

# MASSAWA GOLD PROJECT

TOTAL RESERVES

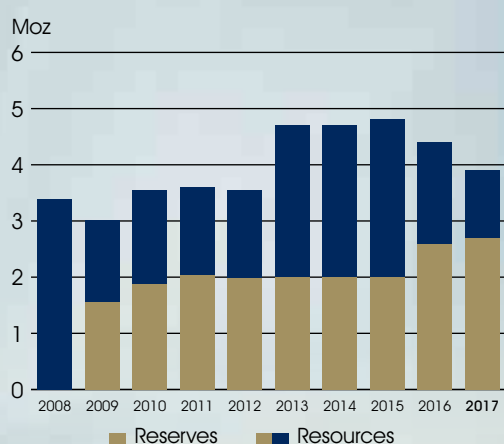
**2.7Moz**





The Massawa project is a grassroots exploration discovery located on the Kanoumba permit in eastern Senegal. Randgold owns 83.25% in partnership with a Senegalese company who owns 6.75%, after providing for the State of Senegal's right to a non-contributory 10% share of any mine developed on the property. The project is located about 700 kilometres south east of the capital city of Dakar and approximately 90 kilometres due west of Randgold's Loulou operation in Mali.

**MASSAWA TOTAL MINERAL RESOURCES AND ORE RESERVES<sup>1</sup>**



<sup>1</sup> Refer to the notes to the annual resources and reserves declaration on page 107 of this annual report.

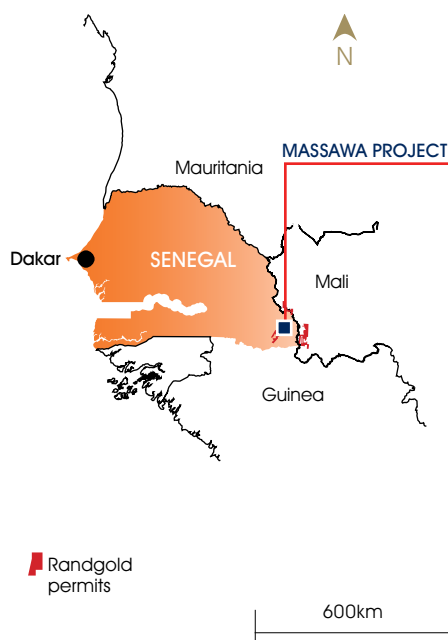


## ACHIEVED IN 2017

- Expanded Sofia orebody reserves
- Converted Delya orebody resources into reserves
- Completed drill out of the Massawa Central Zone metallurgical optimisation areas
- Updated geological and metallurgical understanding of the Massawa orebodies
- Initiated pilot level testwork on Massawa Central and Northern Zones
- Completed environmental and social baseline assessment
- Tested satellite targets outside the three reserve orebodies
- Sterilised TSF and diversion dam infrastructure sites

## TARGETED FOR 2018

- Further expand project reserves
- Complete drill out and metallurgical test work of Massawa
- Complete final feasibility study and development timeline for project
- Add to project reserves through development of satellite orebodies
- Complete sterilisation of plant, administration and camp locations



### Development project

The Massawa feasibility project is being progressed towards a final development decision which includes its potential to meet Randgold's internal investment filters. These investment criteria include a critical mass of 3Moz of mineable gold capable of delivering an IRR of 20% at \$1 000/oz for the project. The project currently falls slightly short of these targets and work is focussing on testing the potential of the high grade portion of the Central Zone (CZ) orebody and the surrounding satellite deposits of KB, Kaviar and others. Results from the CZ and satellite targets have recently highlighted some exciting potential for high grade mineralisation.

The Massawa project is located within the Kedougou-Kenieba inlier which is underlain by Lower Proterozoic Birimian metasedimentary-volcanic sequences. Regionally it is located on the plus 150 kilometre long northeast/southwest trending Main Transcurrent Shear Zone (MTZ) which is a significant transcrustal dislocation between the Mako Supergroup (basaltic flow rocks, minor intercalated volcanoclastics, and ultramafic sub-volcanic intrusions) and the Diale-Dalema Supergroup (volcano-sedimentary to sedimentary rocks). Mineralisation at Massawa occurs in various lithologies but is structurally controlled within anastomosing shears which exploit the contact between volcanic, sedimentary and intrusive lithologies.



## MASSAWA MINERAL RESOURCES AND ORE RESERVES

at 31 December	Category	Tonnes (Mt)		Grade (g/t)		Gold (Moz)		Attributable gold <sup>3</sup> (Moz)	
		2017	2016	2017	2016	2017	2016	2017	2016
<b>MINERAL RESOURCES<sup>1</sup></b>									
■ Open pits	Measured	-	0.54	-	5.5	-	0.095	-	0.079
	Indicated	24	19	3.8	4.0	2.9	2.5	2.4	2.0
	Inferred	10	20	2.3	2.6	0.79	1.6	0.66	1.4
■ Underground	Inferred	1.4	1.1	4.5	4.9	0.20	0.17	0.17	0.14
<b>TOTAL MINERAL RESOURCES</b>									
	Measured and indicated	24	20	3.8	4.0	2.9	2.6	2.4	2.1
	Inferred	12	21	2.6	2.7	0.99	1.8	0.82	1.5
<b>ORE RESERVES<sup>2</sup></b>									
■ Open pits	Probable	23	19	3.6	4.3	2.7	2.6	2.2	2.2
<b>TOTAL ORE RESERVES</b>									
	Proved and probable	23	19	3.6	4.3	2.7	2.6	2.2	2.2

<sup>1</sup> Open pit mineral resources are reported as the in situ mineral resources falling within the \$1 500/oz pit shell reported at an average cut-off of 0.8g/t. Underground mineral resources are those in situ mineral resources below the \$1 500/oz pit shell of the North Zone 2 deposit reported at a 2.3g/t cut-off. All Massawa mineral resources were generated by Simon Bottoms and Rodney Quick, both officers of the company and competent persons.

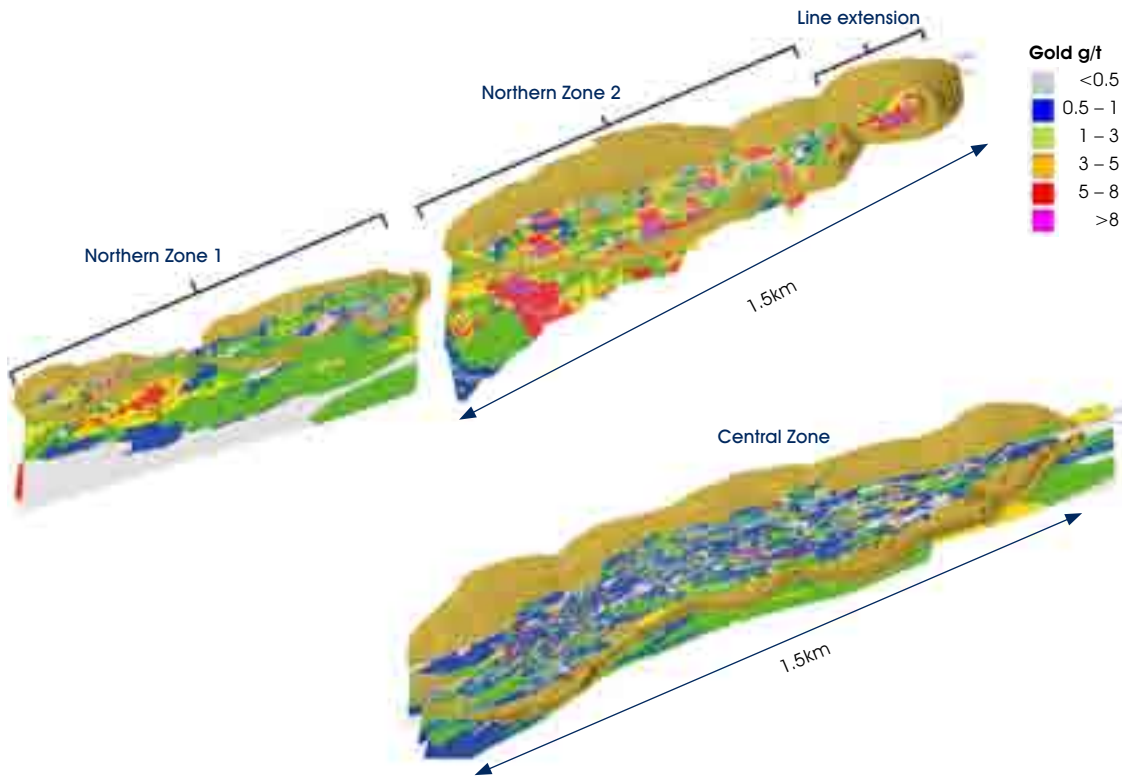
<sup>2</sup> Open pit ore reserves are reported at a gold price of \$1 000/oz and at an average cut-off of 1.1g/t, including both dilution and ore loss factors. Open pit ore reserves were generated by Shaun Gillespie, an officer of the company and competent person.

<sup>3</sup> Attributable gold (Moz) refers to the quantity attributable to Randgold based on its 83.25% interest in Massawa.

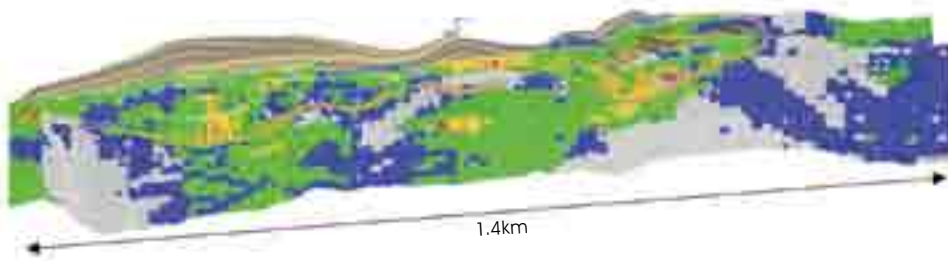
Mineral resource and ore reserve numbers are reported as per JORC 2012 and as such are reported to the second significant digit. All mineral resource tabulations are reported inclusive of that material which is then modified to form ore reserves. Refer to the notes to the annual resources and reserves declaration on page 107 of this annual report.



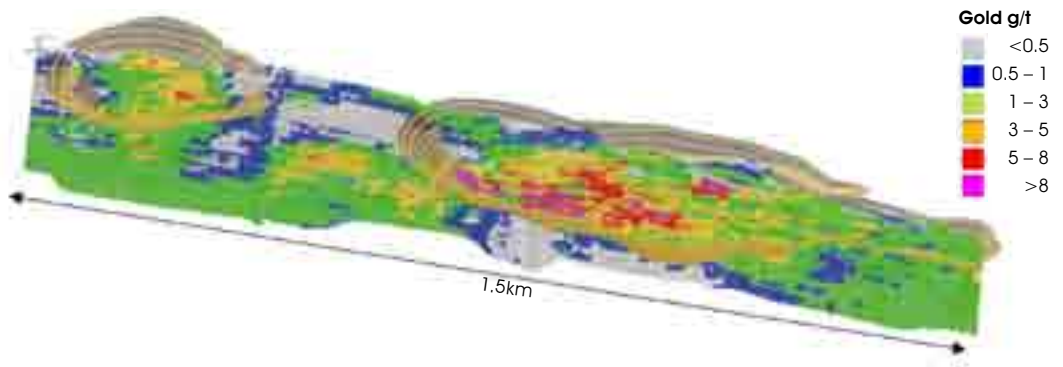
MASSAWA BLOCK MODEL AND \$1 000/OZ PIT DESIGN



SOFIA NORTH BLOCK MODEL AND \$1 000/OZ PIT DESIGN



SOFIA MAIN BLOCK MODEL AND \$1 000/OZ PIT DESIGN



Evaluation work on the Massawa project continued through the year focussing on the Massawa, Sofia and Delya orebodies. The non-refractory Sofia deposit, located 11km west of the Massawa deposit, has been extended to include the Sofia North extension and now contributes a total of 5.9Mt at 2.9g/t for 0.54Moz of ore reserves. The mineralisation remains open to the north and south of Sofia and further exploration is underway to determine if these resources can be expanded.

The Delya satellite deposit was infill drilled and confirmed, adding 0.092Moz to the ore reserve and exploration work is also testing the strike extensions of this system, both to the north and the south.

Pilot scale metallurgical testwork commenced on the CZ orebody with two of four pilot plant tests completed. Each test comprises a 2.5t composite sample collected from all RC sample intersections modelled within the mineralisation in a 15m by 10m drilled block.

Results of the first two pilot plant programmes have confirmed the following:

- The closer spaced drilling has confirmed a complex array of anastomosing shears which range in width from 1m to 12m, being continuous over the strike of the block.
- The RC drilling has returning significantly higher grades than the original diamond core drilling.
- The Leachwell assay method has returned a 10% higher grade across all grade ranges compared to the fire assay method.
- The back calculated grades from the two 2.5t pilot plant samples have confirmed the higher grades reported from RC sampling and the Leachwell assay method.
- Both blocks have returned high gravity gold recoveries of +55%.
- Both blocks have reported overall gravity plus whole leach recoveries of +80%.

The third pilot plant test is currently underway, while the sampling for the fourth test is currently being conducted. Dissolution results from Leachwell indicate that the grade and the leach recovery decrease to the north of the pilot plant 3 area. The completion of the remaining pilot plant tests is critical in determining the proportion of the orebody which will be processed by whole ore leach instead of the bio-oxidation circuit.

Bio-oxidation pilot plant testwork has progressed on the Massawa Northern Zone (NZ). Flotation optimisation and pilot bio-oxidation results indicate that an overall recovery of 88% is achievable. Batch scale bio-oxidation tests have confirmed that similar overall recoveries are likely from the Delya fresh ore.

Based on the latest improvements in the geological and metallurgical models, a mining scenario analysis is being undertaken to understand the optimal mining approach to maximise the value of the ore. This includes a trade off between grade, dilution and ore selectivity.

Environmental and social baseline studies have been completed and these will be used to identify the potential impact of the project to the area and define mitigation measures to implement.

The current phase of the feasibility study is focused on the completion of the metallurgical testwork, infill drilling of the CZ orebody and sterilisation and exploration drilling. An updated mine and feed plan, along with an updated financial assessment, is expected to be available by mid year and the rest of the year will be devoted to final design and costing of the project. The final feasibility is expected to be completed by the end of 2018.

### Exploration

Exploration this year focused on pursuing multiple priority targets with the aim of identifying both upside potential and adding further resources to meet the economic filter of 3Moz. Following the conversion of the Sofia Main and Sofia North targets to indicated resources, further work continues to explore 4km of open strike potential to the north, with initial positive results. Open strike length of over 3km of mineralisation was identified at Delya, 15km NE of Massawa, with work in progress along strike from the new indicated resource mentioned above, and further exploration work is planned for 2018. A strategy of aggressive exploration is in progress on 11 priority targets around Massawa, with positive results already forthcoming from initial drilling on the KB and Kaviar targets that are located south west of the Massawa orebody. This is presented in more detail in the exploration section of this report.