# 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 consultan
3rd Floor · Guarantee House· 37 Burg Street· Greenmarket Squa
P O Box 50605 Waterfront· 8002· Cape To
021 424 vida (8432) cell: 082 330 4066 · quahnita@vidamemoria.co
CK 2006/049087/23

MR 587 Central Karoo

Beaufort West – Central Karoo District Municipality, Western Cape

## Executive summary

*Aurecon South Africa (Pty) Ltd* appointed *vidamemoria* to conduct a heritage impact assessment for expansion of an existing borrow pit *located along MR 587 near Nelspoort, Central Karoo* District Municipality. *vidamemoria* appointed *Dr John Almond (Natura Viva CC)* to conduct necessary palaeontological specialist study and Madelon Tusenius (*Natura Viva CC)* to conduct necessary archaeological impact assessment. 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 Department Mineral Resources.

Proposed borrow pit is mainly excavated into overbank mudrocks of the Teekloof 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 MR00587/27.0/0,0R it *before* any excavation or clearance work at the site takes place. The background surface scatter of isolated stone artefacts, rather than a discrete site, in a disturbed context is considered to be of low archaeological heritage significance. No significant impact on such resources is expected if the proposed pit extension is developed. No further archaeological studies or mitigation are recommended. Proposed intervention would result in a detrimental heritage impact, yielding social and economic benefits with a negative impact on heritage resources. Further palaeontological studies or mitigation is required.

## 1. Introduction

*Aurecon South Africa (Pty) Ltd* on behalf of the *WCPA: Department of Transport and Pubic 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 borrow pit at km 27.0 along MR 587 in Beaufort West, Central Karoo District Municipality.** NID dated 02 April 2015 was submitted to Heritage Western Cape (HWC) for consideration. Response dated 11 May 2015 (**case ref 15040123GT0422E**) requested *'a heritage impact assessment limited to archaeological scoping report and a palaeontological scoping report with an integrated set of recommendations is required'* (Refer Annexure A). *vidamemoria* appointed *Dr John Almond (Natura Viva CC)* to conduct the necessary palaeontological specialist study (dated July 2015) and Madelon Tusenius (*Natura Viva CC)* to conduct necessary archaeological impact assessment (dated July 2015).

The proposed action triggers Section 38(1) *(c)(a) activity that will change the character of a site exceeding 5 000 m$^2$*. 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.

| | |
|---|---|
| *Annexure A* | Interim comment from HWC |
| *Annexure B* | Mine plan |
| *Annexure C* | Methodology for the preparation, operation and closure of borrow pit |
| *Annexure D* | Palaeontological specialist study conducted by Dr John Almond, Natura Viva CC (July 2015) |
| *Annexure E* | Archaeological conducted by Madelon Tusenius, Natura Viva CC (July 2015) |

**Site location and description**

The potential source of a wearing coarse gravel pit site is located along the unpaved MR 587/27.0/0.0R is accessed from the N1 east of Nelspoort in Central Karoo District, Western Cape. The proposed extension lies on a pediment with a very gentle/shallow slope eastwards and which MR587 traverses in an east west direction. Sparsely scattered bushes and low grass surround the borrow pit. Farm Road Reserve is in private ownership of Western Cape Government (Roads Department). Borrow pit co-ordinates are 32° 5'42.37"S and 23° 9'26.85"E.

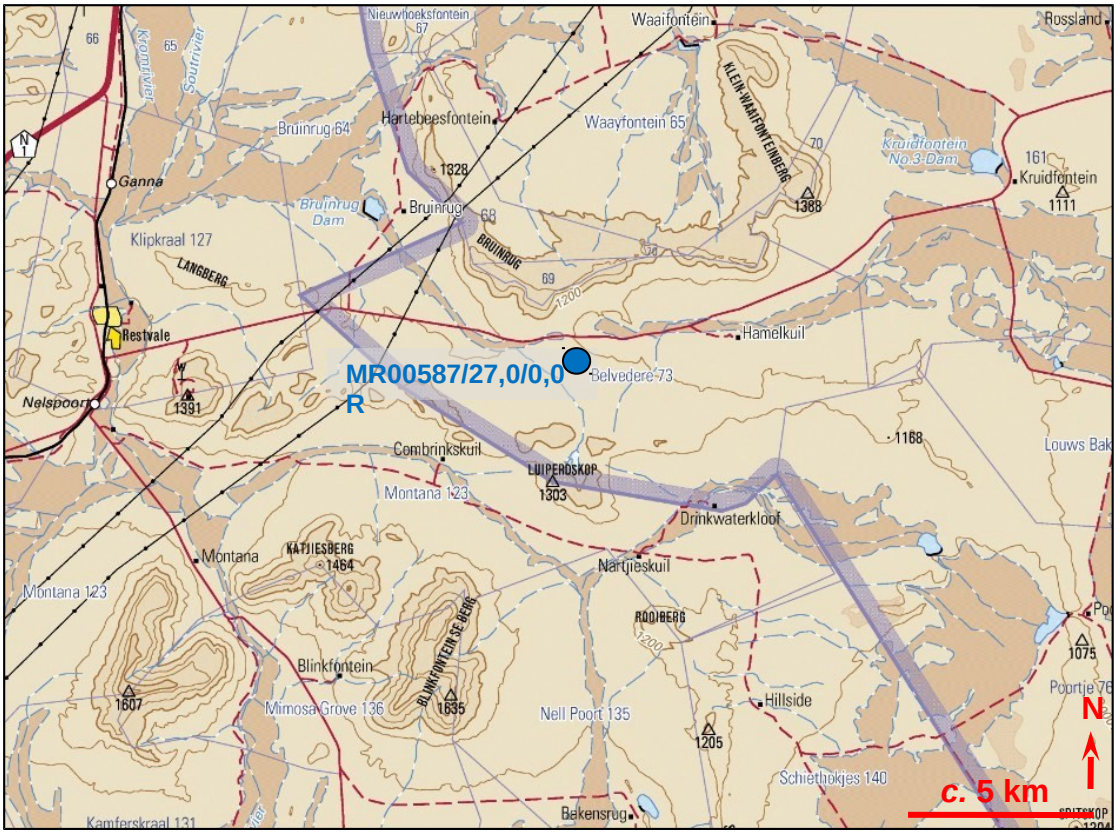


Figure 1: Extract from topographical sheets 3222 Beaufort West (Dr John E. Amond 2015:2)

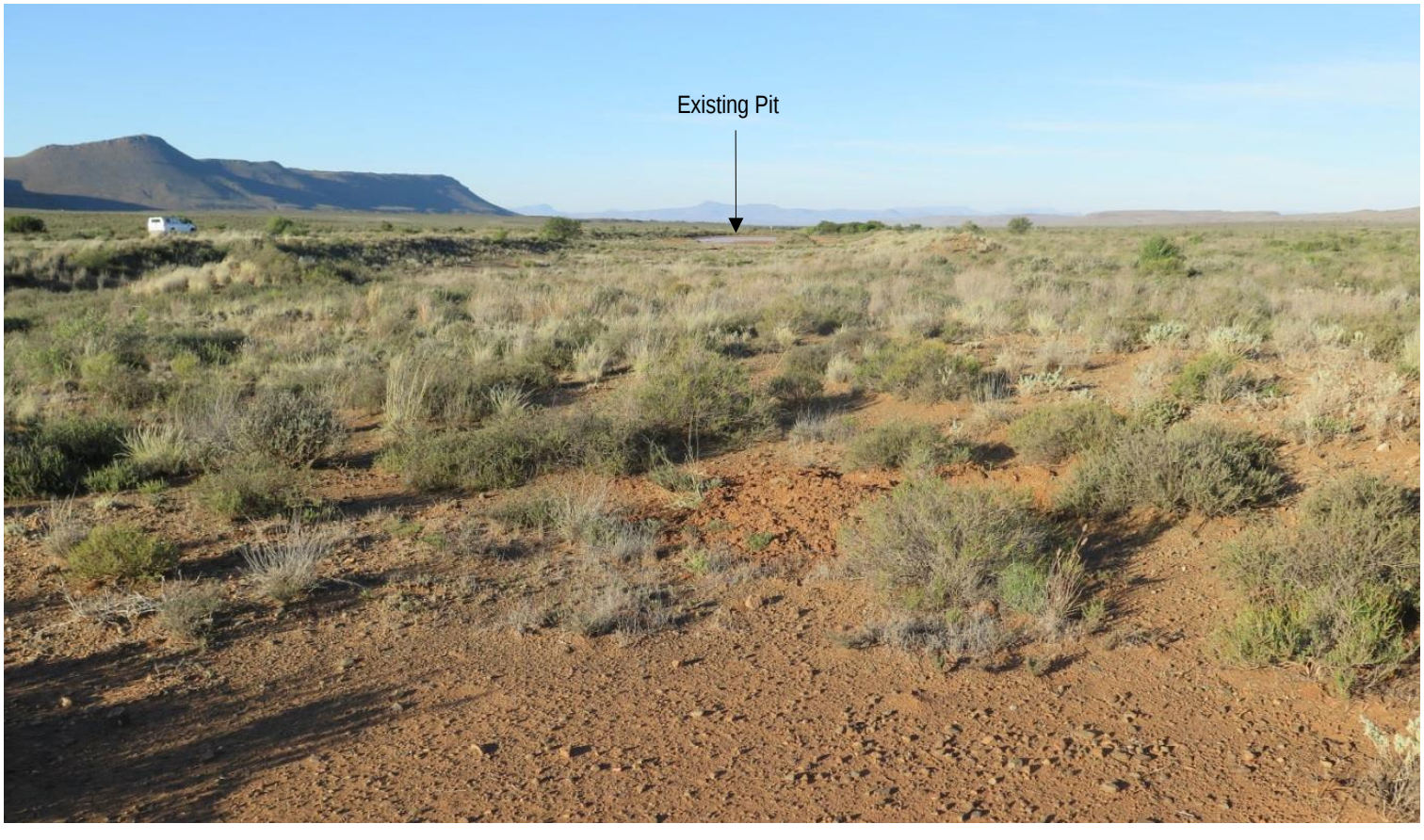


Figure 3: Site context and borrow bit location (Google earth, April 2015)

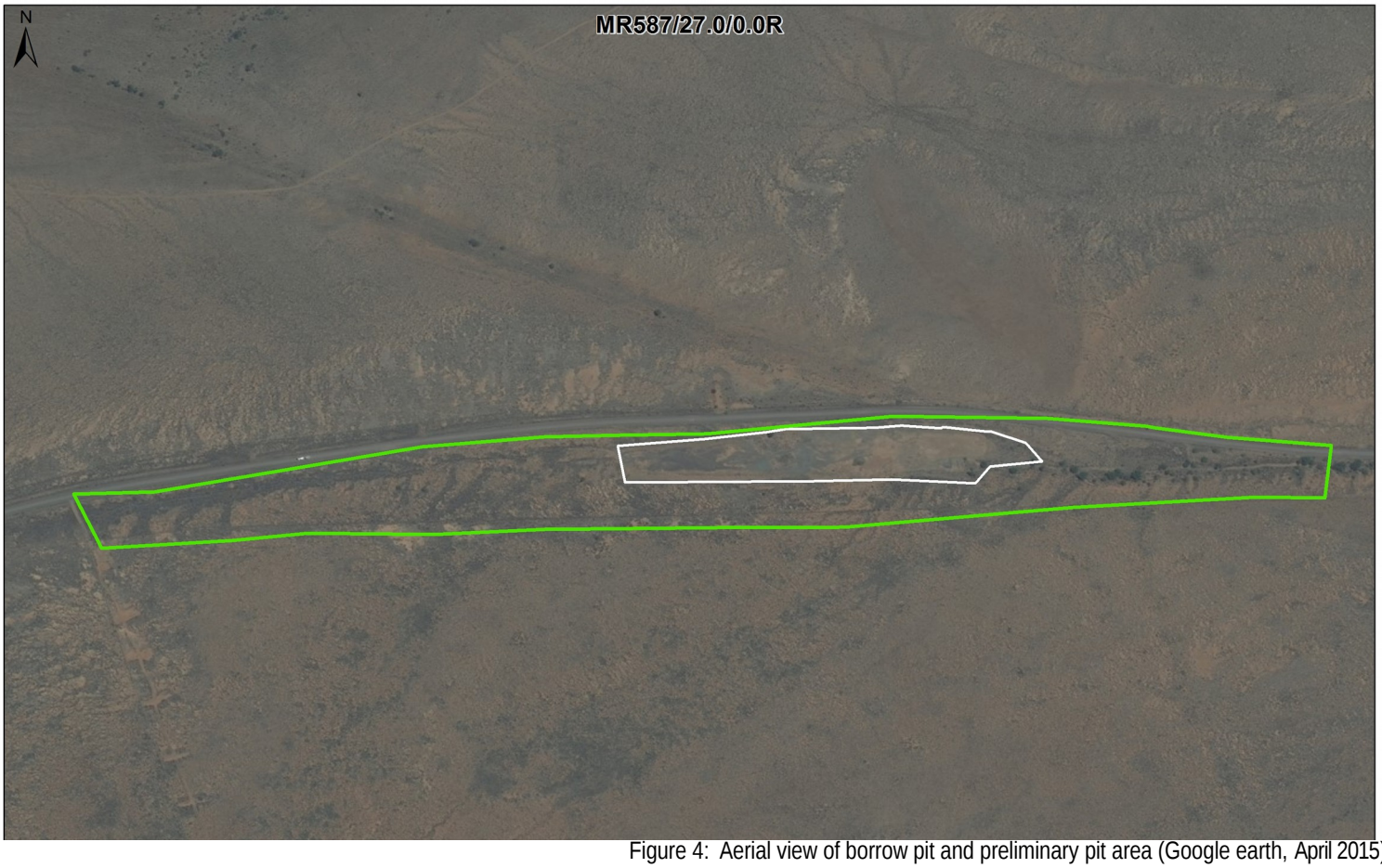


Figure 4: Aerial view of borrow pit and preliminary pit area (Google earth, April 2015)

**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 potential borrow pit located at **km 27.0 along MR 587** will be used for the re-gravelling so as to benefit road users in terms of road safety and user economy as well as to minimise maintenance-related disruptions.

| Summary of borrow pit | |
|---|---|
| Borrow pit / expropriation area | 22 000 $m^2$ |
| Maximum depth | 2.4m |
| Material description | mudrocks of the Teekloof Formation (Lower Beaufort Group / Adelaide Subgroup) of Late Permian age |
| Proposed usage after rehabilitation | Revegetation |
| Volume of material to be sourced | 35 000 $m^3$ |
| Estimated proven material reserves | 35 000 $m^3$ |

Trial pit investigations and sampling were conducted 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 attached as Annexure B. Methodology for the preparation, operation and closure of borrow pit is outlined in Annexure C.

Central Karoo 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.

No heritage related comments and / or concerns were received.

*Requests / concerns of owner:*

- None noted

## 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 existing borrow pit falls within the Teekloof Formation (Lower Beaufort Group / Adelaide Subgroup) of Late Permian age. 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).

Madelon Tusenius conducted archaeological field assessment and provided report identifying and assessing archaeological resources, associated impact, assessment of significance and recommendations regarding any mitigation required. The survey of the site investigation area revealed a patchy, low density scatter of material on the surface. About 100 dispersed, isolated stone artefacts of various ages, but probably mostly associated with the Middle Stone Age, were recorded. One Early Stone Age handaxe was also noted. Most of the artefacts were made of local sandstone and quartzite. Several hornfels flakes and cores may pertain to the Later Stone Age. No other archaeological remains such as organic material, historical remains, graves or rock engravings were observed (Tusenius 2015: 2).

The site has historical significance. No built environment issues and / or cultural landscape issues have been identified. Further heritage resources were identified.

**Heritage significance**

The fossil material is of significant palaeontological interest (Almond 2015: 11). The background surface scatter of isolated stone artefacts, rather than a discrete site, in a disturbed context is considered to be of low archaeological heritage significance (Tusenius 2015:11).

**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. Sensitive landscapes and material of palaeontological significance were identified.

## 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 on resources would occur as a result of expansion. A suitably qualified professional palaeontologist be commissioned to record and judiciously sample the fossil "warren" of vertebrate burrows currently exposed within the MR00587/27,0/0,0R pit *before* any excavation or clearance work at the site takes place.

**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 from, 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 most recent access from MR587.

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

## 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.

The background surface scatter of isolated stone artefacts, rather than a discrete site, in a disturbed context is considered to be of low archaeological heritage significance. No significant impact on such heritage resources is expected if the proposed extension is developed. No further archaeological studies or mitigation are therefore recommended. If any human remains are found during the development of the proposed pits, work in that area must cease and the South African Heritage Resources Agency (SAHRA) must be notified immediately (Tusenius 2015: 11).

This fossil material is of significant paleontological 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 MR00587/27,0/0,0R pit *before* any excavation or clearance work at the site takes place (Almond 2015: 9).

Site is considered to possess a very high level of intrinsic heritage value and the overall status of the impact is considered as high. Proposed intervention would result in a detrimental heritage impact, yielding social and economic benefits with a negative impact on heritage resources. Further specialist paleontological studies or mitigation is recommended and expansion should not be allowed to proceed.

**Recommendations**

It is therefore recommended that:

1. suitably qualified professional palaeontologist be commissioned to record and judiciously sample the fossil “warren” of vertebrate burrows currently exposed within the MR00587/27,0/0,0R 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).comment be issued that proposed activity may proceed in terms of Section 38(8) of the NHRAct.
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 MR00587/27.0/0,0R 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 (November 2014): *Geotechnical investigationsand 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*
- Tusenius M (July 2015): *Archaeological Impact Assessment*
- vidamemoria (April 2015): *Notification of Intent to Develop*