

**"CHANCE FIND PROTOCOL" FOR THE  
PROPOSED GREATER BULWER-  
DONNYBROOK BULK WATER SUPPLY  
SCHEME (GBDBWSS): HARRY GWALA  
DISTRICT MUNICIPALITY, KWAZULU-  
NATAL**

**FOR  
Harry Gwala District Municipality**

**DATE: 5 January 2017**

**By**

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## EXECUTIVE SUMMARY

Dr. Gideon Groenewald was appointed by Kinvig and Associates (Pty) Ltd to undertake a Phase 1 Palaeontological field survey, assessing the potential Palaeontological Impact of the proposed Greater Bulwer-Donnybrook Bulk Water Supply Scheme (GBDBWSS), Harry Gwala District Municipality, Kwazulu-Natal Province.

Following the Phase 1 assessment, further site visits will be required to record possible findings of fossils on site. A "Chance Find Protocol" for finding of significant fossils is presented and need to be discussed with the client. The proposal is broadly that if significant fossils are recorded during the initial visits of the professional palaeontologist, a suitable qualified Palaeontologist or alternatively an accredited student will be employed on a day-to day basis to monitor the excavations in all areas allocated as High Palaeontological significance on behalf of the Professional Palaeontologist. The appointed Palaeontologist will be responsible for the recording of all "chance finds" as per a protocol arrangement with the client.

The purpose of this communication as an addendum to the Phase 1 Palaeontological Impact Assessment, is to discuss a procedure for the recording of any significant fossils in this development site.

The development site for the proposed extension of the Greater Bulwer-Donnybrook Bulk Water Supply Scheme (GBDBWSS): Harry Gwala District Municipality, Kwazulu-Natal Province is underlain by Permian to Triassic aged sedimentary rocks of the Eccca and Beaufort Groups and Dolerite of the Karoo Supergroup, as well as a minor sections by Masotcheni Formation clays and Alluvium.

Several poorly defined fossils were observed during the field investigation. The potential for finding significant fossils in any excavation into sediments of the Eccca and Beaufort Groups is always high and the cooperation of the entire team is required. The interest and cooperation of the management team will be highly appreciated. It is highly likely that the excavation into rocks of the Eccca and Beaufort Groups will expose significant fossils. No fossils will be associated with areas underlain by dolerite.

It is recommended that:

- The EAP and ECO must be informed of the fact that a High Palaeontological sensitivity was allocated to areas underlain by rocks of

the Beaufort Group and a Moderate Palaeontological sensitivity is allocated to the Ecca Group sediments. Due to very deep weathering, no significant fossils were recorded during the Phase 1 field investigation.

- The entire team at the construction site must be motivated, through proper initial training, to assist with the recovering of significant fossils from this development site.
- All areas allocated a red, orange or green colour in Figure 1 must be visited by a suitably qualified Palaeontologist, or an accredited assistant, during excavations of trenches exceeding 1.5m in depth.
- These recommendations and the detail of this “Chance Find Protocol” document must be incorporated into the EMPr as well as the budget of this project.

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## INTRODUCTION

Dr. Gideon Groenewald was appointed by Kinvig and Associates (Pty) Ltd to undertake a Phase 1 Palaeontological field survey, assessing the potential Palaeontological Impact of the proposed Greater Bulwer-Donnybrook Bulk Water Supply Scheme (GBDBWSS), Harry Gwala District Municipality, Kwazulu-Natal Province.

Following the Phase 1 assessment, further site visits will be required to record possible findings of fossils on site. A “Chance Find Protocol” for finding of significant fossils is presented and must be discussed with the client. The proposal is broadly that if significant fossils are recorded during the initial visits of the professional palaeontologist, a suitable qualified Palaeontologist or alternatively an accredited student will be employed on a day-to day basis to monitor the excavations in all areas allocated a High Palaeontological significance on behalf of the Professional Palaeontologist. The appointed Palaeontologist will be responsible for the recording of all “chance finds” as per a protocol arrangement with the client.

The purpose of this communication as an addendum to the Phase 1 Palaeontological Impact Assessment, is to discuss a procedure for the recording of any significant fossils in this development site.

### Legal Requirements

This Palaeontological Assessment Protocol for “Chance Finds” forms part of the Heritage Impact Assessment (HIA) and comply with the requirements of the South African National Heritage Resource Act No 25 of 1999 as well as the KwaZulu-Natal Heritage Act No 4 of 2008. In accordance with Section 38 of the National Resources Act No 25 of 1999 (Heritage Resources Management), a HIA is required to assess any potential impacts to palaeontological heritage within the development footprint.

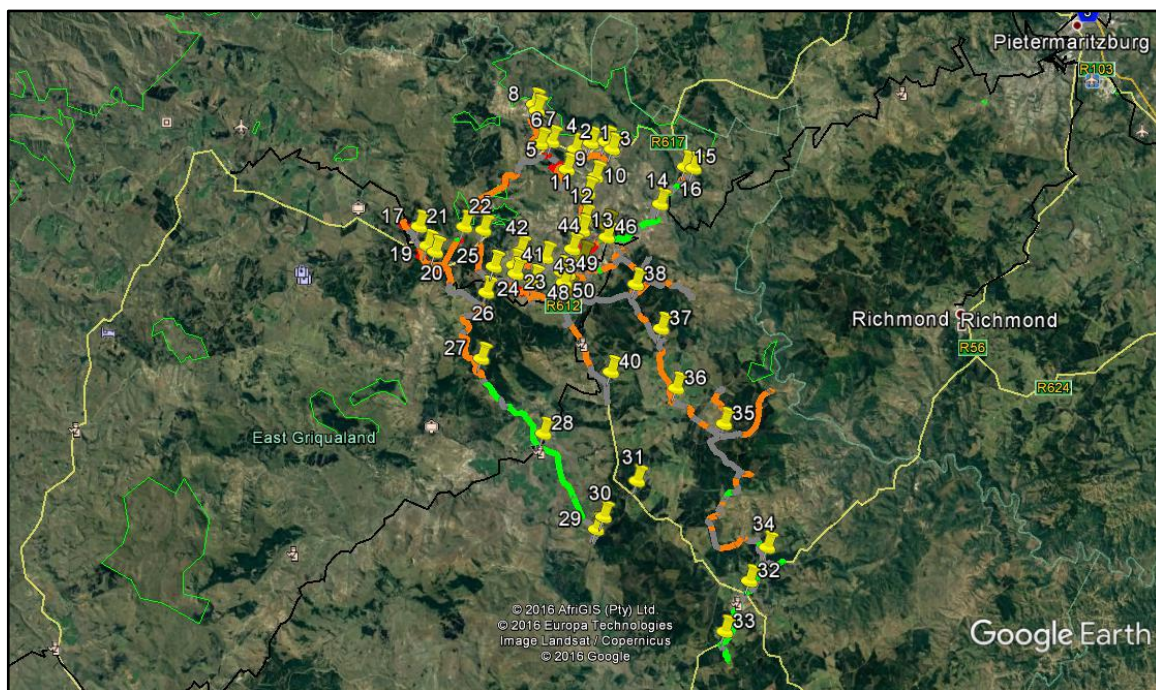
The proposal for development includes the total area of the GBDBWSS project.

## FIELD INVESTIGATION

Dr. Gideon Groenewald, experienced fieldworker, visited the site of the proposed Greater Bulwer-Donnybrook Bulk Water Supply Scheme (GBDBWSS): Harry Gwala District Municipality, Kwazulu-Natal on Monday 19<sup>th</sup> December 2016 to Thursday 22<sup>nd</sup> December 2016 to confirm clearance of the site in terms of significant Palaeontological Heritage items and to produce this “Chance Find Protocol” report.

Excavations for the new development will most probably expose siltstone and shale of the Ecca and Beaufort Group as well as Dolerite of the Karoo Supergroup. Several sites, referred to as 1 to 50 were specifically targeted to record any obvious fossils (Figure 1). No significant fossils were observed as the time-constraints on the Phase 1 assessment was extreme (270km of surveys in only three days). It is therefore envisaged that significant fossil finds are possible during the trenching process for this project.

The most significant finds are expected in areas underlain by relatively shallow soils covering the sedimentary rocks of the Volksrust and Normandien Formations (Figure 1). Recording of the fossils will contribute significantly to our understanding of the geological history of the site.



**Figure 1** Points visited for specific investigation during the Phase 1 investigation, numbered 1 to 50. All areas allocated a red, orange or green colour must be visited by a suitably qualified Palaeontologist, or an accredited assistant, during excavations of trenches exceeding 1.5m in depth.

The “Chance Find Protocol” includes procedures that need to be followed with the recording of significant fossils and does not replace a normal communication between the Palaeontologist and the EAP, ECO and/or Site Management Team and contractors during the life-time of the excavation for this development. Although the initial budget for the Palaeontological Heritage component must include the full-time involvement of a suitably qualified Palaeontologist or accredited representative, the reality is that the deeply weathered rocks might be less fossiliferous and the actual time spent on site can be reduced according to the



progress of the excavation and proper protocol arrangements with the Palaeontologist.

## **PALAEONTOLOGICAL IMPACT AND MITIGATION PROTOCOL**

The predicted palaeontological impact of the development is based on the initial mapping assessment and literature reviews as well as information gathered during the field investigation. The field investigation confirms that the study area is underlain by fine-grained sandstone and khaki-coloured to dark grey shale beds of the Pietermaritzburg and Volksrust Formations as well as sandstone of the Vryheid Formation of the Ecca Group and sandstone and mudstone of the Adelaide and Tarkastad Subgroups of the Beaufort Group as well as significant Dolerites of the Karoo Supergroup. The weathering is in general very deep and fossils will only be exposed in areas where excavation is more than 1.5m deep into bedrock.

The excavations for the construction of the infrastructure for this development will expose some sediments of the Normandien and Volksrust Formations as well as dolerite. Due to weathering, no well-preserved fossils were observed during the Phase 1 field investigation. Exposure of bedrock during excavation however will result in the exposure of varying degrees of well- to poorly-defined plant and trace fossils, fossilized wings of insects and vertebrate remains.

## **CHANCE FIND PROTOCOL FOR PALAEONTOLOGICAL HERITAGE**

### **Mitigation For Excavation Impact On Palaeontological Heritage Resources**

It is proposed that the appointed palaeontologist, in consultation with the Project Manager of the Excavation works and the client, develop a short-term strategy for the recovery of significant fossils during the excavation operation. As part of such a strategy the palaeontologist will have to:

- Initially, and at least for the first three months of operation, visit the site at least once every two weeks to ensure recording of all significant fossil strata
- Determine a short-term strategy and budget for the recording of significant fossils. This Strategy can simply be an oral agreement on when the site is to be inspected and what the finds are that were recorded.
- In the case of any unusual structures, the Palaeontologist must be notified immediately by the ECO and/or EAP, and a site visit must be arranged at the earliest possible time with the Palaeontologist. In the case of the ECO or the Site Manager becoming aware of suspicious looking material that

might be a “Significant Find”, the construction must be halted in that specific area and the Palaeontologist must be given enough time to reach the site and remove the material before excavation continues.

### **Mitigation Measures Normally Encountered**

1. Mitigation of palaeontological material must begin as soon as possible during planning of “trial excavation” for geotechnical investigations. The appointed specialists must acquaint themselves with the operation and determine feasible mitigation strategies.
2. A plan for systematic sampling, recording, preliminary sorting and storage of palaeontological and sedimentological samples will be developed during the early stages of the project, in collaboration with the Evolutionary Studies Institute (ESI) at WITS University and/or the Museum in Pietermaritzburg, as arranged with AMAFA.
3. Mitigation will involve the attempt to capture all rare fossils and systematic collection of all fossils discovered. This will take place in conjunction with descriptive, diagrammatic and photographic recording of exposures, also involving sediment samples and samples of both representative and unusual sedimentary or biogenic features. The fossils and contextual samples will be processed (sorted, sub-sampled, labelled, boxed) and documentation consolidated, to create an archive collection from the excavated sites for future researchers.
4. It is important to note that SAHRA (South African Heritage Resources Agency) specifically requires that the developer will not be responsible for the costs of any “Palaeontological Research” without prior arrangement between the developer and the Palaeontological Specialist.

### **Functional responsibilities of the Developer**

1. The developer will at full cost to the project, and guided by the appointed Palaeontological Specialist, ensure that a representative archive of palaeontological samples and other records is assembled to characterise the palaeontological occurrences affected by the excavation operation.
2. Provide field aid, if necessary, in the supply of materials, labour and machinery to excavate, load and transport sampled material from the excavation areas to the sorting areas, removal of overburden if necessary, and the return of discarded material to the disposal areas.
3. Facilitate systematic recording of the stratigraphic and palaeo-environmental features in exposures in the fossil-bearing excavations, by described and measured geological sections, and by providing aid in the surveying of positions where significant fossils are found.



4. Provide safe storage for fossil material found routinely during excavation operations by construction personnel. In this context, isolated fossil finds in disturbed material qualify as “normal” fossil finds.
5. Provide covered, dry storage for samples and facilities for a work area for sorting, labelling and boxing/bagging samples.
6. Costs of basic curation and storage in the sample archive at the ESI, WITS University and/or the Museum in Pietermaritzburg (labels, boxes, shelving and, if necessary, specifically-tasked temporary employees) as specified by or agreed with AMAFA.

#### **Documentary record of palaeontological occurrences**

1. The contractor will in collaboration with the Palaeontologist, make the excavation plan available to the appointed specialist, in which appropriate information regarding plans for excavations and work schedules must be indicated on the plan of the excavation sites. This must be done in conjunction with the appointed specialist:
2. Initially, all known specific palaeontological information will be indicated on the plan. This will be updated throughout the excavation period
3. Locations of samples and measured sections are to be pegged, and routinely accurately surveyed. Sample locations, measured sections, etc., must be recorded three-dimensionally if any “significant fossils” are recorded during the time of excavation.

#### **Functional responsibilities of the appointed palaeontologist**

1. Establishment of a representative collection of fossils and a contextual archive of appropriately documented and sampled palaeoenvironmental and sedimentological geodata at the ESI at WITS University or the Museum in Pietermaritzburg.
2. Undertake an initial evaluation of potentially affected areas and of available exposures in excavations.
3. On the basis of the above, and evaluation during the early stages of excavation development, in collaboration with the contractor management team, more detailed practical strategies to deal with the fossils encountered routinely during excavation, as well as the strategies for major finds.
4. Informal on-site training in responses applicable to “normal” fossil finds must be provided for the ECO and environmental staff by the appointed specialist.
5. Respond to significant finds and undertake appropriate mitigation.
6. Initially, for the first three months of operation, at least two weekly visits to “touch base” with the monitoring progress, process and document interim

“normal” finds and to undertake an inspection and documentation of new excavation faces. A strategy for further visits during the life of the excavation must then be determined.

7. Transport of material from the site to the ESI, WITS University and /or Pietermaritzburg.
8. Reporting on the significance of discoveries, as far as can be preliminarily ascertained. This report is in the public domain and copies of the report must be deposited at ESI, AMAFA, and the South African Heritage Resources Authority (SAHRA). It must fulfil the reporting standards and data requirements of these bodies.
9. Reasonable participation in publicity and public involvement associated with palaeontological discoveries.

### **Exposure of palaeontological material**

In the event of construction exposing new palaeontological material, not regarded as normative/routine as outlined in the initial investigation, such as a major fossil plant find, the following procedure must be adhered to:

1. The appointed specialist or alternates (AMAFA, SAHRA; ESI WITS University) must be notified by the responsible officer (e.g. the ECO or contractor manager), of major or unusual discoveries during excavation, found by the Contractor Staff.
2. Should a major in situ occurrence be exposed, excavation will immediately cease in that area so that the discovery is not disturbed or altered in any way until the appointed specialist or scientists from the ESI at WITS University, or its designated representatives at AMAFA, have had reasonable opportunity to investigate the find. Such work will be at the expense of the Developer.

### **CONCLUSION**

The development site for the proposed extension of the Greater Bulwer-Donnybrook Bulk Water Supply Scheme (GBDBWSS): Harry Gwala District Municipality, Kwazulu-Natal Province is underlain by Permian to Triassic aged sedimentary rocks of the Ecca and Beaufort Groups and Dolerite of the Karoo Supergroup, as well as a minor sections by Masotcheni Formation clays and Alluvium.

Several poorly defined fossils were observed during the field investigation. The potential for finding significant fossils in any excavation into sediments of the Ecca and Beaufort Groups is always high and the cooperation of the entire team is required. The interest and cooperation of the management team will be highly appreciated. It is highly likely that the excavation into rocks of the Ecca and

Beaufort Groups will expose significant fossils. No fossils will be associated with areas underlain by dolerite.

It is recommended that:

- The EAP and ECO must be informed of the fact that a High Palaeontological sensitivity was allocated to areas underlain by rocks of the Beaufort Group and a Moderate Palaeontological sensitivity is allocated to the Ecca Group sediments. Due to very deep weathering, no significant fossils were recorded during the Phase 1 field investigation.
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## QUALIFICATIONS AND EXPERIENCE OF THE AUTHOR

Dr. Gideon Groenewald has a PhD in Geology from the University of Port Elizabeth (Nelson Mandela Metropolitan University) (1996) and the National Diploma in Nature Conservation from Technicon RSA (the University of South Africa) (1989). He specialises in research on South African Permian and Triassic sedimentology and macrofossils with an interest in biostratigraphy, and palaeo-ecological aspects. He has extensive experience in the locating of fossil material in the Karoo Supergroup and has more than 20 years of experience in locating, collecting and curating fossils, including exploration field trips in search of new localities in the southern, western, eastern and north-eastern parts of the country. His publication record includes multiple articles in internationally recognized journals. Dr Groenewald is accredited by the Palaeontological Society of Southern Africa (society member for 25 years).

## DECLARATION OF INDEPENDENCE

I, Dr. Gideon Groenewald, declare that I am an independent specialist consultant and have no financial, personal or other interest in the proposed development, nor the developers or any of their subsidiaries, apart from fair remuneration for work performed in the delivery of palaeontological heritage assessment services. There are no circumstances that compromise the objectivity of my performing such work.



Dr. Gideon Groenewald  
Geologist