Clarens Dinosaur Hunting Expeditions CC
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Dear Jonathan

POTENTIAL PALAEONTOLOGY OF THE PROPOSED MANGANESE MINE DEVELOPMENT

Thank you for your request to assess the potential for Palaeontological resources for a proposed manganese mining operation near Hotazel in the Northern Cape. The proposed project aims to exploit the Hotazel Manganese Formation of the Griqualand West Supergroup of the middle Protozoic age.

A site map (Fig 1) is included for reference. The key areas of concern are obviously the open pit mining area as well as the manganese ore and banded iron formation to be removed during the underground mining phase, and the stockpiling and processing areas to less of a degree.

From the information provided for this desktop study we were able to do a preliminary investigation and summarize as follows.

1. **Geology**

The desk top study indicates that the development of the mine falls in an area underlain by the Hotazel Manganese Formation of the Griqualand West Supergroup. Overlaying the manganese and banded iron formations are mostly Kalahari sands and calcrete outcrops as well as limited clay and pebbles. Also of concern are the GaMogara - current and ancient - riverbeds.

The rocks of the older formations are known to contain fossil structures of algae, called Stromatolites. These structures are important indicators of palaeo-environments but are normally not collected or preserved for their palaeontological value.

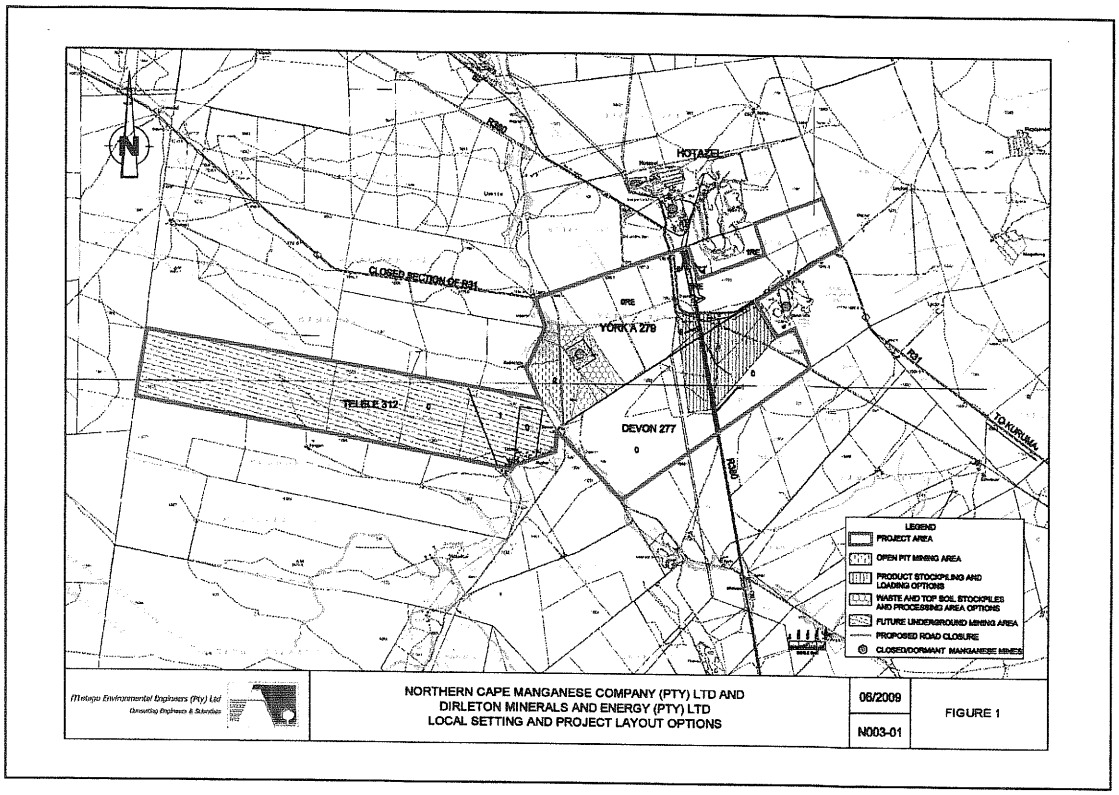

Fig 1. Site of the Proposed Manganese Mine development

From this information a desktop study indicates the following regarding possible palaeontological finds at the site.

2. Palaeontology and its potential importance in the this area

2.1 Hotazel Manganese Formation of the Griqualand West Supergroup – it is known that this group of rocks represent a very old deposit and that the most important palaeontological information is present as "stromatolites" or the remains of the algal organisms that lived in relatively shallow water environments, with an important transition to different aquatic environments where the resulting rocks reveal information about the shallow water living creatures of the time.

2.2 Kalahari sands – it is well known that this group of rocks presents us with a unique opportunity to discover some younger organisms. The Kalahari sands are not known to be productive many palaeontological finds.

2.3 Younger calcrete outcrops and other geological formations, including GaMogara – very limited information exists on the palaeontological content of calcretes in this part of South Africa and the developer should record any information related to new finds on site.

3. Actions recommended during construction and operation of the Mine

It is recommended that all excavation of the surface deposits be scanned for palaeontological material. This action must be part of the management plan for the construction and operation processes and the developer should have an "in-house"

trainee that can work under distant supervision of a professional palaeontologist or a registered Palaeontological Institute such as BPI Palaeontology at WITS University, who can record any new finds of Stromatolites and/or any material of palaeontological interest.

All records of palaeontological interest must be reported to the Site Environmental Controlling Officer (ECO) that must be appointed by the Mine Management for the implementation of the Environmental Management Plan (EMP) for the mine. This is a basic legal requirement for the management of Palaeontological finds on site.

Recording of any outstanding examples of Stromatolites or the finding of any suspicious looking material that might contain the remains of plants or animals must be recorded and reported to a registered Institute such as BPI Palaeontology. In the case of such a recording it will obviously be necessary for a trained palaeontologist to inspect the site of the development to confirm the finds. It is important to ensure that the developer of this project obtains a permit from SAHRA for the disturbance of palaeontological remains, including the Stromatolites, during the construction and operational phase of this project.

Thank you very much for your request.

Greetings

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