

# HERITAGE IMPACT ASSESSMENT

submitted in terms of section 38(8) of the National Heritage Resources Act

prepared for

AURECON South Africa (Pty) Ltd

14 July 2015

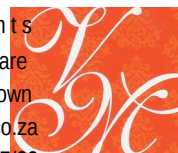
vidamemoria heritage consultants

3<sup>rd</sup> Floor · Guarantee House · 37 Burg Street · Greenmarket Square

P O Box 50605 Waterfront · 8002 · Cape Town

021 424 vida (8432) cell: 082 330 4066 · quahnita@vidamemoria.co.za

CK 2006/049087/23



MR 587 Central Karoo

Beaufort West – Central Karoo Municipality, Western Cape

## Executive summary

Aurecon South Africa (Pty) Ltd appointed *vidamemoria* to conduct a heritage impact assessment for an existing borrow pit located along MR 587 approximately km 14 east of Nelspoort in Central Karoo District Municipality, Western Cape. *Vidamemoria* appointed Dr John Almond (Natura Viva CC) to conduct necessary palaeontological specialist study (dated July 2015). Heritage impact assessment is submitted for comment in terms of Section 38(8) of the NHRAct as a component of an Environmental Management Programme (EMProg in terms of Mineral and Petroleum Resources Development Act 49 of 2008) to be submitted to the Department of Mineral Resources (DMR).

Proposed borrow pit is mainly excavated into overbank mudrocks of the Balfour Formation (Lower Beaufort Group / Adelaide Subgroup) of Late Permian age. Numerous sandstone casts of straight, curved to helical burrows of small vertebrates (probably the dicynodont *Diictodon*) are exposed in the floor of the pit and the isolated skull of a small dicynodont was also recorded at the same stratigraphic level. This fossil material is of significant palaeontological interest. It is therefore recommended that a suitably qualified professional palaeontologist be commissioned to record and judiciously sample the fossil "warren" of vertebrate burrows currently exposed within the MR00587/50,2/0,1R pit *before* any excavation or clearance work at the site takes place. Proposed intervention would result in a detrimental heritage impact, yielding social and economic benefits with a negative impact on heritage resources.

## 1. Introduction

Aurecon South Africa (Pty) Ltd on behalf of the WCPA: Department of Transport and Public Works appointed Quahnita Samie (*vidamemoria*) to conduct a Notification of Intent to Develop (NID) application in terms of Section 38(1) of the National Heritage Resources Act (Act 25 of 1999) **for an existing pit along MR 587 near Beaufort West, Central Karoo District Municipality**. NID dated 02 April 2015 was submitted to Heritage Western Cape (HWC) for consideration. Response dated 13 May 2015 (**case ref 15040125GT0422E**) requested 'a heritage impact assessment consisting of a palaeontological study' (Refer Annexure A). *Vidamemoria* appointed Dr John Almond (Natura Viva CC) to conduct the necessary palaeontological specialist study (dated July 2015) as incorporated within this assessment.

The proposed action triggers Section 38(1) (c)(a) *activity that will change the character of a site exceeding 5 000 m<sup>2</sup>*. This assessment report is submitted for comment in terms of Section 38(8) of the NHRAct as a component of an Environmental Management Programme (EMProg) in terms of the Mineral and Petroleum Resources Development Act (49 of 2008) to be submitted to the Department of Mineral Resources (DMR). Notification as previously submitted to HWC (dated 31 May 2011) and response (dated 20 June 2011) confirmed the approach to be undertaken in submitting borrow pit notifications to HWC.

### Structure of assessment

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<i>Annexure A</i>	Interim comment from HWC
<i>Annexure B</i>	Mine plan
<i>Annexure C</i>	Methodology for the preparation, operation and closure of borrow pit
<i>Annexure D</i>	Palaeontological specialist study conducted by Dr John Almond, Natura Viva CC (July 2015)

### Site location and description

Proposal is for an existing borrow pit located along the unsealed MR 587/50.2/0.1R approximately 14 km east of Nelspoort, Central Karoo District Municipality. The pit study area lies in semi-arid Karoo terrain south of the Bruinrug escarpment. Short grass and koppie surround the borrow pit. Farm Kareebosch is in private ownership of Mr Daniel Francois Grobler. Borrow pit co-ordinates are 32° 1'10.39"S and 23°22'4.47"E.

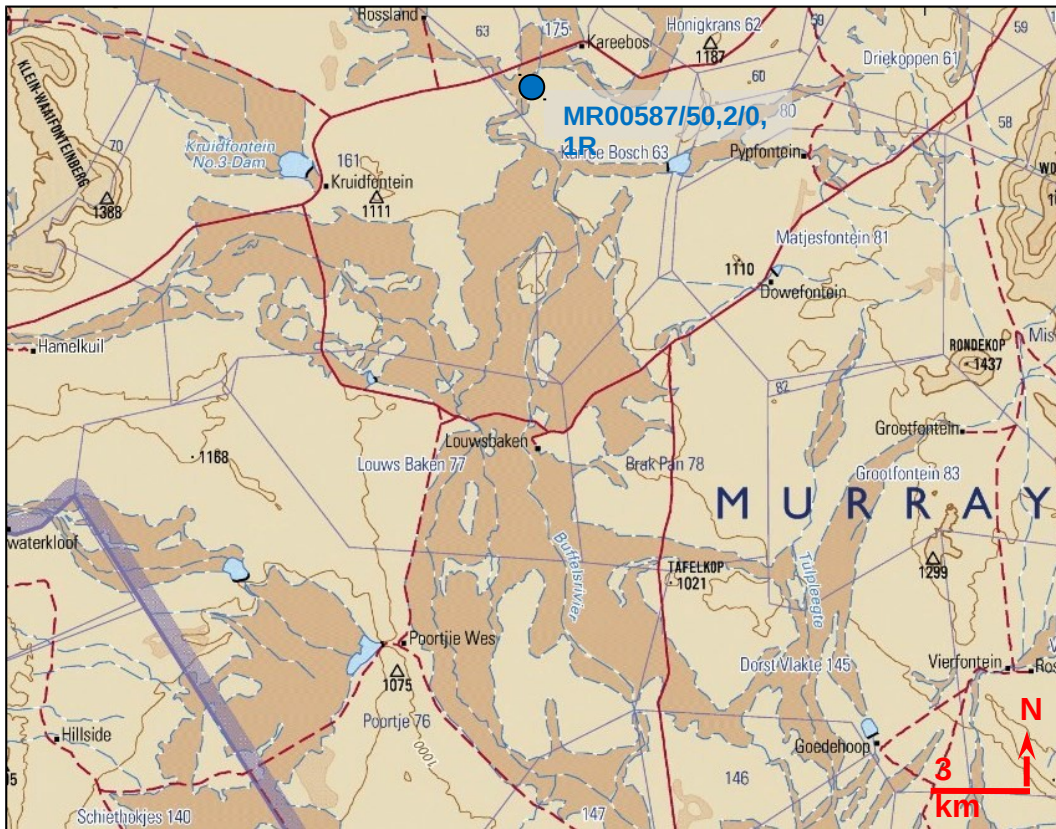


Figure 1: Extract from topographical sheet 3222 Beaufort West (Almond 2015: 2)



Figure 2: view towards the southeast across the MR00587/50.2/0.1R (Almond 2015: 4)



Figure 3: Site context and borrow pit location (Google earth, April 2015)



Figure 4: Aerial view of borrow pit and preliminary pit area (Google earth, April 2015)

## Description of proposals

In terms of the Minerals and Petroleum Resources Development Act, all mining activities including extraction of material from borrow pits and quarries requires authorisation from the Department of Mineral Resources (DMR). Where the WCPA: Dept Transport and Public Works is undertaking the maintenance and / or upgrading of roads under its control, no application needs to be submitted for a mining right or permit, however, as per provisions of Section 106(2) of the MPRDAct, they are required to prepare and submit an EMProg to DMR for their approval prior to the extraction of any material from a proposed borrow pit or quarry. According to the MPRDAct, mineral resources are in the custodianship of the State, where WCPA would temporarily acquire the right to mine the borrow pits, subject to approval by the DMR.

For a gravel road to be able to carry traffic safely and effectively an upper layer of gravel known as a wearing course, which meets specific technical requirements, has to be placed on the prepared roadbed. With time, the wearing course is eroded away by both traffic and the elements. This wearing course needs to be replaced in order to continue to deliver a safe and functional surface to road users. Implementation of regravelling activities requires extraction of suitable materials from identified material sources. During decommissioning, working areas are rehabilitated and revegetated. Material excavated from the proposed borrow pit will be used for re-gravelling of portions of road **MR 587 at km 50.2** to benefit road users in terms of road safety and user economy as well as to minimize maintenance-related disruptions.

Summary of borrow pit	
Expropriation area	24 000 m <sup>2</sup>
Borrow pit	22 000 m <sup>2</sup>
Maximum depth	1.5 m
Material description	mudrocks of the Balfour Formation (Lower Beaufort Group / Adelaide Subgroup) of Late Permian age.
Proposed usage after rehabilitation	Re-vegetation
Volume of material to be sourced	17 000 m <sup>3</sup>

Trial pit investigations and sampling were conducted by Aurecon at four proposed borrow pits considered as potential sources of material. Three were however excluded from consideration due to environmental concerns and / or unsuitability of material for purpose of regravelling.

The mine plan outlining extent of borrow pit and mining is outlined as Annexure B. Methodology for the preparation, operation and closure of borrow pit is outlined in Annexure B.

Central Karoo District Municipality is to undertake work on behalf of the WCPA. Formal agreements are to be entered into between the landowner and the WCPA, with the municipality managing the site until decommissioning and closure. During decommissioning, the working area will be rehabilitated and revegetated as per the approach outlined in the mining plan. WCPA's liability for the site persists until such time as a Closure Certificate has been issued by the DMR.

## **Results of consultation**

DMR has outlined requirements for public participation in terms of the Minerals and Petroleum Resources Development Act (Act 28 of 2002) for exempted organs of state. This includes liaison with the landowner, notification of the immediate neighbours and either an on-site advertisement or advertisement in the local newspaper. The WCPA has indicated a commitment to developing and maintaining good relations with landowners and therefore landowners concerns are incorporated into the final agreement.

The public consultation process for this project has involved consultation with the landowners and neighbours, and the advertising of the proposed activity in the local newspaper.

### *Requests / concerns of owner:*

Although not directly relating to the development of this borrow pit, the farmer reported that the current drainage lines along the road are inadequate and that they should be upgraded to take water to a nearby river. He stated that water draining from MR 587 sometimes run into his house.

## 2. Heritage resources

### Identification of heritage resources

Proposed site and immediate context do not fall within conservation or protected heritage areas, and is not located near to or visible from any protected heritage sites. The site does not fall within a historical settlement or townscape and does not contribute towards rural or natural landscape of cultural significance. The site is therefore not considered as an integral component of the cultural landscape.

Dr John Almond conducted a palaeontological field assessment and provided a report outlining geological context, palaeontological heritage and palaeontological sensitivity. The fluvial sediments of the Teekloof Formation in this region are assigned to the Hoedemaker Member and often highly fossiliferous, containing a range of reptiles, therapsids (“mammal-like reptiles”), plants and trace fossils (including large vertebrate burrows) that are assigned to the *Tropidostoma* Assemblage Zone. Numerous sandstone casts of straight, curved to helical burrows of small vertebrates (probably the dicynodont *Diictodon*) are exposed in the floor of the pit and the isolated skull of a small dicynodont was also recorded at the same stratigraphic level. This fossil material is of significant palaeontological interest (Almond, 2015: 1).

The near absence of archaeological remains at the proposed extension site indicates that the proposed site is of low archaeological significance (Dave Halkett ACO, April 2015).

The site has historical, social, or spiritual significance. No built environment issues and / or cultural landscape issues have been identified. Heritage resources were identified and further palaeontological studies be commissioned.

### Heritage significance

Numerous sandstone casts of straight, curved to helical burrows of small vertebrates (probably the dicynodont *Diictodon*) are exposed in the floor of the pit and the isolated skull of a small dicynodont was also recorded at the same stratigraphic level. This fossil material is of significant palaeontological interest. It is therefore recommended that a suitably qualified professional palaeontologist be commissioned to record and judiciously sample the fossil “warren” of vertebrate burrows currently exposed within the MR00587/50,2/0,1R pit *before* any excavation or clearance work at the site takes place project (Almond, 2015: 11).

The context within which the site lies is identified as possessing high intrinsic heritage value. Heritage resources were identified within the immediate context of the site. The proposed development site is transformed and possesses known historical, social or spiritual significance. Sensitive landscapes were identified. The site is therefore considered to possess a high level of intrinsic heritage value.

### Heritage indicators

Heritage indicators identified aim to ensure that significance would not be adversely impacted on by the proposed development. Indicators concern impact on the cultural landscape, identified heritage resources and visual impact. No sensitive landscapes, archaeological or palaeontological material of significance were identified. Landscaping and rehabilitation of the site should commence as soon as advancing face and sufficient working/loading area moves away from an area that has been mined out.



### 3. Assessment of impacts

An assessment of the potential development impacts on significance is undertaken using relevant assessment criteria as well as response to indicators. Assessment of impacts on palaeontological significance has been provided as well as consideration of the cultural landscape and assessment of cumulative impacts.

**Cultural landscape:** Proposed borrow pit would result in a negative impact on the cultural landscape. The landscape within which the site lies possesses high intrinsic heritage value and heritage resources were identified within the immediate context. The site and its immediate context are considered as being of high heritage significance. Heritage resources will be impacted and the overall status of the impact is considered as high.

- Archaeological and palaeontological impact: Impact would occur as a result of the proposed borrow pit. It is recommended that a suitably qualified professional palaeontologist be commissioned to record and judiciously sample the fossil “warren” of vertebrate burrows currently exposed within the MR00587/50,2/0,1R pit *before* any excavation or clearance work at the site takes place. All work should conform to international best practice for palaeontological fieldwork and the study (e.g. data recording fossil collection and curation, final report) should adhere to the minimum standards for Phase 2 palaeontological studies published by SAHRA (2013).

**Visual impact:** Low intensity visual impact is limited to the immediate surroundings and will be limited to operational phase.

**Cumulative impact:** The proposed moderate intensity intervention lies within a disturbed context with degraded conditions. No new roads would have to be constructed as the borrow pit is accessed directly off main / divisional roads or via existing access tracks. The borrow pit and access tracks would be fenced for the duration of the mining activities. There will be no site buildings located at the borrow pit site. No long-term traffic increase will be experienced. Low impact is associated with impact of increased personnel and cumulative impacts on borrow pit footprint and surroundings.

**Site rehabilitation:**

- All possible worked surfaces should be covered as soon as possible with any available and stockpiled topsoil.
- Previously mined and rehabilitated areas should not be traversed as far as possible by access tracks to, nor covered by temporary stockpiles of gravel of, the subsequent mining phases.
- The proposed pit should be designed to be worked such that any portion/phase is free-draining at all times.
- A stockpile of loosened gravel should be left after each mining phase as close as possible to the access from MR587, i.e. in the existing un-rehabilitated southern borrow pit.

**Impact relative to sustainable social and economic benefits:** The project will result in social and economic benefits for the local community in terms of service provision and employment opportunities.

The site is considered to possess a very high level of intrinsic heritage value and the overall status of the impact is considered as high.

## 4. Discussion

During the course of borrow pit excavations, operations should be planned in such a way that the amount of work that will be necessary for the finishing off of the borrow pit is reduced as far as possible. Indiscriminate excavation without due regard for the desired final shape of the borrow pit should not be permitted and should be rectified immediately. Timing of rehabilitation is important as rehabilitation of disturbed areas should ideally be programmed to occur as soon as practically possible following cessation of work in a specific area. The period between cessation of activities associated with mining of materials and the onset of rehabilitation for that area should ideally not exceed 1 month. Rehabilitation operations should ideally be conducted in parallel with extraction. Accordingly, progressive rehabilitation, in which depleted sections of a borrow pit are reclaimed while extraction is ongoing in other sections of the same pit is encouraged.

Site development, operation, mining and closure guidelines outlined with the Environmental Management Programme provides detailed guidance for the preparation, operation and decommissioning of the site. Rehabilitation of old and current working faces has been undertaken to mitigate visual impact to road users. Measures outlined should be adhered to in order to minimise potential negative impacts. It is recommended within the EMProg that an environmental control officer or suitable experienced engineer monitors the preparation, operational and decommissioning of the borrow pit so as to ensure that mitigation and rehabilitation measures are adhered to. Standard safety measures in place would include fencing, access control and fire management.

Fossil material was recorded during the present field assessment and it is concluded that further specialist palaeontological studies or mitigation for this project are required.

### Recommendations

It is therefore recommended that:

1. It is recommended that a suitably qualified professional palaeontologist be commissioned to record and judiciously sample the fossil "warren" of vertebrate burrows currently exposed within the MR00587/50,2/0,1R pit before any excavation or clearance work at the site takes place. All work should conform to international best practice for palaeontological fieldwork and the study (e.g. data recording fossil collection and curation, final report) should adhere to the minimum standards for Phase 2 palaeontological studies published by SAHRA (2013).
2. The Environmental Control Officer (ECO) responsible for the borrow development should be aware of the possibility of important fossils (notably vertebrate bones and teeth) being present or unearthed on site and should monitor fresh (i.e. unweathered) sedimentary bedrock for fossil remains. In the case of any significant fossil finds made during construction, these should be safeguarded - preferably in situ - and reported by the ECO as soon as possible to the relevant heritage management authority (Heritage Western Cape. Protea Assurance Building, Green Market Square, Cape Town 8000. Private Bag X9067, Cape Town 8001. Tel: 086-142 142. Fax: 021-483 9842. Email: hwc@pgwc.gov.za) so that appropriate mitigation (i.e. recording, sampling or collection) by a palaeontological specialist can be considered and implemented, at the developer's expense. These recommendations should be incorporated into the Environmental Management Plan (EMP) for the MR00587/50.2/0,1R borrow pit project.

References:

- Almond John E PhD (July 2015): *Palaeontological specialist study: field assessment & recommendation for exemption from further studies & mitigation*
- ASAPA Aggregate and Sand Producers Association of Southern Africa (30 September 2009): *The issue of borrow pits being used in the aggregate and sand industry* accessed online
- Aurecon / Nadeson JV (July 2011): *Draft environmental management programme, summary report and mine plan*
- Galliers R M (September 2014): *Geotechnical investigations and geological strategic gravel pit summary report* for Aurecon South Africa
- Heritage Western Cape (May 2015): *Minimum Standards For Phase 1 Archaeological Impact Assessment (Aia) Reports*
- vidamemoria (April 2015): *Notification of Intent to Develop*