DESKTOP PALAEONTOLOGICAL IMPACT ASSESSMENT

Booysensdal Mining extension development

Specialist report by:

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EXECUTIVE SUMMARY

Bruce Rubidge was appointed by Amec Foster Wheeler Environmental Consultants on behalf of Northam Platinum Development (Ltd) to undertake a desktop Palaeontological Impact Assessment for the Booysendal Mine Expansion project on the farms Buttonshope 51 JT, Booysendal 43JT, Sterkfontein 52JT, Sterkfontein 749JT, De Kafferskraal 53JT in the Steelpoort and Mashishing (Lydenburg) districts of Limpopo and Mpumalanga provinces. The development is for expansion of a mining development.

Most of the area is underlain by Precambrian igneous rocks of the Rustenberg Layered Suite of the Bushveld Igneous Complex. This is an intrusive igneous body comprising a series of ultramafic-mafic layers and a suite of associated granitoid rocks. A very minor part of the TSF1 development will extend onto the arenaceous Steenkampsberg Formation of the Transvaal Supergroup. The geological map indicates that parts of the TSF1 development will be on unconsolidated Quaternary alluvial deposits

As the Precambrian Bushveld Igneous Complex is of igneous origin and the Precambrian arenaceous Steenkampsberg Formation of the Transvaal Supergoup is not known to host fossils it is highly unlikely that palaeontological heritage will be affected by the proposed mining development. The Quaternary alluvial sediments which are covered by vegetation in the study area are the only sedimentary deposits in the area which could host fossils of Quaternary-aged animals and plants. As these deposits are not consolidated it is very unlikely that any fossils will be present.

If in the unlikely event that fossils are exposed in Quaternary sediments in the course of the proposed development, a qualified palaeontologist must be contacted to assess the exposure for fossils so that the necessary rescue operations are implemented.

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Introduction and Brief

A Palaeontological Impact Assessment was requested by Amanda Pyper of Amec Foster Wheeler Environmental Consultants on behalf of Northam Platinum Development (Ltd) on parts of the farms Buttonshope 51 JT, Booysendal 43JT, Sterkfontein 52JT, Sterkfontein 749JT, De Kafferskraal 53JT in the Steelpoort and Mashishing (Lydenburg) districts of Limpopo and Mpumalanga provinces (Figure 1). This report is part of a Heritage Impact Assessment to determine the effect that the proposed development of light commercial buildings will have on palaeontological heritage.

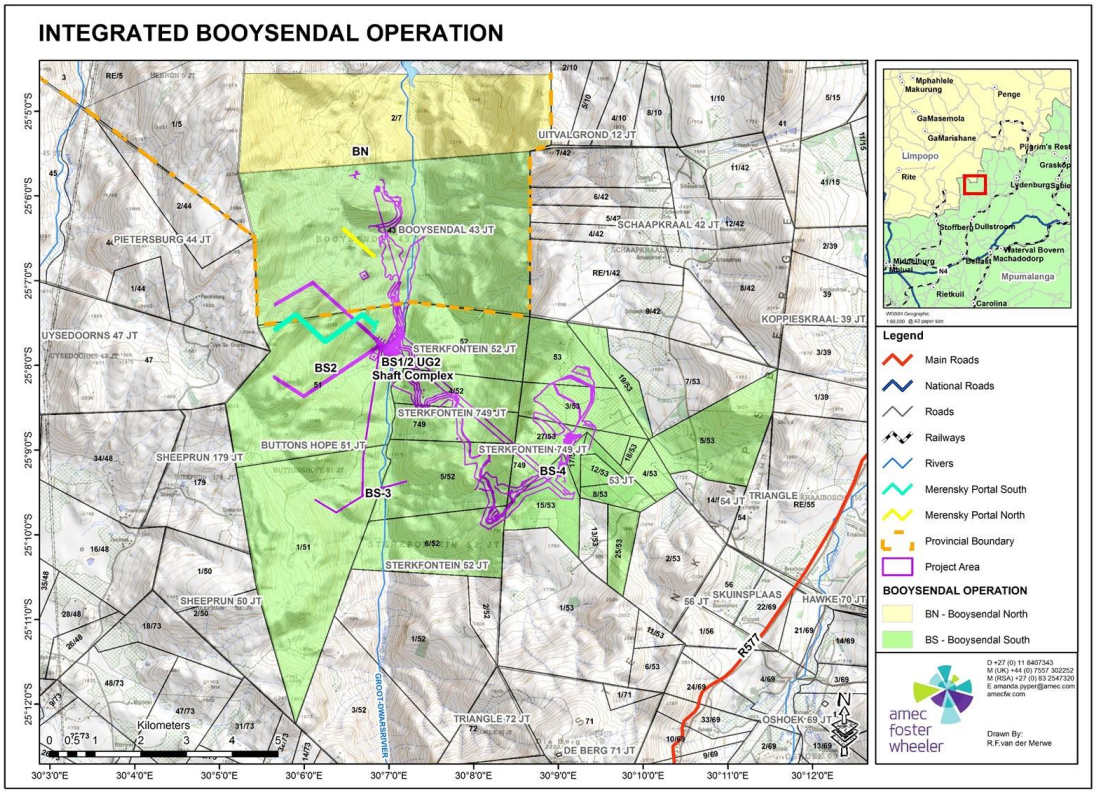

Figure 1: Topographic map (Sheet 2530AA) showing the integrated Booysendal operation relative to farm boundaries.

Legislative framework

The Department of Environmental Affairs (DEA) through the National Environmental Management Act (NEMA Act 107 of 1998) requires that developers apply to the competent authority for approval of the proposed development as more than 1 hectare or more than 300m² in protected environments of indigenous vegetation is to be removed (Listing Notice 1 and 3 of the EIA regulations).

National Heritage is protected by the South African Heritage Resources Act (Act No 25) of 1999. Developers are required to submit development plans to SAHRA for approval. These plans must include documentation detailing the expected impact that the development will have on national heritage.

Categories of heritage resources recognised as part of the National Estate in Section 3 of the Heritage Resources Act include:

- Geological sites of scientific or cultural significance.
- Objects recovered from the soil or waters of South Africa, including archaeological and palaeontological objects, material, meteorites and rare geological specimens.
- Objects with the potential to contribute to understanding South Africa's natural or cultural heritage.

Accordingly a Heritage Impact Assessment (HIA) is required to assess the possible impacts of a proposed development on archaeological and palaeontological heritage. This report addresses the palaeontological aspects of the HIA as part of the Environmental Management Plan (EMP).

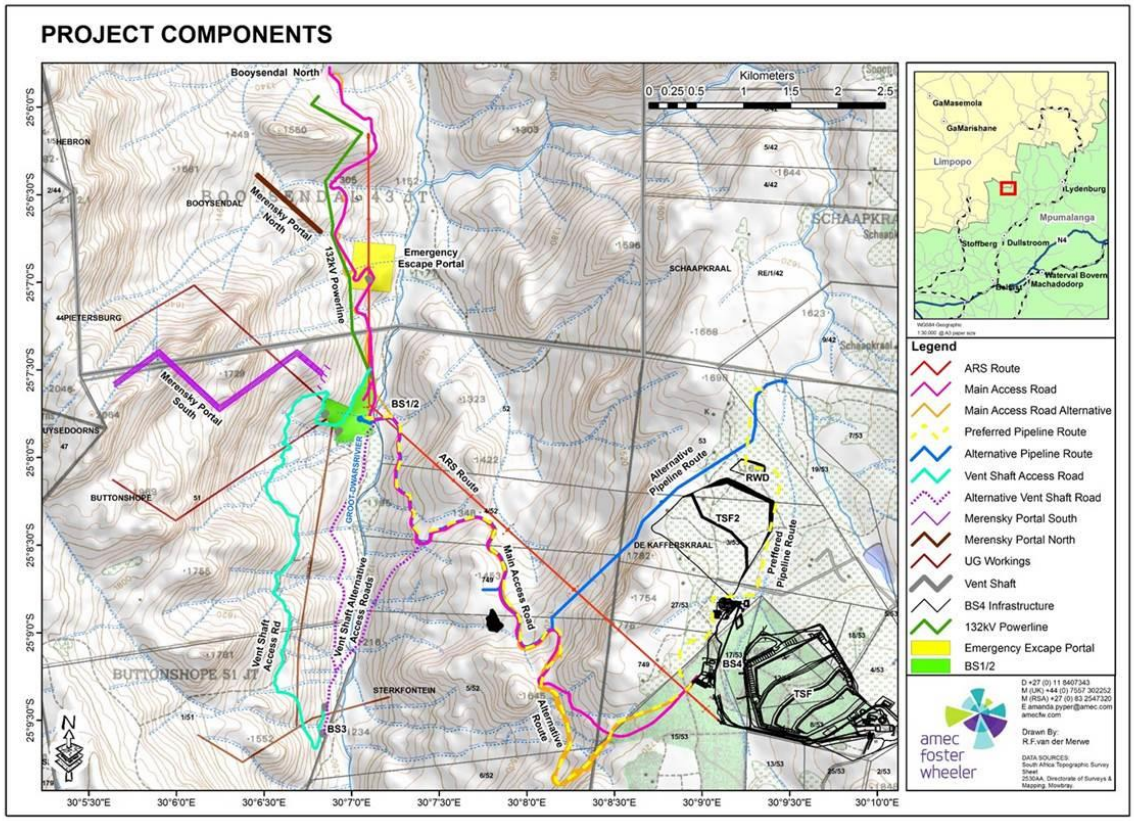

Figure 2: 1:50 000 topographical (Sheet 2530AA) showing the position of the proposed development.

Details of the study area

The study area of the Booysendal mine is located in the Limpopo and Mpumalanga Provinces of South Africa on the following farms: Buttonshope 51 JT, Booysendal 43JT, Portions 4, 5, 6 and the remaining extent of the farm Sterkfontein 52JT, portion 5, 6 and 7 of the farm Sterkfontein 749JT as well as sections of the farm De Kafferskraal 53JT. The closest towns are Steelpoort and Mashishing (Lydenburg). The study area is covered by the 1:50 000 topographical map Sheet 2530 AA Draaikraal (Figures 1 & 2). The proposed development area surveyed covers about 600Ha.

The main infrastructure expansion is associated with the new portal complex and associated infrastructure at BS2 (Booysendal Central) which is being developed on the farm Buttonshope 51JT. Booysendal Central North (BS1) will consist of an emergency escape portal, an access road, vent shaft, powerline and sub-station positioned on the farm Booysendal 43JT. A total of 450ktpa PGMs will be mined from both the Merensky and UG2 Reefs from these two complexes.

In addition hard top two lane access road will be constructed between Booysendal North, past BS1 to BS2 and up to Everest Mine. An aerial ropeway for the transportation of ore will run from the farm Buttonshope 51JT to Booysendal North and to Everest. The properties applicable to the Everest side of the development which will be traversed by the above services includes portion 4, 5, 6 and the remaining extent of the farm Sterkfontein 52JT, the farm Sterkfontein 749JT as well as portions 2, 3, 4, 8, 15, 17, 19, 27 and RE of the farm De Kafferskraal 53JT. The northern expansion will involve the RE of the farm Buttonshope 51JT and the farm Buttonshope 43JT.

Geological Setting

Most of the area is underlain by Precambrian igneous rocks of the Rustenberg Layered Suite of the Bushveld Igneous Complex. This is an intrusive igneous body comprising a series of ultramafic-mafic layers and a suite of associated granitoid rocks. A very minor part of the TSF1 development will extend onto the arenaceous Steenkampsberg Formation of the Transvaal Supergroup. The geological map indicates that parts of the TSF1 development will be on unconsolidated Quaternary alluvial deposits (Figure 3).

Palaeontological Heritage

As the Precambrian Bushveld Igneous Complex is of igneous origin and the Precambrian arenaceous Steenkampsberg Formation of the Transvaal Supergoup is not known to host fossils it is highly unlikely that palaeontological heritage will be

affected by the proposed mining development. The Quaternary alluvial sediments which are covered by vegetation in the study area are the only sedimentary deposits in the area which could host fossils of Quaternary-aged animals and plants. As these deposits are not consolidated it is very unlikely that any fossils will be present.

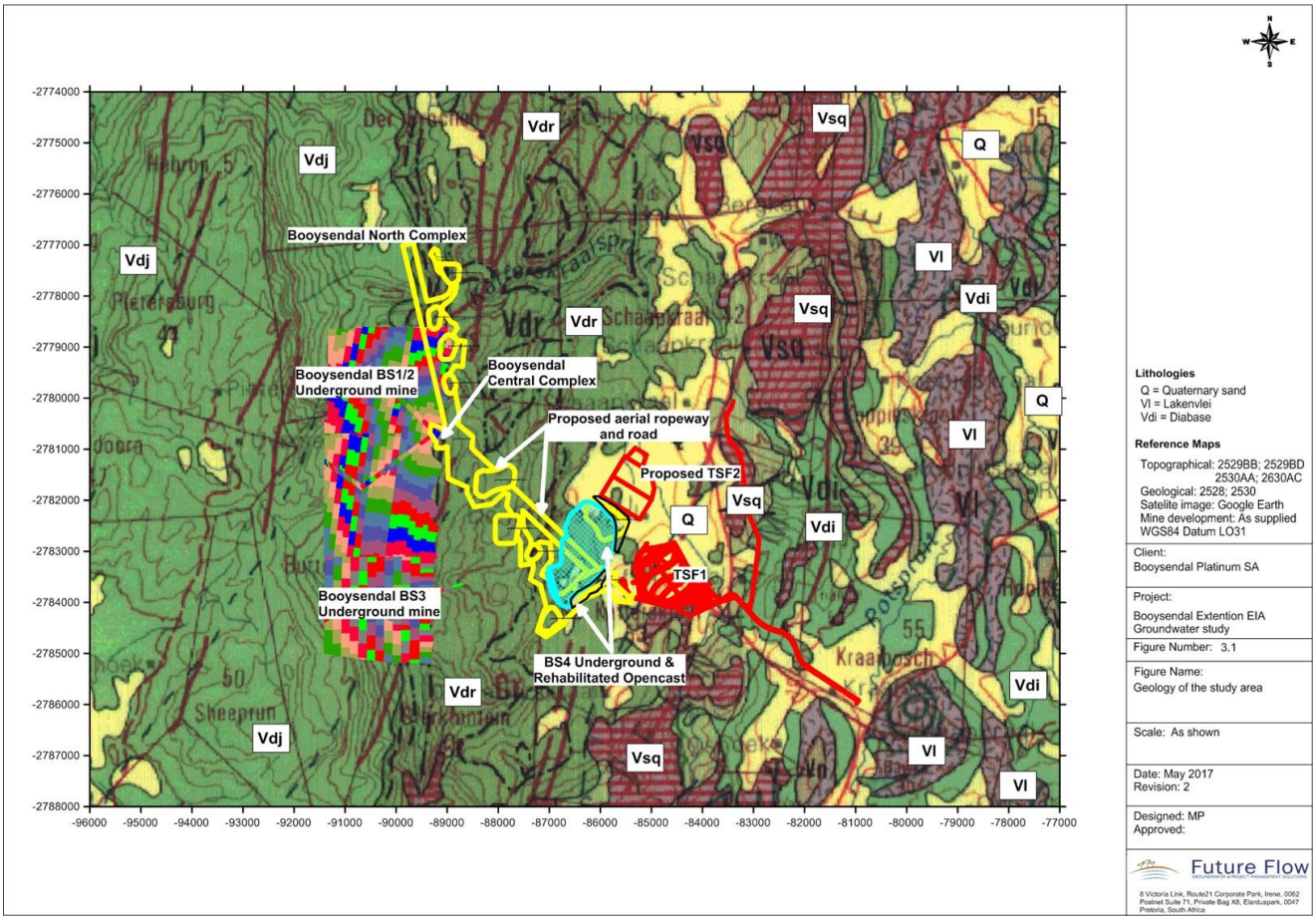

Figure 3: Geological map (2530 Barbeton) showing the position of the study locality in relation to the regional geology. Vd – Rustenberg Layered Suite (Bushveld Complex) Vsq – Steenkampsberg Formation (Transvaal Supergroup); Q – Quaternary alluvial deposits.

Methodology

Because the study area is underlain by Precambrian rocks of low palaeontological sensitivity a desktop Palaeontological Impact Assessment was undertaken to identify possible sensitive fossil occurrences, assess the significance of possible fossil occurrences, comment on the impact of the proposed development, and to make mitigating recommendations.

Recommendations

It is extremely unlikely that the proposed development will have any affect on palaeontological heritage. However if fossils are exposed in the Quaternary alluvial deposits it will create a unique opportunity to explore the area for fossils. It is thus recommended that, in the unlikely event that fossils are exposed as a result of construction activities, a qualified palaeontologist must be contacted to assess the exposure for fossils before further development takes place so that the necessary rescue operations are implemented. Depending on the nature of the fossils discovered this could entail excavation and removal to a registered palaeontological museum collection. A list of professional palaeontologists is available from South African Heritage Resources Agency (SAHRA).

Conclusion

The proposed Booysendal mining expansion development area is underlain by Precambrian aged rocks of the Bushveld Igneous Complex and the Steenkampsberg Formation of the Transvaal Supergoup which in turn are overlain by unconsolidated Quaternary aged alluvial deposits. It is extremely unlikely that fossils will be exposed as a result of the development. From a palaeontological perspective, the proposed Booysendal mine development should proceed but, if fossils are uncovered in the course of construction activities, the developer immediately calls in a qualified palaeontologist to assess the situation and, if necessary, undertake excavation of the fossils.

Bibliography

Cawthorn RG, Eales HV, Walraven F, Uken R, and Watkeys MK. 2006. The Bushveld Complex. *In*: Johnson MR, Anhaeusser and Thomas RJ (Eds). *The Geology of South Africa*. Geological Society of South Africa, Johannesburg/Council for Geosciences, Pretoria. pp 261-281.

Eriksson PG, Altermann W., & Hartzer FJ. 2006. The Transvaal Supergroup and its precursors. *In*: Johnson MR, Anhaeusser and Thomas RJ (Eds). *The Geology of South Africa*. Geological Society of South Africa, Johannesburg/Council for Geosciences, Pretoria. pp 237-260.

Mac Rae C. 1999. *Life etched in stone: fossils of South Africa*. The Geological Society of South Africa, Johannesburg, pp 305.

Mc Carthy, T.S. and Rubidge, B.S. 2005. *The story of Earth and Life – a southern African perspective on the 4.6 billion year journey*. Struik Publishers, Cape Town. pp 333.

Partridge TC, Botha GA, and Haddon IG. 2006. Cenozoic deposits of the interior. *In*: Johnson MR, Anhaeusser and Thomas RJ (Eds). *The Geology of South Africa*.

Geological Society of South Africa, Johannesburg/Council for Geoscience, Pretoria. pp. 585-604.

SAHRA. 2013. Minimum standards: palaeontological component of heritage impact assessment reports. South African Heritage Resources Agency, Cape Town. pp15.

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