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14 May 2016

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Dear Mr Turner,

**Palaeontological Desktop Study – HERNIC development**

As requested, herewith a Desktop Palaeontological Impact Assessment with regard to the HERNIC Ferrochrome (Pty) Ltd development (HERNIC) in the North West Province.

As is evident from my report for the HERNIC operation the proposed development should not have any impact on palaeontological heritage, but have included a mitigation clause.

Yours sincerely

A handwritten signature in blue ink, appearing to read 'B. Rubidge'.

**Bruce Rubidge** PhD, FGSSA, FRSSA, Pr Sci Nat

**PALAEONTOLOGICAL DESKTOP STUDY  
HERNIC FERROCHROME (PTY) LTD,  
MADIBENG LOCAL AND BOJANALA PLATINUM DISTRICT (DC37)  
MUNICIPALITIES, NORTH WEST PROVINCE, SOUTH AFRICA**

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**DATE: 14 May 2016**

## **EXECUTIVE SUMMARY**

A desktop Palaeontological Impact Assessment was undertaken for HERNIC Ferrochrome (Pty) Ltd (HERNIC) on Portions 46 (RE), 47 (RE), 102, 103, 104 (RE), 105 (RE), 135, 143 (RE), 165, 169, 170, 173 (RE), 200, 216, 231, 267, 296 and 303 of the Farm De Kroon 444 JQ and Portion 37 of the Farm Elandsfontein 440 JQ in the Madibeng Local and Bojanala Platinum District (DC37) Municipalities within the North West Province of South Africa. The proposed development is for an upgrade of some of the on site activities and in so-doing HERNIC wishes to develop an Environmental Master Plan for their operations in line with the current environmental legislation. Expansions will take place within the delineated site boundary at HERNIC.

The entire study area is underlain by rocks of the Precambrian Bushveld Igneous Complex. There is a slight, but unlikely, possibility that in low lying areas there may be Quaternary alluvial deposits which could contain fossils.

In my opinion this development will not negatively affect palaeontological heritage. If, in the extremely unlikely event that fossils are exposed in Quaternary alluvial deposits in the process of development activities, a qualified palaeontologist must be contacted to assess the exposure for fossils so that the necessary rescue operations are implemented.

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# REPORT

## Background Information of the development

This desktop report is part of a Heritage Impact Assessment to determine the effect of upgrading activities on the HERNIC site on portions of the farms De Kroon 444 JQ and Elandsfontein 440 JQ south-east of Brits in the Madibeng Local and Bojanala Platinum District (DC37) Municipalities within the North West Province. The project will comprise of both mining and beneficiation operations. The mining includes both historic opencast and current underground operations and the beneficiation operations include; chromite ore beneficiation, pelletizing and sintering as well as smelting operations to produce Ferrochrome. The study area covers a surface area of about 422 ha.

The study was commissioned by JMA Consulting (Pty) Ltd. and I was asked to provide a desktop assessment of the effect that the proposed development will have on the palaeontological heritage.

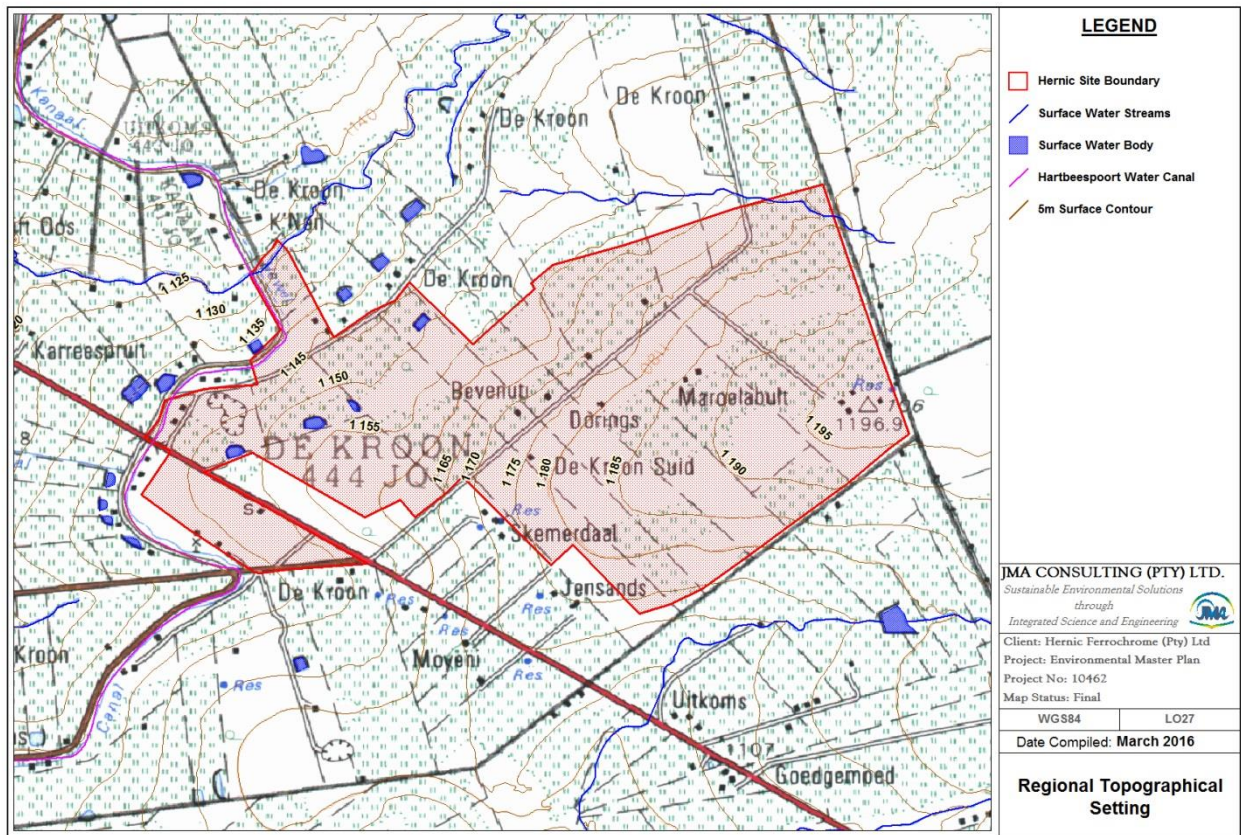


Figure 1: 1:50 000 Map showing the position of the HERNIC development on portions of the farm De Kroon 444 JQ south-east of Brits in the Madibeng Local and Bojanala Platinum District (DC37) Municipalities within the North West Province (Map Sheet 2427CC).

## Details of the study area

The study area extends across Portions 46 (RE), 47 (RE), 102, 103, 104 (RE), 105 (RE), 135, 143 (RE), 165, 169, 170, 173 (RE), 200, 216, 231, 267, 296 and 303 of the Farm De Kroon 444 JQ and Portion 37 of the Farm Elandsfontein 440 JQ in the Madibeng Local and Bojanala Platinum District (DC37) Municipalities within the North West Province (Figure 1) and is covered by the 1:50 000 topographical Map Sheet number 2527DB.

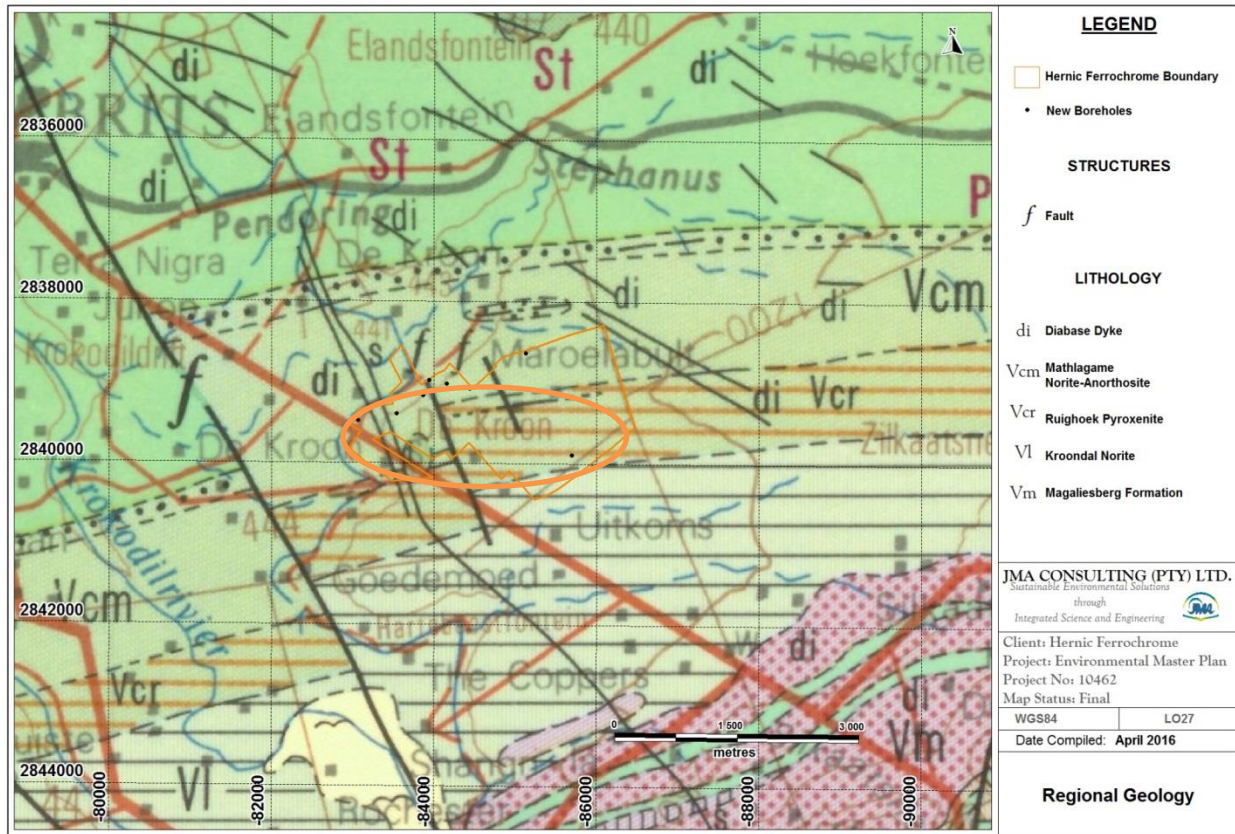


Figure 2: Geology of the Study area (1:250 000 Geological Map Series of the Republic of South Africa, Sheet Number 2526 Rustenburg, Government Printer 1981). Orange ovoid shows study area

## Geological Setting

The entire area is underlain by norites and anorthosites through to gabbros, harzburgites, magnetites and pyroxenites of the Rustenburg Layered Suite of the Precambrian Bushveld Igneous Complex (Figure 2). Although not indicated by the geological map (1:250 000 geological map Sheet 2526 Rustenburg, Government Printer 1981), the geology underlying the site specifically comprises (from south to north) Kroondal Norites, Ruighoek Pyroxenites and Mathlagame Norite-Anorthosites. Several diabase dykes and faults also transect the site. There is a possibility that low lying areas are covered by Quaternary alluvial deposits.

## **Palaeontological Heritage**

As the rocks of the Bushveld Complex are of igneous origin there is no possibility of fossils being present. There is a slight, but very unlikely, possibility that fossils could be present in Quaternary alluvial deposits present in low-lying areas.

## **Recommendation**

It is extremely unlikely that the proposed HERNIC upgrades will have any effect on palaeontological heritage. However if fossils are exposed in 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 developments of HERNIC extend over Precambrian rocks of the Bushveld Igneous Complex and possibly Quaternary alluvial deposits. It is extremely unlikely that fossils will be exposed as a result of the development. It is considered that, from a palaeontological perspective, the proposed developments should proceed, but that 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**

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