



DESKTOP PALAEOLOGICAL
HERITAGE IMPACT ASSESSEMENT
REPORT ON THE SITE OF TWO
PROPOSED INDUSTRIAL PARKS KNOWN
AS CHLOORKOP NORTH (LOCATED ON
THE REMAINDER PORTION 57 AND
PORTION 58 OF THE FARM
KLIPFONTEIN 12 IR) AND CHLOORKOP
SOUTH (TO BE LOCATED ON PORTION
73, REMAINDER PORTION 43 AND
REMAINDER PORTION 53 OF THE FARM
KLIPFONTEIN 12 IR 53), GAUTENG
PROVINCE

10 June 2014

Prepared for:
Heritage Contracts and Archaeological
Consulting CC

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Palaeontological Impact Assessment Report –On the sites of two proposed industrial parks known as Chloorkop North and Chloorkop South, Gauteng Province.

**DESKTOP PALAEOLOGICAL HERITAGE IMPACT ASSESSEMENT REPORT ON
THE SITE OF TWO PROPOSED INDUSTRIAL PARKS KNOWN AS CHLOORKOP
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FARM KLIPFONTEIN 12 IR) AND CHLOORKOP SOUTH (TO BE LOCATED ON
PORTION 73, REMAINDER PORTION 43 AND REMAINDER PORTION 53 OF THE
FARM KLIPFONTEIN 12 IR 53), GAUTENG PROVINCE**

Prepared for:

Heritage Contract and Archaeological Consulting CC

On Behalf of:

Eco Assessments CC

Prepared By:

Prof B.D. Millstead

EXECUTIVE SUMMARY

Lord Trust Developers (Pty) Ltd desires to construct two industrial parks and these are termed herein as Chloorkop North and Chloorkop South. The two sites are located close to each other with Chloorkop North being located approximately 1.1 km to the NNW of Chloorkop South. The two sites lie approximately 3.5 km NNE of Modderfontein and 7 km SW of Tembisa within the Magisterial District of Tembisa, Ekurhuleni District Council, Gauteng Province (Figure 1). Chloorkop North is planned to cover an area of 7.5 ha and lies within Remainder Portion 57 and Portion 58 of the farm Klipfontein 12 IR. Chloorkop South has a planned aerial extent of 22 ha and is located within Portion 73, Remainder Portion 43 and Remainder Portion 53 of the farm Klipfontein 12 IR 53.

Eco Assessments CC was appointed by Lord Trust Developers (Pty) Ltd, to conduct the Environmental Impact Assessment process for the establishment of two industrial parks (known herein as Chloorkop North and Chloorkop South). Eco assessment CC has Heritage Contract and Archaeological Consulting CC, as independent consultants, to undertake a Scoping Heritage Impact Assessment to identify and assess all potential environmental impacts associated with the proposed project for the area as identified and propose appropriate mitigation measures in an Environmental Management Programme ("EMP"). Heritage Contract and Archaeological Consulting CC has appointed BM Geological Services to provide a desktop Palaeontological Heritage Impact Assessment Report in respect of the proposed project that will form part of the final Heritage Impact assessment Report.

The proposed industrial park complexes are envisaged to comprise industrial parks that will offer manufacturing, storage and warehousing land uses. No Noxious Activities are proposed within either park. Accordingly, it is assumed for the purposes of this report that the developments will largely consist of buildings (and their foundations), access roads and parking areas. As such, it is anticipated that the effects of the construction process will be restricted to the upper 1-2 m of the underlying geology.

The project areas are completely underlain by unfossiliferous rocks of the Achaean Halfway House Granite. As a result, of the unfossiliferous nature of this geological unit, the potential for a negative impact on the fossil heritage of the area can be quantified in the following manner; the probability and significance of a negative impact on the palaeontological heritage of the Halfway House Granite is nil.

The projects have been assessed as being socially beneficial, herein, as it would provide infrastructure useful to facilitate economic activity within Gauteng. This positive assessment does not need to be balanced against any potential negative impact on the palaeontological heritage of either project area as no fossil materials are expected to be negatively impacted. As no fossil materials are expected to be negatively impacted by either project no damage mitigation procedures are outlined herein.

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In summary, this desktop study has not identified any palaeontological reason to prejudice the progression of either the Chloorkop North or Chloorkop South projects.

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1.1

2 INTRODUCTION

Lord Trust Developers (Pty) Ltd desires to construct two industrial parks and these are termed, herein, as Chloorkop North and Chloorkop South. The two sites are located close to each other with Chloorkop North being located approximately 1.1 km to the NNW of Chloorkop South. The two sites lie approximately 3.5 km NNE of Modderfontein and 7 km SW of Tembisa within the Magisterial District of Tembisa, Ekurhuleni District Council, Gauteng Province (Figure 1). Chloorkop North is planned to cover an area of 7.5 ha and lies within Remainder Portion 57 and Portion 58 of the farm Klipfontein 12 IR. Chloorkop South has a planned aerial extent of 22 ha and is located within Portion 73, Remainder Portion 43 and Remainder Portion 53 of the farm Klipfontein 12 IR 53.

Eco Assessments CC was appointed by Lord Trust Developers (Pty) Ltd, to conduct the Environmental Impact Assessment process for the establishment of two industrial parks (known herein as Chloorkop North and Chloorkop South). Eco assessment CC has Heritage Contract and Archaeological Consulting CC, as independent consultants, to undertake a Scoping Heritage Impact Assessment to identify and assess all potential environmental impacts associated with the proposed project for the area as identified and propose appropriate mitigation measures in an Environmental Management Programme ("EMP"). Heritage Contract and Archaeological Consulting CC has appointed BM Geological Services to provide a desktop Palaeontological Heritage Impact Assessment Report in respect of the proposed project that will form part of the final Heritage Impact assessment Report.

3 TERMS OF REFERENCE AND SCOPE OF THE STUDY

The terms of reference for this study were as follows:-

- Conduct a desktop assessment of the potential impact of the proposed project on the palaeontological heritage of the project area.
- Describe the possible impact of the proposed development on the palaeontological heritage of the site, according to a standard set of conventions.
- Quantify the possible impact of the proposed development on the palaeontological heritage of the site, according to a standard set of conventions.
- Provide an overview of the applicable legislative framework.
- Make recommendations concerning future work programs as, and if, necessary.

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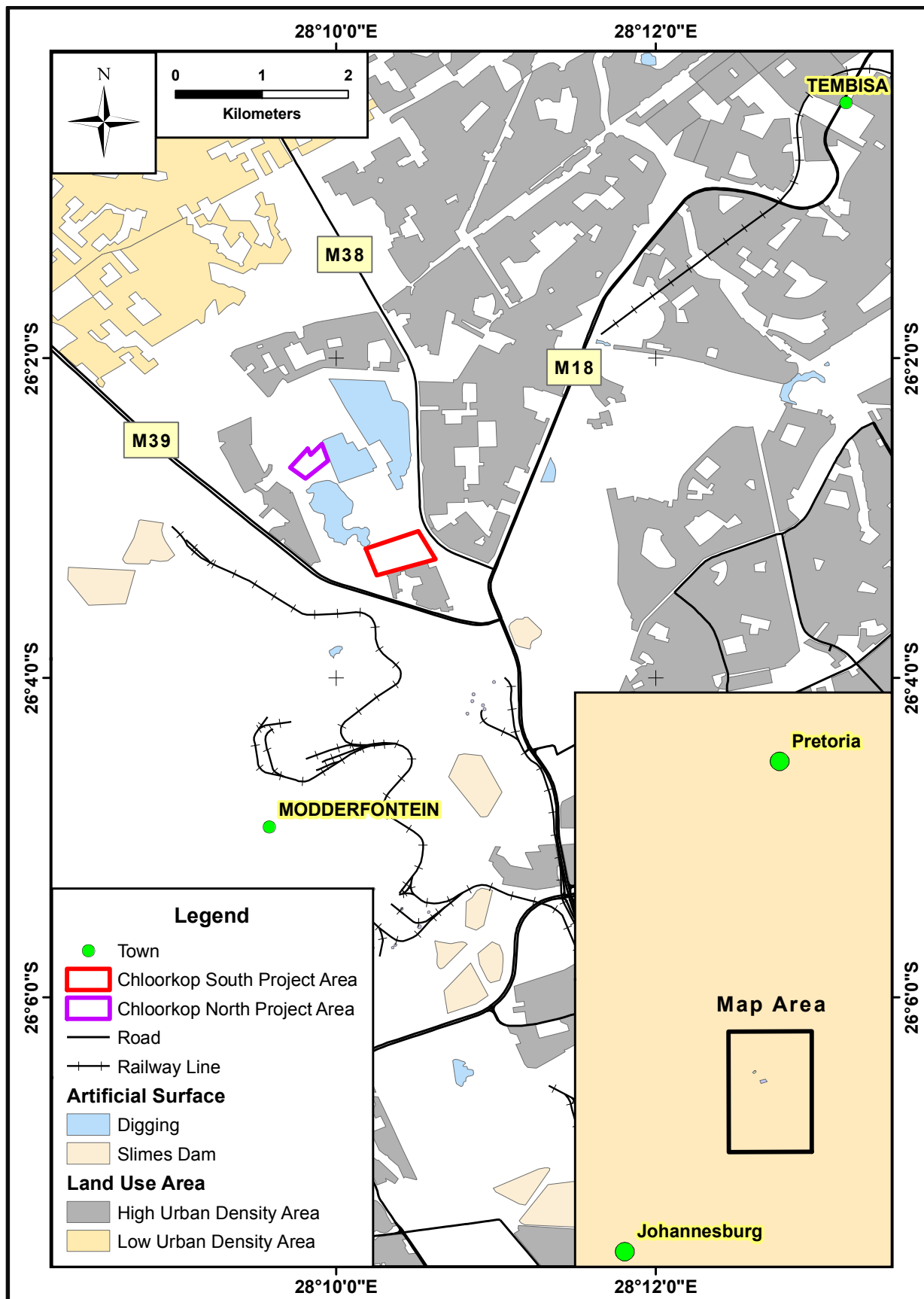


Figure 1: Location map showing the position of the industrial parks known as Chloorkop North and Chloorkop South.

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4 LEGISLATIVE REQUIREMENTS

South Africa's cultural resources are primarily dealt with in two Acts. These are the National Heritage Resources Act (Act 25 of 1999) and the National Environmental Management Act (Act 107 of 1998).

4.1 The National Heritage Resources Act

The following are protected as cultural heritage resources by the National Heritage Resources Act:

- Archaeological artefacts, structures and sites older than 100 years,
- Ethnographic art objects (e.g. prehistoric rock art) and ethnography,
- Objects of decorative and visual arts,
- Military objects, structures and sites older than 75 years,
- Historical objects, structures and sites older than 60 years,
- Proclaimed heritage sites,
- Grave yards and graves older than 60 years,
- Meteorites and fossils,
- Objects, structures and sites of scientific or technological value.

The Act also states that those heritage resources of South Africa which are of cultural significance or other special value for the present community and for future generations must be considered part of the national estate and fall within the sphere of operations of heritage resources authorities. The national estate includes the following:

- Places, buildings, structures and equipment of cultural significance,
- Places to which oral traditions are attached or which are associated with living heritage,
- Historical settlements and townscapes,
- Landscapes and features of cultural significance,
- Geological sites of scientific or cultural importance,
- Sites of Archaeological and palaeontological importance,
- Graves and burial grounds,
- Sites of significance relating to the history of slavery,
- Movable objects (e.g. archaeological, palaeontological, meteorites, geological specimens, military, ethnographic, books etc.).

4.2 Need for Impact Assessment Reports

Section 38 of the Act stipulates that any person who intends to undertake an activity that falls within the following:

- The construction of a linear development (road, wall, power line, canal etc.) exceeding 300 m in length,
- The construction of a bridge or similar structure exceeding 50 m in length,

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- Any development or other activity that will change the character of a site and exceed 5 000 m² or involve three or more existing erven or subdivisions thereof,
- Re-zoning of a site exceeding 10 000 m²,
- Any other category provided for in the regulations of SAHRA or a provincial heritage authority.

must at the very earliest stages of initiating such a development, notify the responsible heritage resources authority and furnish it with details regarding the location, nature and extent of the proposed development. If there is reason to believe that heritage resources will be affected by such development, the developer may be notified to submit an impact assessment report. A Palaeontological Impact Assessment (PIA) only looks at the potential impact of the development palaeontological resources of the proposed area to be affected.

4.3 Legislation Specifically Pertinent to Palaeontology*

*Note: Section 2 of the Act defines “palaeontological” material as “any fossilised remains or fossil trace of animals or plants which lived in the geological past, other than fossil fuels or fossiliferous rock intended for industrial use, and any site which contains such fossilised remains”.

Section 35(4) of this Act specifically deals with archaeology, palaeontology and meteorites. The Act states that no person may, without a permit issued by the responsible heritage resources authority (national or provincial):

- Destroy, damage, excavate, alter, deface or otherwise disturb any archaeological or palaeontological site or any meteorite,
- Destroy, damage, excavate, remove from its original position, collect or own any archaeological or palaeontological material or object or any meteorite,
- Trade in, sell for private gain, export or attempt to export from the Republic any category of archaeological or palaeontological material or object, or any meteorite; or
- Bring onto or use at an archaeological or palaeontological site any excavation equipment or any equipment that assists in the detection or recovery of metals or archaeological and palaeontological material or objects, or use such equipment for the recovery of meteorites,
- Alter or demolish any structure or part of a structure which is older than 60 years as protected.

The above mentioned palaeontological objects may only be disturbed or moved by a palaeontologist, after receiving a permit from the South African Heritage Resources

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Agency (SAHRA). In order to demolish such a site or structure, a destruction permit from SAHRA will also be needed.

Further to the above point, Section 35(3) of this Act indicates that “any person who discovers archaeological or palaeontological objects or material or a meteorite in the course of development or agricultural activity must immediately report the find to the responsible heritage resources authority, or to the nearest local authority offices or museum, which must immediately notify such heritage resources authority”. Thus, regardless of the granting of any official clearance to proceed with any development based on an earlier assessment of its impact on the Palaeontological Heritage of an area, the development should be halted and the relevant authorities informed should fossil objects be uncovered during the progress of the development.

4.4 The National Environmental Management Act [as amended]

This Act does not provide the detailed protections and administrative procedures for the protection and management of the nation’s Palaeontological Heritage as are detailed in the National Heritage Resources Act, but is more general in its application. In particular Section 2(2) of the Act states that environmental management must place people and their needs at the forefront of its concerns and, amongst other issues, serve their cultural interests equitably. Further to this point section 2(4)(a)(iii) states that disturbances of sites that constitute the nation’s cultural heritage should be avoided, and where it cannot be avoided should be minimised and remedied.

Section 23(1) indicates that a general objective of integrated environmental management is to identify, predict and evaluate the actual and potential impact of activities upon the cultural heritage. This section also highlights the need to identify options for mitigating of negative effects of activities with a view to minimising negative impacts.

In order to give effect to the general objectives of integrated environmental management outlined in the Act the potential impact on cultural heritage of activities that require authorisation or permission by law must be investigated and assessed prior to their implementation and reported to the relevant organ of state. Thus, a survey and evaluation of cultural resources must be done in areas where development projects that will potentially negatively affect the cultural heritage will be performed. During this process the impact on the cultural heritage will be determined and proposals for the mitigation of the negative effects made.

5 RELEVANT EXPERIENCE

Prof Millstead holds a PhD in palaeontology and has previously been employed as a professional palaeontologist with the Council for Geoscience in South Africa. He is currently the principle of BM Geological Services and has sufficient knowledge of

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palaeontology and the relevant legislation required to produce this Palaeontological Impact Assessment Report. Dr Millstead is registered with the South African Council for Natural Scientific Professions (SACNASP), and is a member of the Palaeontological Society of South African and the Geological Society of South Africa.

6 INDEPENDENCE

Prof Millstead was contracted as an independent consultant to conduct this Palaeontological Heritage Impact Assessment study and shall receive fair remuneration for these professional services. Neither Prof Millstead nor BM Geological Services has any financial interest in Lord Trust Developers (Pty) Ltd, Eco Assessments CC, Heritage Contract and Archaeological Consulting CC or either of the proposed industrial park projects.

7 GEOLOGY AND FOSSIL POTENTIAL

Figure 2 shows that the project area is completely underlain by rocks of the Swazian age halfway House granite. Inspection of the published geological map of the area (Geological Survey of South Africa, 1969) indicates that no significant accumulations of potentially fossiliferous younger strata have been identified within the boundaries of either of the two project areas. A summary of the characteristics of the Halfway House Granite and its fossiliferous potential follows.

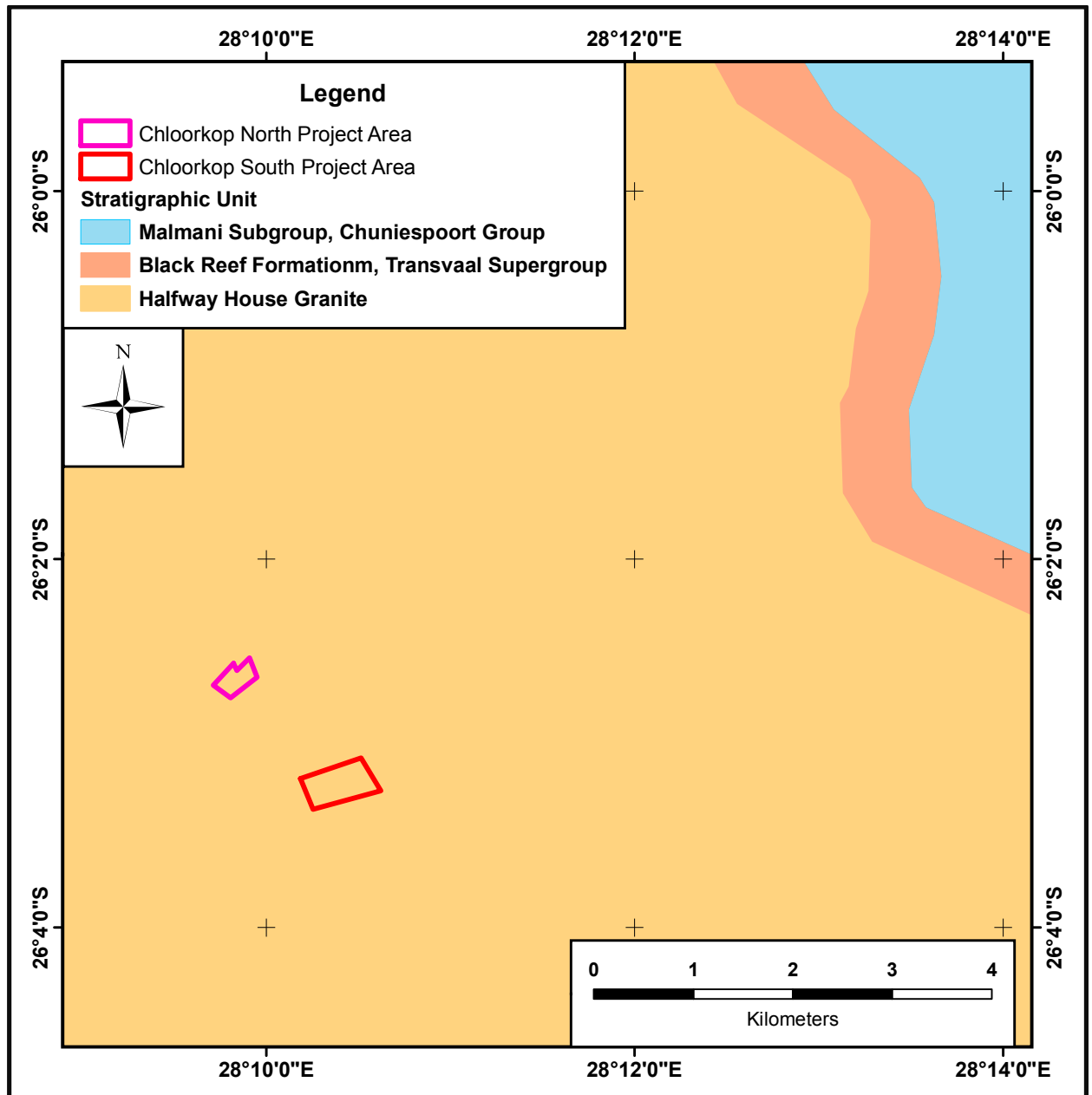
7.1 Halfway House Granite

7.1.1 Geology

The entire area underlying both the Chloorkop North and Chloorkop South project areas is underlain by Swazian-age (Achaean), coarse-grained, plutonic, igneous rocks of the Halfway House Granite (Figure 2).

7.1.2 Palaeontological potential

The Halfway House Granite is a coarse-grained plutonic igneous rock type. It has accordingly, formed by crystallisation directly from a liquid magma at significant depth within the Earth's crust. The potential for any fossil materials occurring within this rock unit is **nil**.



7.2

Figure 2: Generalised geological map of the areas underlying the Chlookop North and South project areas and their immediate environs.

8 ENVIRONMENT OF THE PROPOSED PROJECT SITE

The area underlain by each of the project areas is 7.5 ha for the Chlookop North project and 22 ha for Chlookop South. Examination of Google earth imagery (Figure 3 and 4) indicates that the Chlookop North site is situated immediately adjacent to heavily urbanised and industrialised areas to its immediate north and west. The areas immediately adjacent to the southern and eastern boundaries appear to have been extensively cleared and are no longer in their natural state (Figure 3). Within the

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Figure 3: Google earth image showing the location of the Chloorkop North project area (blue polygon).



Figure 4: Google earth image showing the location of the Chloorkop South project area (blue polygon).

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boundaries of the Chloorkop North project area it is apparent that significant disturbance of the land surface has occurred within the past, and a large percentage of the land surface is no longer in a pristine condition. Historically the site was used for subsistence rural residential land uses. More recently the site lies vacant and dumping occurs. It is evident from Figure 4 that a large percentage of the land area of the Chloorkop South site has also been historically disturbed (particularly in the northern and western sections) and a series of buildings have been erected in the south-eastern corner of the site. Historically the site was utilised for subsistence agriculture and rural residential purposes. The western and eastern boundaries of the Chloorkop South site are formed by roads (the eastern boundary being Marsala Road). The land immediately adjacent to the southern boundary of the Chloorkop South site is heavily urbanised, and that lying to the west and north has been extensively cleared for development.

The Chloorkop South site is located upon the crest of a low, rounded NW-SE oriented ridge; Chloorkop North is situated upon the NW flanks of the same ridge (Figure 5). No significant drainage lines or river systems transect either of the project areas, although surface water flow from either project area would join with a number of nearby ephemeral drainage lines (Figure 5).

Mucina and Rutherford (2006) indicate that the vegetation cover of the general area encompassing both project areas consists of two veld types, these being Egoli Granite Grassland and Charltonville Dolomite Grassland (Figure 6). The conservation status of the Egoli Granite Grassland is described by Mucina and Rutherford as endangered while that of the Charltonville Dolomite Grassland is listed as vulnerable. The Chloorkop North project area is completely underlain by vegetation of the Egoli Granite Grassland veld type. The Chloorkop South Project area is underlain by the Egoli Granite Grassland veld type along its western margin, and the remainder of the area is vegetated with the Charltonville Dolomite Grassland veld type (Figure 6).

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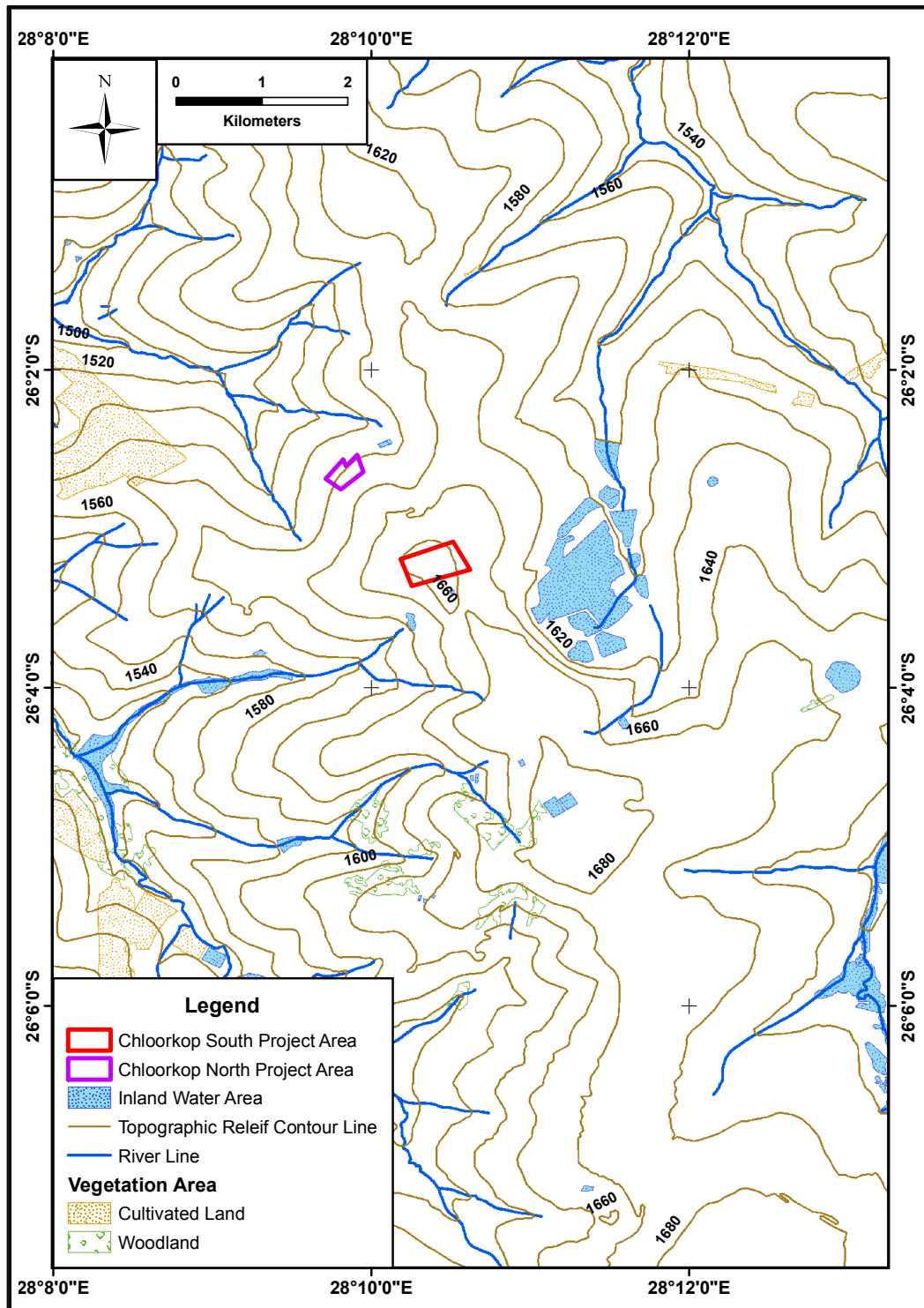


Figure 5: Map of the two project areas and their immediate environs. The topographic contour interval is 20 m and, as such, it is clear that the region is generally gently undulating. Chlookop South is located on the crest of a rounded, NW-SE oriented ridge and Chlookop North is located upon the NW flanks of the same ridge. It is also evident that no surface drainage systems transect either project area.

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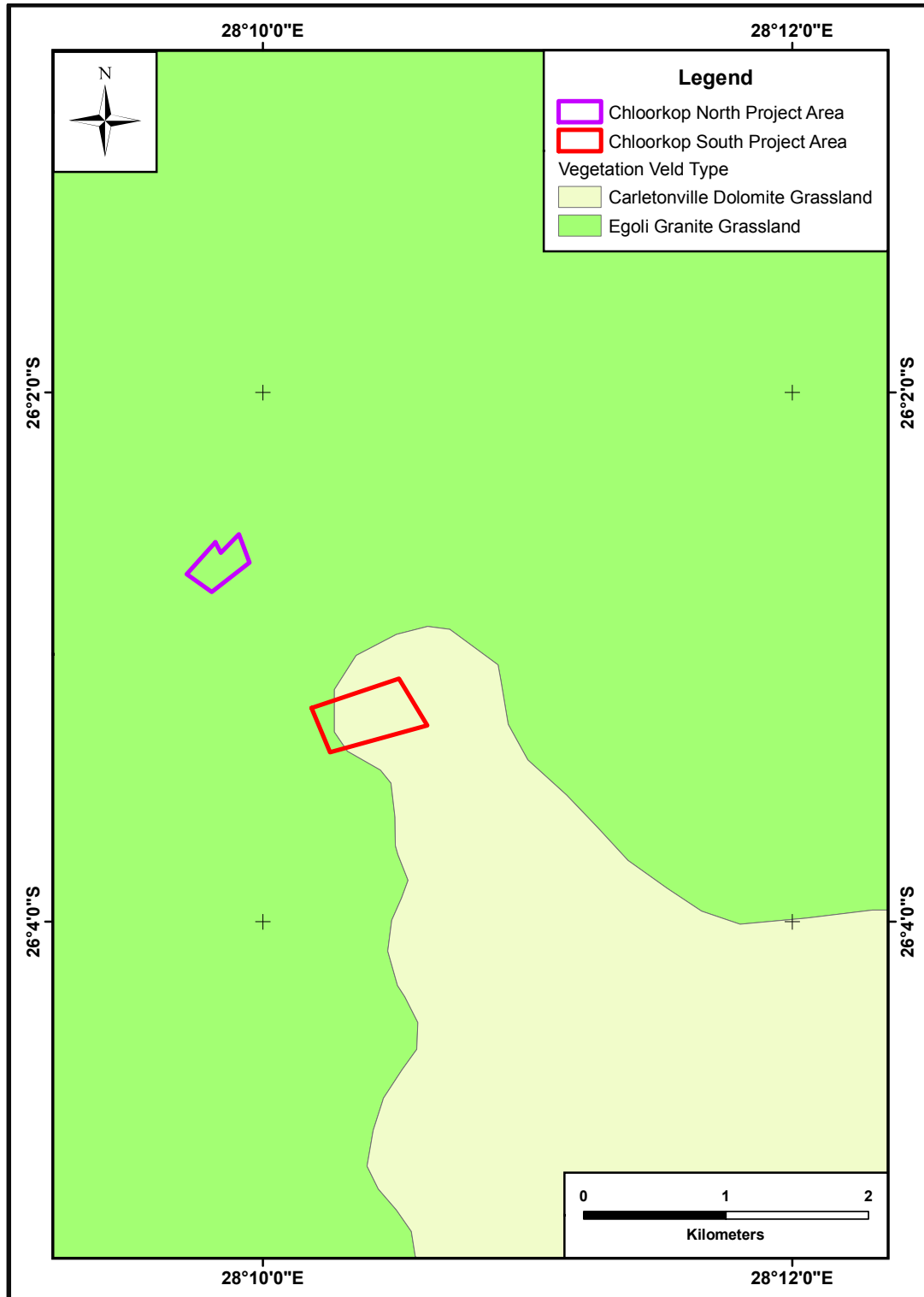


Figure 6: Map of the distribution of the vegetation veld types located within the two project areas and their immediate environs (after Mucina and Rutherford, 2006).

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9 OVERVIEW OF SCOPE OF THE PROJECT

The proposed projects will consist of two industrial park developments termed, herein, as the Chloorkop North and Chloorkop South projects.

A general overview of the infrastructure required for each facility is as follows:

9.1 Overview of the projects

9.1.1 Chloorkop North

The proposed development is envisaged to comprise an Industrial Park that will offer manufacturing, storage and warehousing land uses. No Noxious Activities are proposed within the park.

9.1.2 Chloorkop South

The proposed development is envisaged to comprise an Industrial Park that will offer manufacturing, storage and warehousing land uses. No Noxious Activities are proposed within the park.

9.2 Effect of project on the geology

It is evident from Sections 9.1.1 and 9.1.2 above that the development anticipated within each of the two project areas could be expected to be restricted to the erection of buildings (and their foundations) as well as access roads and parking areas. The effects of these constructions upon the geology of either area would, accordingly, be expected to be restricted to the upper 1-2 m of the land surface.

10 IMPACT ASSESSMENT

The potential impact of the proposed mining area is categorised below according to the following criteria:-

10.1 Nature of Impact

The potential negative impacts of the proposed project on the palaeontological heritage of the area are:

- Damage or destruction of fossil materials during the construction of project infrastructural elements to a maximum depth of those excavations. Many fossil taxa (particularly vertebrate taxa) are known from only a single fossil and, thus, any fossil material is potentially highly significant. Accordingly, the loss or damage to any

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single fossil can be potentially significant to the understanding of the fossil heritage of South Africa and to the understanding of the evolution of life on Earth in general. Where fossil material is present and will be directly affected by the building or construction of the projects infrastructural elements the result will potentially be the irreversible damage or destruction of the fossil(s).

- Movement of fossil materials during the construction phase, such that they are no longer *in situ* when discovered. The fact that the fossils are not *in situ* would either significantly reduce or completely destroy their scientific significance.
- The loss of access for scientific study to any fossil materials present beneath infrastructural elements for the life span of the existence of those constructions and facilities.

10.2 Extent of impact

The possible extent of the permanent impact of the proposed project on the palaeontological heritage of South Africa is restricted to the damage, destruction or accidental relocation of fossil material caused by the excavations and construction of the necessary infrastructure elements forming part of the project. The possible source of a less permanent negative impact on the palaeontological heritage is the loss of access for scientific research to any fossil materials that become covered by the various infrastructural elements that comprise the project. The **extent of the area of potential impact is, accordingly, categorised as local** (i.e., restricted to the project site).

10.3 Duration of impact

The anticipated duration of the identified potential impact is assessed as potentially **permanent to long term**. This assessment is based on the fact that, in the absence of mitigation procedures (should fossil material be present within the area to be affected) the damage or destruction of any palaeontological materials will be permanent. Similarly, any fossil materials that exist below the structures and infrastructural elements that will constitute the two industrial parks will be unavailable for scientific study for the life of the existence of those features.

10.4 Probability of impact

The Halfway House Granite completely underlies both the Chloorkop North and Chloorkop South project areas. The geological unit is composed of a plutonic igneous rock type which is unfossiliferous. The probability either project resulting in a negative impact upon the palaeontological heritage the Gauteng is assessed as being **nil**

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10.5 Significance of the impact

The rocks of the Halfway House Granite are unfossiliferous, thus, the significance of any affect of the mining operations on the palaeontological heritage of this unit is **nil**.

10.6 Severity / Benefit scale

The proposed project is categorised, herein, as being potentially **beneficial**. This classification is based on the intention that the project will provide infrastructure useful to the economic life of this part of Gauteng.

The probability of a negative impact on the palaeontological heritage of the project areas has been categorised as nil. As such there are no negative effects on the palaeontological heritage of either project area that must be weighed against the potential benefits of either project.

10.7 Status

Given the combination of factors discussed above, it is anticipated that the construction phase of each project will result in no negative effect on the palaeontological heritage of the area. As the proposed project would provide infrastructure useful to the commerce of Gauteng the project is determined as having a **positive status** herein.

11 DAMAGE MITIGATION, REVERSAL AND POTENTIAL IRREVERSABLE LOSS

The degree to which the possible negative effects of the proposed project can be mitigated, reversed or will result in irreversible loss of the palaeontological heritage can be determined as discussed below.

11.1 Mitigation

Due to the unfossiliferous nature of the rocks underlying both the Chloorkop North and Chloorkop South project areas it is not anticipated that any fossil materials will be negatively impacted upon. Accordingly, no damage mitigation procedures are required to be outlined for either of the two projects.

11.2 Reversal of damage

Any damage to, or the destruction of, palaeontological materials or reduction of scientific value due to a loss of the original location is **irreversible**.

11.3 Degree of irreversible loss

Once a fossil is damaged, destroyed or moved from its original position without its geographical position and stratigraphic location being recorded the **damage is irreversible**.

Fossils are usually scarce and sporadic in their occurrence and the chances of negatively impacting on a fossil in any particular area are low. However, any fossil material that may be contained within the strata underlying the project area is potentially of the greatest scientific and cultural importance. Thus, the potential always exists during construction and excavation within potentially fossiliferous rocks for the permanent and irreversible loss of extremely significant or irreplaceable fossil material. This said, many fossils are incomplete in their state of preservation or are examples of relatively common taxa. As such, just because a fossil is present it is not necessarily of great scientific value. Accordingly, not all fossils are necessary significant culturally or scientifically significant and the potential degree of irreversible loss will vary from case to case. The judgement on the significance of the fossil must be made by an experienced palaeontologist.

12 ASSUMPTIONS, UNCERTAINTIES AND GAPS IN KNOWLEDGE

The information provided within this report was derived from a desktop study of available maps and scientific literature; no direct observation was made of the area as result of a site visit.

13 ENVIRONMENTAL IMPACT STATEMENT

A desktop study has been conducted on the sites of two proposed industrial park developments (named Chloorkop North and Chloorkop South). This desktop study forms part of a Heritage Impact Assessment Report that is a component of a larger Scoping and Environmental Impact Assessment to identify and assess all potential environmental impacts associated with the proposed projects for the areas as identified, and propose appropriate mitigation measures in an Environmental Management Programme.

The proposed project areas are moderately large (approximately 7.5 ha for Chloorkop North and 22 ha for Chloorkop South). However, any negative impacts to the palaeontological heritage of the region will be limited to the footprint area of either development area. The extent of any impacts is accordingly characterised as local.

In terms of the effects of the construction operations disruption to geological strata will be restricted to the Achaean Halfway House Granite; this geological unit is unfossiliferous. Accordingly, no negative effect upon the palaeontological heritage of either the Chloorkop North or Chloorkop South project areas is anticipated.

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The social benefits of the project have been classified as beneficial, herein, as the project aims to provide useful infrastructure for the economic activity of Gauteng. This positive assessment does not need to be balanced against any possible negative impacts upon the palaeontological heritage of either project area. As such **this desktop study has not identified any palaeontological reason to prejudice the progression of either the Chloorkop North or the Chloorkop South projects.**

14 REFERENCES

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Prof B.D. Millstead

10th June 2014