrusion that cuts across the bedding or foliation of the country rock.
facies	A rock assemblage defined by composition, shape and internal geometry or physical properties.
fault	A fracture within rock along which movement has occurred.
feldspar	Feldspars ($KAlSi_3O_8$ –$NaAlSi_3O_8$ – $CaAl_2Si_2O_8$) are a group of rock-forming tectosilicate minerals that make up as much as 60% of the Earth's crust.
filter cake	A deposit of insoluble material left on a filter.
filtration	Filtration is commonly the mechanical or physical operation which is used for the separation of solids from fluids (liquids or gases) by interposing a medium through which only the fluid can pass. The fluid that passes through is called the filtrate.

Technical term	Explanation
fold	A geological fold occurs when one or a stack of originally flat and planar surfaces, such as sedimentary strata, are bent or curved as a result of permanent deformation.
flotation	Ore is ground to a fine powder and mixed with water, frothing reagents, and collecting reagents. When air is blown through the mixture, mineral particles cling to the bubbles, which rise to form froth on the surface. The waste material (gangue) settles to the bottom.
fire assay	The assaying of ore by furnace or furnace methods.
footwall	The mass of rock underlying a zone of mineralisation or a fault.
gabbro	A dark, coarse-grained plutonic rock of crystalline texture, consisting mainly of pyroxene, plagioclase feldspar, and often olivine.
geozone	A defined area having similar geological and grade distribution characteristics.
global grade	The low confidence grade applied to an entire deposit.
graben	A depressed block of land bordered by parallel faults.
grade	The relative quantity or percentage of ore mineral content in an orebody.
granite-gneiss	A layered or banded crystalline metamorphic rock containing predominately felsic minerals.
grout pack	A method of support used in narrow tabular mines.
hangingwall	The mass of rock overlying a zone of mineralisation or a fault.
haulage	A horizontal underground mining tunnel or excavation that is used primarily for the transfer of workers, supplies, ore and waste rock often located in the footwall.
head-grade	The value, usually expressed in parts per million or g/t, of the contained mineralisation of economic interest in material delivered to the mill.
hydrabolt	A roof support tendon hydraulically inflated with water to provide an easily installed verifiable roof support for underground excavations.
hydro power	The use of water power to power, e.g. rock drills.
hydrothermal	Process of injection of hot, aqueous, mineral-rich solutions into existing rocks or along structural breaks.
Indicated Mineral Resource	That part of a Mineral Resource for which quantity, grade or quality, densities, shape, and physical characteristics, can be estimated with a level of confidence sufficient to allow the appropriate application of technical and economic parameters, to support mine planning and evaluation of the economic viability of the deposit. The estimate is based on detailed and reliable exploration and testing information gathered through appropriate techniques from locations such as outcrops, trenches, pits, workings and drillholes that are spaced closely enough for geological and grade continuity to be reasonably assumed.
Inferred Mineral Resources	That part of a Mineral Resource for which quantity and grade or quality can be estimated on the basis of geological evidence and limited sampling and reasonably assumed, but not verified, geological and grade continuity. The estimate is based on limited information and sampling gathered through appropriate techniques from locations such as outcrops, trenches, pits, workings and drillholes.
illmenite	Ilmenite is the titanium-iron oxide mineral with the idealised formula $FeTiO_3$.
in-situ	The original, natural state of the orebody before mining or processing of the ore takes place.
in stope bolts	The installation of roof bolts as a temporary and primary support in stopes and gullies.
intrusion	A unit of igneous rock, which is emplaced within pre-existing rocks as magma and then solidifies below surface.
intrusive	an igneous rock body that forms from crystallized magma under Earth's surface
IsaMill^{TM}	An energy efficient, high intensity large scale grinding machine.

Technical term	Explanation
kriging	Best linear unbiased estimate. Kriging employs the variogram model as the weighting function; because of this, kriging weights are assigned in a way that reflects the spatial correlation of the grades themselves.
leuconorite	A form of gabbro containing calcic (calcium) plagioclase.
Level	A main underground roadway or passage driven along a level course to afford access to stopes or workings and to provide ventilation and a haulage way for the removal of rock or ore.
Life of Mine or LoM	The time in which, through the employment of the available capital, mineral reserves – or such reasonable extension of the mineral reserves as conservative geological analysis may justify – will be extracted.
local block grade	The high confidence grade applied on a local block scale within a deposit.
Listings Requirements	JSE Listings Requirements, Service Issue 19.
mafic	Mafic is an adjective describing a silicate mineral or rock that is rich in magnesium and iron, and is a contraction of “magnesium” and “ferric”.
magnetite	One of the three common naturally occurring iron oxides (chemical formula Fe_3O_4).
magma	A mixture of molten or semi-molten rock, volatiles and solids that is found beneath the surface of the Earth.
Measured Mineral Resources	That part of a Mineral Resource for which quantity, grade or quality, densities, shape, and physical characteristics are so well established that they can be estimated with confidence sufficient to allow the appropriate application of technical and economic parameters, to support production planning and evaluation of the economic viability of the deposit. The estimate is based on detailed and reliable exploration, sampling and testing information gathered through appropriate techniques from locations such as outcrops, trenches, pits, workings and drillholes that are spaced closely enough to confirm both geological and grade continuity.
metasediment	Metamorphosed sedimentary rock.
metamorphism	The mineralogical, chemical and structural adjustment of solid rocks in response to physical and chemical conditions which differ from the conditions under which the rocks originated.
mill	A mill is a device that breaks solid materials into smaller pieces by grinding, crushing, or cutting.
mill liner	The mill shell is fitted with an inner lining to protect the mill cylinder: A lining generally consists of highly wear resistant sectional plates serves as protection against the grinding media used in the milling process.
Mine Call Factor or MCF	The MCF is the ratio, expressed as a percentage, of the specific product recovered at the concentrator (plus residue) to the specific product contained in the orebody calculated based on the mine’s measuring methods.
Mineral Resource	A concentration or occurrence of natural, solid, inorganic or fossilized organic material in or on the Earth’s crust in such form and quantity and of such a grade or quality that it has reasonable prospects for economic extraction. The location, quantity, grade, geological characteristics and continuity of a Mineral Resource are known, estimated or interpreted from specific geological evidence and knowledge.
Mineral Resource Estimation	The mineral resource estimation process involves the definition of mineralisation constraints or geological domains, the statistical and/or geostatistical analysis of the sample data, and the application of a suitable grade interpolation technique. The final stage of the estimation process is to classify the resource according to the guidelines of a Reporting Code such as the SAMREC Code.

Technical term	Explanation
Mineral Reserve	The economically mineable part of a Measured or Indicated Mineral Resource demonstrated by at least a preliminary feasibility study. This study must include adequate information on mining, processing, metallurgical, economic and other relevant factors that demonstrate, at the time of reporting, that economic extraction can be justified. A Mineral Reserve includes diluting materials and allowances for losses that may occur when the material is mined.
Mining Charter	The Broad-based Socio-Economic Empowerment Charter for the South African mining industry, promulgated in August 2004.
Modifying factors	Modifying factors include mining, metallurgical, economic, marketing, legal, environmental, social and governmental considerations that affect quantification of Mineral Reserve.
New order Mining Right	A Mining Right as defined in the MPRDA as being subject to HDSA equity participation pursuant to the Mining Charter.
Net Present Value or NPV	This is a method used to describe the value of the cash flows produced by a project, discounted to the value of the present day.
Old order Mining Right	A Mining Right as defined in the MPRDA and referring to existing Mining Rights which must be converted to new order rights within five years of the MPRDA coming into force and effect.
olivine	Olivine is a magnesium iron silicate with the formula $(Mg^{+2}, Fe^{+2})_2SiO_4$.
ordinary kriging	Ordinary kriging (OK) is a geostatistical approach to modelling. Instead of weighting nearby data points by a power of their inverted distance, OK relies on the spatial correlation structure of the data to determine the weighting values. This is a more rigorous approach to modelling, as correlation between data points determines the estimated value at an unsampled point.
ore	A mineral or an aggregate of minerals from which a valuable constituent, especially a metal, can be profitably mined or extracted.
ore block	A defined area of ore that is derived from the resource model.
orebody	A continuous well-defined mass of material, with sufficient ore content to make extraction of it economically viable.
orepass	A vertical or inclined passage for the downward transfer of ore; equipped with gates or other appliances for controlling the flow. An orepass is driven in ore or country rock and connects a level with the hoisting shaft or with a lower level.
overburden	Layers of soil and rock and sub-grade mineralised material covering a mineral deposit. Overburden is removed prior to and during the mining of the economic ore zone.
Paterson Grading	A grading system developed by Paterson (1972) that refers to bands of job grading. Employees are graded in bands from A (unskilled) to D1 (junior management) to D2 (middle management) to F (senior management).
payable	Where value of the ore is equal to or greater than the total cost of extracting the material of value.
pay limit	Breakeven grade at which the orebody can be mined without profit or loss, calculated using forecast gold price, working costs and recoveries.
penstock	An intake structure that controls water flow.
plagioclase	A series of tectosilicate minerals within the feldspar family.
Platreef	The Platreef occurs at the base of the Northern Limb of the Bushveld Complex and is variably mineralised with PGE, Cu, and Ni. The Platreef varies in thickness from a few metres to a few hundred metres and rests on progressively older sediments of the Transvaal Supergroup and Archaean granite basement northwards.
plutonic	A body of intrusive igneous rock that is crystallized from magma slowly cooling below the surface of the Earth.

Technical term	Explanation
poikilitic texture	Refers to igneous rocks where component crystals contain smaller grains of other minerals within them.
pothole	A pothole is a geological feature in which one layer of the Bushveld Complex transgresses its footwall and forms a basin-shaped depression.
pre-stressed elongate	Elongates are permanent support which is used to support the hangingwall behind the working face.
Prefeasibility Study	A comprehensive study of the viability of a mineral project that has advanced to a state where the mining method (for underground mining) or the pit configuration (for open pit), has been established and an effective method of mineral processing has been determined, and includes a financial analysis based on the reasonable assumptions of technical, engineering, legal, operating, economic, social and environmental factors, and the evaluation of other relevant factors which are sufficient for a Qualified Person, acting reasonably, to determine if all or part of the Mineral Resource may be classified as a Mineral Reserve. Planned capital and operating expenditure accuracy is typically within +15%/-25%.
Probable Reserves	Defined by the SAMREC Code as the economically minable material derived from a Measured or Indicated Mineral Resource or both. It is estimated with a lower level of confidence than a Proved Mineral Reserve. It includes diluting and contaminating material and allows for losses that are expected to occur when the material is mined. Appropriate assessments to a minimum of a Prefeasibility Study for a project or a Life of Mine Plan for an operation must have been carried out, including consideration of and modification by, realistically assumed mining, metallurgical, economic, marketing, legal, environmental, social and governmental factors. Such modifying factors must be disclosed.
production	Mining that produces ore from stoping activities that is processed in the plant
Proved Reserves	Defined by the SAMREC Code as the economically mineable material derived from a Measured Mineral Resource. It is estimated with a level of confidence. It includes diluting and contaminating materials and allows for losses that are expected to occur when the material is mined. Appropriate assessments to a minimum of a Prefeasibility Study for a project or a Life of Mine Plan for an operation must have been carried out including considerations of, and modification by, realistically assumed mining, metallurgical, economic marketing, legal, environmental, social and governmental factors. Such modifying factors must be disclosed.
pyrite	A common, pale bronze or brass yellow mineral, namely FeS_2.
pyroxenite	Pyroxenite is an ultramafic igneous rock consisting essentially of minerals of the pyroxene group, such as augite and diopside, hypersthene, bronzite or enstatite.
raise	An inclined opening in a mine driven upward from a level to connect with the level above, or to explore the ground for a limited distance above one level. After two levels are connected, the connection may be a winze or a raise, depending upon which level is taken as the point of reference.
Real Cash Flow Model	Cash flow model reported in Real terms (i.e. constant money terms) with no nominal escalations or inflationary effects on revenue, operating or capital costs.
resin bolt	A form of roof bolt that uses resin to anchor it in the surrounding rock mass.
reef	A generic term for a metalliferous mineral deposit, especially gold bearing quartz.
regional pillar	Rock left behind as permanent support.
Resource Model	A resource model may be a 2D or 3D resource estimate, which reflects total *in-situ* mineralised content, using cut-offs, geological losses, grade/tonnage curves and mining widths (where applicable), under the guidelines of a Reporting Code such as the SAMREC Code.
return airway	The portion of a ventilation system of a mine through which contaminated air is withdrawn and evacuated to surface.
rock bolt	A rock bolt is a long anchor bolt used to stabilise rock in an excavation.

Technical term	Explanation
rougher	A process through which roughing takes place, that produces a rougher concentrate.
rift	Elongate topographical depression bounded by steep-dipping parallel or sub-parallel faults that are the result of crustal extension.
safety net	Used as a temporary support in stopes and working ends to prevent rock falls.
sampling	Taking small representative pieces of rock or material along exposed mineralisation or diamond drill core for assay.
SAMstat	SAMstat is a C program used to display statistics of large sequence files from next generation sequencing projects.
sedimentary	Refers to rocks formed by deposition of detrital or chemical material that originates from the weathering of rock, and is transported from a source to a site of deposition.
seepage	The slow escape of a liquid through porous material.
semi-variogram	Spatial expression of the average variance between points in a specific direction at a particular distance apart.
sequential mining	When mining a deposit following a planned sequence.
shaft	A vertical or near-vertical tunnel from the top down allowing access to the orebody.
slimes dam	Storage facility for tailings discharged from a processing plant after valuable fractions have been metallurgically recovered.
sluicing	An artificial channel for conducting water.
slurry	A thin mixture of an insoluble substance, e.g. tailings.
stope	An underground excavation on the plain of the reef where ore is extracted.
stoping	The underground activities conducted in the stope including, drilling, blasting, mucking and supporting to excavate ore.
stratigraphy	The order which rock types occur in a vertical sequence.
strike	Direction along sloping strata or surface, which is at right angles to the dip.
sulphide	A chemical compound of sulphur.
supernatant	The liquid lying above a solid residue after crystallization, precipitation, centrifugation, or other process.
tail cut	Physical mining constraints (or other) may necessitate the pre-mature cessation of mining, as the shaft or area of operation becomes uneconomic to mine.
tailings	The material remaining after processing has removed the valuable minerals or material.
tailings storage facility	A designated area where tailings are stored. Also referred to as a slimes dam.
tectosillicate	Tectosilicates, or “framework silicates”, have a three-dimensional framework of silicate tetrahedra with SiO_2 or a 1:2 ratio.
Tertiary	The interval of geological time between 65 and 2.5 million years ago.
thrifting	Using cheaper alternatives/less material to reduce costs.
travelling-way	An underground excavation, sometimes inclined, and used by stope-workers to travel to and from the stope. Also any underground excavation or tunnel used by workers to travel to and from their place of work in the mine.
trenching	The act of excavating a narrow, shallow ditch to cut across a mineral deposit to obtain samples or to observe mineralogical character.
unconformity	A substantial break or gap in the geological record where a rock unit is overlain by another that is not in the stratigraphic succession.
veld	Veld, also spelled veldt, is a type of wide open rural landscape in Southern Africa. A flat area covered in grass or low scrub.

Technical term	Explanation
vertic clays	Soil material with vertic properties has of the following attributes: 30% or more clay throughout a thickness of 15 cm or more, and one or both of the following: 1) slickensides or wedge-shaped aggregates; 2) cracks that open and close periodically and are 1 cm or more wide.
vertical shaft	A vertical shaft equipped for hoisting ore, men and material to the underground working places.
waste	Barren rock or mineralised material that is too low in grade to be economically processed.
working places	Any area of development; usually restricted in meaning to apply to development and stoping areas.

21.2 Abbreviations

Unit/abbreviation	Full form
°	degree
°C	degrees centigrade
%	percent or percentage
µm	micron or 1 x 10^{-6} metre
2D	two-dimensional
3D	three-dimensional
3E	platinum, palladium and gold, sometimes referred to as 2PGE+Au
4E	platinum, palladium, rhodium and gold, sometimes referred to as 3PGE+Au
6E	platinum, palladium, rhodium, gold, ruthenium and iridium
AAPL	Anglo American Platinum Limited
AARL	Anglo American Research Laboratories
ABC	activity-based costing
ACP	Anglo Platinum Converting Process
ADRs	American Depositary Receipts
ADT	articulated dump truck
AIDS	acquired immunodeficiency syndrome
AM	aeromagnetic
AMIS	African Mineral Standards (Pty) Limited
Anfo	ammonium nitrate/fuel oil
APS	average pillar stress
ASD	advanced strike drives
ASG	advance strike gulley
Atlatsa	Atlatsa Resources Corporation
Au	gold
AUF	air utilisation factor
AWOP	absence without pay
B	billion
BAC	bulk air cooler
BBE	Bluhm Burton Engineering (Pty) Limited
BC	Bushveld Complex
BEE	Black Economic Empowerment
BMS	base metal sulphides
Bokoni	Bokoni Platinum Mine
BOMs	Bill of material(s)
BOQ	Bill of Quantities
BP	Business Planning
BQ	core drilling size, typically 42 mm diameter
C&I	control and instrumentation

Unit/abbreviation	Full form
C&M	care and maintenance
Capex	capital expenditure
CAPM	capital asset pricing model
CBA	core bearing angles
CBE	control budget estimate
CCS	Central Control System
CCTV	closed-circuit television
CEO	Chief Executive Officer
cfm	cubic feet per minute
CFO	Chief Financial Officer
CGG	Companie General de Geophysigue
CLA	Closure liability Assessment
Client	Sibanye Gold Limited
cm	centimetre
CO	carbon monoxide
CO_2	carbon dioxide
COIDA	Compensation for Occupational Injuries and Diseases Act 130 of 1993
Commissioner	Commissioner for the South African Revenue Service
COO	Chief Operating Officer
CP	Competent Person
CPI	Consumer Price Index
CPR	Competent Person's Report
CRM	Certified Reference Material
CRP	chrome retreatment plant
Cr_2O_3	chromium (III) oxide
CSI	Corporate and Social investment
Cu	copper
CV	Curriculum Vitae
CW	channel width
Cyest	Cyest Corporation (Pty) Limited
DAF	Dissolved Air Filter
DC	Down cast
DCF	discounted cash flow
DEA	Department of Environmental Affairs
Defl	Deflection
DMR	Department of Mineral Resources
dmt	dry metric tonne
DOA	Date of Assessment

Unit/abbreviation	Full form
DRA	DRA Projects SA (Pty) Limited
DTM	Design to Mine Consulting Limited
DWAF	Department of Water Affairs and Forestry
DWS	Department of Water and Sanitation
E	east
EA	Environmental Authorisation
EBIT	earnings before interest and taxation
EBRL	Eastern Bushveld Regional Laboratory
ECA	Environment Conservation Act (Act 73 of 1989)
EC & I	Electrical, control and instrumental
EHS	environmental, health and safety
EIA(s)	environmental impact assessments
EMP	environmental management program
EMPR	environmental management program report
EMS	Electronic–Multi-Shot
ENS	Edward Nathan Sonnenbergs Incorporated
EPS	electronic multi shot
EOH	end of hole
EPA	Environmental Protection Agency
EPCM	Engineering, Procurement, Construction and Management
ERM	Environmental Resources Management Southern Africa (Pty) Limited
ETFs	exchange traded funds
EU	European Union
F1	Fault line 1
Fe	Iron
FET	further education and training
FOG	Fall of Ground
FOS	Factor of Safety
Fraser Alexander	Fraser Alexander (Pty) Limited
ft	foot
FW	Foot Wall
FY(s)	financial year(s)
g	gram
GAAP	Generally accepted accounting principles
g/t	grams per tonne
GCC	group centralised costs
GCOS	global change of support
GDP	Gross Domestic Product

Unit/abbreviation	Full form
GEMA	Group Evaluation Metal Accounting
Genalysis	Genalysis Laboratory Services
Gold One	Gold One International Limited
GPS	Global Positioning System
Great Basin Gold	Great Basin Gold Limited
Group	Sibanye Gold Limited
GTL	gas-to-liquids
H	Highveld
ha	hectares
HC	hydrocarbons
HDD	heavy-duty diesel
HDPE	High-density polyethylene
HDSA	historically disadvantaged South Africans
HIV	human immunodeficiency virus
HL	Half Level
HOD	Head of Department
HR	Human resources
HRD	Human Resource Development
HSA	Hazardous Substances Act, No. 15 of 1973
HW	Hanging Wall
ICF	Institutional consensus forecasting
ICP	Inductively Coupled Plasma. An analytical technique whereby ICP Optical Emission Spectroscopy (ICP-EOS) or ICP Mass Spectroscopy is used
IFRS	International Financial Reporting Standards
Implats	Impala Platinum Holdings Limited
IO	Independent Operator
Ir	Iridium
IRR	internal rate of return
IRMS	Integrated Risk Management System
IRUP(s)	iron rich ultramafic pegmatoid(s)
ISAB	International Accounting Standards Board
ISO	International Standards Organisation
IWUL	Integrated water use licence
IWWMP	Integrated water and waste management plan
JCI	Johannesburg Consolidated Investments Limited
JSE	Johannesburg Stock Exchange Limited
JSE Listings Requirements	JSE Listings Requirements, Issue 19, specifically section 4 and 12.
kg/s	Kilogram/ second

Unit/abbreviation	Full form
kℓ	kilolitre
km	kilometre
km^2	kilometre squared/square kilometres
KNA	kriging neighbourhood analysis
koz	kilo-ounces or ‘000 oz
KPA	key performance areas
kt	kilotonne
ktpm	kilotonnes per month
kV	kilovolt
kVA	Kilovolt ampere
kW	kilowatt
L1/L2	Level 1/Level 2
lb	pound (weight)
LED	Local Economic development
LEV	Local exhaust ventilation
LG	Lower Group
LHD	load haul dump trucks
Lo	local survey
LoM	Life of Mine
LP	Low profile
LTP	Long Term Plan
M	million
m	metre
m^2	metres squared/square metres
m^3	metres cubed/cubic metres
M&M	mineralogical and metallurgical analysis
m^3/h	metres cubed per hour
m/month	metres per month
m/s	metres per second
Ma	million years (ago)
mamsl	metres above mean sea level
MB	Main Band
MBC	Metres below collar
MCC	motor control centre
MCF	mine call factor
Merensky	Merensky Reef
MER	Merensky Reef
MES	Mine Extraction Strategy

Unit/abbreviation	Full form
MF2	mill-float, mill-float
MG1/2	Middle Group 1/Middle Group 2
mH	metres high
MIG	Mainstream Inert Grinding
Mℓ	Mega litre
MLCC	Multi-Layer ceramic capacitors
MHSA	Mine Health and Safety Act (Act 29 of 1996)
Middindi	Middindi Consulting (Pty) Limited
Mineral Asset	Rustenburg Operations
Minerals Act	Minerals Act, Act No.50 of 1991
Mlb	Million pounds
mm	millimetre
Moth	Motherhole
Moz	million ounces
MP	Merensky Pyroxenite
MPEGs	mafic pegmatoids
MPRDA	Minerals and Petroleum Resources Development Act No.28 of 2002
MRPDA Bill	Mineral and Petroleum Resources Development Amendment Bill
MR	Mining Right
MRE	Mineral Resource estimate
MRM	Mineral Resources Management
MSAIMM	Member of the South African Institute of Mining and Metallurgy
MSP	Municipal sewerage plant
Mt	million tonnes
MTS	ESCOM Maranga Main Transmission Station
MVA	mega-volt ampere
mW	metres wide
MW	megawatts
MWh	Megawatt hour
MWP	Mine Works Program
MWR	megawatt of refrigeration
NEM: AQA	National Environmental Management: Air Quality Act, No. 39 of 2004
NEM:WA	National Environmental Management: Waste Act, No. 59 of 2008
NEMA	National Environmental Management Act (Act 107 of 1998)
N/A	not applicable/not available
NB	nominal ball (with reference to mm)
NGO	Non-governmental organisation
Ni	Nickel

Unit/abbreviation	Full form
NMD	notified maximum demand/ nominal maximum demand
NNE	north-northeast
NNR	National Nuclear Regulator
No.	number
Northam	Northam Platinum Limited
NO_x	Oxides of nitrate
NPC	Net present cost
NPV	net present value
NT	Northern Transvaal
NUM	National Union of Mineworkers
NWA	National Water Act (Act 36 of 1998)
NYMEX	New York Mercantile Exchange
NYSE	New York Stock Exchange
OBD	On board diagnostics
ODA	Occupational Diseases Act
OEM(s)	original equipment manufacturer(s)
OIC	other indirect costs
OH:	overhead lines
OHSA	Occupational Health and Safety Act number 85 of 1993
OHSAS	Occupational Health and Safety Assessment Series
opex	Operating expenditure
Os	Osmium
oz	Troy ounce, equivalent to 31.1035 grams
P&Ps	Policies and procedures
pa/p.a.	per annum
Pd	palladium
PDC	process design criteria
PFS	prefeasibility study
PGE(s)	platinum group element(s)
PGI	Platinum Guild International
PLC	programmed-logic-controlled
PM	Particulate Matter
PMCP	Provisional mine closure plan
PMR	Precious Metal Refinery
PoC	Purchase of concentrate agreement
PoD	Point of delivery
PPE	Personal Protective Equipment
PPET	Platinum Producers Environmental Trust

Unit/abbreviation	Full form
Pr.Sci.Nat	Person registered with the South African Council for Natural Scientists
PRS	pressure reducing station
Pt	platinum
PWPs	Prospecting Works Programs
Q	Quarter
Q-Q	quantile-quantile
QAQC	quality assurance/quality control
QC	quality control
QEM*SEM	Quantitative evaluation of materials by scanning electron microscopy
R	Regional road
RAW(s)	return airway(s)
RBMR	Rustenburg Base Metal Refinery
RBS	Raise drillhole
RBN	Royal Bafokeng Nation
RB Plats	Royal Bafokeng Platinum Limited
RDO	rock drill operator
RDR	Rock Deformation research Limited
Redev	Redevelopment
RF	Radio frequency
Rh	rhodium
RIF/RIH	Reef in footwall/ Reef in hangingwall
RLM	Rustenburg local municipality
RLS	Rustenburg Layered Suite
RMR	Rock Mass Rating
RoD	Record of discussion
RoM	run of mine
RoW	Rest of the World
Royalty Act	Mineral and Petroleum Resources Royalty Act, 2010
RPM	Rustenburg Platinum Mines Limited
RS	Rustenburg Section/ Rustenburg Operations
RSA	Republic of South Africa
Rustenburg Operations	Rustenburg Platinum Mines Limited – Rustenburg Section
RWB	Rand Water Board
RWST	Rustenburg Water Services Trust
SABLE	SABLE Data Warehouse
SABS	South African Bureau of Standards
SACNASP	South African Council for Natural Scientific Professions
SACS	South African Committee for Stratigraphy

Unit/abbreviation	Full form
SAHRA	South African Heritage Resource Agency
SAIMM	South African Institute for Mining and Metallurgy
SAMREC Code	South African Code for the Reporting of Exploration Results, Mineral Resources and Mineral Reserves, 2007 Edition, as amended in July 2009
SAMVAL Code	South African Code for the Reporting of Mineral Asset valuation, as amended in July 2009
SANS	South African national Standards
SARS	South African Revenue Services
SAV(s)	Single Accommodation Village(s)
SAWIS	South African Waste Information System
SCADA	supervisory control and data acquisition
SEC	Securities and Exchange Commission
SFA (Oxford)	Steve Forest and Associates (Oxford)
SGS	Société Générale de Surveillance
SHE	Safety, health and environmental
SHEQ	Safety, health, environmental, quality
SHERQ	Safety, Health, Environment, Risk and Quality
SIB	Stay in business
Sibanye	Sibanye Gold Limited or the Group
Sibanye Platinum	Sibanye Platinum (Pty) Limited
SiO_2	Silica dioxide
SLA	Service Level Agreement
SLP	Social and Labour Plan
SMME	Small, Medium and Micro-sized Enterprises
Sn	Tin
Snowden	Snowden Mining Consultants (Pty) Limited
SOM	School of Mines
SOW	Scope of work
SRK	SRK Consulting (South Africa) (Pty) Limited
SRP	Surface Rights permit
SRPM	Sibanye Rustenburg Platinum Mines (Pty) Limited
t/m^2	tonnes per square metre
TB	Tuberculosis
TCC(s)	Total Cash Cost(s)
TH1, TH2	Thembelani 1, Thembelani 2
tpd	tonnes per day
tpm	tonnes per month
Triplets	Triplet Chromitite Bands
TSF	Tailings storage facility

Unit/abbreviation	Full form
TSW	Treated sewage water
TSX	Toronto Stock Exchange
TMMM	Trackless Mobile Mining Equipment
TOCOM	Tokyo Commodity Exchange
UFG	Ultra-fine grind
UC	Upcast
UK	United Kingdom
ULP	Ultra low profile
US	United States (of America)
US$	United States dollar
VAT	Value Added tax
VFL	Visibly Felt Leadership
WAP	Water Action Plan
WBS	Work Breakdown Structure
Wits Gold	Witwatersrand Consolidated Gold Resources Limited
WLDC	Western Limb Distribution Centre
WLTR plant	Western Limb Tailings Retreatment plant
WML	Waste management licence
WPIC	World Platinum Investment Council
WRD	Waste Rock Dump
WUL	Water use licence
WULA	Water use licence agreement
XLP	Extra low profile
XRF	X-ray fluorescence
YTD	Year to date
ZAR	South African Rand

22 COMPETENT PERSON'S CERTIFICATES

T11A/B/C(i)-(iii)

CERTIFICATE of COMPETENT PERSON (RESOURCES)

I, Quartus Snyman, Head: Mining and Geological Services, Anglo American Platinum Limited, 55 Marshall St, Marshalltown, 2001, South Africa do hereby certify that:

(a) I am a reviewer/ reviser of the Competent Person's Report prepared for Sibanye Gold Limited on Rustenburg Operations dated 9 December 2015 ("the CPR").

(b) I graduated with a BSc (Hons) Geology and a Masters of Business Leadership.

(c) I am a Member of the South African Council for Natural Scientific Professions (Membership No. 400027/04).

(d) I have worked as a geologist for a total of 29 years, with a break in service of six years (July 1990 to July 1996), during which I was self-employed. I received my BSc (Hons) degree from the University of Potchefstroom in 1981 and a Masters of Business Leadership from UNISA School of Business Leadership in 2006. This includes three years as the Manager of Exploration and 6 years as the Manager of Geosciences and Exploration.

(e) I have read the definition of a 'Competent Person' or "CP" set out in the SAMREC Code and JSE Listings Requirements and certify that by reason of my education, affiliation with a professional association and past relevant work experience, I fulfil the requirements of a 'CP' for the purposes of the SAMREC Code.

(f) I have made frequent visits to Rustenburg Operations between 2006 and 2015.

(g) I am responsible for the review of the Geology and Mineral Resource sections of the CPR. I confirm that I have approved the information in the aforementioned section(s), prior to CPR publication.

(h) I am an employee of RPM. I am not fully independent of the issuer as defined in terms of 4.28(a), 12.9(c) and 12.10(a) (ii) of the JSE Listings Requirements, as RPM is involved in the Rustenburg Operations transaction.

(i) I have had prior involvement with the property that is the subject of the CPR.

(j) I have read the SAMREC Code, SAMVAL Code and JSE Listings Requirements; the CPR has been prepared in compliance with the SAMREC Code, SAMVAL Code and JSE Listings Requirements (JSE, 2015).

(k) As of the effective date of this CPR, to the best of my knowledge, information and belief, the CPR contains all the scientific and technical information that is required to be disclosed to make the CPR not misleading.

Dated at Johannesburg, RSA on 9 December 2015.

Original signed

Quartus Snyman
MBL, BSc (Hons), Pr. Sci. Nat

CERTIFICATE of COMPETENT PERSON (GEOTECHNICAL)

I, Johan Wilhelm Ludwig Hanekom of Middindi Consulting (Pty) Limited of 193 Hole-in-One Avenue, Ruimsig, South Africa do hereby certify that:

(a) I am the co-author of the Competent Person's Report prepared for Sibanye Gold Limited on Rustenburg Operations dated 9 December 2015 ("the CPR").

(b) I graduated with a M. Sc (Eng).

(c) I am a Member of the South African National Institute of Rock Engineering (Membership No. M.018).

(d) I have worked in the field of Rock Engineering continuously for a total of 26 years since 1989. I am currently a Director of Middindi Consulting (Pty) Limited, consulting as a specialist in rock engineering, in different commodities and for numerous clients. I joined AngloGold-Ashanti ("AGA") in 1989 as a strata control officer on Vaal Reefs Operations. I attained the required RSA Rock Engineering qualifications and was promoted to Rock Engineering Manager at Saaiplaas and later Bambanani Mines, both within AGA. During this time I completed Graduate Diploma in Engineering ("GDE") and MSc (Eng), specialising in Rock Engineering (Univ. of Witwatersrand). I joined SRK Consulting (South Africa) (Pty) Limited ("SRK") in 2000, as a Principal Engineer. I started a rock engineering consultancy, MIDD Consulting in 2002 and merged with IndiRoc Consulting to create Middindi Consulting (Pty) Limited, specialising in Rock Engineering, Geotechnical and Geological Services in 2004.

(e) I have read the definition of a 'Competent Person' or "CP" set out in the Mine Health and Safety Act (and where applicable, the SAMREC Code and JSE Listings Requirements) and certify that by reason of my education, affiliation with a professional association and past relevant work experience, I fulfil the requirements of a 'CP' for the purposes of the Mine Health and Safety Act and where applicable, SAMREC Code.

(f) I have made several visits to Rustenburg Operations between July and October of 2015.

(g) I am responsible for the preparation of the Geotechnical Engineering section of the CPR. I confirm that I have approved the information in the aforementioned section(s), prior to CPR publication.

(h) I am independent of the issuer as defined in terms of 4.28(a), 12.9(c) and 12.10(a)(ii) of the JSE Listings Requirements.

(i) I have had prior involvement with the property that is the subject of the CPR. I was involved as an external consultant to Snowden / DRA / AAPL in several projects mainly focusing on mine design, rock engineering related risks and the undermining of surface structures.

(j) I have read the SAMREC Code, SAMVAL Code and JSE Listings Requirements; the CPR has been prepared in compliance with the SAMREC Code, SAMVAL Code and JSE Listings Requirements (JSE, 2015).

(k) As of the effective date of this CPR, to the best of my knowledge, information and belief, the CPR contains all the scientific and technical information that is required to be disclosed to make the CPR not misleading.

Dated at Ruimsig, RSA on 9 December 2015.

Original signed

JWL Hanekom
M Sc. Eng., MSAINIRE

CERTIFICATE of COMPETENT PERSON (VENTILATION)

I, Wynand Marx of BBE Consulting (Pty) Limited of 24 Sloane street, Bryanston, South Africa do hereby certify that:

(a) I am the co-author of the Competent Person's Report prepared for Sibanye Gold Limited on Rustenburg Operations dated 9 December 2015 ("the CPR").

(b) I graduated with a B. Eng & M. Eng.

(c) I am a Member of the Mine Ventilation Society of South Africa and Member of the South African Institute of Mining and Metallurgy or "MSAIMM" (Membership No. 702441).

(d) I am the Managing Director of BBE Consulting and involved at both technical and strategic levels in the company. I have over 15 years of professional and practical experience in mine environmental control at mine, consulting and research and development levels, gained during my employment at BBE, Avgold and the CSIR. My main technical involvement is in mine ventilation and cooling system design for all commodities and have successfully completed numerous concept/pre-feasibility/feasibility/engineering projects in gold, platinum, copper, coal, diamond, etc. mines. I previously headed the Environment Control programme of CSIR's Division of Mining Technology as Programme Manager. I have been actively involved in the DeepMine and FutureMine research programmes that addressed industry needs to enable mining up to five kilometres below surface. I have authored, co-authored and presented several papers in the field of mine ventilation and cooling. I am qualified as a Mine Radiation Protection Officer and I am a Fellow of the Mine Ventilation Society of MSAIMM. I am also registered with the Engineering Council of South Africa.

(e) I have read the definition of a 'Competent Person' or "CP" set out in the SAMREC Code and JSE Listings Requirements and certify that by reason of my education, affiliation with a professional association and past relevant work experience, I fulfil the requirements of a 'CP' for the purposes of the SAMREC Code.

(f) BBE has made several visits to Rustenburg Operations during 2015.

(g) I am responsible for the preparation of the Due Diligence Report of Ventilation and Refrigeration.

(h) I am independent of the issuer as defined in terms of 4.28(a), 12.9(c) and 12.10(a)(ii) of the JSE Listings Requirements.

(i) BBE has conducted numerous projects in the past for Anglo Platinum.

(j) I have read the SAMREC Code, SAMVAL Code and JSE Listings Requirements; the CPR has been prepared in compliance with the SAMREC Code, SAMVAL Code and JSE Listings Requirements.

(k) As of the effective date of this CPR, to the best of my knowledge, information and belief, the CPR contains all the scientific and technical information that is required to be disclosed to make the CPR not misleading.

Dated at Bryanston, RSA on 9 December 2015.

Original signed

W.M. Marx
BEng, MEng (Mech), MSAIMM

CERTIFICATE of COMPETENT PERSON (MINING)

I, Frank Egerton, Senior Mining Consultant of DRA Mining, DRA Minerals Park, 3 Inyanga Close, Sunninghill 2157, South Africa do hereby certify that:

(a) I am the co-author of the Competent Person's Report prepared for Sibanye Gold Limited on Rustenburg Operations dated 9 December 2015 ("the CPR").

(b) I graduated with a BSc Eng. (Mining)

(c) I am a Fellow of the South African Institute of Mining and Metallurgy (Membership No. 720886).

(d) I have worked as a mining engineer continuously for a total of 48 years since my graduation from the University of the Witwatersrand. This includes thirty five years in gold and platinum mining with thirteen years as a General Manager, ten years as Associate Director at the Technikon South Africa, and three years as Senior Mining Engineer at DRA Mining.

(e) I have read the definition of a Competent Person or "CP" set out in the SAMREC Code and JSE Listings Requirements and certify that by reason of my education, affiliation with a professional association and past relevant work experience, I fulfil the requirements of a CP for the purposes of the SAMREC Code.

(f) I visited Rustenburg Operations during July to October 2015 (including underground visits).

(g) I am responsible for the preparation of the Mining and Mineral Reserves sections of the CPR. I confirm that I have approved the information in the aforementioned section(s), prior to CPR publication.

(h) I am independent of the issuer as defined in terms of 4.28(a), 12.9(c) and 12.10(a)(ii) of the JSE Listings Requirements.

(i) I have worked on RPM projects previously, but never been employed on the property that is the subject of the CPR.

(j) I have read the SAMREC Code, SAMVAL Code and JSE Listings Requirements; the CPR has been prepared in compliance with the SAMREC Code, SAMVAL Code and JSE Listings Requirements (JSE, 2015).

(k) As of the effective date of this CPR, to the best of my knowledge information and belief, the CPR contains all the scientific and technical information required to make the CPR not misleading.

Dated at Johannesburg, RSA on 9 December 2015.

Original signed

Frank Egerton
BSc Eng. (Mining), FSAIMM

CERTIFICATE of COMPETENT PERSON (PROCESS)

I, Antony Nyakudarika, Principal Process Engineer of DRA Projects (Pty) Limited, DRA Minerals Park, 3 Inyanga Close, Sunninghill 2157, South Africa do hereby certify that:

(a) I am the co-author of the Competent Person's Report prepared for Sibanye Gold Limited on Rustenburg Operations dated 9 December 2015 ("the CPR").

(b) I graduated with a BSc (Hons) Chemical Eng. and Diploma in Industrial Studies.

(c) I am a registered Professional Engineer with the Engineering Council of South Africa ("ECSA"), with membership No. 20140392; and a member of the South African Institute of Mining and Metallurgy ("SAIMM"), with membership No. 704784.

(d) I have worked as a process engineer continuously for a total of 34 years since my graduation from Loughborough University (UK) in 1981. For the last 19 years I have worked on mining operations and projects. From 1996 to 2005 I was a Divisional Engineer for Anglo American's Zimbabwe operations. For 16 years from 2005 to 2011 I worked as a Senior/Lead Process Engineer for Anglo American Platinum Limited ("AAPL"). I have been employed by DRA as a Principal Process Engineer since 2011. I have been involved in conducting Feasibility Studies for several projects and evaluation of plant operations.

(e) I have read the definition of a 'Competent Person' or "CP" set out in the SAMREC Code and JSE Listings Requirements and certify that by reason of my education, affiliation with a professional association and past relevant work experience, I fulfil the requirements of a 'CP' for the purposes of the SAMREC Code.

(f) I have made visits to RPM during August 2015 and September 2015.

(g) I am responsible for the preparation of the Processing and Tailings sections of the CPR. I confirm that I have approved the information in the aforementioned section(s), prior to CPR publication.

(h) I am independent of the issuer as defined in terms of 4.28(a), 12.9(c) and 12.10(a)(ii) of the JSE Listings Requirements.

(i) I have not had prior involvement with the property that is the subject of this CPR.

(j) I have read the SAMREC Code, SAMVAL Code and JSE Listings Requirements; the CPR has been prepared in compliance with the SAMREC Code, SAMVAL Code and JSE Listings Requirements (JSE, 2015).

(k) As of the effective date of this CPR, to the best of my knowledge, information and belief, the CPR contains all the scientific and technical information that is required to be disclosed to make the CPR not misleading.

Dated at Johannesburg, RSA on 9 December 2015.

Original signed

Tony Nyakudarika
BSc (Hons) Chemical. Eng. (Pr. Eng.)

CERTIFICATE of COMPETENT VALUATOR

I, John Miles, Director of Design to Mine Consulting Limited, 6 Clarendon Villas, Bath BA2 6AG, United Kingdom, do hereby certify that:

(a) I am the co-author of the Competent Person's Report for Sibanye Gold Limited on Rustenburg Platinum Mines Limited dated 9 December 2015 ("the CPR") prepared for Sibanye Gold Limited. I am signing off on the overall CPR Valuation.

(b) I graduated with a BSc (Hons) Mining (Royal School of Mines, Imperial College) in 1985 and a MSc Mining at the University of Witwatersrand 1997.

(c) I am a Chartered Engineer and member of IOM3 (Membership No.50277).

(d) I have worked as an independent consultant in the minerals industry for 15 years during which time I have undertaken numerous valuations of projects and operating mines covering a wide range of commodities. Before becoming an independent mining consultant I worked in industry for 15 years.

(e) I have read the definition of a 'Competent Valuator' set out in the SAMVAL Code and JSE Listing Requirements and certify that by reason of my education, affiliation with a professional association and past relevant work experience, I fulfil the requirements of a Competent Valuator for the purposes of the SAMVAL Code.

(f) I have made visits to RPM during October 2014.

(g) I am responsible for the co-authoring and preparation of the overall Valuation of the CPR/ Mineral Asset.

(h) I am independent of the issuer as defined in terms of 4.28(a), 12.9(c) and 12.10(a)(ii) of the JSE Listing Requirements. The Competent Valuator confirms that he has no bias with respect to the assets that are the subject of the report, or to the parties involved with the assignment. The Competent Valuator's confirms that compensation, employment or contractual relationship with the Commissioning Entity is not contingent on any aspect of the report. The Competent Valuator's confirms that he has no present or prospective interest in the subject property or asset.

(i) I have had no prior involvement with the property that is the subject of this CPR beyond undertaking an internal valuation of the long term plan for RPM during 2012.

(j) I have read the SAMREC Code, SAMVAL Code and JSE Listing Requirements; the CPR has been prepared in compliance with the SAMREC Code, SAMVAL Code and JSE Listing Requirements (JSE, 2015).

(k) As of the effective date of this CPR, to the best of my knowledge, information and belief, the CPR contains all the scientific and technical information that is required to be disclosed to make the CPR not misleading.

(l) John Miles highlights that the analyses and conclusions of this CPR are limited by the reported forecasts and conditions.

Major valuations, reviews and competent person sign-offs performed by John Miles include inter alia:

Project	Period	Study level	Valuation/ CP
First Quantum	2006	Producing mines	ITR, CP Reserves
Kinsevere Copper Project	2008	Feasibility Study	ITR, CP Reserves
Tolukuma Gold Mine	2008	Producing mine	Investment Valuation
Impala Platinum	2009	Producing mine	Performance Improvement Project
Sedibelo Project	2010	Feasibility Study	Internal Valuation
Minera Nova Ventura	2011	Care & Maintenance	Internal Valuation
Booysendal Project	2011	Feasibility Study	Internal Valuation
Mina Justa Copper Project	2011	Feasibility Study	Investment Valuation
Golden Star Resources	2011	Producing mine	NI 43-101 Technical Report, QP Reserves
Silvinit Phosphate	2011	Producing mine	ITR, CP Reserves
Marampa Iron Ore Project	2011	Feasibility Study	Investment Valuation
Rustenburg Platinum Mines	2012	Producing mine	Internal Valuation
Rusal	2012	Producing mines	CPR, CP Reserves
Artic Platinum OY	2013	Feasibility Study	Optimisation Review
Esaase Gold Project	2013	Feasibility Study	ITR, CP Reserves
Union Mine	2014	Producing mine	Internal Valuation
Umm Wu'al Phosphate Project	2014	Feasibility Study	CPR, CP Reserves
Ariana Copper Project	2014	Feasibility Study	Investment Valuation
Condestable Copper Mine	2014	Producing mine	Investment Valuation
Hindustan Zinc	2015	Producing mines	CPR CP Reserve
Obuasi Gold Mine	2015	Producing mine	CPR, CP Reserves
Bokoni Platinum Mine	2015	Producing mine	NI 43-101 Technical Report, Valuation

Dated at Bath, United Kingdom, this 9 December 2015.

Original signed

John Miles
B.Sc (Hons), M.Sc, C.Eng, IOM3

CERTIFICATE of COMPETENT VALUATOR

I, Vince Agnello, Senior Consultant of Corporate Advisory of Snowden Mining Industry Consultants (Pty) Limited ("Snowden") of Technology House, Greenacres Complex, cnr Victory and Rustenburg Rds, Victory Park, do hereby certify that:

(a) I am the co-author of the Competent Person's Report prepared for Sibanye Gold Limited on Rustenburg Operations dated 9 December 2015 ("the CPR").

(b) I graduated with a B.Sc (Hons) Geology (Univ. Stellenbosch) in 2000 and an M.Eng (Mineral Economics) at University of Witwatersrand (2005).

(c) I am a Member of the SAIMM (No. 703384) and Pr. Sci Nat (No. 4000271/06).

(d) I have worked as a Valuator continuously for a total of nine years at Snowden. Before this I worked at the Department of Minerals and Energy as a Mineral Economist for five years.

(e) I have read the definition of a 'Competent Valuator' set out in the SAMVAL Code and JSE Listings Requirements and certify that by reason of my education, affiliation with a professional association and past relevant work experience, I fulfil the requirements of a Competent Valuator for the purposes of the SAMVAL Code.

(f) I have made a current visit to Rustenburg Operations from 13 October 2014 to 29rd October 2014.

(g) I am responsible for the co-authoring and preparation of the Valuation of the CPR/ Mineral Asset. I confirm that I have approved the information in the aforementioned section(s), prior to CPR publication.

(h) I am independent of the issuer as defined in terms of 4.28(a), 12.9(c) and 12.10(a)(ii) of the JSE Listings Requirements. The Competent Valuator confirms that he has no bias with respect to the assets that are the subject of the report, or to the parties involved with the assignment. The Competent Valuator's confirms that compensation, employment or contractual relationship with the Commissioning Entity is not contingent on any aspect of the report. The Competent Valuator's confirms that he has no present or prospective interest in the subject property or asset.

(i) I have had no prior involvement with the property that is the subject of this CPR.

(j) I have read the SAMREC Code, SAMVAL Code and JSE Listings Requirements; the CPR has been prepared in compliance with the SAMREC Code, SAMVAL Code and JSE Listings Requirements (JSE, 2015).

(k) As of the effective date of this CPR, to the best of my knowledge, information and belief, the CPR contains all the scientific and technical information that is required to be disclosed to make the CPR not misleading.

(l) Vince Agnello highlights that the analyses and conclusions are limited by the reported forecasts and conditions.

Major valuations performed by Vince Agnello include inter alia:

Project	Period	Study level	Valuation
RED Graniti and	2005/6	Producing mine	Internal Valuation
Finstone/ Marlin Group	2005/6	Producing mine	Internal Valuation
Mitsubishi Corporation	2007	Various project levels	Internal Valuation
Blina Minerals NL	2007	Producing mine	CPR Valuation
Mitsubishi Corporation	2009	Various project levels	Internal Valuation
Aquila Resources	2010	Various project levels	CPR Valuation
Jubilee Platinum	2010	Pre-Feasibility Study	Internal Valuation
Royal Bafokeng Platinum	2010	Producing mine	CPR Valuation
Glenover Rare Earth Project	2011	Conceptual Study	CPR Valuation
Anglo American Base Metals Project	2011	Pre-Feasibility Study	Internal Valuation
Uranium One	2011/12	Feasibility Study	Internal Valuation
Afarak Platinum Project	2011	Conceptual Study	Internal Valuation
Zhonghe Resources	2011	Conceptual Study	Internal Valuation
Alufer Labe Bauxite Project	2012	Conceptual Study	Internal Valuation
Alufer Bel Air Bauxite Project	2012/13	Feasibility Study	CPR Valuation
Syrah Balama Project	2013	Conceptual Study	Internal Valuation
Signature Metals gold assets	2013	Producing mine	Internal Valuation
Trans Hex – Namaqualand Mines	2011-2014	Feasibility Study	CPR Valuation
Bokoni Platinum Mine	2015	Producing mine	NI 43-101 Technical Report, Valuation
Sadiola Mine	2015	Producing mine	Internal Valuation

Dated at Randburg, Johannesburg on 9 December 2015.

Original signed

Vince Agnello
B.Sc (Hons), M.Eng., Pr Sci Nat, MGSSA, MSAIMM

Appendix A Rustenburg Operations Mining Rights

Map reference	Property description		Mineral description reference
	Farm name	Farm portion	
1	Anglo Tailings No 942 JQ	The farm	81 MR
2	Boschfontein No.268 JQ	A part of the Remainder of the farm	86 MR
3	Brakspruit No. 299 JQ	A part of the Remainder of portion 22	81 MR
4	Brakspruit No. 299 JQ	A part of Portion 23	81 MR
5	Hoedspruit No. 298 JQ	A part of the Remainder	86 MR
6	Hoedspruit No. 298 JQ	Remainder of Portion 2	79 MR
7a	Hoedspruit No. 298 JQ	A part of Portion 3	81 MR
7b	Hoedspruit No. 298 JQ	A part of Portion 3	85 MR
8	Hoedspruit No. 298 JQ	Remainder of Portion 6	86 MR
9	Hoedspruit No 298 JQ	Portion 8	86 MR
10	Hoedspruit No 298 JQ	Portion 13	85 MR
11	Hoedspruit No. 298 JQ	A part of Portion 19	81 MR
12a	Klipfontein No. 300 JQ	A part of the Remainder of portion 2	83 MR
12b	Klipfontein No. 300 JQ	A part of the Remainder of portion 2	86 MR
13	Klipfontein No. 300 JQ	Portion 6	86 MR
14	Klipfontein No. 300 JQ	Portion 10	86 MR
15	Klipfontein No. 300 JQ	Portion 11	86 MR
16	Klipfontein No. 300 JQ	A part of Portion 12	86 MR
17a	Klipgat No.281 JQ	A part of the farm	82 MR
17b	Klipgat No.281 JQ	A part of the farm	86 MR
18	Lonmin Tailings No 943 JQ	The farm	81 MR
19	Paardekraal No.279 JQ	Remainder of Portion 4	81 MR
20	Paardekraal No.279 JQ	Remainder of Portion 5	81 MR
21	Paardekraal No.279 JQ	Portion 6	81 MR
22	Paardekraal No.279 JQ	Remainder of Portion 7	81 MR
23	Paardekraal No.279 JQ	Remainder of Portion 13	81 MR
24	Paardekraal No.279 JQ	Remainder of Portion 14	81 MR
25	Paardekraal No.279 JQ	Remainder of Portion 15	81 MR
26	Paardekraal No.279 JQ	Remainder of Portion 16	81 MR
27a	Paardekraal No.279 JQ	A part of the Remainder of Portion 18	81 MR
27b	Paardekraal No.279 JQ	A part of the Remainder of Portion 18	82 MR
28	Paardekraal No. 279 JQ	Remainder of Portion 23	82 MR
29	Paardekraal No. 279 JQ	Remainder of Portion 25	81 MR
30	Paardekraal No. 279 JQ	Remainder of Portion 26	81 MR
31	Paardekraal No. 279 JQ	Remainder of Portion 27	81 MR
32	Paardekraal No. 279 JQ	Remainder of Portion 28	81 MR
33	Paardekraal No. 279 JQ	Remainder of Portion 32	81 MR
34	Paardekraal No. 279 JQ	Remainder of Portion 33	81 MR
35	Paardekraal No. 279 JQ	Remainder of Portion 34	81 MR
36	Paardekraal No. 279 JQ	Portion 35	81 MR
37	Paardekraal No. 279 JQ	Portion 36	81 MR
38	Paardekraal No. 279 JQ	Portion 39	81 MR

Map reference	Property description		Mineral description reference
	Farm name	Farm portion	
39	Paardekraal No. 279 JQ	Remainder of Portion 44	81 MR
40	Paardekraal No. 279 JQ	Remainder of Portion 45	81 MR
41	Paardekraal No. 279 JQ	Portion 46	81 MR
42	Paardekraal No.279 JQ	Remainder of Portion 49	81 MR
43	Paardekraal No. 279 JQ	Remainder of Portion 50	81 MR
44	Paardekraal No.279 JQ	Remainder of Portion 51	81 MR
45	Paardekraal No. 279 JQ	Portion 52	82 MR
46	Paardekraal No.279 JQ	Portion 53	82 MR
47	Paardekraal No. 279 JQ	Portion 54	82 MR
48	Paardekraal No. 279 JQ	Portion 55	81 MR
49	Paardekraal No. 279 JQ	Portion 58	81 MR
50	Paardekraal No. 279 JQ	Portion 59	81 MR
51	Paardekraal No. 279 JQ	Portion 60	81 MR
52	Paardekraal No. 279 JQ	Portion 61	81 MR
53	Paardekraal No. 279 JQ	Portion 62	81 MR
54	Paardekraal No. 279 JQ	Portion 63	81 MR
55	Paardekraal No. 279 JQ	Portion 64	81 MR
56	Paardekraal No. 279 JQ	Portion 65	81 MR
57	Paardekraal No. 279 JQ	Portion 66	81 MR
58	Paardekraal No. 279 JQ	Portion 67	81 MR
59	Paardekraal No. 279 JQ	Portion 68	81 MR
60	Paardekraal No. 279 JQ	Portion 69	81 MR
61a	Paardekraal No. 279 JQ	A part of the Remainder of Portion 70	81 MR
61b	Paardekraal No. 279 JQ	A part of the Remainder of Portion 70	82 MR
62a	Paardekraal No. 279 JQ	A part of the Remainder of Portion 71	81 MR
62b	Paardekraal No. 279 JQ	A part of the Remainder of Portion 71	82 MR
63	Paardekraal No. 279 JQ	Portion 78	81 MR
64	Paardekraal No. 279 JQ	Portion 81	81 MR
65	Paardekraal No. 279 JQ	Portion 84	81 MR
66	Paardekraal No. 279 JQ	Portion 85	81 MR
67	Paardekraal No. 279 JQ	Portion 86	81 MR
68	Paardekraal No. 279 JQ	Portion 87	81 MR
69a	Paardekraal No. 279 JQ	A part of Portion 94	81 MR
69b	Paardekraal No. 279 JQ	A part of Portion 94	82 MR
70a	Paardekraal No. 279 JQ	A part of Portion 95	81 MR
70b	Paardekraal No. 279 JQ	A part of Portion 95	82 MR
71a	Paardekraal No. 279 JQ	A part of Portion 96	81 MR
71b	Paardekraal No. 279 JQ	A part of Portion 96	82 MR
72	Paardekraal No. 279 JQ	Remainder of Portion 101	81 MR
73	Paardekraal No. 279 JQ	Portion 103	81 MR
74	Paardekraal No. 279 JQ	Portion 104	81 MR
75	Paardekraal No. 279 JQ	Portion 105	81 MR

Map reference	Property description		Mineral description reference
	Farm name	Farm portion	
76	Paardekraal No. 279 JQ	Portion 106	81 MR
77	Paardekraal No. 279 JQ	Portion 108	81 MR
78	Paardekraal No. 279 JQ	Portion 109	81 MR
79	Paardekraal No. 279 JQ	Portion 111	81 MR
80	Paardekraal No. 279 JQ	Portion 112	81 MR
81	Paardekraal No. 279 JQ	Portion 113	81 MR
82	Paardekraal No. 279 JQ	Portion 114	81 MR
83	Paardekraal No. 279 JQ	Portion 119	81 MR
84	Paardekraal No. 279 JQ	Portion 120	81 MR
85	Paardekraal No. 279 JQ	Portion 122	81 MR
86	Paardekraal No. 279 JQ	Portion 123	81 MR
87	Paardekraal No. 279 JQ	Portion 124	81 MR
88	Paardekraal No. 279 JQ	Portion 125	81 MR
89	Paardekraal No. 279 JQ	Portion 129	81 MR
90a	Paardekraal No. 279 JQ	A part of the Remainder of Portion 130	81 MR
90b	Paardekraal No. 279 JQ	A part of the Remainder of Portion 130	82 MR
91a	Paardekraal No. 279 JQ	A part of Portion 131	81 MR
91b	Paardekraal No. 279 JQ	A part of Portion 131	82 MR
92	Paardekraal No. 279 JQ	Portion 132	81 MR
93	Paardekraal No. 279 JQ	Portion 133	81 MR
94a	Paardekraal No. 279 JQ	A part of Portion 134	81 MR
94b	Paardekraal No. 279 JQ	A part of Portion 134	82 MR
95a	Paardekraal No. 279 JQ	A part of Portion 135	81 MR
95b	Paardekraal No. 279 JQ	A part of Portion 135	82 MR
96	Paardekraal No. 279 JQ	Remainder of Portion 136	81 MR
97a	Paardekraal No. 279 JQ	A part of Portion 137	81 MR
97b	Paardekraal No. 279 JQ	A part of Portion 137	82 MR
98	Paardekraal No. 279 JQ	Portion 141	81 MR
99	Paardekraal No. 279 JQ	Portion 148	81 MR
100	Paardekraal No. 279 JQ	Remainder of portion 150	81 MR
101	Paardekraal No. 279 JQ	Portion 151	81 MR
102	Paardekraal No. 279 JQ	Remainder of Portion 152	81 MR
103	Paardekraal No. 279 JQ	Portion 153	81 MR
104	Paardekraal No. 279 JQ	Portion 157	81 MR
105	Paardekraal No. 279 JQ	Portion 158	81 MR
106	Paardekraal No. 279 JQ	Portion 159	81 MR
107	Paardekraal No. 279 JQ	Portion 161	81 MR
108	Paardekraal No. 279 JQ	Portion 165	81 MR
109	Paardekraal No. 279 JQ	Portion 166	81 MR
110a	Paardekraal No. 279 JQ	A part of the Remainder of Portion 170 (excluding part of the remaining extent of portion 21 – now consolidated into part of the remainder of portion 170 and portion 171)	81 MR
110b	Paardekraal No. 279 JQ	A part of the Remainder of Portion 170 (excluding part of the remaining extent of portion 21 – now	82 MR

Map reference	Property description		Mineral description reference
	Farm name	Farm portion	
		consolidated into part of the remainder of portion 170 and portion 171)	
111	Paardekraal No. 279 JQ	Portion 171 (excluding part of the remaining extent of portion 21 – now consolidated into part of the remainder of portion 170 and portion 171)	82 MR
112	Paardekraal No. 279 JQ	Portion 175	81 MR
113	Paardekraal No. 279 JQ	Portion 176	81 MR
114	Paardekraal No. 279 JQ	Portion 177	81 MR
115a	Paardekraal No. 279 JQ	A part of Portion 178	81 MR
115b	Paardekraal No. 279 JQ	A part of Portion 178	82 MR
116	Paardekraal No. 279 JQ	Portion 179	81 MR
117	Seraleng No. 967 JQ	A Part of The farm	81 MR
118	Town And Townlands Of Rustenburg No. 272 JQ	Part of the Remainder of Portion 1	81 MR
119	Town And Townlands Of Rustenburg No. 272 JQ	Part of the Remainder of Portion 3	81 MR
120	Town And Townlands Of Rustenburg No. 272 JQ	Remainder of Portion 16	81 MR
121	Town And Townlands Of Rustenburg No. 272 JQ	Part of Portion 117	81 MR
122	Town And Townlands Of Rustenburg No. 272 JQ	Remainder of Portion 118	81 MR
123	Town And Townlands Of Rustenburg No. 272 JQ	Part of the Portion 199	81 MR
124	Town And Townlands Of Rustenburg No. 272 JQ	Part of the Portion 200	81 MR
125	Town And Townlands Of Rustenburg No. 272 JQ	Part of the Portion 201	81 MR
126	Town And Townlands Of Rustenburg No. 272 JQ	Portion 209	81 MR
127	Town And Townlands Of Rustenburg No. 272 JQ	Portion 212	81 MR
128	Town And Townlands Of Rustenburg No. 272 JQ	Portion 223	81 MR
129	Town And Townlands Of Rustenburg No. 272 JQ	Part of the Portion 229	81 MR
130a	Turffontein No.302 JQ	A part of Remainder of the farm	82 MR
130b	Turffontein No.302 JQ	A part of Remainder of the farm	86 MR
131	Turffontein No.302 JQ	Portion 2	86 MR
132	Turffontein No.302 JQ	Portion 3	86 MR
133	Waterval No. 303 JQ	Remainder	81 MR
134	Waterval No.303 JQ	Portion 2	81 MR
135a	Waterval No. 303 JQ	A part of Portion 3	81 MR
135b	Waterval No. 303 JQ	A part of Portion 3	84 MR
136a	Waterval No. 303 JQ	A part of the Remainder of Portion 5	81 MR
136b	Waterval No. 303 JQ	A part of the Remainder of Portion 5	84 MR
137a	Waterval No. 303 JQ	A part of Remainder of Portion 6	81 MR
137b	Waterval No. 303 JQ	A part of Remainder of Portion 6	84 MR
138	Waterval No. 303 JQ	Portion 7	84 MR
139a	Waterval No. 303 JQ	A part of Remainder of Portion 8	81 MR
139b	Waterval No. 303 JQ	A part of Remainder of Portion 8	84 MR
140	Waterval No. 303 JQ	A part of the Remainder of Portion 9	81 MR
141	Waterval No. 303 JQ	Remainder of Portion 10	81 MR
142	Waterval No. 303 JQ	Remainder of Portion 11	81 MR
143	Waterval No. 303 JQ	Portion 12	81 MR
144	Waterval No, 303 JQ	Remainder of Portion 13	81 MR

Map reference	Property description		Mineral description reference
	Farm name	Farm portion	
145	Waterval No. 303 JQ	A part of Portion 14	81 MR
146	Waterval No.303 JQ	A part of the Remainder of Portion 16	81 MR
147	Waterval No. 303 JQ	Remainder of Portion 19	81 MR
148	Waterval No.303 JQ	A part of Portion 42	81 MR
149	Waterval No.303 JQ	Portion 43	81 MR
150	Waterval No. 303 JQ	Portion 48	81 MR
151a	Waterval No.303 JQ	A part of Portion 51	84 MR
151b	Waterval No.303 JQ	A part of Portion 51	84 MR
152	Waterval No.303 JQ	A part of Portion 53	81 MR
153	Waterval No.303 JQ	Portion 54	81 MR
154	Waterval No.303 JQ	Portion 55	81 MR
155	Waterval No.303 JQ	Portion 58	81 MR
156	Waterval No.303 JQ	Portion 60	81 MR
157	Waterval No.303 JQ	A part of Portion 61	81 MR
158a	Waterval No.306 JQ	A part of Remainder of Portion 2	81 MR
158b	Waterval No.306 JQ	A part of Remainder of Portion 2	83 MR
159	Waterval No. 306 JQ	A part of Portion 53	81 MR
160	Waterval No. 306 JQ	Portion 57	83 MR
161	Waterval No.306 JQ	Remainder of Portion 81	83 MR
162	Waterval No. 306 JQ	Portion 82	83 MR
163	Waterval No.306 JQ	Remainder of Portion 116	83 MR
164	Waterval No. 306 JQ	Portion 135	83 MR
165	Waterval No.306 JQ	Portion 136	83 MR
166	Waterval No.306 JQ	Portion 137	83 MR
167	Waterval No. 306 JQ	Portion 138	83 MR
168	Waterval Na.306 JQ	Portion 307	83 MR
169	Waterval No.307 JQ	Remainder of Portion 1	43 MR
170	Waterval No.307 JQ	Portion 3	43 MR
171	Waterval No.307 JQ	Portion 7	43 MR
172	Waterval No.307 JQ	Portion 8	43 MR
173	Waterval No.307 JQ	Portion 9	43 MR
174	Waterval No.307 JQ	Remainder of Portion 10	43 MR
175	Waterval No.307 JQ	Portion 11	43 MR
176	Waterval No.307 JQ	Portion 12	43 MR
177	Waterval No.581 JQ	Remainder	43 MR
178a	Waterval No.581 JQ	A part of Portion 1	81 MR
178b	Waterval No.581 JQ	A part of Portion 1	43 MR
179	Waterkloof No.305 JQ	Remainder of Portion 53	43 MR
180	Waterkloof No.305 JQ	Portion 77	43 MR
181	Waterkloof No.305 JQ	Remainder of Portion 78	43 MR
182	Waterkloof No.305 JQ	Portion 80	43 MR
183	Waterkloof No.305 JQ	Portion 86	43 MR

Map reference	Property description		Mineral description reference
	Farm name	Farm portion	
184	Waterkloof No.305 JQ	Portion 87	43 MR
185	Waterkloof No.305 JQ	Remainder of Portion 367	43 MR
186	Waterkloof No.305 JQ	Portion 368	43 MR

Legend (below) to table of Rustenburg Operations Mining Rights (above)

Mineral Description Reference	Mineral Description as per right
43 MR	All rights to Platinum Group Metals i.e. Platinum, Palladium, Rhodium, Iridium, Osmium and Ruthenium in the Merensky and UG2 reefs, together with metals and minerals found in mineralogical association therewith, including but not limited to chrome, gold, silver, copper, nickel and cobalt together with any such metals and minerals which will be extracted out of necessity and convenience during the mining of the platinum group
79 MR	Platinum Group Metals and Associated Minerals (precious metals) amended to include Chrome, Cobalt, Nickel, Silver, Gold and Copper (on UG2 and Merensky reefs)
81 MR	Platinum Group Metals and Associated Minerals (precious metals) amended to include Chrome, Cobalt, Nickel, Gold, Copper and Silver (on UG2 and Merensky reefs)
82 MR	Precious Metals and Base Minerals (on UG2 and Merensky reefs)
83 MR	Platinum Group Metals, Precious and Base Minerals
84 MR	Platinum Group Metals, Precious and Base Minerals
85 MR	Platinum Group Metals, that is to say platinum, palladium, rhodium, iridium, ruthenium and osmium, together with all other metals and minerals found in mineralogical association therewith, including but not limited to chrome, gold, silver, copper, nickel and cobalt together with any such other metals and minerals which have to be mined out of necessity and convenience together with the Platinum Group Metals in UG2 and Merensky Reefs
86 MR	Platinum Group Metals and Associated Minerals (precious metals) amended to include Chrome, Cobalt, Nickel, Silver, Gold and Copper (on UG2 and Merensky reefs)

Appendix B Rustenburg Operations immovable properties

Immovable properties that are part of the Asset sale package

	Parent Property	Properties to be Sold
1	RE Waterval 303	Remaining Extent of the Farm Waterval 303, Registration Division JQ, North West Province In Extent 212,7242 ha; Held by Deed of Transfer T99101/1999
2	PTN-RE 6 Waterval 303	A Portion of the Remaining Extent of Portion 6 of the Farm Waterval 303, Registration Division JQ, North West Province Extent to be determined in the subdivision process and once the SG diagram has been approved; Held by Deed of Transfer T4809/1998
3	RE PTN 8 Waterval 303	The Remaining Extent of Portion 8 of the Farm Waterval 303, Registration Division JQ, Province of North West In Extent 104,7161 ha; Held by Deed of Transfer T27736/1998
4	RE-PTN 10 Waterval 303	A Portion of the Remaining Extent of Portion 10 of the Farm Waterval 303, Registration Division JQ, North West Province Extent to be determined in the subdivision process and once the SG diagram has been approved; Held by Deed of Transfer T29237/2000
5	PTN 14-9 Waterval 303	The Remaining Extent of Portion 14 of the Farm Waterval 303, Registration Division JQ, Province of North West Extent to be determined in the subdivision process and once the SG diagram has been approved; Held by Deed of Transfer T34009/1976
6	RE-PTN 16 Waterval 303	Portion 79 (a Portion of Portion 16) of the Farm Waterval 303, Registration Division JQ, Province of North West In extent 27.6307 ha, as will appear from SG Diagram 621/2015; Held by Deed of Transfer T65334/1998
7	RE-PTN 16 Waterval 303	A Portion of the Remaining Extent of Portion 16 of the Farm Waterval 303, Registration Division JQ, Province of North West Extent to be determined in the subdivision process and once the SG diagram has been approved; Held by Deed of Transfer T65334/1998
8	RE-PTN 19 Waterval 303	Remaining Extent of Portion 19 of the Farm Waterval 303, Registration Division JQ, Province of North West In Extent 216,5550 ha; Held by Deed of Transfer T9544/1980
9	PTN 48-8 Waterval 303	The Remaining Extent of Portion 48 (a Portion of Portion 8) of the Farm Waterval 303, Registration Division JQ, Province of North West Extent to be determined in the subdivision process and once the SG diagram has been approved; Held by Deed of Transfer T47441/1997
10	PTN 49-8 Waterval 303	The Remaining Extent of Portion 49 of the Farm Waterval 303, Registration Division JQ, Province of North West Extent to be determined in the subdivision process and once the SG diagram has been approved; Held by Deed of Transfer T47441/1997
11	PTN 51-6 Waterval 303	Portion 51 (a Portion of Portion 6) of the Farm Waterval 303, Registration Division JQ, North West Province In Extent 2,9989 ha; Held by Deed of Transfer T 4809/1998
12	PTN 122 Kroondal 304	The Remaining Extent of Portion 122 (a Portion of Portion 76) of the Farm Kroondal 304, Registration Division JQ, Province of North West Extent to be determined in the subdivision process and once the SG diagram has been approved; Held by Deed of Transfer T55202/1984.
13	PTN 132 Kroondal 304	Certain Portion 132 (a Portion of Portion 54) of the Farm Kroondal 304, Registration Division JQ, Province of North West In Extent (10.0867) morgen; Held by Deed of Transfer T3740/1962.
14	PTN-PTN 145 Kroondal 304	The Remaining Extent of Portion 145 of the Farm Kroondal 304, Registration Division JQ, Province of North West Extent to be determined in the subdivision process and once the SG diagram has been approved; Held by Deed of Transfer. T3148/1969
15	PTN-PTN 167-87 Kroondal 304	The Remaining Extent of Portion 167 of the Farm Kroondal 304, Registration Division JQ, North West Province Extent to be determined in the subdivision process and once the SG diagram has been

	Parent Property	Properties to be Sold
		approved; Held by Deed of Transfer T145443/1998.
16	PTN-PTN 170-89 Kroondal 304	The Remaining Extent of Portion 170 of the Farm Kroondal 304, Registration Division JQ, North West Province Extent to be determined in the subdivision process and once the SG diagram has been approved; Held by Deed of Transfer T147238/1998.
17	PTN-PTN 172-90 Kroondal 304	Portion 172 (a Portion of Portion 90) of the Farm Kroondal 304, Registration Division JQ, North West Province In Extent 11,2649 ha; Held by Deed of Transfer T147238/1998.
18	RE-PTN 27 Paardekraal 279	Remaining Extent of Portion 27 of the Farm Paardekraal 279, Registration Division JQ, Province of North West In Extent 158,1097 ha; Held by Deed of Transfer T21390/1987.
19	RE-PTN 28 Paardekraal 279	Remaining Extent of Portion 28 of the Farm Paardekraal 279, Registration Division JQ, Province of North West In Extent 297,3293 ha; Held by Deed of Transfer T3573/1985
20	PTN 111-27 Paardekraal 279	Portion 111 (Portion of Portion 110) of the Farm Paardekraal 279, Registration Division JQ, North West Province In Extent 58,7957 ha; Held by Deed of Transfer T88352/2006
21	PTN 114-27 Paardekraal 279	Portion 114 (a Portion of Portion-27) of the Farm Paardekraal 279, Registration Division JQ, Province of North West In Extent 82,6554 ha; Held by Deed of Transfer T50329/1985
22	PTN 119-45 Paardekraal 279	Certain Portion 119 (a Portion of Portion-45) of the Farm Paardekraal 279, Registration Division JQ, North West Province In Extent 42,8262 ha; Held by Deed of Transfer T27020/1972
23	PTN 120-29 Paardekraal 279	Portion 120 (a Portion of Portion-29) of the Farm Paardekraal 279, Registration Division JQ, North West Province In Extent 91,0653 ha; Held by Deed of Transfer T46927/1984
24	PTN 122-42 Paardekraal 279	Portion 122 (Portion of Portion-42) of the Farm Paardekraal 279, Registration Division JQ, North West Province In Extent 95,6177 ha; Held by Deed of Transfer T38868/1986
25	PTN 123 Paardekraal 279	Portion 123 of the Farm Paardekraal 279, Registration Division JQ, North West Province In Extent 11,7501 ha; Held by Deed of Transfer T88352/2006
26	PTN 124 Paardekraal 279	Portion 124 of the Farm Paardekraal 279, Registration Division JQ, North West Province In Extent 58,7510 ha; Held by Deed of Transfer T88352/2006
27	PTN 125 Paardekraal 279	Portion 125 of the Farm Paardekraal 279, Registration Division JQ, North West Province In Extent 12,0211 ha; Held by Deed of Transfer T88352/2006
28	PTN 23-22 Brakspruit 299 (Siphumele 2 and WLTR)	Portion 23 (a Portion of Portion-22) of the Farm Brakspruit 299, Registration Division JQ, North West Province In Extent 472,9636 ha; Held by Deed of Transfer T4733/2004
29	Farm Anglo Tailings 942	The Farm Anglo Tailings 942, Registration Division JQ, North West Province In Extent 151,4405 ha; Held by Deed of Transfer T110164/2003
30	PTN 19 Hoedspruit 298 (Hoedspruit Tailings)	Portion 19 of the Farm Hoedspruit 298, Registration Division JQ, North West Province In Extent 404,4055 ha; Held by Deed of Transfer T4733/2004
31	RE-PTN 2 Waterval 306 (Hex River complex)	Remaining Extent of Portion 2 of Farm Waterval 306, Registration Division JQ, North West Province In Extent 239,4182 ha; Held by Deed of Transfer T24653/1961
32	RE-PTN 4 Klipfontein 300	A Portion of the Remaining Extent of Portion 4 of the Farm Klipfontein 300, Registration Division JQ, Province of North West Extent to be determined in the subdivision process and once the SG diagram has been approved; Held by Deed of Transfer T123/1987
33	PTN 5-4 Klipfontein 300	The Remaining Extent of Portion 5 of the Farm Klipfontein 300, Registration Division JQ, The Province of North West

	Parent Property	Properties to be Sold
		Extent to be determined in the subdivision process and once the SG diagram has been approved; Held by Deed of Transfer T9419/2003
34	PTN 78 Paardekraal 279	Portion 78 (a Portion of Portion 77) of the Farm Paardekraal 279, Registration Division JQ, Province of North West In Extent 130,6380 ha; Held by Deed of Transfer T24677/1987
35	PTN 7 Waterval 303	Portion 7 of the Farm Waterval 303, Registration Division JQ, North West Province In Extent 66,5569 ha; Held by Deed of Transfer T8356/2004
36	RE PTN 85 Kroondal 304	Remaining Extent of Portion 85 of Farm Kroondal 304, Registration Division JQ, North West Province In Extent 3,4964 ha; Held by Deed of Transfer T22867/2002
37	RE-PTN 13 Waterval 303	A Portion of the Remaining Extent of Portion 13 (Portion of Portion 9) of the Farm Waterval 303, Registration Division JQ, Province of North West Extent to be determined in the subdivision process and once the SG diagram has been approved; Held by Deed of Transfer T42141/2001
38	RE-PTN 9 Waterval 303	A Portion of Remaining Extent of Portion 9 of the Farm Waterval 303, Registration Division JQ, Province of North West Extent to be determined in the subdivision process and once the SG diagram has been approved; Held by Deed of Transfer T34009/1976
39	PTN-RE 5 Waterval 303	A Portion of the Remaining Extent Portion 5 of the Farm Waterval 303, Registration Division JQ, Province of North West Extent to be determined in the subdivision process and once the SG diagram has been approved; Held by Deed of Transfer T77255/1990
40	RE PTN 76 Kroondal 304	A Portion of the Remaining Extent of Portion 76 of the Farm Kroondal 304, Registration Division JQ, North West Province Extent to be determined in the subdivision process and once the SG diagram has been approved; Held by Deed of Transfer T82779/2005
41	PTN 3 Waterval 303	Portion 3 of the Farm Waterval 303, Registration Division JQ, North West Province In Extent 60,8281 ha; Held by Deed of Transfer T10080/1998

Appendix C SAMREC Code Checklist

REPORTING OF MINERAL RESOURCES AND RESERVES			
No.	**Assessment Criteria**	**Executive Summary**	**CPR body**
T1	General		
T1.1	Purpose of Report	Covering Letter, Section 1.1	Section 2.1
T1.2	Project Outline	Section 1.1	Section 2.1
T1.3	History		Section 3.2, 8.5
T1.4	Key Plan, Maps and Diagrammes		Section 4.2, 6.3, 6.4, 7.2, 8.1
T1.5	Project location and Description	Section 1.1	Section 4.1, 4.2, 4.4
T1.6	Topography and Climate		Section 4.4, 4.5
T1.7	Legal Aspects and Tenure	Section 1.2	Section 2.1, 5.1- 5.4
T2	Project Data		
T2.1	Data Management and Database		Section 7.1
T2.2	Spatial Data		Section 6.3, 6.5, 7.1
T2.3	Geological Data		Section 6.3, 7.1, 7.2
T2.4	Specific Gravity and Bulk Tonnage data		Section 7.1
T2.5	General Data		Section 7.1
T3	Sampling		
T3.1	Sampling Governance		Section 7.1
T3.2	Sample Method, Collection, Validation, Capture and Storage		Section 6.4, 7.1
T3.3	Sample Preparation		Section 7.1
T3.4	Sample Analysis		Section 7.1.5, 7.1
T4	Interpretation And Modelling		-
T4.1	Geological Model and Interpretation		Section 6.1, 6.6, 7.2
T4.2	Estimation and Modelling Techniques		Section 7.2
T5	Techno-Economic Study (Including Modifying Factors)		
T5.1	Governmental		Section 5.1, 5.3, 5.4, 13.5
T5.2	Environmental		Section 10.4.4, 13.4, 13.5
T5.3	Social		Section 15
T5.4	Mining		Section 8.2
T5.5	Treatment Processing		Section 9.1, 9.3, 9.4, 9.6
T5.6	Infrastructure		Section 11
T5.7	Economic Criteria	Section 1.7.2	Section 8.2, 8.10, 18.9
T5.8	Marketing		Section 17, 18.9
T6	Risk		Section 7.2.8, 9.9, 9.10, 11.9, 13.6, 13.8, 19
T7	Resource and Reserve Classification Criteria		Section 7.2, 8.2
T8	Balanced Reporting		Section 7.2, 8.2, 8.5
T9	Audits and Reviews		Section 7.2.9, 8.12, 18.20
T10	Other Considerations		Section 6.5, 18.21, 21
T11	Qualification of Competent Person(s) And Other Key Technical Staff, Date and Signature Page.		Section 22

Appendix D SAMVAL Code Checklist

REPORTING OF MINERAL ASSET VALUATION			
No.	**Assessment criteria**	**Executive summary**	**CPR body**
SV 2.1	*Executive Summary*	Covering Letter; Section 1.1	Section 2.1
SV 2.2	*Introduction and scope*	Covering Letter; Section 1.1	Section 2.1, 18.1
SV 2.3	*Identity and Tenure*	Section 1.2	Section 3.1, 4.1, 5.1-5.3, 18.3
SV 2.4	*History*	Section 1.1	Section 3.1, 3.2, 6.3, 18.4
SV 2.5	*Geological setting*	Section 1.3	Section 6, 18.5
SV 2.6	*Mineral Resources and Mineral Reserves*	Section 1.5	Section 7.2.10, 8.2, 8.3, 8.4, 8.5, 18.6
SV 2.7	*Modifying factors*	-	Section 8.2.2, 18.7
SV 2.8	*Valuation approaches and methods*	Section 1.7	Section 18.8, 18.9, 18.10
SV 2.9	*Valuation date*	Section 1.7	Section 18.11
SV 2.10	*Valuation summary and conclusions*	Section 1.7.7	Section 18.13
SV 2.11	*Sources of information*	-	Section 2.3., 18.2
SV 2.12	*Previous valuations*	-	Section 18.14
SV 2.13	*Competent Persons and Other Experts*	Covering Letter, Section 1.1	Section 2.3, 18.15, 22
SV 2.14	*Competent Valuator*	Section 1.1	Section 18.16, 22
SV 2.15	*Range of values*	Section 1.7.6	Section 18.12, 18.13
SV 2.16	*Identifiable component asset values*	-	Section 18.17
SV 2.17	*Historic verification*	-	Section 18.17
SV 2.18	*Market assessment*	-	Section 17, 18.19
SV 2.19	*Audits and reviews*	-	Section 18.20