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## Appendix 1: Project Specific Results

### Stilfontein Grid connection

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### 1. Introduction

Mainstream proposes the construction of the Stilfontein Grid connection and substation on the following property:

- Doornplaat RE4/410
- Doornplaat 3/410
- Rietfontein RE/388
- Rietfontein 88/388

The Project is located approximately 20 km south-west of Potchefstroom and 6 km north-east of Stilfontein, in the North West Province (Figure 1.1) and within the Klerksdorp Renewable Energy Development Zone (REDZ).

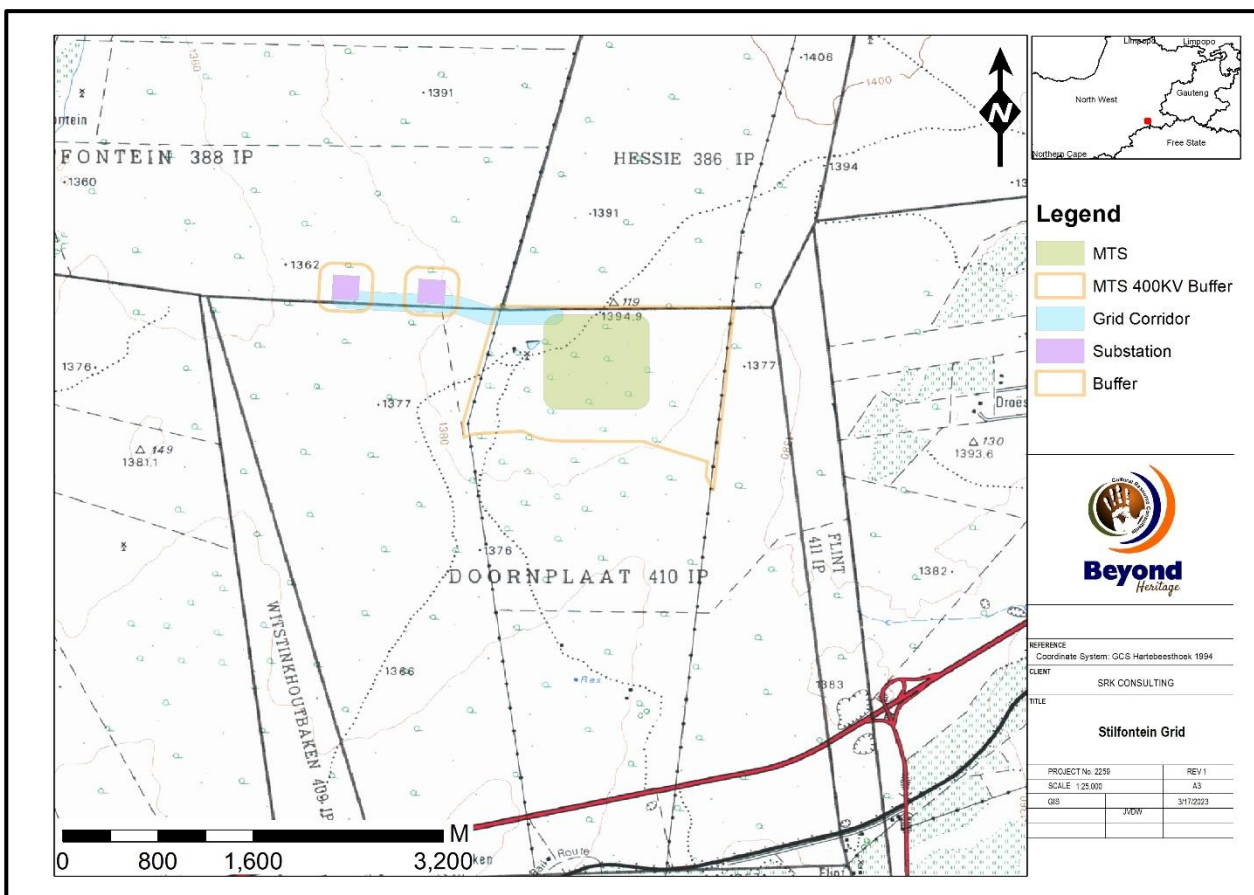


Figure 1.1. Local setting of the Project (1: 50 000 topographical map).

## 2. Findings of the survey

The topography of the study area is flat without any focal points like hills or pans that would have attracted human occupation in antiquity and is considered to be of low heritage potential. This was confirmed during a physical walkthrough (Figure 2.1) of the study area and recorded heritage resources included a Stone Age scatter at SF002 (26,87044702; -26,77756296). The artefacts are isolated and out of context and of low significance with a field rating of GP C. Artefacts consist of flakes and chunks and based on size could date to the MSA. All artefacts are made on chert. The low-density open-air scatters are considered as background scatter (Orton 2016) that is generally speaking of low significance and has a field rating of GP C.

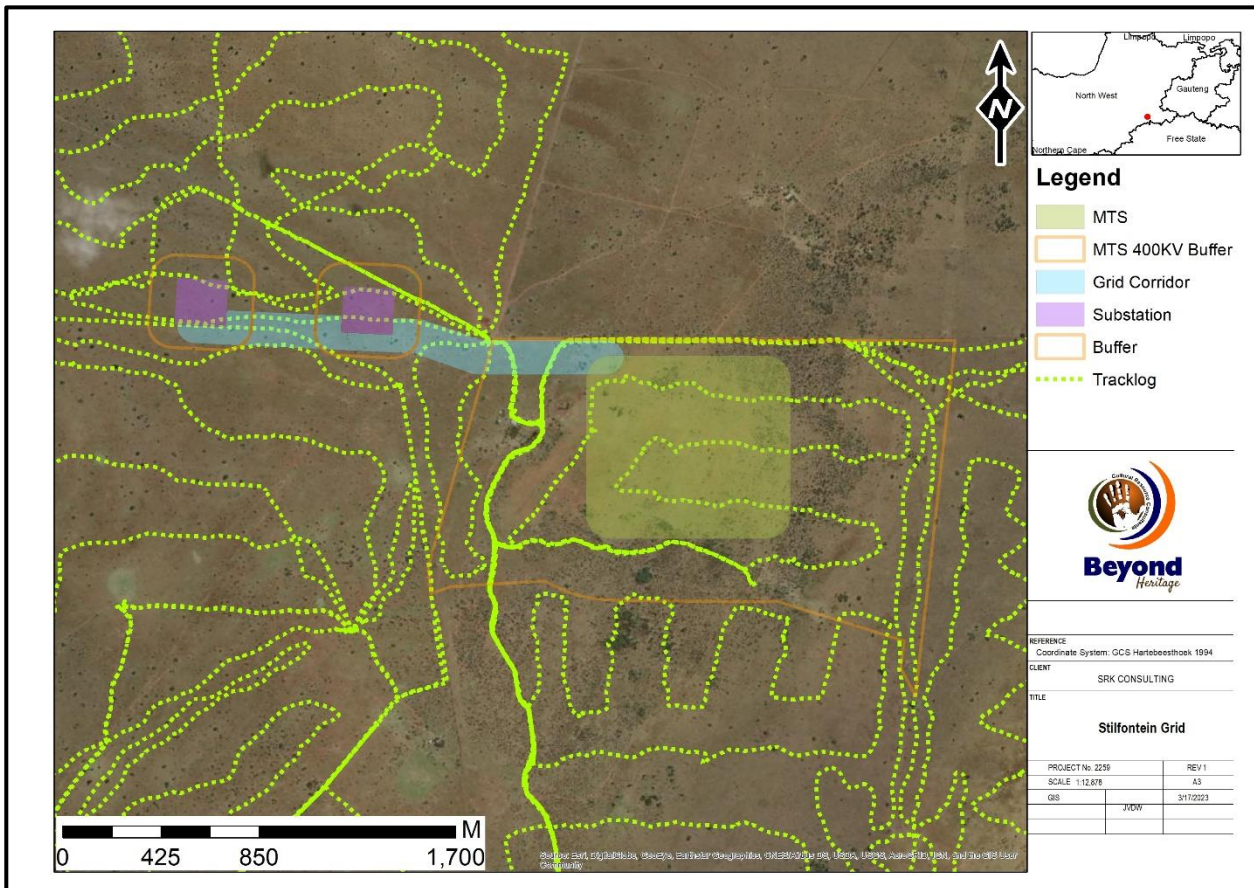


Figure 2.1. Tracklogs of survey paths in green.



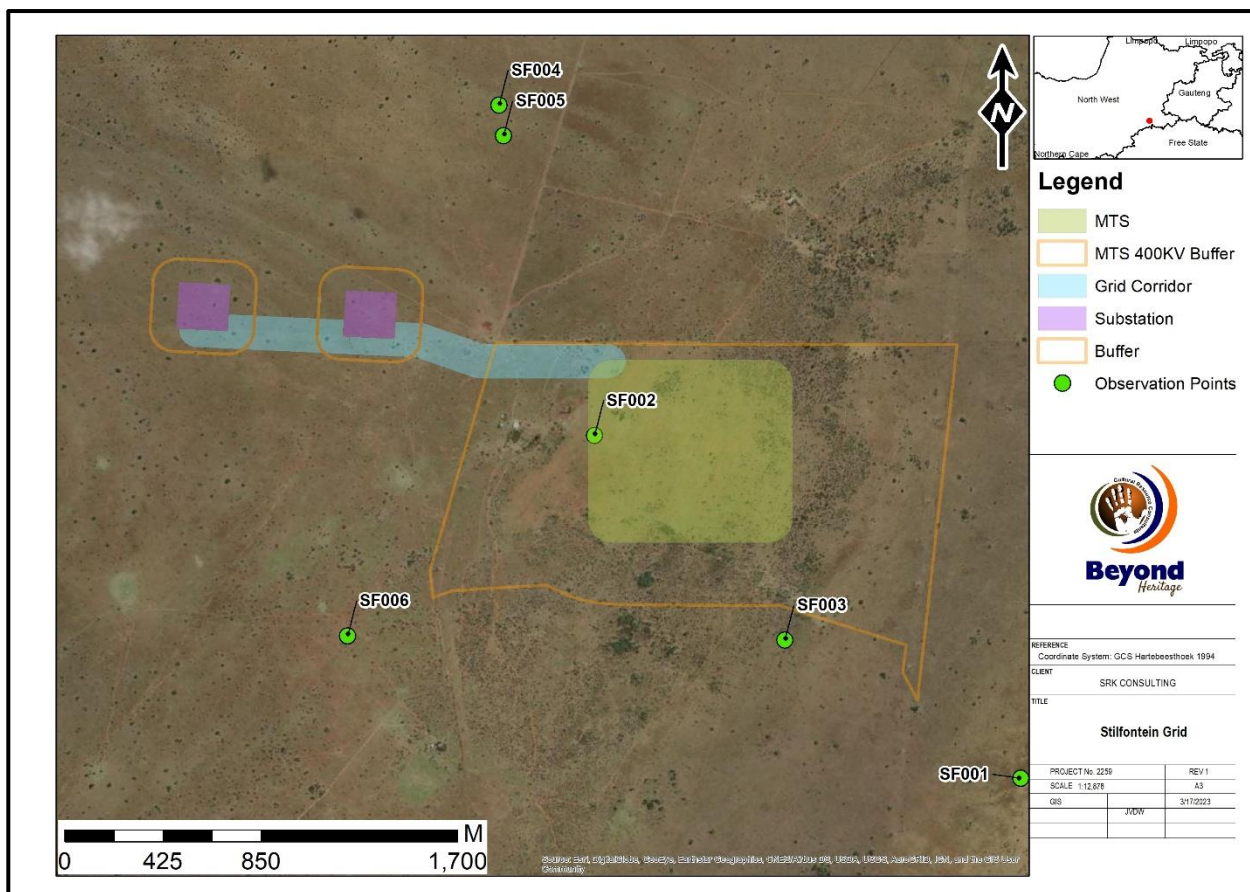


Figure 2.2. Recorded observations in relation to the study area.



Figure 2.3. Artefact scatter at SF002.

### Cultural landscape

The study area is currently used for agricultural purposes and infrastructure in the general area is limited to roads, fences and powerlines with no other developments within the Project footprint indicated prior to 1996 (Figure 2.2 to 2.3).

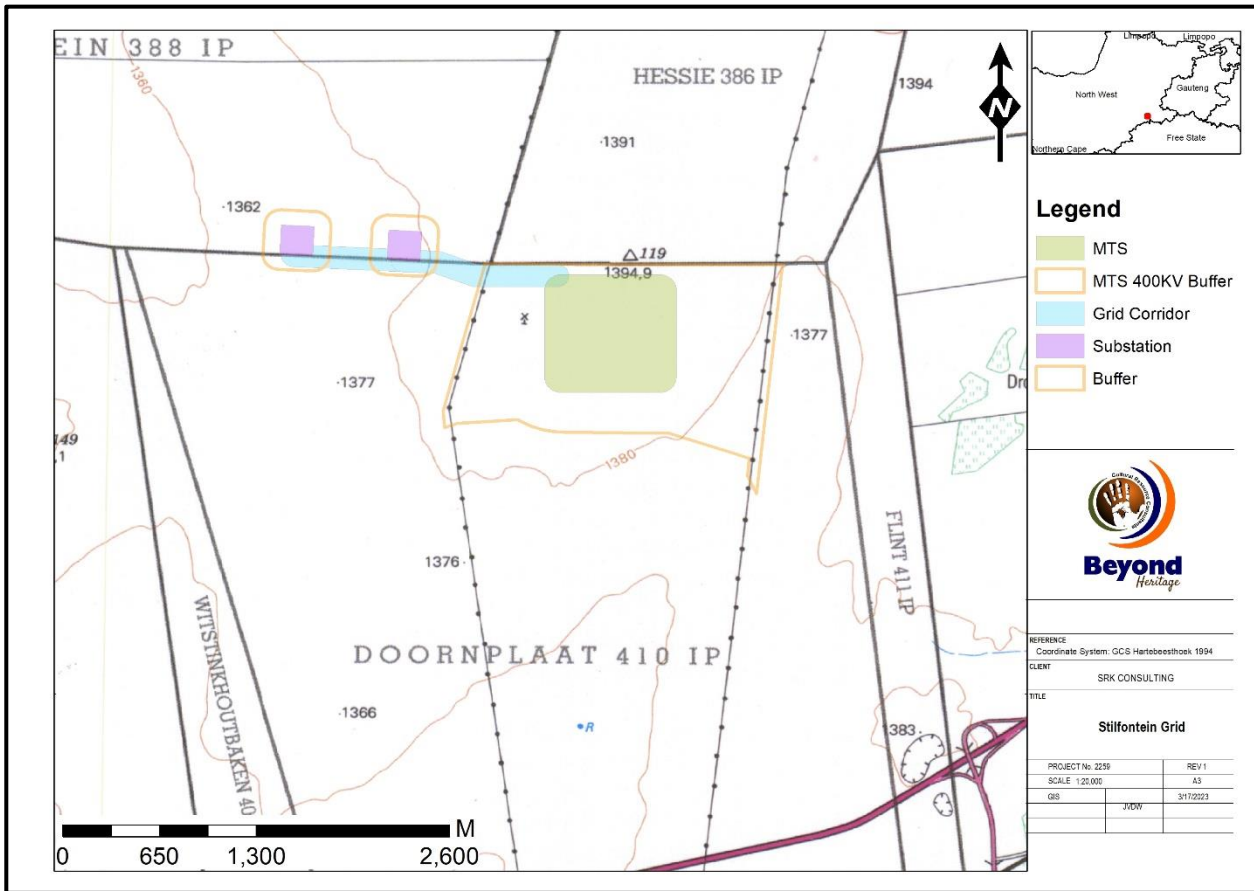


Figure 2.4. 1996 Topographic map of the Project showing no developments in the study area, apart from a power line.

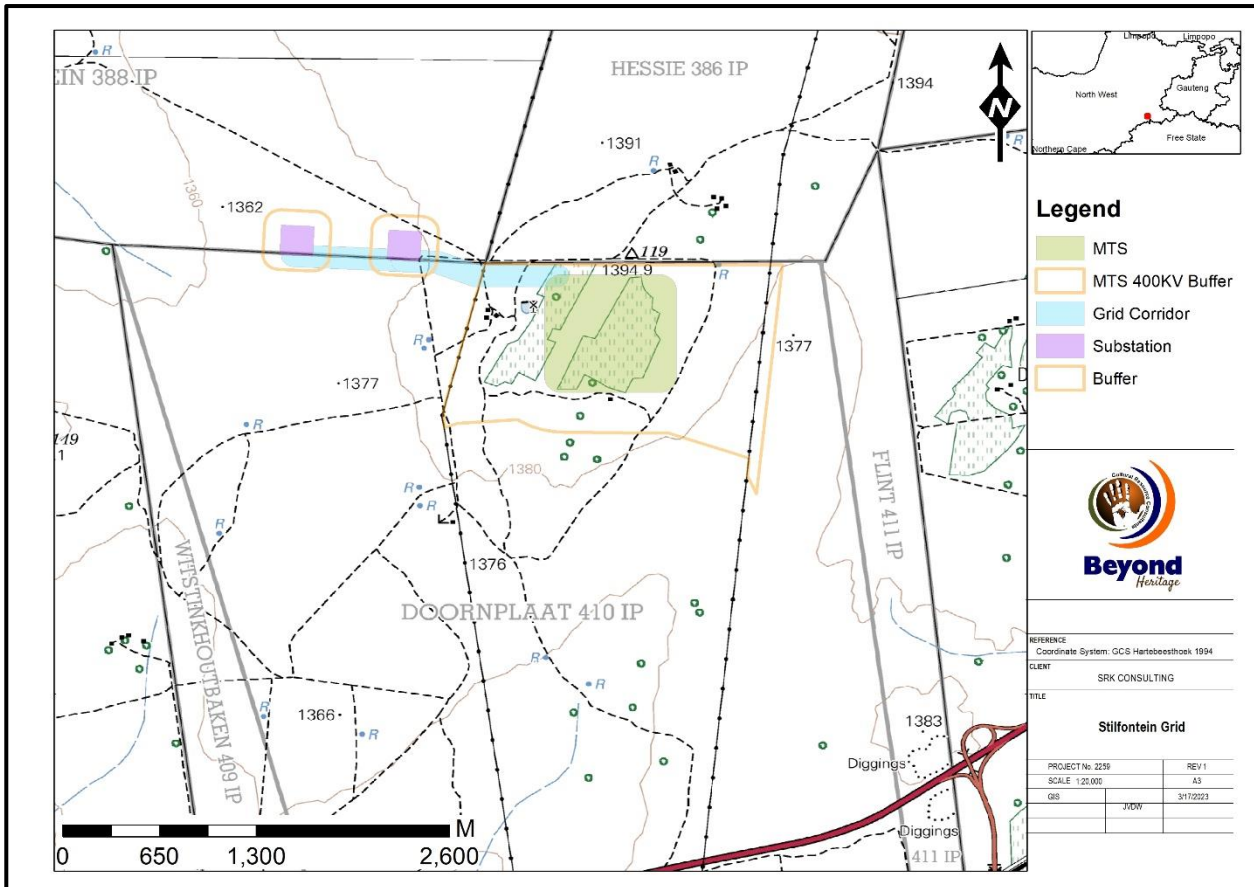


Figure 2.5. 2006 Topographical map of the Project indicating no developments in the study area apart from a powerline.

### 3. Potential Impacts

Impacts to heritage resources without mitigation within the project footprint will be permanent and negative and occur during the pre-construction and construction activities. It is assumed that the pre-construction and construction phase involves the removal of topsoil and vegetation as well as the establishment of infrastructure. These activities can impact on heritage features and impacts include destruction or partial destruction of non-renewable heritage resources. Impacts during the operation phase is considered to affect the cultural landscape and sense of place.

In terms of this project the main source of impacts will happen during the following activities.

- Establishment of new roads and upgrade of existing roads;
- Earthworks for temporary infrastructure including laydown areas;
- Visual impact of the grid infrastructure on the landscape and sense of place;
- Trenches for cables and erection of powerlines;
- Excavations during construction of pylons.

No impacts on heritage resources or paleontological resources are expected during the operation phase.

#### 3.1. Potential Impact: Loss of heritage resources

No heritage resources of significance were recorded in the study area. Impacts of the Project on heritage resources is expected to be very low with the implementation of a Chance Find Procedure and Monitoring during all phases of the development (Table 1).

**Table 1. Impacts on heritage resources during the construction phase.**

	<i>Extent</i>	<i>Intensity</i>	<i>Duration</i>	<i>Consequence</i>	<i>Probability</i>	<i>Significance</i>	<i>Status</i>	<i>Confidence</i>
Without mitigation	Local 1	Low 1	Long-term 3	<b>Low</b> 5	Possible	<b>VERY LOW</b>	– ve	High
<b>Essential mitigation measures:</b>								
<ul style="list-style-type: none"> <li>• Implement a chance find procedure for the Project and monitoring of the development footprint by the ECO or designated responsible person.</li> <li>• Employ an ECO or designated responsible person to monitor the construction activities regularly.</li> </ul>								
With mitigation	Local 1	Low 1	Long-term 3	<b>Low</b> 5	Improbable	<b>VERY LOW</b>	– ve	High

#### 3.2. Potential Impact: Loss of Fossils

There are no fossils above ground, as confirmed by the site visit, but as part of the implementation of the Stilfontein PV Cluster and infrastructure, excavations for foundations, pipes, cables and fibres will disturb fossils below the ground – only if they are present.

The fossils that might be below ground are trace fossils such as stromatolites. They are common in the Malmani Subgroup, and furthermore, they are traces of microbial activity not fossils of the microbes (bacteria and algae). This reduces their scientific value. If such trace fossils are found, removed and housed in a research institute or museum for future research, this will be a positive impact.

The impact is assessed to be insignificant with the implementation of mitigation (removal and collection) (Table 2). There are no alternatives because the whole area is on the same rock type.



**Table 2. Significance of loss of fossils**

	Extent	Intensity	Duration	Consequence	Probability	Significance	Status	Confidence
Without mitigation	Local 1	Medium 2	Short-term 1	<b>Very low</b> 4	Improbable	<b>Insignificant</b>	- ve	High
<b>Best Practice mitigation measures:</b>								
<ul style="list-style-type: none"> <li>Put aside and photograph any fossils found during excavations and send pictures to a palaeontologist to assess their scientific importance. If deemed important, the palaeontologist must obtain a SAHRA permit and remove the stromatolites to a recognised repository.</li> </ul>								
With mitigation	Local 1	Medium 2	Short-term 1	<b>Very Low</b> 4	Possible	<b>Insignificant</b>	+ ve	High

#### 4. Conclusion

The study area is rural in character and the impact area is undeveloped. The proposed site is covered in quaternary soils and used for grazing with no major focal points like rocky outcrops or pans that would have attracted human occupation in antiquity. Examination of historical topographic maps and aerial images also showed no structures or stone walled settlements in the study area and the impact footprint is considered to be of low archaeological potential. This was confirmed during the site visit and recorded heritage resources were limited to a low density Stone Age scatter.

According to the SAHRA Paleontological sensitivity map the study area is of very high significance, the site visit however confirmed that there are no fossils visible on the surface. It is not known if fossils occur below ground, but if any are discovered when excavations commence, they should be removed, and a palaeontologist called to assess their scientific importance.

The Stilfontein Grid Connection is expected to have a very low impact on heritage resources and an insignificant impact on paleontological resources, and it is recommended that the Project can commence on the condition that the following recommendations are implemented as part of the EMPr and based on approval from SAHRA.

##### 4.1. Recommendations for condition of authorisation

The following recommendations for Environmental Authorisation apply and the Project may only proceed based on approval from SAHRA:

##### Recommendations:

- Implement a chance find procedure for the Project and monitoring of the development footprint by the ECO or designated responsible person.
- Employ an ECO or designated responsible person to monitor the construction activities regularly.

##### 4.2. Chance Find Procedures

###### 4.2.1. Heritage Resources

The possibility of the occurrence of subsurface finds cannot be excluded. Therefore, if during construction any possible finds such as stone tool scatters, artefacts or bone and fossil remains are made, the operations must be stopped, and a qualified archaeologist must be contacted for an assessment of the find and therefore chance find procedures should be put in place as part of the EMPr. A short summary of a Chance



Find Procedure is discussed below and monitoring guidelines for this procedure are provided in Section 4.5.

This procedure applies to the developer's permanent employees, its subsidiaries, contractors and subcontractors, and service providers. The aim of this procedure is to establish monitoring and reporting procedures to ensure compliance with this policy and its associated procedures. Construction crews must be properly inducted to ensure they are fully aware of the procedures regarding chance finds as discussed below.

- If during the pre-construction phase, construction, operations or closure phases of this project, any person employed by the developer, one of its subsidiaries, contractors and subcontractors, or service provider, finds any artefact of cultural significance or heritage site, this person must cease work at the site of the find and report this find to their immediate supervisor, and through their supervisor to the senior on-site manager.
- It is the responsibility of the senior on-site Manager to make an initial assessment of the extent of the find and confirm the extent of the work stoppage in that area.
- The senior on-site Manager will inform the ECO or designated responsible person of the chance find and its immediate impact on operations. The ECO or designated responsible person will then contact a professional archaeologist for an assessment of the finds who will notify the SAHRA.

#### **4.2.2. Chance find protocol for Paleontology – to commence once the excavation activities begin.**

1. The following procedure is only required if fossils are seen on the surface and when excavations commence.
2. When excavations begin the rocks must be given a cursory inspection by the environmental officer or designated person. Any fossiliferous material (trace fossils, stromatolites, plants, insects, bone or coal) should be put aside in a suitably protected place. This way the project activities will not be interrupted.
3. Photographs of similar fossils must be provided to the developer to assist in recognizing the fossil plants, vertebrates, invertebrates or trace fossils in the shales and mudstones (for example see Figure 4.1). This information will be built into the EMP's training and awareness plan and procedures.
4. Photographs of the putative fossils can be sent to the palaeontologist for a preliminary assessment.
5. If there is any possible fossil material found by the developer/environmental officer then the qualified palaeontologist sub-contracted for this project, should visit the site to inspect the selected material and check the dumps where feasible.
6. Fossil plants or vertebrates that are considered to be of good quality or scientific interest by the palaeontologist must be removed, catalogued and housed in a suitable institution where they can be made available for further study. Before the fossils are removed from the site a SAHRA permit must be obtained. Annual reports must be submitted to SAHRA as required by the relevant permits.
7. If no good fossil material is recovered then no site inspections by the palaeontologist will be necessary. A final report by the palaeontologist must be sent to SAHRA once the project has been completed and only if there are fossils.
8. If no fossils are found and the excavations have finished then no further monitoring is required.

#### 4.2.2.1. Examples of fossils from the Malmani Subgroup



Weathering of dolomite



Small domal stromatolites



Side view of a stromatolite



Surface view of domal stromatolites

Figure 4.1: Photographs of stromatolites as seen in the field.

#### 4.3. Reasoned Opinion

The overall impact of the Project on heritage resources is considered to be low and residual impacts can be managed to an acceptable level through implementation of the recommendations made in this report. The Project is acceptable from a heritage perspective and the socio-economic benefits also outweigh the possible impacts of the development if the correct mitigation measures are implemented for the Project.

#### 4.4. Potential risk

Potential risks to the proposed project are the occurrence of intangible features and unrecorded cultural resources (of which graves and subsurface material like fossils are the highest risk). This can cause delays during construction, as well as additional costs involved in mitigation and possible layout changes.

#### 4.5. Monitoring Requirements

Day to day monitoring can be conducted by the Environmental Control Officers (ECO) or designated responsible person. The ECO or other responsible persons should be trained along the following lines:

- *Induction training:* Responsible staff identified by the developer should attend a short course on heritage management and identification of heritage resources.
- *Site monitoring and watching brief:* As most heritage resources occur below surface, all earth-moving activities need to be routinely monitored in case of accidental discoveries. The greatest potential impacts are from pre-construction and construction activities. The ECO or designated responsible person should monitor all such activities daily. If any heritage resources are found, the Chance Find Procedure must be followed as outlined above.

**Table 3. Monitoring requirements for the Project.**

Heritage Monitoring						
Aspect	Area	Responsible monitoring measuring for and	Frequency	Proactive or reactive measurement	Method	
Cultural Heritage Resources Chance Finds	Entire project area	ECO or designated responsible person	Weekly (Pre construction and construction phase)	Proactively	<ul style="list-style-type: none"> <li>• If risks are manifested (accidental discovery of heritage resources) the Chance Find Procedure should be implemented:               <ol style="list-style-type: none"> <li>1. Cease all works immediately;</li> <li>2. Report incident to the Site Manager;</li> <li>3. Contact an archaeologist/ palaeontologist to inspect the site;</li> <li>4. Report incident to the competent authority; and</li> <li>5. Employ reasonable mitigation measures in accordance with the requirements of the relevant authorities.</li> </ol> </li> <li>• Only recommence operations once impacts have been mitigated.</li> </ul>	

