APPENDIX E

SPECIALIST STUDIES

APPENDIX E1 – AGRICULTURAL IMPACT ASSESSMENT

APPENDIX E2 – RIPARIAN HABITAT AND WETLAND DELINEATION IMPACT ASSESSMENT

APPENDIX E3 – HERITAGE IMPACT ASSESSMENT

APPENDIX E4 – SOCIO-ECONOMIC IMPACT ASSESSMENT

APPENDIX E5 – TERRESTRIAL ECOLOGICAL IMPACT ASSESSMENT

APPENDIX E1

AGRICULTURAL IMPACT ASSESSMENT

REPORT

SOIL, LAND USE AND AGRICULTURAL POTENTIAL SURVEY:

PROPOSED LIMPOPO CENTRAL HOSPITAL, LIMPOPO PROVINCE

13 October 2016
(Updated: 28 October 2019)

Compiled by:
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Registration number: 400106/08

Declaration

I, Johan Hilgard van der Waals, declare that –

- I act as the independent specialist in this application
- I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant
- I declare that there are no circumstances that may compromise my objectivity in performing such work;
- I have expertise in conducting the specialist report relevant to this application, including knowledge of the Act, regulations and any guidelines that have relevance to the proposed activity;
- I will comply with the Act, regulations and all other applicable legislation;
- I have no, and will not engage in, conflicting interests in the undertaking of the activity;
- I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing - any decision to be taken with respect to the application by the competent authority; and - the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority;
- all the particulars furnished by me in this form are true and correct; and
- I realise that a false declaration is an offence in terms of Regulation 71 and is punishable in terms of Section 24F of the Act.

J.H. VAN DER WAALS
TERRA SOIL SCIENCE

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SOIL, LAND USE AND AGRICULTURAL POTENTIAL SURVEY: PROPOSED LIMPOPO CENTRAL HOSPITAL, LIMPOPO PROVINCE

1. INTRODUCTION

1.1 TERMS OF REFERENCE

Terra Soil Science was appointed by **Nemai Consulting** to conduct a desk-top agricultural potential impact assessment for the proposed Limpopo Central Hospital in the Limpopo Province.

1.2 PROJECT DETAILS

Project Name
Proposed Limpopo Central Hospital

Proposed Site
The proposed Limpopo Central Hospital is currently situated between Edupark, the Northern Academy Secondary School and the N1 road. The proposed site is approximately 21 ha in extent and is situated on the remainder of Erf 6861 of Pietersburg Extension 30. See latest attached shapefile of the site boundary, and ensure all maps show latest site.

Project Alternatives
There are no alternatives to assess.

Project Scope
The building of a new 488 bed central hospital, Limpopo Central Hospital, on a new site in Polokwane that will provide the tertiary care for the province and which will be the major teaching hospital for the University of Limpopo Faculty of Health Sciences and School of Medicine.
There will be provision of the following at the new facility:

- 488 beds clinical care capacity for a wide range of highly specialised care;
- Mostly arranged in 28 bed wards (comprising some single-bed, double-bed, four bed and six bed units);
- Specific intensive care units (ICU) and high care (HC) layouts;
- Maternal and child health (MCH) (Paediatrics and Obstetrics & Gynaecology) will be consolidated on the site separate to the adult component but sharing clinical and hospital support services;
- A mother's lodge (capacity of 24);
- A pregnant mothers lodge (capacity of 18);
- Transit – waiting (capacity of 12); and
- A day procedure beds (capacity of 12)

There will be support for a complete tertiary clinical care and academic complex core teaching capacity, compromising of a 488 x L3 beds at Limpopo Central Hospital delivering Provincial Tertiary Services (T1) and Central Referral Services (T2) care in most major clinical disciplines.

1.3 AGRICULTURAL POTENTIAL BACKGROUND

The assessment of agricultural potential rests primarily on the identification of soils that are suited to crop production. In order to qualify as high potential soils they must have the following properties:

- Deep profile (more than 600 mm) for adequate root development,
- Deep profile and adequate clay content for the storing of sufficient water so that plants can weather short dry spells,
- Adequate structure (loose enough and not dense) that allows for good root development,
- Sufficient clay or organic matter to ensure retention and supply of plant nutrients,
- Limited quantities of rock in the matrix that would otherwise limit tilling options and water holding capacity,
- Adequate distribution of soils and size of high potential soil area to constitute a viable economic management unit, and
- Good enough internal and external (out of profile) drainage if irrigation practices are considered. Drainage is imperative for the removal (leaching) of salts that accumulate in profiles during irrigation and fertilization.

In addition to soil characteristics, climatic characteristics need to be assessed to determine the agricultural potential of a site. The rainfall characteristics are of primary importance and in order to provide an adequate baseline for the viable production of crops rainfall quantities and distribution need to be sufficient and optimal.

In the case where crop production is not possible due to soil or climatic constraints aspects such as grazing potential and carrying capacity is considered. Grazing capacity is mainly determined by vegetation characteristics of a site and would therefore have to be deduced from vegetation reports (that do address carrying capacity) or from dedicated discussions with farmers and land users. The combination of the above-mentioned factors will be used to assess the agricultural potential of the soils on the site.

Several soil quality, landscape and surrounding land use parameters influence agricultural potential. These parameters include pollution of soils and water, human activities influencing the economic viability of farming enterprises, storm water management and water availability (for irrigation purposes or inherent soil properties that provide perched water sources). Where applicable these parameters will be addressed in this report.

1.4 REPORT METHODOLOGY

This report was generated following a dedicated satellite image, topographical and land type data interpretation exercise. Due to extensive experience in the field as well as in the general area the pronouncements in this report are considered to be accurate and representative of the specific site.

The report addresses the following aspects:

1. Land use and land cover (satellite image interpretation)
2. General soil associations (topographical parameters and land type data)
3. Agricultural potential (experience and interpretation of above information)
4. Risks flagged with agricultural activities on the site (experience on similar projects)

2. BRIEF DESCRIPTION OF THE SURVEY AREA

2.1 SURVEY AREA BOUNDARY

The survey site lies between 23° 55' 03" and 23° 55' 36" S and 29° 28' 20" and 29° 29' 10" E south of Polokwane in the Limpopo Province (**Figure 1**). The site is surrounded by urban infrastructure developments on all sides and is currently not characterised by agricultural activities.

2.2 SURVEY AREA PHYSICAL FEATURES

The investigation site lies on a spur, with a westerly aspect, in undulating terrain with two westerly draining depressions to the north and the south. The geology of the general area is dominated by biotite granite, migmatite, pegmatite, lava and pyroclasts (Land Type Survey Staff, 1972 – 2006) with a consequent dominance of well-drained soils of variable depth and rockiness. The site falls into the "SVcb23 Polokwane Plateau Bushveld" vegetation unit (short open tree layer with well developed grass layer) as described by Mucina and Rutherford (2006). Mucina and Rutherford (2006) indicate the mean annual precipitation of Polokwane to be 500 mm and the generalised rainfall map of South Africa is provided in **Figure 2**.

3. METHOD OF AGRICULTURAL POTENTIAL SURVEY

The survey was conducted in three phases.

3.1 PHASE 1: LAND TYPE DATA

Land type data for the site was obtained from the Institute for Soil Climate and Water (ISCW) of the Agricultural Research Council (ARC) (Land Type Survey Staff, 1972 – 2006). The land type data is presented at a scale of 1:250 000 and entails the division of land into land types, typical terrain cross sections for the land type and the presentation of dominant soil types for each of the identified terrain units (in the cross section). The soil data is classified according to the Binomial System (MacVicar et al., 1977). The soil data was interpreted and re-classified according to the Taxonomic System (The Soil Classification Working Group, 1991).

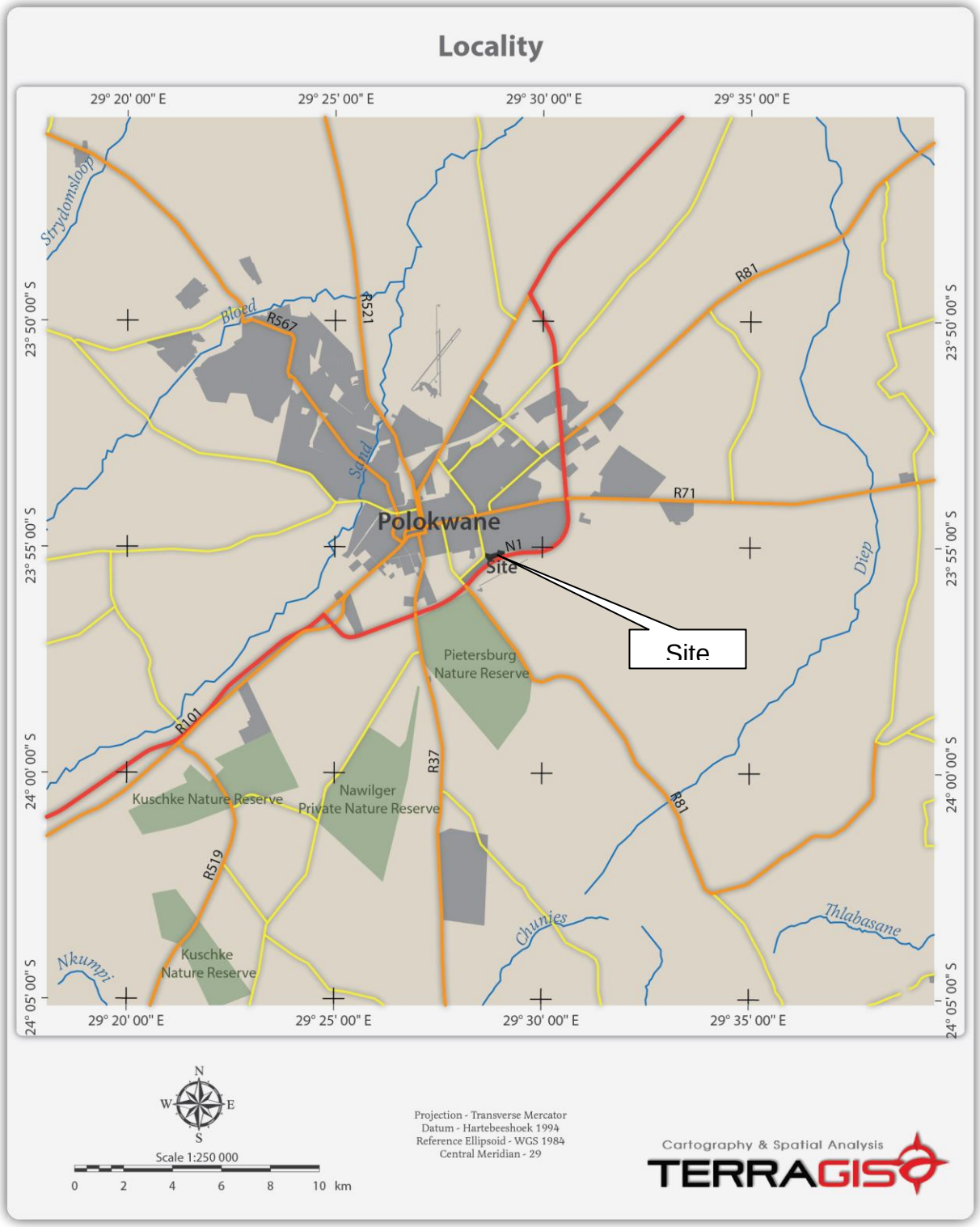

Figure 1 Location of the survey site

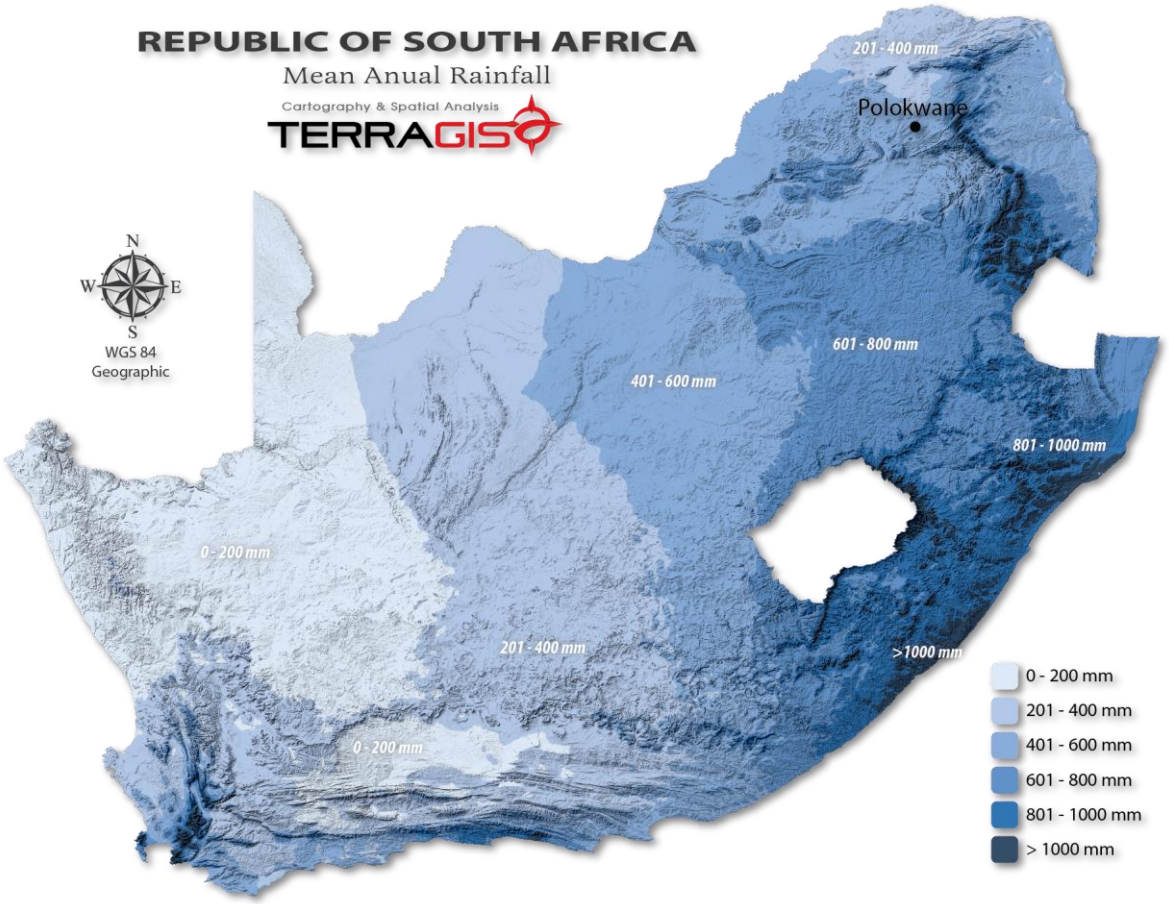

Figure 2 Rainfall map of South Africa indicating the survey site

3.2 PHASE 2: TOPOGRAPHIC PARAMETERS

The topography of the sites was elucidated through the generation of a digital elevation model (DEM) map and a topographic wetness index (TWI) for each site. Data generated during this phase was verified during the field survey phase and used to generate additional soil information for the sites.

3.3 PHASE 3: SATELLITE IMAGE INTERPRETATION

A dedicated satellite image (Google Earth) interpretation exercise was conducted to determine the current site conditions as well as the historical land uses. This was done through the accessing of Google Earth images from different periods in the past.

4. AGRICULTURAL POTENTIAL SURVEY RESULTS

4.1 PHASE 1: LAND TYPE DATA

Figure 3 presents the land type distribution for the sites and surrounding area. The land type found on the sites is **Ae225** (Land Type Survey Staff, 1972 – 2006). Below follows a brief description of the land type in terms of soils, land capability, land use and agricultural potential.

Land Type Ae225

Land Type – General: Ae land types denote landscapes where the dominant soils are well-drained and red, without water tables, and where the soils are of high base status (also lime containing in drier landscapes).

Soils: The land type is dominated by variable depth structureless red soils in the crest, midslope and footslope areas with the occasional occurrence of shallow rocky soils in higher lying positions. Structured soils occur in footslope and valley bottom positions and some of these soils may contain free lime. Drainage features and streambeds are characterised by soils with signs of incipient soil formation as well as recent erosion and depositions cycles.

Land capability and land use: The pre-development land use in the general land type area is characterised predominantly by extensive grazing and sporadic dry-land crop production due to limitations imposed by the climate. Irrigated crop production occurs in areas where water is available and where the topography allows for irrigation infrastructure development. A large part of the land type has been transformed extensively through urban developments. The land capability mimics the land use.

Agricultural potential: The agricultural potential is moderate due to the restrictions posed by the relatively low and erratic rainfall. In general 500 mm is considered the lower limit for dryland crop production in South Africa. In areas where irrigation water and infrastructure is available the potential is high due to the suitability of the soils in crest, midslope and footslope positions to irrigation land uses.

4.2 PHASE 2: TOPOGRAPHIC PARAMETERS

Contours of the site (5 meters – **Figure 4**) were used to generate a digital elevation model (**Figure 5**). This data was used to generate the topographic wetness index (TWI) for the site (**Figure 6**).

From extensive experience in the field of hydropedology it is evident that the TWI provides a very accurate indication of water flow paths and areas of water accumulation that are often correlated with wetlands. This is a function of the topography of the site and ties in with the dominant water flow regime in the soils and the landscape. Areas in blue indicate concentration of water in flow paths with lighter shades of blue indicating areas of regular water flows in the soils and on the surface of the wetland / terrestrial zone interface.

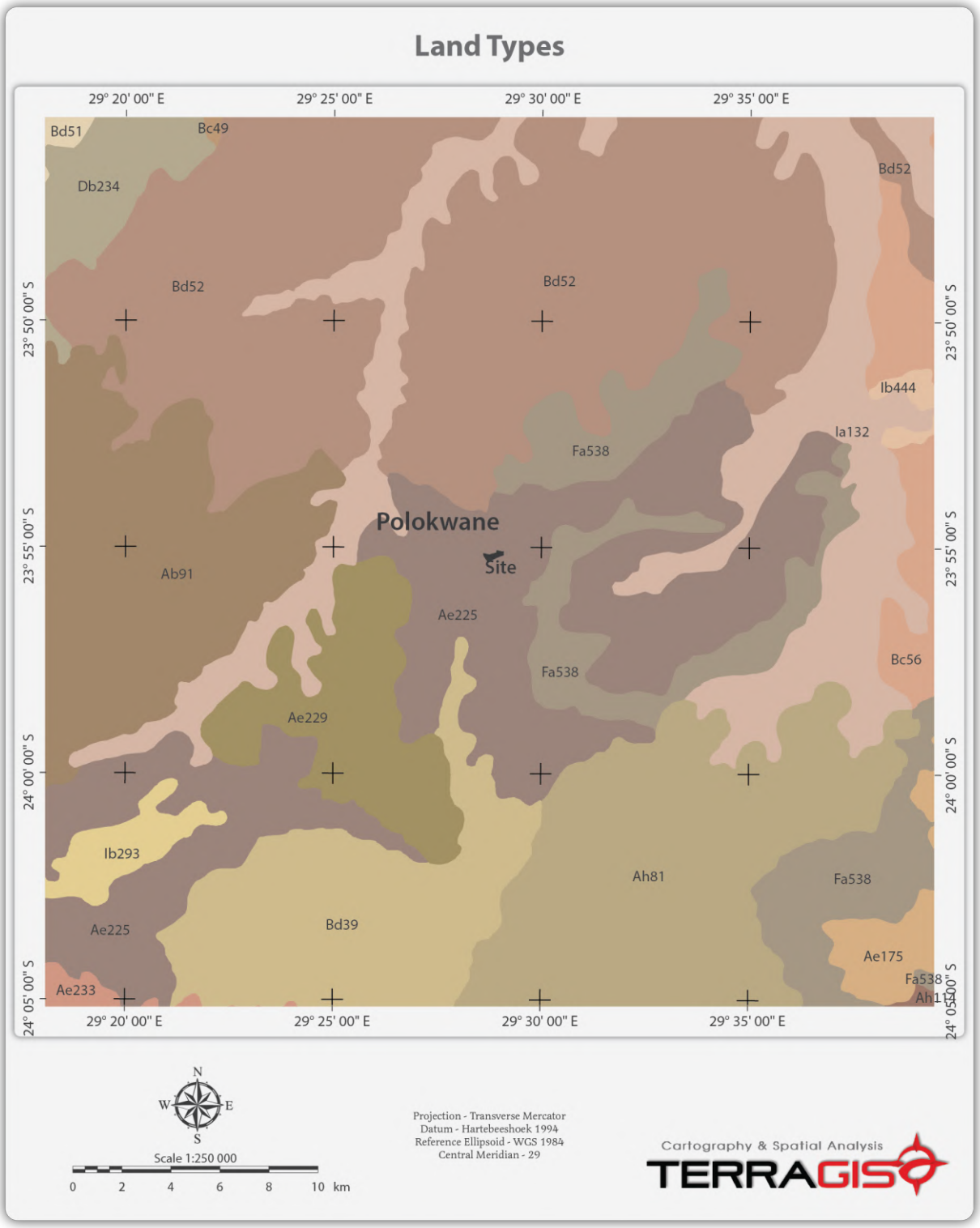

Figure 3 Land type map of the survey site and its surrounding area

Figure 4 Satellite image of the site with 5 meter contours

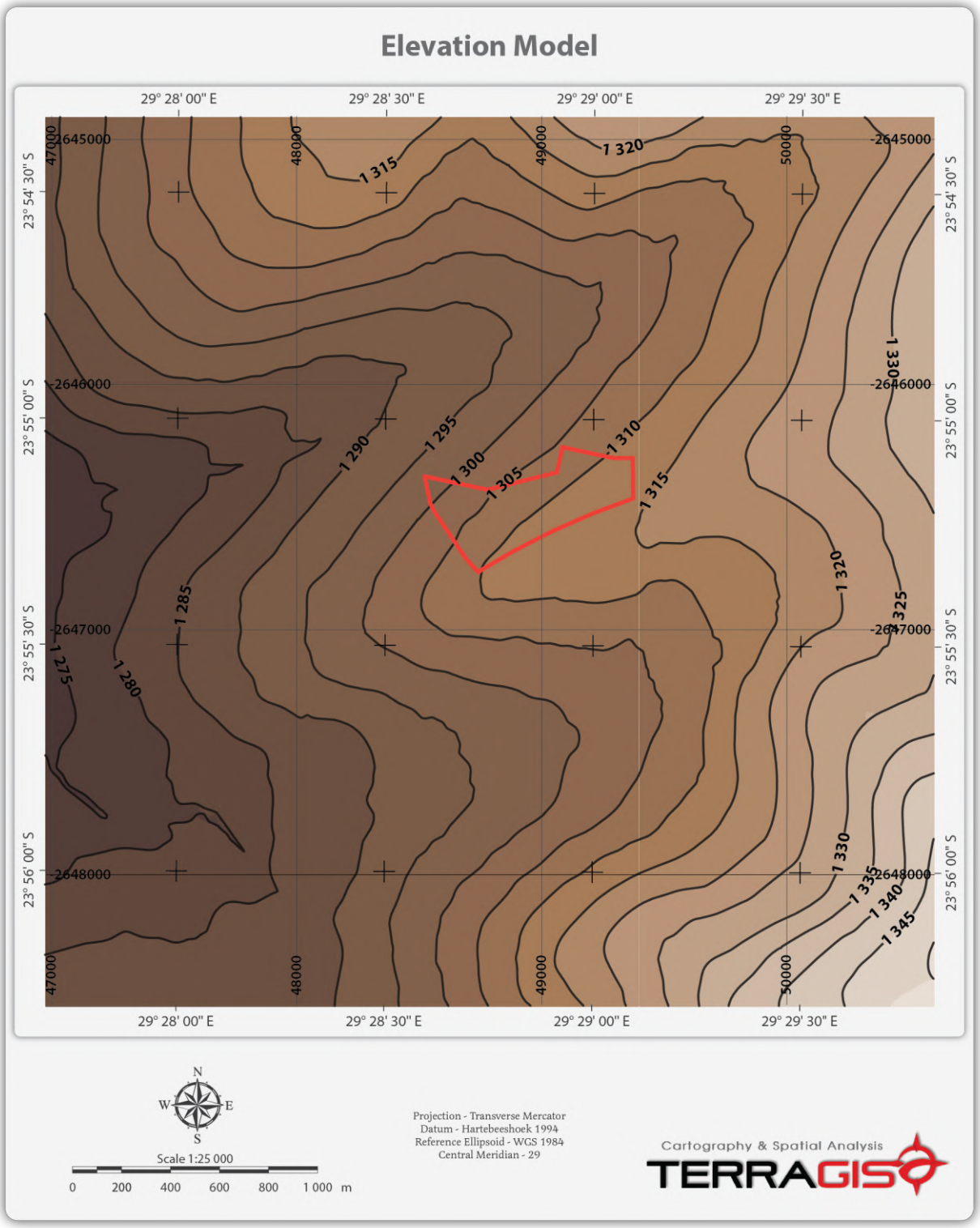

Figure 5 Digital elevation model for the site

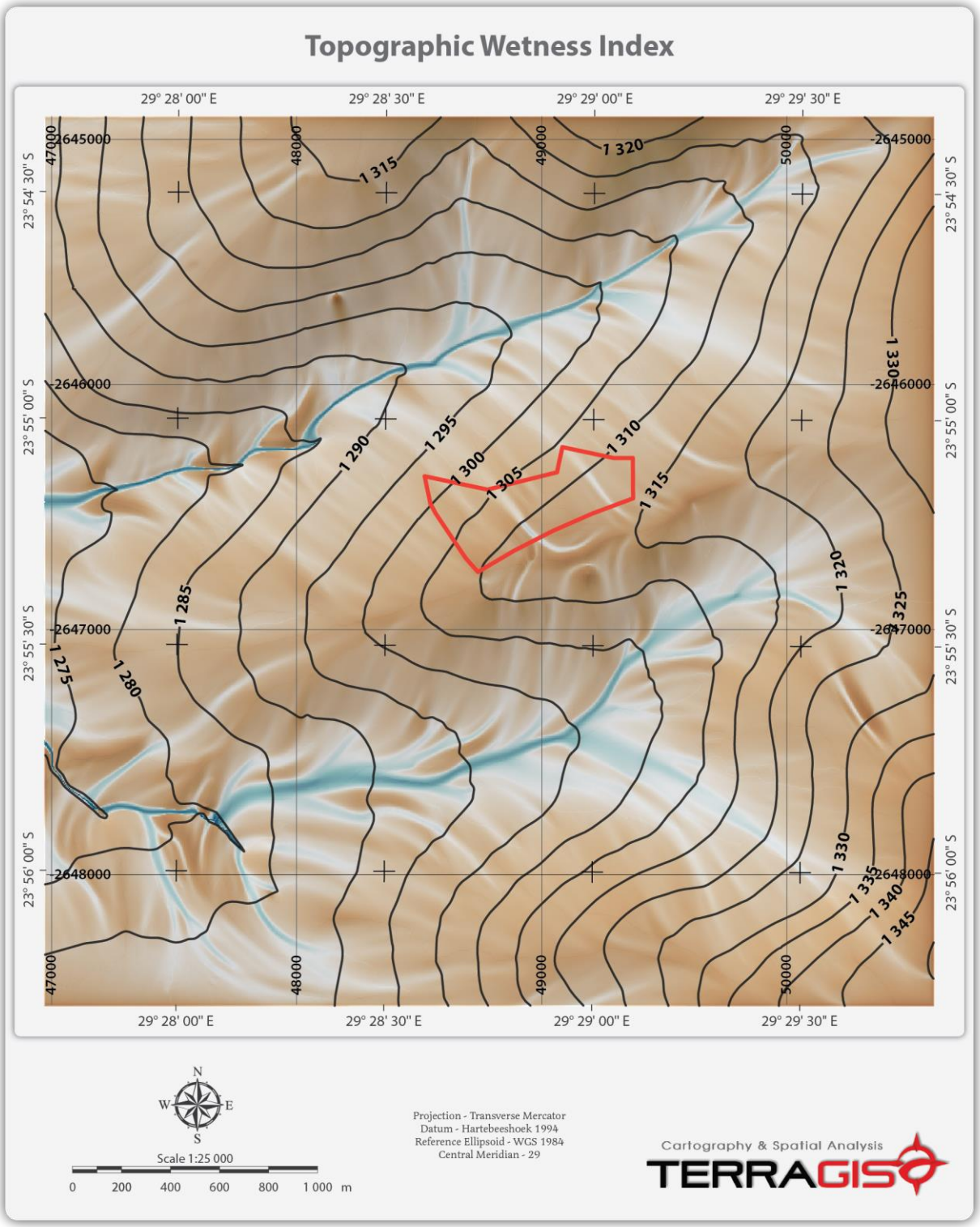

Figure 6 Topographic wetness index for Site 1

The TWI for Site 1 indicates the distinct drainage features running from east to west on the northern and southern sides of the site.

4.3 PHASE 3: SATELLITE IMAGE INTERPRETATION

The satellite image provided in **Figure 4** indicates that the investigation site is characterised by bushveld with a distinct grass layer and a shrub and tree layer. The Google Earth image from 2016 (**Figure 7**) indicates the vegetation structure as well as human influences in the form of rubble dumping in the eastern half of the site. These are signature urban site land use activities and are difficult to control unless the site is properly fenced off.

The soils on the site are in line with the description provided in section 4.1.

Figure 7 Google Earth image (2016/3/31) of the site indicating the vegetation structure and dumping of rubble in the eastern section (yellow arrows)

5. AGRICULTURAL POTENTIAL

5.1 AGRICULTURAL POTENTIAL OF THE SITE

The agricultural potential of the site is linked to the following parameters:

1. The relatively low rainfall of 500 mm per year;
2. The relatively small area of the site (38ha);
3. The urban developments surrounding the site; and
4. The well-drained nature of the soils.

The soils are suitable for dryland and irrigated crop production activities and are therefore considered to be of moderate to high agricultural potential. However, the urban nature of the surrounding developments as well as the fact that the site is enclosed by developments and national roads, and therefore limited to 38 ha in size, yields that it does not constitute a viable agricultural entity. This observation is underpinned by the fact that land users on the site would have to pay municipal rates and taxes.

5.2 SOIL POTENTIAL LINKED TO CURRENT LAND USE AND STATUS

The current land is open veld that could be used for extensive cattle grazing. This is not a safe land use in the light of the risks cattle movement pose to the vehicles travelling the N1 highway on the southern boundary. The soils on the site can be used for crop production purposes with this assumption being dependent on a physical soil survey. This use is not advised due to the limitations posed by dust generation to vehicles and planes, farming vehicle movement near the N1 and urban developments, and access restrictions to the site by agricultural land users.

5.3 COST-BENEFIT ANALYSIS

With urban and infrastructure developments the benefit and value of the developments will invariably exceed the agricultural value. As the land is not of exceptional agricultural potential the result of such an analysis will be skewed towards development. This is especially relevant within the urban fringe and the current surrounding and intensifying urban developments.

5.4 CURRENT ACTIVITIES / DEVELOPMENTS / BUILDINGS

The site itself is not characterised by any buildings or developments but, as has been shown in this report, the surrounding areas are characterised by distinct and intensive urban development and expansion.

5.5 SURROUNDING DEVELOPMENTS / LAND USES / ACTIVITIES WITHIN A 500 M RADIUS

Refer to point 5.4. It is not possible to expand the site to incorporate surrounding land as it is has been developed on all sides through urban and transport infrastructure.

5.6 CURRENT STATUS OF LAND

The current status of the land is open veld with no obvious land use. The land is characterised by urban developments on all sides and as such constitutes a hemmed-in piece of land without the possibility of expansion within the immediate vicinity.

5.7 POSSIBLE LAND USE OPTIONS FOR THE SITE

Within the context of the surrounding urban developments and the mounting urbanisation pressures experience in Polokwane the possibility of agricultural activities on the site appear to be very limited. In this regard, due to the isolated nature (from other agricultural land areas) of the site the most suitable land use is considered to be incorporation with the existing urban character of the surrounding areas.

6. AGRICULTURAL IMPACT ASSESSMENT

6.1 IMPACT ASSESSMENT METHODOLOGY

The impact assessment methodology was provided by Nemai Consulting and is as follows:

The impacts and the proposed management thereof are discussed on a qualitative level and thereafter quantitatively assessed by using the methodology provided below. Where applicable, the impact assessments and significance ratings provided by the respective specialists are included. The impact assessment methodology used by Nemai Consulting makes provision for the assessment of impacts against the following criteria:

- Nature (N);
- Significance (S);
- Extent (E);
- Duration (D);
- Probability (P); and
- Magnitude (M).

For the methodology of the impact assessment, the analysis is conducted on a quantitative basis with regard to the nature, extent, magnitude, duration, probability and significance of the impacts. The following definitions and scoring system apply:

1. Nature

   The project could have a positive, negative or neutral impact on the environment.

2. Significance Rating

   Provides an overall impression of an impact's importance, and the degree to which it can be mitigated. A more detailed description of the impact significance rating scale is given in **Table 1** below.

Nature		
Negative	Neutral	Positive
-1	0	+1

Magnitude		
Low	Medium	High
1	2	3

Significance			
No impact/None	No impact after mitigation / Low	Residual impact after mitigation / Medium	Impact cannot be mitigated / High
0	1	2	3

Extent			
Local	Regional	National	International
1	2	3	4

Duration			
Short Term (0-5yrs)	Medium Term (5-11yrs)	Long Term	Permanent
1	2	3	4

Probability				
Rare/Remote	Unlikely	Moderate	Likely	Almost Certain
1	2	3	4	5

Table 1: Description of the significance rating scale

RATING		DESCRIPTION
5	VERY HIGH	Of the highest order possible within the bounds of impacts which could occur. In the case of adverse impacts: there is no possible mitigation and/or remedial activity which could offset the impact. In the case of beneficial impacts, there is no real alternative to achieving this benefit.
4	HIGH	Impact is of substantial order within the bounds of impacts, which could occur. In the case of adverse impacts: mitigation and/or remedial activity is feasible but difficult, expensive, time-consuming or a combination of these. In the case of beneficial impacts, other means of achieving this benefit are feasible but they are more difficult, expensive, time-consuming or a combination of these.
3	MODERATE	Impact is real but not substantial in relation to other impacts, which might take effect within the bounds of those which could occur. In the case of adverse impacts: mitigation and/or remedial activity are both feasible and fairly easily do-able. In the case of beneficial impacts: other means of achieving this benefit are about equal in time, cost, effort, etc.
2	LOW	Impact is of a low order and therefore likely to have little real effect. In the case of adverse impacts: mitigation and/or remedial activity is either easily achieved or little will be required, or both. In the case of beneficial impacts, alternative means for achieving this benefit are likely to be easier, cheaper, more effective, less time consuming, or some combination of these.
1	VERY LOW	Impact is negligible within the bounds of impacts which could occur. In the case of adverse impacts, almost no mitigation and/or remedial activity is needed, and any minor steps which might be needed are easy, cheap, and simple. In the case of beneficial impacts, alternative means are almost all likely to be better, in one or a number of ways, than this means of achieving the benefit. Three additional categories must also be used where relevant. They are in addition to the category represented on the scale, and if used, will replace the scale.
0	NO IMPACT	There is no impact at all - not even a very low impact

3. Extent

The spatial scale refers to the extent of the impact i.e. will the impact be felt at the local, regional, or global scale:

Table 2: Description of the spatial scale

RATING		DESCRIPTION
4	International	Impact outside of South Africa.
3	National	Impact on an interprovincial scale.
2	Regional	Impact on the region but within the province.
1	Local	Extend to the site and its immediate surroundings.

4. Duration

In order to accurately describe the impact, it is necessary to understand the duration and persistence of an impact on the environment. The temporal scale will be rated according to criteria set out in **Table 3**.

Table 3: Description of the temporal rating scale

RATING		DESCRIPTION
1	Short-term	The environmental impact identified will operate for the duration of the construction phase or a period of less than 5 years, whichever is the greater.
2	Medium term	The environmental impact identified will operate for the duration of life of plant (5-11 years).
3	Long term	The environmental impact identified will operate beyond the life of operation.
4	Permanent	The environmental impact will be permanent.

5. Degree of Probability

Probability or likelihood of an impact occurring which is shown in **Table 4** below.

Table 4: Description of the degree of probability of an impact accruing

RATING	DESCRIPTION
1	Rare/Remote
2	Unlikely
3	Moderate
4	Likely
5	Alost Certain

6. Magnitude

Degree to which impact may cause irreplaceable loss of resources is discussed in **Table 5** below.

Table 5: Description of the degree of certainty rating scale

RATING		DESCRIPTION
1	Low	Natural and social functions and processes are not affected or minimally affected.
2	Medium	Affected environment is notably altered; natural and social functions and processes continue albeit in a modified way.
3	High	Natural or social functions or processes could be substantially affected or altered to the extent that they could temporarily or permanently cease.

7. Quantitative Description of Impacts

To allow for impacts to be described in a quantitative manner in addition to the qualitative description given above, information provided by specialists will be used to calculate an overall impact score by multiplying the product of the nature, magnitude and the significance of the impact by the sum of the extent, duration and probability based on the following equation:

Overall Score = (NxMxS)x(E+D+P)

For example, the worst possible impact score of -117 would be achieved based on the following ratings:

N = Nature = -1
M = Magnitude = 3
S = Significance = 3
E = Extent = 4
D = Duration = 4
P= Probability = 5

Worst impact score = (-1 x 3 x 3) x (4+4+5) = -117

On the other hand, if the nature of an impact is 0 (neutral or no change) or the significance is 0 (no impact), then the impact will be 0.

The Overall Impact Scores (OS) will therefore be ranked in the following way:

Table 6: Ranking of Overall Impact Scores

IMPACT RATING	LOW/ACCEPTABLE IMPACT	MEDIUM	HIGH	VERY HIGH
Score	0-30	-31-60	-61-90	-91-117

6.2 IMPACT ASSESSMENT

The impact assessment is conducted on the following parameters:

1. Soil resources: The soil resources of the development site are variable depth well-drained soils predominantly of the Hutton form. Although the soil forms will be altered in their entirety the soil material serves as construction material. The infrastructure developed on the soils is considered to have a permanent impact on the alteration of the soils of the site.
2. Agricultural potential: The agricultural potential of the site is considered to be moderate (but low if the small extent of the area is considered) and with significant limitations due to the surrounding urban developments. Due to the low baseline of the agricultural potential the impacts within the broader landscape and area are considered to be low but permanent.

Table 7: Impact Assessment: Soil Resources

<table>
<tr><th>Potential Impacts</th><th>Proposed Mitigation</th></tr>
<tr><td colspan="2">SOIL RESOURCES</td></tr>
<tr><td>Loss of quality and quantity topsoil</td><td>During site preparation, special care must be taken during the clearing of the construction works area and the site camp where topsoil material will be stored separately from the subsoil and spoil material to ensure for the protection thereof. This topsoil must be re-used during the rehabilitation phase. Erosion control measures must be implemented to ensure that the loss of topsoil is prevented. Important: Mitigation will have no beneficial effect on the impact site itself but may contribute to decreased sediment and erosion pressures immediately off site.
<table>
<tr><th></th><th>+/- Impacts</th><th>Extent</th><th>Magnitude</th><th>Duration</th><th>Probability</th><th>Significance</th><th>OS</th></tr>
<tr><td>Without Mitigation</td><td>-</td><td>Local</td><td>Low</td><td>Permanent</td><td>Almost certain</td><td>Very low</td><td>-20</td></tr>
<tr><td>With Mitigation</td><td>-</td><td>Local</td><td>Low</td><td>Permanent</td><td>Almost certain</td><td>Very low</td><td>-20</td></tr>
</table>
</td></tr>
</table>

Table 8: Impact Assessment: Agricultural Potential

<table>
<tr><th>Potential Impacts</th><th>Proposed Mitigation</th></tr>
<tr><td colspan="2">AGRICULTURAL POTENTIAL</td></tr>
<tr><td>Loss of quality and quantity topsoil</td><td>The agricultural potential is linked to the soils that will be destroyed and has a low baseline. With the permanence of the structures on the site as well as the poor prognosis for complete rehabilitation to a pre-development state at some time in the future the impacts are considered to be permanent and therefore no mitigation is possible.
<table>
<tr><th></th><th>+/- Impacts</th><th>Extent</th><th>Magnitude</th><th>Duration</th><th>Probability</th><th>Significance</th><th>OS</th></tr>
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</table>
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7. CONCLUSIONS AND RECOMMENDATIONS

It is concluded that:

1. The site lies in the Ae225 land type and as such consists predominantly of soils of the Hutton form. These soils are variable in depth.
2. The rainfall of the area is an average of 500 mm per year and this constitutes the lower boundary of what is considered suitable for dryland crop production.
3. The site is surrounded by urban infrastructure developments and the land can therefore not be incorporated with similar land in the vicinity to enlarge that land unit.
4. Agricultural activities on the site will be limited due to 1) the small geographical extent; 2) the risks posed by vehicle and animal ingress onto the N1 highway; 3) the potential increased risk of regular dust generation with blowing of this dust onto the N1 and nearby airport runways; and 4) the limitations placed on agricultural productivity on urban related rates and taxes.

It is recommended that the site be incorporated into the urban development zone in order to relieve pressure on areas lying further out of the urban fringe in terms of urban expansion pressures.

References

Land Type Survey Staff. 1972 – 2006. Land Types of South Africa: Digital map (1:250 000 scale) and soil inventory databases. ARC-Institute for Soil, Climate and Water, Pretoria.

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Soil Classification Working Group. 1991. Soil Classification. A taxonomic system for South Africa. *Mem. Agric. Nat. Resour. S.Afr.* No.15. Pretoria.

environmental affairs

Department:
Environmental Affairs
REPUBLIC OF SOUTH AFRICA

DETAILS OF THE SPECIALIST, DECLARATION OF INTEREST AND UNDERTAKING UNDER OATH

	(For official use only)
File Reference Number:	
NEAS Reference Number:	DEA/EIA/
Date Received:	

Application for authorisation in terms of the National Environmental Management Act, Act No. 107 of 1998, as amended and the Environmental Impact Assessment (EIA) Regulations, 2014, as amended (the Regulations)

PROJECT TITLE

Proposed Limpopo Central Hospital

Kindly note the following:

1. This form must always be used for applications that must be subjected to Basic Assessment or Scoping & Environmental Impact Reporting where this Department is the Competent Authority.
2. This form is current as of 01 September 2018. It is the responsibility of the Applicant / Environmental Assessment Practitioner (EAP) to ascertain whether subsequent versions of the form have been published or produced by the Competent Authority. The latest available Departmental templates are available at https://www.environment.gov.za/documents/forms.
3. A copy of this form containing original signatures must be appended to all Draft and Final Reports submitted to the department for consideration.
4. All documentation delivered to the physical address contained in this form must be delivered during the official Departmental Officer Hours which is visible on the Departmental gate.
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Private Bag X447
Pretoria
0001

Physical address:
Department of Environmental Affairs
Attention: Chief Director: Integrated Environmental Authorisations
Environment House
473 Steve Biko Road
Arcadia

Queries must be directed to the Directorate: Coordination, Strategic Planning and Support at:
Email: EIAAdmin@environment.gov.za

1. SPECIALIST INFORMATION

Specialist Company Name:	Terra Soil Science			
B-BBEE	Contribution level (indicate 1 to 8 or non-compliant)	Exempt (Micro Enterprise)	Percentage Procurement recognition	
Specialist name:	Dr. J.H. van der Waals			
Specialist Qualifications:	PhD Soil Science University of Pretoria			
Professional affiliation/registration:	The South African Council for Natural Scientific Professions Registration number: 400106/08			
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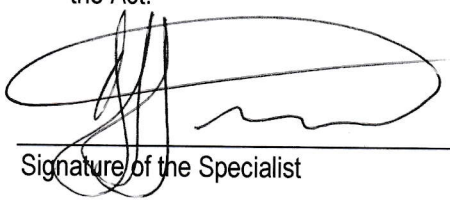
Telephone:		Fax:		
E-mail:	johan@terrasoil.co.za			

2. DECLARATION BY THE SPECIALIST

I, Johan Hilgard van der Waals, declare that –

- I act as the independent specialist in this application;
- I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant;
- I declare that there are no circumstances that may compromise my objectivity in performing such work;
- I have expertise in conducting the specialist report relevant to this application, including knowledge of the Act, Regulations and any guidelines that have relevance to the proposed activity;
- I will comply with the Act, Regulations and all other applicable legislation;
- I have no, and will not engage in, conflicting interests in the undertaking of the activity;
- I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing - any decision to be taken with respect to the application by the competent authority; and - the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority;
- all the particulars furnished by me in this form are true and correct; and
- I realise that a false declaration is an offence in terms of regulation 48 and is punishable in terms of section 24F of the Act.



Signature of the Specialist

Terra Soil Science

Name of Company:

28 October 2019

Date

3. UNDERTAKING UNDER OATH/ AFFIRMATION

I, Johan Hilgard van der Waals, swear under oath / affirm that all the information submitted or to be submitted for the purposes of this ~~application~~ specialist report is true and correct.

Signature of the Specialist

Terra Soil Science

Name of Company

28 October 2019

Date

Signature of the Commissioner of Oaths

Date

SOUTH AFRICAN POLICE SERVICE
GARSFONTEIN
2019 -11- 06
COMMUNITY SERVICE CENTRE
SUID-AFRIKAANSE POLISIEDIENS

Ek sertifiseer dat bostaande verklaring deur my afgeneem is en dat verklaarder erken dat hy/sy vertroud is met die inhoud van hierdie verklaring en dit begryp. Hierdie verklaring is voor my beëdig/bevestig en verklaarder se handtekening/merk/duimafdruk is in my teenwoordigheid daarop aangebring.

by me ... edged that he/she ... contents of this statement ... sworn to/affirmed before me at ... signature/mark/thumbprint was placed thereon in my presence.

te/at ... op/on 2019-11-06 om/at 07h47

(HANDTEKENING) KOMMISSARIS VAN EDE
(SIGNATURE) COMMISSIONER OF OATHS

VOLLE VOORNAME EN VAN IN DRUKSKRIF
FULL FIRST NAMES AND SURNAME IN BLOCK LETTERS

BESIGHEIDSADRES (STRAATADRES)
BUSINESS ADDRESS (STREET ADDRESS)

RANG/RANK

SA POLISIEDIENS
SA POLICE SERVICE

APPENDIX E2

RIPARIAN HABITAT AND WETLAND DELINEATION IMPACT ASSESSMENT

Riparian Habitat and Wetland Delineation Impact Assessment for the proposed Limpopo Central Hospital in Polokwane

Polokwane, Limpopo Province

October 2016 (Updated October 2019)

REFERENCE

10611

Prepared for:

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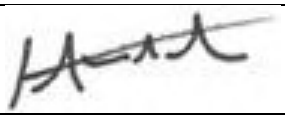
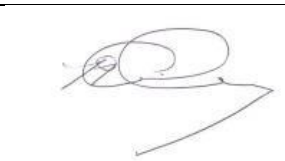
Report name	**Riparian Habitat and Wetland Delineation Impact Assessment for the proposed Limpopo Central Hospital in Polokwane**	
Reference code	**10611**	
Submitted to	**Nemai Consulting**	
Report writer	**Andrew Husted** **MSc Aquatic Health** **SACNASP 400213/11**	
Andrew Husted, is Pr Sci Nat registered in the following fields of practice: Ecological Science, Environmental Science and Aquatic Science. Andrew Husted is an Aquatic, Wetland and Biodiversity Specialist with 12 years' experience in the environmental consulting field. Andrew is an accredited wetland practitioner, recognised by the DWS, and also the Mondi Wetlands programme as a competent wetland consultant.		
Report reviewer	**Peter Kimberg** **BSc Hons Zoology** **SACNASP 400085/15**	
Peter Kimberg is a biodiversity consultant with 12 years of experience conducting ecological assessments. He has conducted assessments across southern Africa and in 15 countries in sub-Saharan Africa. He has extensive experience conducting biodiversity studies throughout South Africa, with considerable experience working within Gauteng, and is therefore familiar with the local conditions and local legislature.		
Declaration		
The Biodiversity Company and its associates operate as independent consultants under the auspice of the South African Council for Natural Scientific Professions. We declare that we have no affiliation with or vested financial interests in the proponent, other than for work performed under the Ecological Assessment Regulations, 2017. We have no conflicting interests in the undertaking of this activity and have no interests in secondary developments resulting from the authorisation of this project. We have no vested interest in the project, other than to provide a professional service within the constraints of the project (timing, time and budget) based on the principals of science.		

EXECUTIVE SUMMARY

Nemai Consulting has been appointed to undertake the Environmental Authorisation process for the Proposed Limpopo Central Hospital in Polokwane, Limpopo province. The purpose of the services of this study are to undertake and compile a Riparian Habitat and Wetland Delineation Impact Assessment for the proposed Limpopo Central Hospital.

A single dry season survey was conducted on the 4th of October 2016. This document presents the results of the survey.

The proposed Limpopo Central Hospital is situated in the quaternary catchment A71A, within the Limpopo Water Management Area. The study area is located just south of Polokwane Central in the Limpopo Province, South Africa. The focus for the study reaches associated with the Sand River which is in close proximity of the project area. The ecological status description for sub-quaternary catchment A71A-249 is as follows:

SQR	Sand River SQR A71A-249
Present Ecological Status	Largely Modified (Class D)
Ecological Importance	High
Ecological Sensitivity	Moderate

The following summary is provided for the wetland component of the study:

- A & B Section channels identified for the study;
- No FEPA wetlands were identified within 500 m of the project area;
- No wetland CBAs or ESAs are associated with the project area; and
- The dominant Soil Form in the project area is Glenrosa, not considered to be indicative of wetlands.

Based on this assessment, the significance of the risks posed to any local watercourses was determined to be low. No watercourses will be directly impacted on by the project. Mitigations measures have been prescribed to further reduce the significance of any potential indirect impacts posed by the project.

Due to the low risk to local watercourses, no fatal flaws were identified for the project. It is the professional opinion of the specialist that the project be favourably considered.

Due to the fact that no rivers or wetlands are located within the project area, with the nearest system being in excess of 250 m from the project area, no monitoring has been prescribed.

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Figures

Tables

DECLARATION

I, **Andrew Husted** declare that:

- I act as the independent specialist in this application;
- I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant;
- I declare that there are no circumstances that may compromise my objectivity in performing such work;
- I have expertise in conducting the specialist report relevant to this application, including knowledge of the Act, regulations and any guidelines that have relevance to the proposed activity;
- I will comply with the Act, regulations and all other applicable legislation;
- I have no, and will not engage in, conflicting interests in the undertaking of the activity;
- I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing - any decision to be taken with respect to the application by the competent authority; and - the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority;
- All the particulars furnished by me in this form are true and correct; and
- I realise that a false declaration is an offence in terms of Regulation 71 and is punishable in terms of Section 24F of the Act.

The Biodiversity Company

5th October 2016

1. INTRODUCTION

Nemai Consulting has been appointed to undertake the Environmental Authorisation process for the Proposed Limpopo Central Hospital in Polokwane, Limpopo province.

The proposed development is located on the remaining extent of Erf No. 6861 of Pietersburg. The proposed site borders the north east of the N1 bypass and is situated east of the Peter Mokaba Soccer Stadium. Access to the hospital site will be obtained from Webster Street where traffic circles will be introduced to regulate traffic congestion to the site.

There are no alternatives to assess. The purpose of the services is to undertake and compile a Riparian Habitat and Wetland Delineation Impact Assessment for the Proposed Limpopo Central Hospital. The findings of this study will be included in the Scoping and Environmental Impact Assessment (EIA).

This specialist study aimed to assess the local watercourses and wetland (including riparian) systems associated with the project area.

A single dry season survey was conducted on the 4th of October 2016. This document presents the results of the survey.

1.1 Background Information

The project is for the building of a new 488 bed central hospital, Limpopo Central Hospital, on a new site in Polokwane that will provide the tertiary care for the province and which will be the major teaching hospital for the University of Limpopo Faculty of Health Sciences and School of Medicine. There will be provision of the following at the new facility:

- 488 beds clinical care capacity for a wide range of highly specialised care;
- Mostly arranged in 28 bed wards (comprising some single-bed, double-bed, four bed and six bed units);
- Specific intensive care units (ICU) and high care (HC) layouts;
- Maternal and child health (MCH) (Paediatrics and Obstetrics & Gynaecology) will be consolidated on the site separate to the adult component but sharing clinical and hospital support services;
- A mother's lodge (capacity of 24);
- A pregnant mothers lodge (capacity of 18);
- Transit – waiting (capacity of 12); and
- A day procedure beds (capacity of 12).

There will be support for a complete tertiary clinical care and academic complex core teaching capacity, compromising of a 488 x L3 beds at Limpopo Central Hospital delivering Provincial Tertiary Services (T1) and Central Referral Services (T2) care in most major clinical disciplines.

1.2 Objectives

The following primary objectives were considered for the study:

- Assessing and delineating watercourses (riparian habitats and wetlands within a 500 m radius of project footprint) at varying levels of detail and rigour, based on the risks posed to the affected watercourses;
- Conduct a comprehensive desktop assessment for the local systems;
- Determine the baseline ecological status of the local watercourses and wetland systems where applicable;
- Conduct a risk assessment for the receiving systems in light of the proposed project. Where applicable provide suggestions to avoid impacts, and where impacts are unavoidable prescribe measures to mitigate these impacts; and
- Provide recommendations and a monitoring programme for the project.

2. LIMITATIONS

According to the wetland definition used in the National Water Act 36 of 1998 (NWA), four wetland indicators are used to delineate wetland boundaries. The general area has been disturbed by local developments, notably excavations, dumping and local developments. These general developments, compounded by the dry season survey period have inhibited the application of the recognised wetland indices, this may inhibit the accuracy of the delineated wetland areas. Figure 2-1 presents photographs of developments associated with the project area.

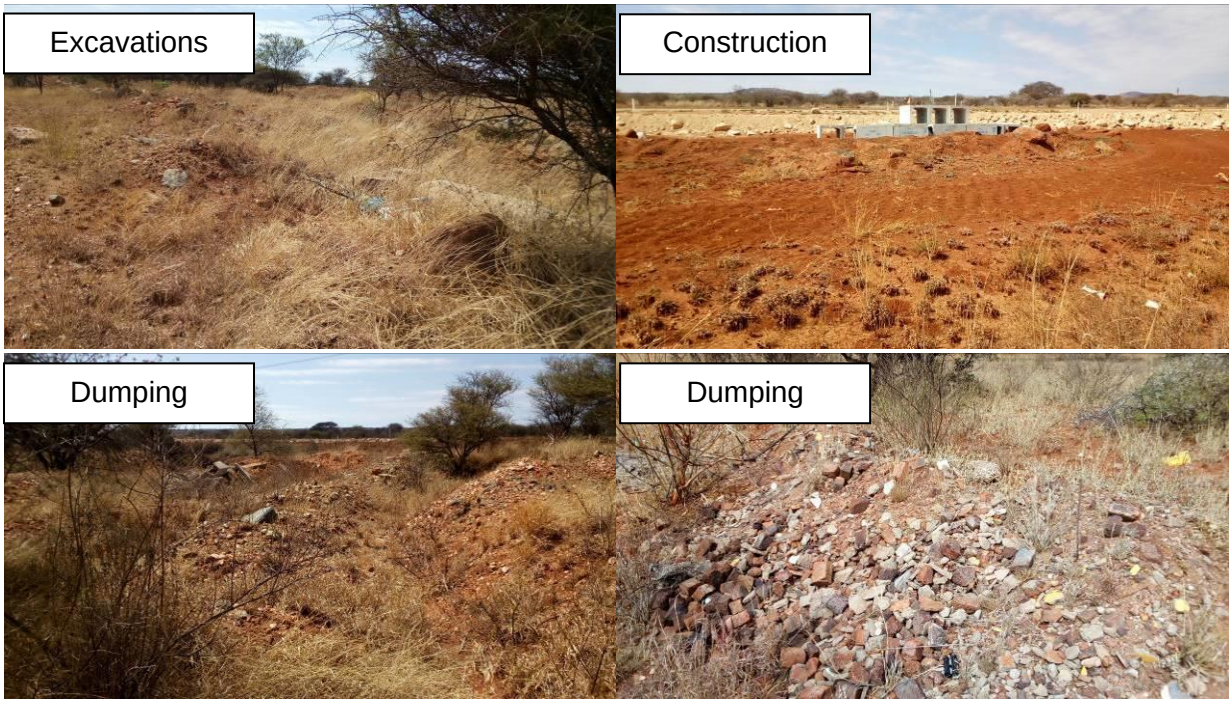

Figure 2-1: Photograph of developments within the project area

3. KEY LEGISLATIVE REQUIREMENTS

3.1 National Water Act (NWA, 1998)

The DWS is the custodian of South Africa's water resources and therefore assumes public trusteeship of water resources, which includes watercourses, surface water, estuaries, or aquifers. The National Water Act (Act No. 36 of 1998) (NWA) allows for the protection of water resources, which includes:

- The maintenance of the quality of the water resource to the extent that the water resources may be used in an ecologically sustainable way;
- The prevention of the degradation of the water resource;
- The rehabilitation of the water resource;

A watercourse means;

- A river or spring;
- A natural channel in which water flows regularly or intermittently;
- A wetland, lake or dam into which, or from which, water flows; and

- Any collection of water which the Minister may, by notice in the Gazette, declare to be a watercourse, and a reference to a watercourse includes, where relevant, its bed and banks.

The NWA recognises that the entire ecosystem and not just the water itself, and any given water resource constitutes the resource and as such needs to be conserved. No activity may therefore take place within a watercourse unless it is authorised by the DWS. Any area within a wetland or riparian zone is therefore excluded from development unless authorisation is obtained from the DWS in terms of Section 21 (c) and (i).

3.2 National Environmental Management Act (NEMA, 1998)

The National Environmental Management Act (NEMA) (Act 107 of 1998) and the associated Regulations as amended in April 2017, states that prior to any development taking place within a wetland or riparian area, an environmental authorisation process needs to be followed. This could follow either the Basic Assessment Report (BAR) process or the Environmental Impact Assessment (EIA) process depending on the scale of the impact.

4. PROJECT AREA

The proposed Limpopo Central Hospital is currently situated between Edupark, the Northern Academy Secondary School and the N1 road. The proposed site is approximately 21 ha in extent and is situated on the remainder of Erf 6861 of Pietersburg Extension 30.

The proposed Limpopo Central Hospital is situated in the quaternary catchment A71A, within the Limpopo Water Management Area (WMA 1). The Limpopo WMA is the northern-most WMA in the country and represents part of the South African portion of the Limpopo Basin, which is also shared by Botswana, Zimbabwe and Mozambique. The Limpopo WMA borders on Botswana and Zimbabwe, where the Limpopo River demarcates the entire length of the international boundaries before flowing into Mozambique. The region is semi-arid and the mean annual rainfall ranges from 300 to 700 mm over most of the WMA.

Economic activity is mainly centred on game, livestock and irrigation farming, while mining activity is increasing. Approximately 200 rural villages are scattered throughout the area, with little local economic activity to support these population concentrations.

Due to the aridity and flatness of the terrain few sites are available for the construction of major dams and the surface water potential has largely been fully developed. Relatively favourable formations for groundwater are found in the area and groundwater is therefore used extensively. Overexploitation of water resources occurs in localised areas. Several inter-water management area water transfers exist, all of which bring water into the Limpopo WMA. Demographic scenarios indicate a small growth in population until 2005 and little change thereafter.

Significant growth in water requirements is expected from mining developments in the mineral-rich Bushveld Igneous Complex, which extends across the south-eastern part of the area, while

the further exploitation of coal reserves near Ellisras could also increase water requirements. Further growth in economic activity is likely to occur at established urban centres.

The study area is located just south of Polokwane Central in the Limpopo Province, South Africa. The focus for the study is a reach is a tributary of the Sand River which is in close proximity of the project area. The area surrounding the proposed project site consists largely of urban activities. The activities in the area and local land uses have had moderate impact to the Sand River. Due to these activities the catchment is regarded as largely modified at a desktop level.

5. METHODOLOGY

5.1 Aquatic ecology

The watercourses in the area are ephemeral systems with very short periods of flowing water. No flowing water was encountered during this dry season survey, and due to the fact that sampling could not be conducted a desktop assessment was conducted for this component of the study. The desktop assessment considered for the following datasets:

- A Desktop Assessment of the Present Ecological State, Ecological Importance and Ecological Sensitivity per Sub Quaternary Reaches for Secondary Catchments in South Africa. Draft. Compiled by RQS-RDM (DWS, 2013); and
- The National Freshwater Ecosystem Priority Areas (NFEPAs, 2011);

5.2 Wetland assessment

The National Wetland Classification System (NWCS, 2010) developed by the South African National Biodiversity Institute (SANBI) was considered for this study. This system comprises of a hierarchical classification process, defining a wetland based on the principles of the hydro geomorphic (HGM) approach at higher levels, and further includes structural features at the lower levels of classification (SANBI, 2009).

5.2.1 Desktop assessment

The desktop assessment consisted of relevant information as presented by the SANBI's Biodiversity Geographic Information Systems (BGIS) website (http://bgis.sanbi.org). Wetland specific information resources taken into consideration during the desktop assessment of the study area included:

- Aerial imagery (Google Earth);
- The National Freshwater Ecosystem Priority Areas (NFEPAs, 2011);
- Limpopo Conservation Plan (C-Plan, 2013); and
- Contour data.

5.2.2 Wetland delineation

The wetland areas were delineated in accordance with the DWAF (2005) guidelines, a cross section is presented in Figure 5-1. The outer edges of the wetland areas are identified by considering the following four specific indicators:

- The Terrain Unit Indicator helps to identify those parts of the landscape where wetlands are more likely to occur;
- The Soil Form Indicator identifies the soil forms, as defined by the Soil Classification Working Group (1991), which are associated with prolonged and frequent saturation;
- The Soil Wetness Indicator identifies the morphological "signatures" developed in the soil profile as a result of prolonged and frequent saturation; and
- The Vegetation Indicator identifies hydrophilic vegetation associated with frequently saturated soils.

Vegetation is used as the primary wetland indicator, which must be present under normal circumstances. However, in practise the soil wetness indicator tends to be the most important, and the other three indicators are used in a confirmatory role.

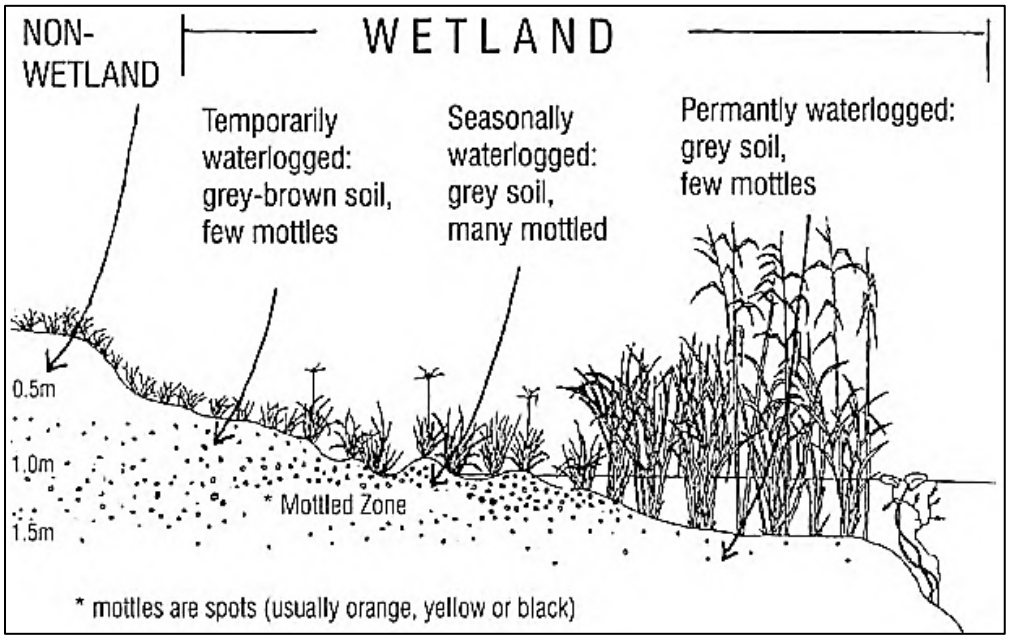

Figure 5-1: Cross section through a wetland, indicating how the soil wetness and vegetation indicators change (DWAF, 2005)

5.2.3 Present Ecological Status

WET-Health is a tool designed to assess the health or integrity of a wetland. Wetland health is defined as a measure of the deviation of wetland structure and function from the wetland's natural reference condition. This technique attempts to assess hydrological, geomorphological and vegetation health in three separate modules. The ecological status categories and descriptions are provided in Table 5-1.

Table 5-1: The PES categories and descriptions for WET-Health (Macfarlane et al, 2008)

Category	Description	Range
A	Unmodified, natural	0-0.9
B	Largely natural with few modifications. A slight change in ecosystem processes is discernible and a small loss of natural habitats and biota may have taken place.	1-1.9
C	Moderately modified. A moderate change in ecosystem process and loss of natural habitats has taken place but the natural habitat remains predominantly intact.	2-3.9
D	Largely Modified. A large change in ecosystem processes and loss of natural habitat and biota has occurred.	4-5.9
E	The change in ecosystem processes and loss of natural habitat and biota is great but some remaining natural habitat features are still recognizable.	6-7.9
F	Modifications have reached a critical level and the ecosystem processes have been modified completely with an almost complete loss of natural habitat and biota.	8-10

5.3 Riparian assessment

The NWA defines a riparian habitat as follows: "*Riparian habitat includes the physical structure and associated vegetation of the areas associated with a watercourse which are commonly characterised by alluvial soils, and which are inundated or flooded to an extent and with a frequency sufficient to support vegetation of species with a composition and physical structure distinct from those of adjacent land areas*."

The riparian areas are also delineated in accordance with the DWAF (2005) guidelines. The riparian areas are identified by considering the following specific indicators:

- Are associated with a watercourse;
- Contain distinctively different plant species than adjacent areas; and contain species similar to adjacent areas but exhibiting more vigorous or robust growth forms; and
- May have alluvial soils.

5.3.1 Present Ecological Status

A level 3 VEGRAI (Riparian Vegetation Response Assessment Index, Kleynhans et. al., 2007) assessment was undertaken to determine the status of the riparian habitats. This method assesses the current condition of riparian habitats based on the response of riparian vegetation to observed impacts (Table 5-2).

Table 5-2: Generic ecological categories for EcoStatus components (modified from Kleynhans 1996 & Kleynhans 1999)

Description	Category
Unmodified, natural	A
Largely natural with few modifications. A small change in natural habitats and biota may have taken place but the ecosystem functions are essentially unchanged.	B
Moderately modified. Loss and change of natural habitat and biota have occurred, but the basic ecosystem functions are still predominantly unchanged	C
Largely modified. A large loss of natural habitat, biota and basic ecosystem functions has occurred.	D
Seriously modified. The loss of natural habitat, biota and basic ecosystem functions is extensive.	E
Critically modified. Modifications have reached a critical level and the lotic system has been modified completely with an almost complete loss of natural habitat and biota. In the worst instances the basic ecosystem functions have been destroyed and the changes are irreversible	F

5.4 Risk assessment

The risk assessment was conducted in accordance with the DWS risk-based water use authorisation approach and delegation guidelines.

The matrix assesses impacts in terms of consequence and likelihood. Consequence is calculated based on the following formula:

Consequence = Severity + Spatial Scale + Duration

Whereas likelihood is calculated as:

Likelihood=Frequency of Activity + Frequency of Incident +Legal Issues + Detection.

Significance is calculated as:

Significance \Risk= Consequence X Likelihood.

The significance of the impact is calculated according to Table 5-3.

Table 5-3: Significance ratings matrix

Rating	Class	Management Description
1 – 55	(L) Low Risk	Acceptable as is or consider requirement for mitigation. Impact to watercourses and resource quality small and easily mitigated. Wetlands may be excluded.
56 – 169	M) Moderate Risk	Risk and impact on watercourses are notably and require mitigation measures on a higher level, which costs more and require specialist input. Wetlands are excluded.
170 – 300	(H) High Risk	Always involves wetlands. Watercourse(s) impacts by the activity are such that they impose a long-term threat on a large scale and lowering of the Reserve.

6. RESULTS & DISCUSSIONS

6.1 Aquatic ecology

The general area was inspected for perennial and non-perennial watercourses. Table 6-1 presents the GPS coordinates of the observation points with a photograph of each site. Figure 6-1 presents the location of the observation points (sites) in relation to the project area.

Table 6-1: GPS coordinates and description of the observation sites.

Site	Description	Photograph
1	Fauna Dam. The site is located on the periphery of the 500m buffer. The dam is surrounded by urban development and roads.	
2	A storm water channel. The linear structure of the system suggests the channel has been modified to manage storm water. Pools of water were present during the site visit. The system is considered to be ephemeral.	
3	The site is located on an ephemeral system. The system is beyond the 500m project area buffer. The system is considered to be a B Section channel.	

3	The site is located on an A Section channel, which has been modified to management storm water. The system is beyond the 500m project area buffer.	

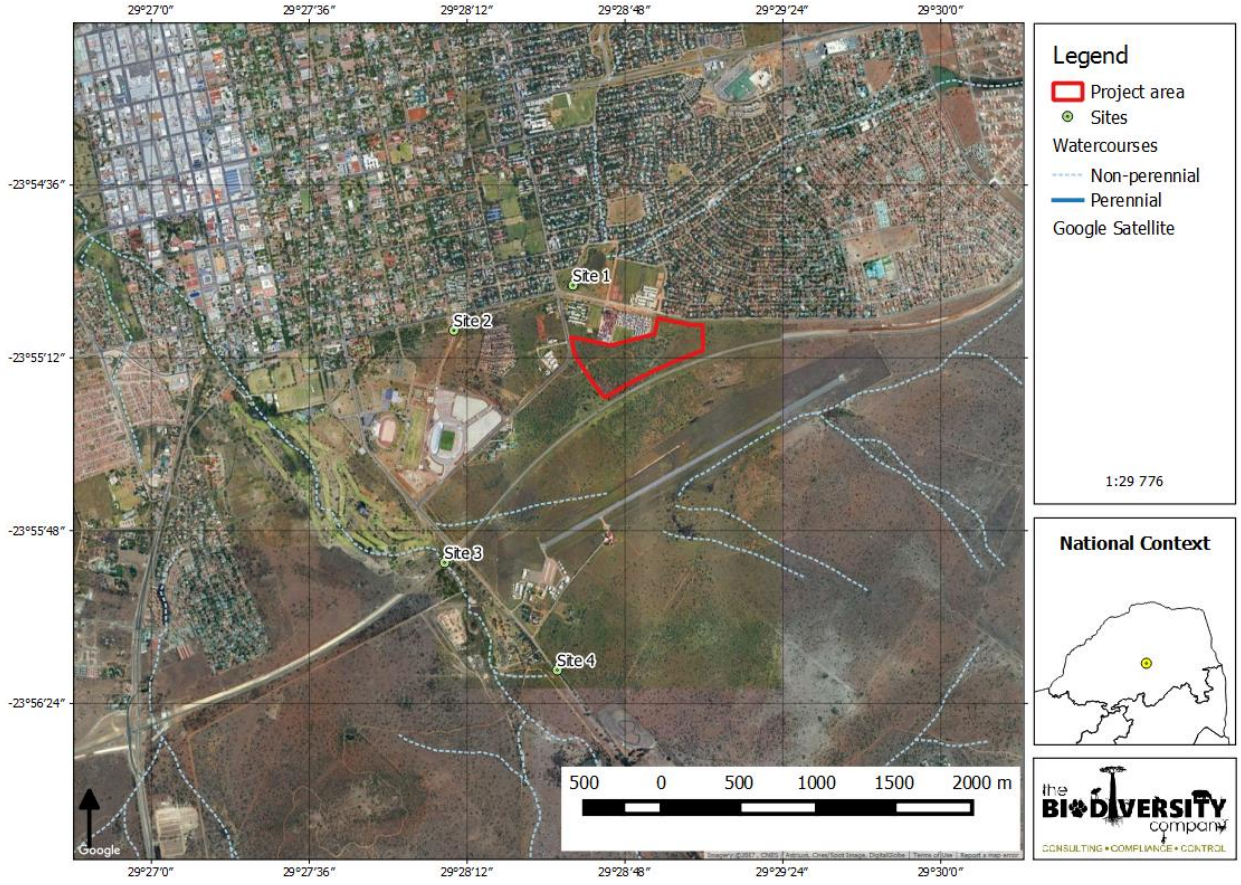

Figure 6-1: The locations of the aquatic observation points (sites) for the project

6.1.1 National Freshwater Ecosystem Priority Area (NFEPA)

The NFEPA database forms part of a comprehensive approach to the sustainable and equitable development of South Africa's scarce water resources. This database provides guidance on how many rivers, wetlands and estuaries, and which ones, should remain in a natural or near-natural condition to support the water resource protection goals of the National Water Act (Act 36 of 1998). This directly applies to the NWA, which feeds into Catchment Management Strategies,

water resource classification, reserve determination, and the setting and monitoring of resource quality objectives (Nel *et al*. 2011). The NFEPAs are intended to be conservation support tools and envisioned to guide the effective implementation of measures to achieve the National Environment Management Biodiversity Act's biodiversity goals (NEM:BA) (Act 10 of 2004), informing both the listing of threatened freshwater ecosystems and the process of bioregional planning provided for by this Act (Nel *et al*., 2011). The sub-quaternary catchment has no freshwater priority areas designated to it

The Present Ecological Status (PES), Ecological State (ES) and Ecological Importance (EI) for the Sand River SQR A71A-249 is presented in Table 6-2.

Table 6-2: Present Ecological Status description for the Sand River SQR A71A-249

Present Ecological State		Ecological Importance		Ecological Sensitivity	
D (Largely Modified)		High		Moderate	
Variable	**Status**	**Variable**	**Status**	**Variable**	**Status**
Modifications to Instream Habitat Continuity	Moderate	Fish species per sub quaternary catchment	6	Fish Physico-Chemical sensitivity description	Low
Modifications to Riparian/ Wetland Zone Continuity	Moderate	Invertebrate taxa per sub quaternary catchment	26	Fish No-flow sensitivity description	Moderate
Potential Instream Habitat Modifications	Large	Habitat Diversity Class	Very High	Invertebrate Physico-Chemical sensitivity	Moderate
Modifications to Riparian/ Wetland Zones	Moderate	Instream Migration Link Class	High	Invertebrate velocity sensitivity	High
Potential Flow Modifications	Large	Riparian-Wetland Zone Migration Link	High	Stream size sensitivity to modified flow/water level changes description	High
Potential Physico-Chemical Modifications	Large	Instream Habitat Integrity Class	Moderate	Riparian-Wetland Vegetation intolerance to water level changes description	Low
Anthropogenic Impacts					
The following impacts/activities were identified: Large: Algal growth, Bed and Channel disturbance, Erosion, Sedimentation, Moderate: Abstraction, Agricultural fields, Chicken farms, Low water crossings, Alien vegetation, Overgrazing/trampling, Irrigation, Roads, Runoff/effluent: Irrigation, Runoff/effluent: Urban areas, Urbanization, Vegetation removal, Small: Small (farm) dams, Alien aquatic macrophytes, Inundation, Industries, Mining, Grazing (land-use),					

6.1.2 Channel network identifications

The channel network is typically divided into three types of channels in order to aid the delineation process, namely A, B or C Section channels (DWAF, 2005). The notable difference between the channel Sections is the respective position relative to the zone of saturation in the riparian area. According to the DWAF (2005) guidelines, the saturated zone must be in contact with the channel network for baseflow to take place, with the classification separating the channel sections that do not have baseflow (A Sections) from those that sometimes have baseflow (B Sections) and those that always have baseflow (C Sections). The following summary is provided for the respective channels identified during the study:

- **A Sections:** Headward channels situated well above the zone of saturation and the channel bed is never in contact with the zone of saturation. These channels carry storm runoff but the flow is of short duration. These steep, eroding, headward watercourses do not have a riparian habitat due to limited deposition of alluvial (or hydromorphic) soils and are not flooded with sufficient frequency to support vegetation of a type that is distinct from the adjacent land areas.

- **B Sections:** Channels in the zone of the fluctuating water table with baseflow at any point in the channel when the saturated zone is in contact with the channel bed. The gradient of the channel bed is flat enough for deposition of material to take place and initial signs of flood plain development observed.

The project has attempted to identify and distinguish between these channels, delineating the wetland areas in the process.

A National Aeronautics and Space Administration (NASA) Shuttle Radar Topography Mission (SRTM) (V3.0, 1 arcsec resolution) Digital Elevation Model (DEM) was obtained from the United States Geological Survey (USGS) Earth Explorer website. Basic terrain analysis was performed on this DEM using the SAGA GIS software (www.saga-gis.org) that encompassed a slope and channel network analyses in order to delineate catchment area (Figure 6-2) and relative slope position (Figure 6-3).

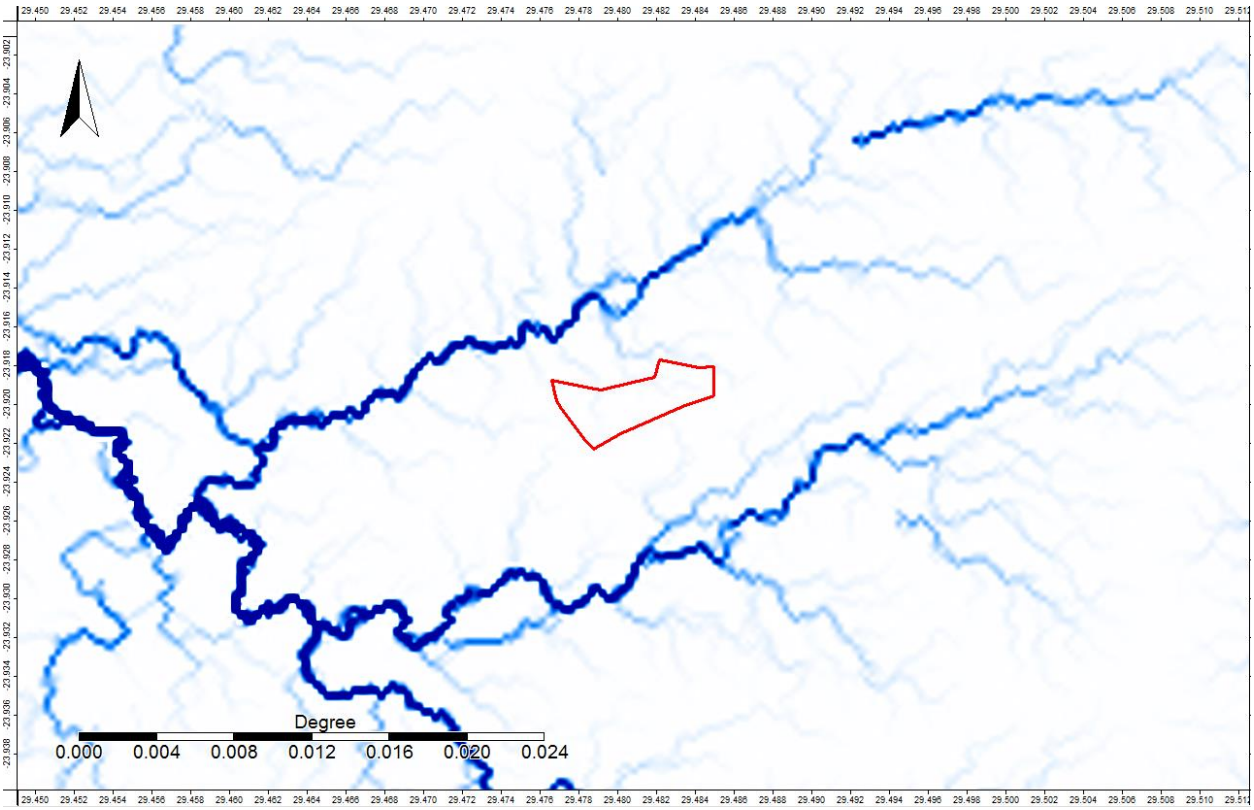

Figure 6-2: The locations of the project area in relation to the catchment area

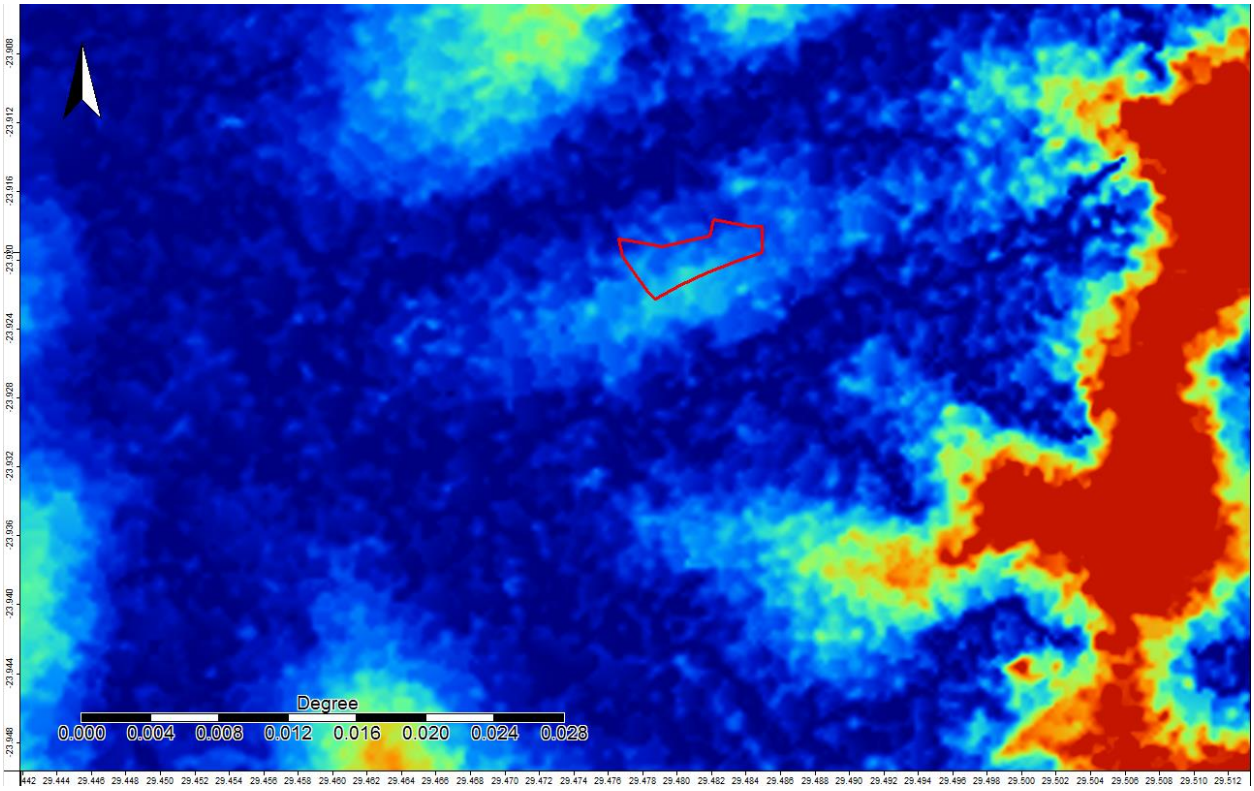

Figure 6-3: The locations of the project area in relation to the relative slope position

6.2 Wetland assessment

6.2.1 Desktop assessment

The desktop delineation attempted to identify the location of wetland areas associated with the project area. Contour data and Google Earth imagery were also considered to identify any potential wetland areas. The wetland specific information resources taken into consideration during the desktop assessment, and discussed briefly below, included:

- The National Freshwater Ecosystem Priority Areas (NFEPAs, 2011).

No FEPA wetlands were identified within 500 m of the project area. The location of the NFEPA wetlands in relation to the project area are presented in Figure 6-4.

- The Limpopo C-Plan (2013).

No wetland CBAs or ESAs are associated with the project area. The area associated with the project area is classified as predominantly “Other Natural Area”, with a considerably smaller portion considered to be unnatural (Figure 6-5).

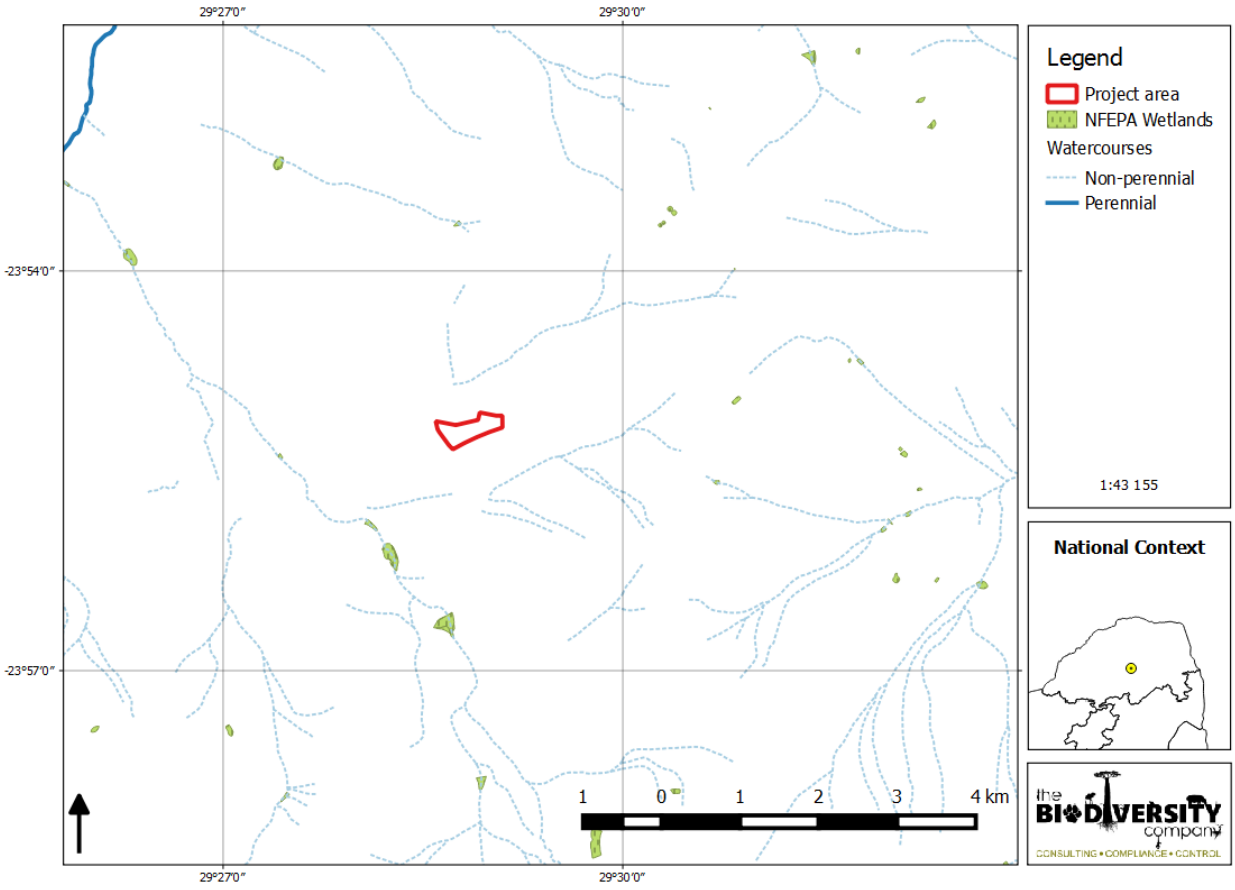

Figure 6-4: The location of NFEPA wetlands in relation to the project area

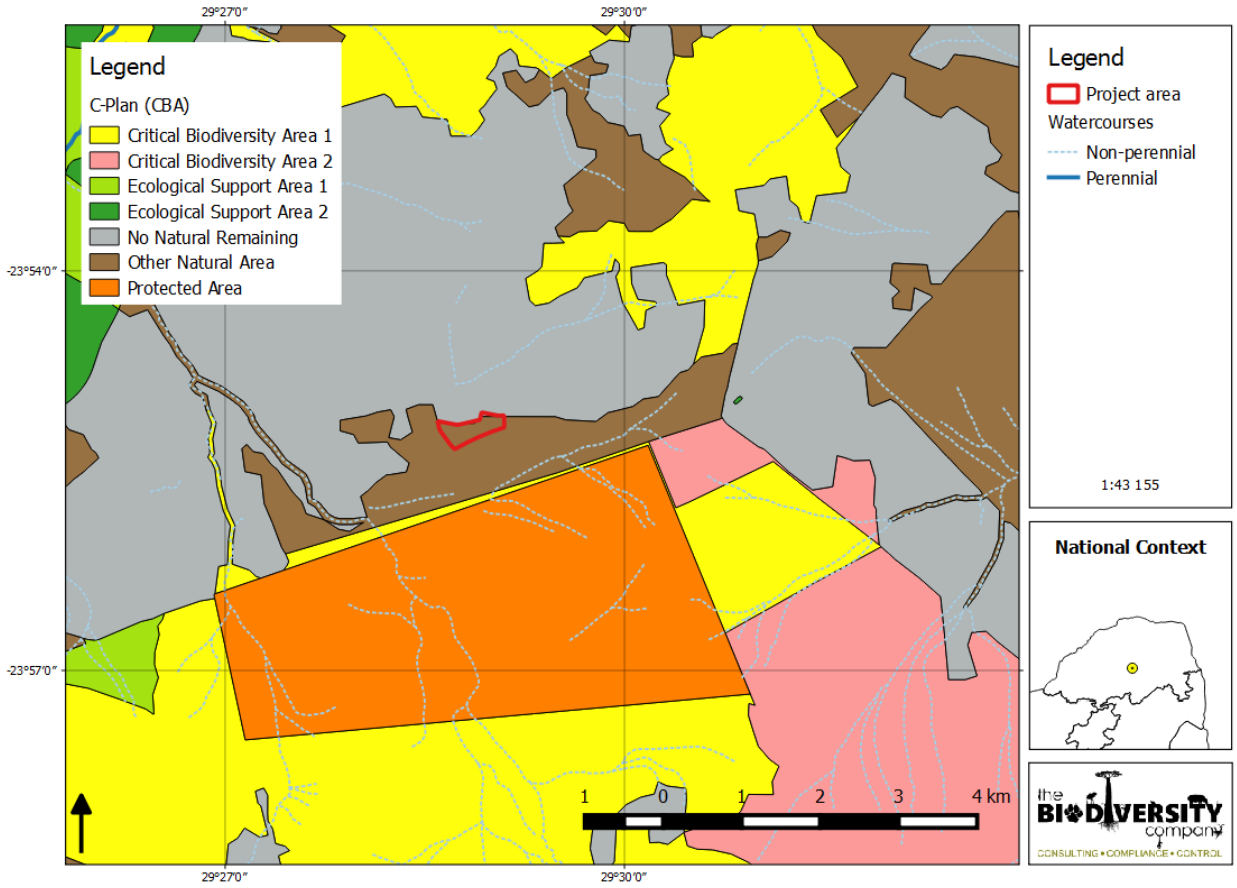

Figure 6-5: The Limpopo C-Plan designations for the project area

6.2.2 Wetland delineation

The desktop findings were ground truthed and the DWAF (2005) wetland guidelines implemented. Wetland boundaries were ground truthed based on soil forms, soil wetness, and vegetation. No wetland areas were identified within, nor in close proximity to the study area. There were no wetland soil forms, nor signs of soil wetness to suggest the presence of any wetland areas within the project area. Figure 6-6 presents the extent of area assessed and key observation points. The dominant soils are well-drained and red, without signs of wetness. Photographs of the soil characteristics identified for the study are presented in Figure 6-7.

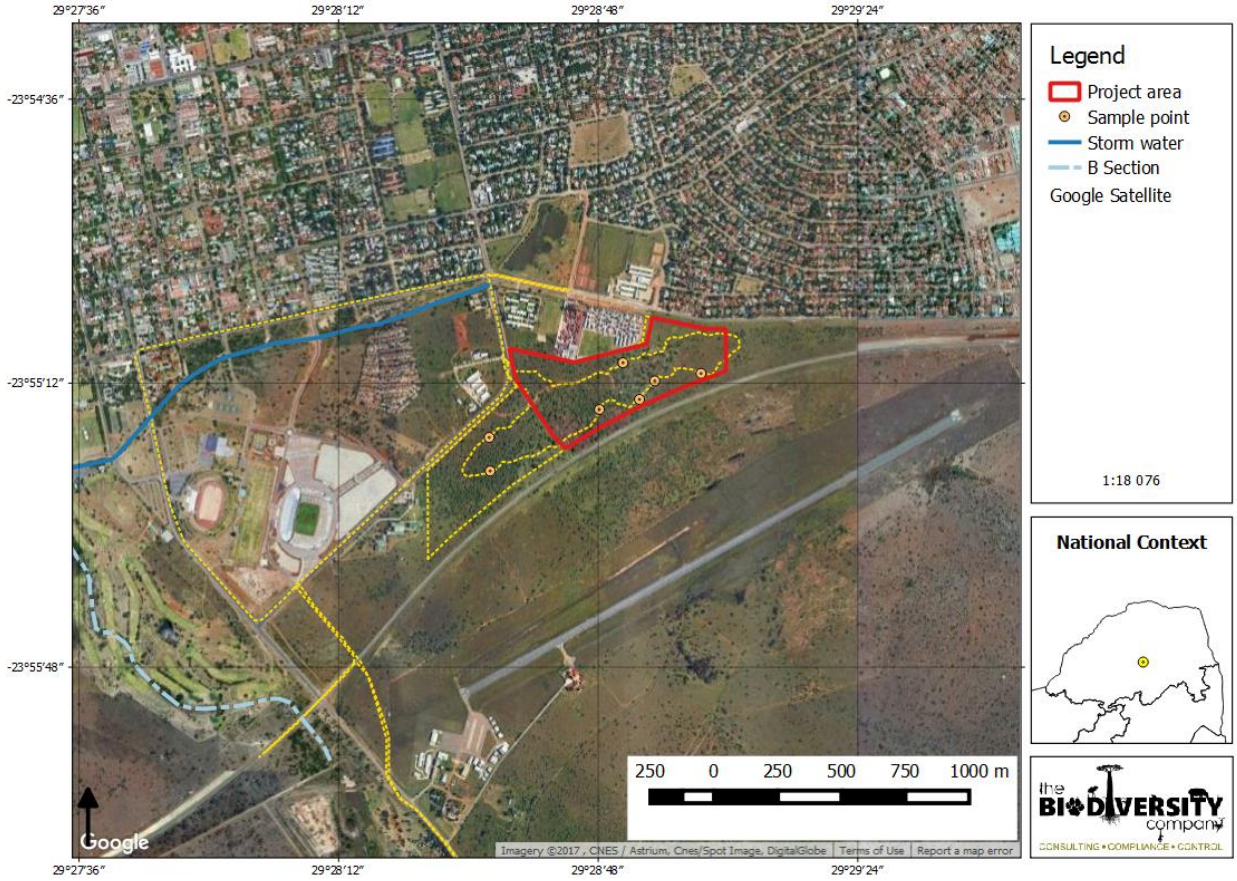

Figure 6-6: The extent of the specialist track and key sample points for the wetland study

Figure 6-7: Photographs of soil characteristics identified for the study

7. RISK ASSESSMENT

This report assessed both the need for Section 21(c) and 21(i) water use licenses and the risks associated with any activities conducted near or within a wetland for the proposed project. For the activities and infrastructure that occur within the 500 m regulation area of a wetland (including within a watercourse), the significance of the risk, namely low, moderate or high was determined. Mitigation measures were then proposed to attempt to reduce the risks, whether they are low, moderate or high. Based on the outcome of the risk assessment, a recommendation was made as to whether or not a water use license is required. No decommissioning phase was considered for the project.

Findings from the DWS aspect and impact register / risk assessment are provided in Table 7-1 and Table 7-2.

Table 7-1: The risk identified for the project activities and aspects

Phase	Activity	Aspect	Impact
Construction	Site preparation & excavations	Clearing of areas in preparation for construction	Contamination (from spills/leaks) Impaired water quality Increased storm water Altered flow regimes Altered flood frequencies Siltation of receiving system. Flow sediment equilibrium change
		Construction of temporary and permanent access routes	
		Drainage patterns change due to levelled surfaces and storm water management	
		On-site vehicle and machinery activities	
		Temporary infrastructure during construction ie laydown yards, mixing areas, ablutions etc	
		Increased footprint area of hardened surfaces	
		Storm water management	
		Installation of culverts/pipes and drains for storm water management	
		Storage of chemicals (hazardous material)	
		Ablutions and waste handling	
Operational	Operation of hospital	Drainage patterns change due to levelled surfaces and storm water management	Contamination (from spills/leaks) Impaired water quality Increased storm water Altered flow regimes Flow sediment equilibrium change
		Increased footprint area of hardened surfaces	
		Storm water management	
		Increased traffic	

Table 7-2: The risk assessment conducted for the study

Phase	Severity								
	Aspect	Flow Regime	Water Quality	Habitat	Biota	Severity	Spatial scale	Duration	Consequence
Construction	Clearing of areas in preparation for construction	2	2	2	2	**2**	2	2	**6**
	Construction of temporary and permanent access routes	2	2	2	2	**2**	2	2	**6**
	Drainage patterns change due to levelled surfaces and storm water management	2	1	2	2	**1.75**	2	3	**6.75**
	On-site vehicle and machinery activities	1	2	1	2	**1.5**	2	3	**6.5**
	Temporary infrastructure during construction ie laydown yards, mixing areas, ablutions etc	1	1	2	1	**1.25**	1	3	**5.25**
	Increased footprint area of hardened surfaces	2	1	2	2	**1.75**	2	3	**6.75**
	Storm water management	1	2	1	2	**1.5**	2	3	**6.5**
	Installation of culverts/pipes and drains for storm water management	2	2	1	2	**1.75**	2	3	**5.75**
	Storage of chemicals (hazardous material)	1	1	1	1	**1**	1	3	**5**
	Ablutions and waste handling	1	1	1	1	**1**	1	3	**5**
Operational	Ablutions and waste handling	2	1	2	2	**1.75**	2	3	**6.75**
	Drainage patterns change due to levelled surfaces and storm water management	2	1	2	2	**1.75**	2	3	**6.75**
	Increased footprint area of hardened surfaces	1	2	1	2	**1.5**	2	3	**6.5**
	Storm water management	1	1	1	2	**1.25**	2	3	**6.25**

Table 7-2: The risk assessment conducted for the study (continued)

Phase	Aspect	Frequency of activity	Frequency of impact	Legal Issues	Detection	Likelihood	Sig.	Risk Rating
Construction	Clearing of areas in preparation for construction	3	2	1	2	**8**	**48**	Low
	Construction of temporary and permanent access routes	3	2	1	2	**8**	**48**	Low
	Drainage patterns change due to levelled surfaces and storm water management	3	2	1	2	**8**	**54**	Low
	On-site vehicle and machinery activities	3	2	1	2	8	52	Low
	Temporary infrastructure during construction ie laydown yards, mixing areas, ablutions etc	3	1	1	2	7	36.8	Low
	Increased footprint area of hardened surfaces	3	2	1	2	8	54	Low
	Storm water management	3	2	1	2	8	52	Low
	Installation of culverts/pipes and drains for storm water management	3	2	1	2	8	48	Low
	Storage of chemicals (hazardous material)	3	1	1	2	**7**	**35**	Low
	Ablutions and waste handling	3	1	1	2	**7**	**35**	Low
Operational	Drainage patterns change due to levelled surfaces and storm water management	3	2	1	2	**8**	**54**	Low
	Increased footprint area of hardened surfaces	3	2	1	2	**8**	**54**	Low
	Storm water management	3	2	1	2	8	52	Low
	Increased traffic	3	2	1	2	8	50	Low

Based on this assessment, the significance of the risks posed to any local watercourses was determined to be low. No watercourses will be directly impacted on by the project.

7.1 Mitigation measures

The following general mitigation measures are recommended:

- Ensure all activities and structures are restricted to the project area only. Do not permit any activities beyond the boundary of the project area. This will ensure that no watercourses will be directly affected by the project;
- Laydown yards and storage areas must not be within the local watercourses. These areas should be away from the watercourses, and measures should be in place to avoid indirect impacts (spills and leaks) to the systems;
- All chemicals, fuels and toxicants to be used for the construction must be stored within the project area in a bunded area;
- All machinery and equipment should be inspected regularly for faults and possible leaks, these should be serviced off-site;
- All contractors and employees should undergo induction which is to include a component of environmental awareness. The induction is to include aspects such as the need to avoid littering, the reporting and cleaning of spills and leaks and general good “housekeeping”;
- Have action plans on site, and training for contactors and employees in the event of spills, leaks and other impacts to the channel system;
- Works should be limited to dry periods;
- No dumping of construction material beyond the project area boundary. All waste must be collected on site and disposed of at licensed depots; and
- Adequate sanitary facilities and ablutions de must be provided for all personnel.

7.2 Professional opinion

A professional opinion is required as per the NEMA regulations with regards to the proposed development. The final summary opinion of the study area is as follows:

- There are no rivers or wetlands that will be directly impacted on by the project;
- The nearest watercourse is in excess of 250 m away from the project area. The system is “buffered” by road and structural developments; and

- The project will not directly impact on any watercourses, and the significance of any potential risks is expected to be low.

It is the professional opinion of the specialist that the project be favourably considered.

8. MONITORING

Due to the fact that no rivers or wetlands are located within the project area, with the nearest system being in excess of 250 m from the project area, no monitoring has been prescribed. In support of this, the significance of potential risks was determined to be low.

9. CONCLUSIONS

The study attempted to assess the ecological state of the local river systems, and identify and assess any wetland systems that may be affected by the project. Due to the ephemeral nature of the systems, no flowing water was available at the time of the survey. Desktop information indicates the systems within the larger reach area are in a largely modified state, with a high ecological importance and moderate ecological sensitivity.

No wetland areas were identified within the project area. The implementation of the wetland indicators was inhibited due to disturbances to the catchment area, specifically vegetation. In spite of this, no wetland soil forms or signs of saturation were encountered during the study in order to indicate there to be the presence of any wetlands.

Based on this assessment, the significance of the risks posed to any local watercourses was determined to be low. No watercourses will be directly impacted on by the project.

Due to the low risk to local watercourses, no fatal flaws were identified for the project. It is the professional opinion of the specialist that the project be favourably considered.

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environmental affairs

Department:
Environmental Affairs
REPUBLIC OF SOUTH AFRICA

DETAILS OF THE SPECIALIST, DECLARATION OF INTEREST AND UNDERTAKING UNDER OATH

	(For official use only)
File Reference Number:	
NEAS Reference Number:	DEA/EIA/
Date Received:	

Application for authorisation in terms of the National Environmental Management Act, Act No. 107 of 1998, as amended and the Environmental Impact Assessment (EIA) Regulations, 2014, as amended (the Regulations)

PROJECT TITLE

Proposed Limpopo Central Hospital

Kindly note the following:

1. This form must always be used for applications that must be subjected to Basic Assessment or Scoping & Environmental Impact Reporting where this Department is the Competent Authority.
2. This form is current as of 01 September 2018. It is the responsibility of the Applicant / Environmental Assessment Practitioner (EAP) to ascertain whether subsequent versions of the form have been published or produced by the Competent Authority. The latest available Departmental templates are available at https://www.environment.gov.za/documents/forms.
3. A copy of this form containing original signatures must be appended to all Draft and Final Reports submitted to the department for consideration.
4. All documentation delivered to the physical address contained in this form must be delivered during the official Departmental Officer Hours which is visible on the Departmental gate.
5. All EIA related documents (includes application forms, reports or any EIA related submissions) that are faxed; emailed; delivered to Security or placed in the Departmental Tender Box will not be accepted, only hardcopy submissions are accepted.

Departmental Details

Postal address:
Department of Environmental Affairs
Attention: Chief Director: Integrated Environmental Authorisations
Private Bag X447
Pretoria
0001

Physical address:
Department of Environmental Affairs
Attention: Chief Director: Integrated Environmental Authorisations
Environment House
473 Steve Biko Road
Arcadia

Queries must be directed to the Directorate: Coordination, Strategic Planning and Support at:
Email: EIAAdmin@environment.gov.za

1. SPECIALIST INFORMATION

Specialist Company Name:	THE BIODIVERSITY COMPANY			
B-BBEE	Contribution level (indicate 1 to 8 or non-compliant)		Percentage Procurement recognition	
Specialist name:	ANDREW HUSTEO			
Specialist Qualifications:	MSc			
Professional affiliation/registration:	SACNASP Pr. Sci. NAT 400213/11			
Physical address:	18 PLEASANT STR, JOHANNESBURG			
Postal address:				
Postal code:	2158	Cell:	083 319 1225	
Telephone:		Fax:		
E-mail:	info@thebiodiversitycompany.com			

2. DECLARATION BY THE SPECIALIST

I, ANDREW HUSTEO, declare that –

- I act as the independent specialist in this application;
- I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant;
- I declare that there are no circumstances that may compromise my objectivity in performing such work;
- I have expertise in conducting the specialist report relevant to this application, including knowledge of the Act, Regulations and any guidelines that have relevance to the proposed activity;
- I will comply with the Act, Regulations and all other applicable legislation;
- I have no, and will not engage in, conflicting interests in the undertaking of the activity;
- I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing - any decision to be taken with respect to the application by the competent authority; and - the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority;
- all the particulars furnished by me in this form are true and correct; and
- I realise that a false declaration is an offence in terms of regulation 48 and is punishable in terms of section 24F of the Act.

Signature of the Specialist

THE BIODIVERSITY COMPANY

Name of Company:

5/11/2021

Date

3. UNDERTAKING UNDER OATH/ AFFIRMATION

I, Andrew Hosie, swear under oath / affirm that all the information submitted or to be submitted for the purposes of this application is true and correct.

Signature of the Specialist

The Biodiversity Company

Name of Company

5/11/2019

Date

Signature of the Commissioner of Oaths

05/11/2019

Date

Certified as a true copy of original

Faral Shadreck Mbirimi **BD52805**
Minister of Religion / Commissioner of Oaths
391 11th Road, Erand, Midrand 1685

Date 05/11/2019

APPENDIX E3

HERITAGE IMPACT ASSESSMENT

PROPOSED DEVELOPMENT OF THE LIMPOPO CENTRAL HOSPITAL ON THE REMAINING EXTENT OF ERF 6861 – EXTENSION 30 IN POLOKWANE IN THE LIMPOPO PROVINCE

Phase 1 – Heritage Impact Assessment

Issue Date - 23 October 2019

Revision No. - 3

Project No. - 203HIA

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Waverley, Pretoria,
South Africa

Directors: HS Steyn, PD Birkholtz, W Fourie

Declaration of Independence

The report has been compiled by PGS Heritage (Pty) Ltd, an appointed Heritage Specialist for Nemai Consulting for the proposed Limpopo Central Hospital. The views stipulated in this report are purely objective and no other interests are displayed during the decision-making processes discussed in the Heritage Impact Assessment Process

HERITAGE CONSULTANT - PGS Heritage (Pty) Ltd

CONTACT PERSON - Marko Hutten
Tel - +27 (0) 12 332 5305
Email - marko@pgsheritage.co.za

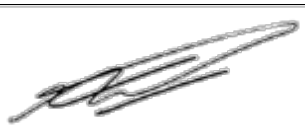
SIGNATURE - 

ACKNOWLEDGEMENT OF RECEIPT

CLIENT - Nemai Consulting

CONTACT PERSON - Kristy Robertson
Tel - +27 (0) 11 781 1730
Fax - +27 (0) 11 781 1731
Email - kristyr@nemai.co.za

SIGNATURE - _____

Date -	23 October 2019		
Document Title -	***The Proposed Development of the Limpopo Central Hospital the Remaining Extent of Erf No. 6861 – Extension 30 in Polokwane in the Limpopo Province.***		
Control	**Name**	**Signature**	**Designation**
Project Sponsor	Wouter Fourie		Heritage Specialists/ Principal Investigator
Author	Marko Hutten		Heritage Specialist
Reviewed	Kristy Robertson		Environmental Consultant

EXECUTIVE SUMMARY

PGS Heritage (Pty) Ltd (PGS) was appointed by Nemai Consulting to undertake a Heritage Impact Assessment (HIA) that forms part of the Environmental Impact Report (EIA), for the proposed development of the Limpopo Central Hospital, situated on the Remaining Extent of Erf no. 6861 – Extension 30 in the Polokwane Local Municipality area, Capricorn District, Limpopo Province.

A total of seven heritage sites were identified within the proposed development area. All related to Iron Age occupation (LIM 003 to LIM 009) were identified.

These heritage sites most probably formed part of a settlement, identified by Roodt (2001), directly to the south where the Edupark Complex is situated. The archaeological sites at the Edupark Complex are dated between 1000AD and 1650AD and the earliest occupation can be linked to the Eiland phase, while the Moloko (Sotho-Tswana) and Letaba (Ndebele) Late Iron Age occupants arrived on the Pietersburg plateau in the 1600s. Roodt mentioned that the Edupark sites extended further to the north, however this was not documented in detail. Roodt also mentioned that a total of 13 burials or partial burials were rescued from the Edupark site, most of which had been disturbed due to construction activities. The excavations in the parking area also revealed seven hut floors, seven oval shaped cattle byres, as well as cultural material such as pottery sherds, ostrich eggshell beads, glass beads, a single cowry shell and various concentrations of faunal skeletal material.

Both of the proposed development layouts present possible impacts on the heritage resources identified. The identified heritage sites are rated of having High/Medium Significance as well as being Generally Protected A (GP.A). Mitigation measures and permits are therefore required before they may be affected or moved/destroyed, thus the sites identified are considered as “no go” areas until further mitigation is implemented.

Extent of mitigation

- The extent of the Iron Age site needs to be documented through surveying of the site and the development of site layout maps;
- Identified structures must be excavated with the aim of determining age, cultural affinity and utilization areas;

- Specific attention must be given to the excavation and documentation of identified middens on the site;
- After completion of the excavation, the collected material must be analysed for reporting purposes and then curated in a recognised provincial repository;
- A destruction permit must then be applied for with the backing of the mitigation report;
- This application for destruction must be lodged with the SAHRA under section 35 of the National Heritage Resources Act 25 of 1999 (NHRA).
- Upon issuing of the destruction permit, construction can then commence.
- During the construction an archaeologist must monitor the site clearing, as the possibility of encountering subsurface cultural and human remains are deemed to be high.

Palaeontology

The SAHRIS online database was accessed and the Palaeontological Sensitivity Map was consulted.

It was found that the palaeontological sensitivity for the study area was low and/or insignificant and that no palaeontological studies are required. A protocol, however, for incidental palaeontological finds is required. This protocol should include the termination of all development work if any palaeontological finds are made, and that SAHRA and a palaeontologist should be alerted to determine the way forward.

.

This report has been compiled taking into account the NEMA appendix 6 requirements for specialist reports as indicated in the table below.

NEMA Regs (2014) - Appendix 6	Relevant section in report
Details of the specialist who prepared the report	Page 2 of Report – Contact details and company
The expertise of that person to compile a specialist report including a curriculum vitae	Section 1.2 – refer to Appendix B
A declaration that the person is independent in a form as may be specified by the competent authority	Page 2 of the report
An indication of the scope of, and the purpose for which, the report was prepared	Section 1.1
The date and season of the site investigation and the relevance of the season to the outcome of the assessment	Section 5
A description of the methodology adopted in preparing the report or carrying out the specialised process	Section 3
The specific identified sensitivity of the site related to the activity and its associated structures and infrastructure	Section 3.2, 4.1- 4.2
An identification of any areas to be avoided, including buffers	Section 4.1
A map superimposing the activity including the associated structures and infrastructure on the environmental sensitivities of the site including areas to be avoided, including buffers;	
A description of any assumptions made and any uncertainties or gaps in knowledge;	Section 1.3
A description of the findings and potential implications of such findings on the impact of the proposed activity, including identified alternatives, on the environment	Section 5
Any mitigation measures for inclusion in the EMPr	Section 6
Any conditions for inclusion in the environmental authorisation	Section 6
Any monitoring requirements for inclusion in the EMPr or environmental authorisation	Section 6
A reasoned opinion as to whether the proposed activity or portions thereof should be authorised and	Section 6
If the opinion is that the proposed activity or portions thereof should be authorised, any avoidance, management and mitigation measures that should be included in the EMPr, and where applicable, the closure plan	
A description of any consultation process that was undertaken during the course of carrying out the study	Not applicable. A public consultation process was handled as part of the EIA and EMP process.
A summary and copies if any comments that were received during any consultation process	Not applicable. To date not comments regarding heritage resources that require input from a specialist have been raised.
Any other information requested by the competent authority.	Not applicable.

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List of Appendices

List of Figures

1 INTRODUCTION

PGS Heritage (Pty) Ltd (PGS) was appointed by Nemai Consulting to undertake a Heritage Impact Assessment (HIA) that forms part of the Environmental Impact Report (EIA) for the proposed development of the Limpopo Central Hospital, on remainder of Erf 6861 of Pietersburg Extension 30, found in the Polokwane Local Municipality area, Capricorn District, Limpopo Province.

1.1 SCOPE OF THE STUDY

The aim of the study is to identify possible heritage sites and finds that may occur in the proposed development area and as a result help determine if the proposed layout is viable. The HIA aims to inform the EIA in the development of a comprehensive EMP to assist the developer in managing the discovered heritage resources in a responsible manner, in order to protect, preserve, and develop the heritage resources within the framework provided by the National Heritage Resources Act of 1999 (Act 25 of 1999) (NHRA).

1.2 SPECIALIST QUALIFICATIONS

This HIA was compiled by PGS Heritage (PGS).

The staff at PGS has a combined experience of nearly 80 years in the heritage consulting industry. PGS and its staff have extensive experience in managing HIA processes and will only undertake heritage assessment work where they have the relevant expertise and experience to undertake that work competently.

Mr. Marko Hutten, author and field archaeologist investigator for this project, is registered with the Association of Southern African Professional Archaeologists (ASAPA) and has CRM accreditation within the said organisation. He has 18 years of experience in heritage management and holds a B.A. in Archaeology and Social Anthropology and a B.A. (Hons) in Archaeology.

Mr. Wouter Fourie, the Project Coordinator, is registered with the Association of Southern African Professional Archaeologists (ASAPA) as a Professional Archaeologist and is accredited as a Principal Investigator; he is further an Accredited Professional Heritage Practitioner with the Association of Professional Heritage Practitioners (APHP).

Refer to **Appendix B** for CV's.

1.3 ASSUMPTIONS AND LIMITATIONS

Not detracting in any way from the comprehensiveness of the fieldwork undertaken, it is necessary to realise that the heritage resources located during the fieldwork do not necessarily represent all the possible heritage resources present within the development area. Various factors account for this, including the subterranean nature of some archaeological sites. As such, should any heritage features and/or objects not included in the present inventory, be located or observed, a heritage specialist must immediately be contacted.

Such observed or located heritage features and/or objects may not be disturbed or removed in any way until such time that the heritage specialist has been able to make an assessment as to the significance of the site (or material) in question, which also applies to graves and cemeteries. In the event that any graves or burial places are located during the development, the procedures and requirements pertaining to graves and burials will apply as set out below.

1.4 LEGISLATIVE CONTEXT

The identification, evaluation and assessment of any cultural heritage site, artefact or find in the South African context is required and governed by the following legislation -

i. National Environmental Management Act (NEMA) Act 107 of 1998
ii. National Heritage Resources Act (NHRA) Act 25 of 1999
iii. Minerals and Petroleum Resources Development Act (MPRDA) Act 28 of 2002

The following sections in each Act refer directly to the identification, evaluation and assessment of cultural heritage resources.

i. National Environmental Management Act (NEMA) Act 107 of 1998
    a. Basic Environmental Assessment (BEA) – Section (23)(2)(d)
    b. Environmental Scoping Report (ESR) – Section (29)(1)(d)
    c. Environmental Impacts Assessment (EIA) – Section (32)(2)(d)
    d. Environmental Management Plan (EMP) – Section (34)(b)
ii. National Heritage Resources Act (NHRA) Act 25 of 1999
    a. Protection of Heritage Resources – Sections 34 to 36; and
    b. Heritage Resources Management – Section 38
iii. Minerals and Petroleum Resources Development Act (MPRDA) Act 28 of 2002
    a. Section 39(3)

The NHRA stipulates that cultural heritage resources may not be disturbed without authorization from the relevant heritage authority. Section 34 (1) of the NHRA states that, “no person may alter or demolish any structure or part of a structure which is older than 60 years without a permit issued by the relevant provincial heritage resources authority…”. NEMA states that an integrated EMP should, (23 -2 (b)) “…identify, predict and evaluate the actual and potential impact on the environment, socio-economic conditions and cultural heritage”. In accordance with legislative requirements and EIA rating criteria, the regulations of SAHRA and ASAPA have also been incorporated to ensure that a comprehensive legally compatible AIA report is compiled.

1.5 TERMINOLOGY AND ABBREVIATIONS

Archaeological resources

This includes -

i. material remains resulting from human activity which are in a state of disuse and are in or on land and which are older than 100 years including artefacts, human and hominid remains and artificial features and structures;

ii. rock art, being any form of painting, engraving or other graphic representation on a fixed rock surface or loose rock or stone, which was executed by human agency and which is older than 100 years, including any area within 10m of such representation;

iii. wrecks, being any vessel or aircraft, or any part thereof which was wrecked in South Africa, whether on land, in the internal waters, the territorial waters or in the maritime culture zone of the republic as defined in the Maritimes Zones Act, and any cargo, debris or artefacts found or associated therewith, which is older than 60 years or which SAHRA considers to be worthy of conservation;

iv. features, structures and artefacts associated with military history which are older than 75 years and the site on which they are found.

Cultural significance

This means aesthetic, architectural, historical, scientific, social, spiritual, linguistic or technological value or significance

Development

This means any physical intervention, excavation, or action, other than those caused by natural forces, which may in the opinion of the heritage authority in any way result in a change to the nature, appearance or physical nature of a place or influence its stability and future well-being, including -

i. construction, alteration, demolition, removal or change in use of a place or a structure at a place;
ii. carrying out any works on or over or under a place;
iii. subdivision or consolidation of land comprising a place, including the structures or airspace of a place;
iv. constructing or putting up for display signs or boards;
v. any change to the natural or existing condition or topography of land; and
vi. any removal or destruction of trees, or removal of vegetation or topsoil

Earlier Stone Age

The archaeology of the Stone Age, between 400 000 and 2500 000 years ago.

Fossil

Mineralised bones of animals, shellfish, plants and marine animals. A trace fossil is the track or footprint of a fossil animal that is preserved in stone or consolidated sediment.

Heritage

That which is inherited and forms part of the National Estate (Historical places, objects, fossils as defined by the National Heritage Resources Act 25 of 1999.

Heritage resources

This means any place or object of cultural significance.

Holocene

The most recent geological time period which commenced 10 000 years ago.

Later Stone Age

The archaeology of the last 30 000 years, associated with fully modern people.

Late Iron Age (Early Farming Communities)

The archaeology of the last 1000 years up to the 1800s, associated with people who carried out iron working and farming activities such as herding and agriculture.

Middle Stone Age

The archaeology of the Stone Age between 30 000-300 000 years ago, associated with early modern humans.

Palaeontology

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 or trace.

Abbreviations	***Description***
AIA	Archaeological Impact Assessment

ASAPA	Association of Southern African Professional Archaeologists
CRM	Cultural Resource Management
DEA	Department of Environmental Affairs
EIA practitioner	Environmental Impact Assessment Practitioner
EIA	Environmental Impact Assessment
ESA	Earlier Stone Age
GPS	Global Positioning System
HIA	Heritage Impact Assessment
I&AP	Interested & Affected Party
LSA	Later Stone Age
LIA	Late Iron Age
MSA	Middle Stone Age
MIA	Middle Iron Age
NEMA	National Environmental Management Act
NHRA	National Heritage Resources Act
PHRA	Provincial Heritage Resources Authority
ROD	Record of Decision
SADC	Southern African Development Community
SAHRA	South African Heritage Resources Agency

Refer to **Appendix A** for further discussions on heritage management and legislative frameworks.

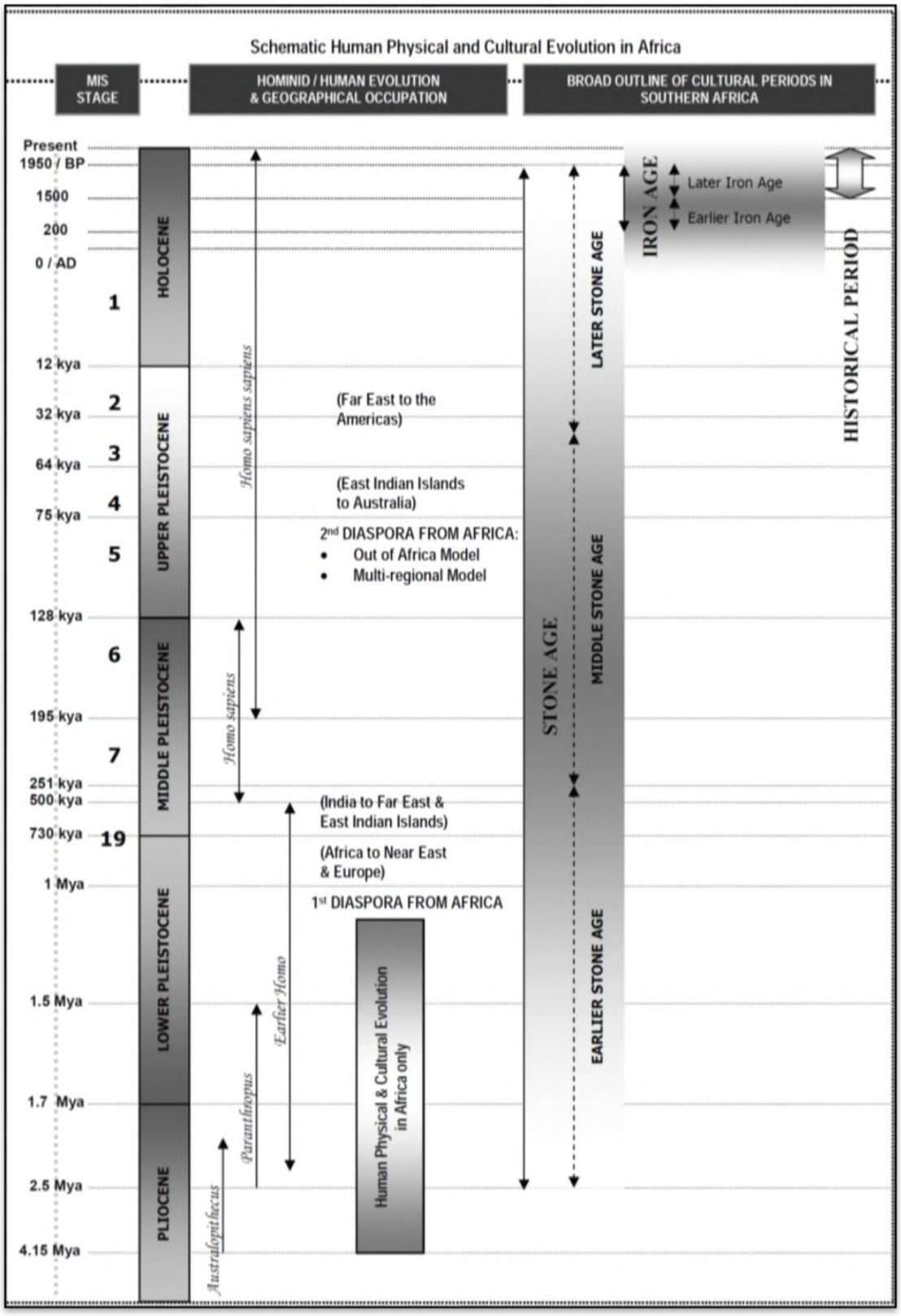

Figure 1*: Human and Cultural timeline in Africa (Morris, 2008).*

2 TECHNICAL DETAILS OF THE PROJECT

2.1 PROJECT DESCRIPTION

The proposed Limpopo Central Hospital is currently situated between Edupark, the Northern Academy Secondary School and the N1 road. The proposed site is approximately 21 ha in extent and is situated on the remainder of Erf 6861 of Pietersburg Extension 30. The proposed site borders the north east of the N1 bypass, situated east of the Peter Mokaba Soccer Stadium. Access to the hospital site will be obtained from Webster Street where traffic circles will be introduced to regulate traffic congestion to the site.

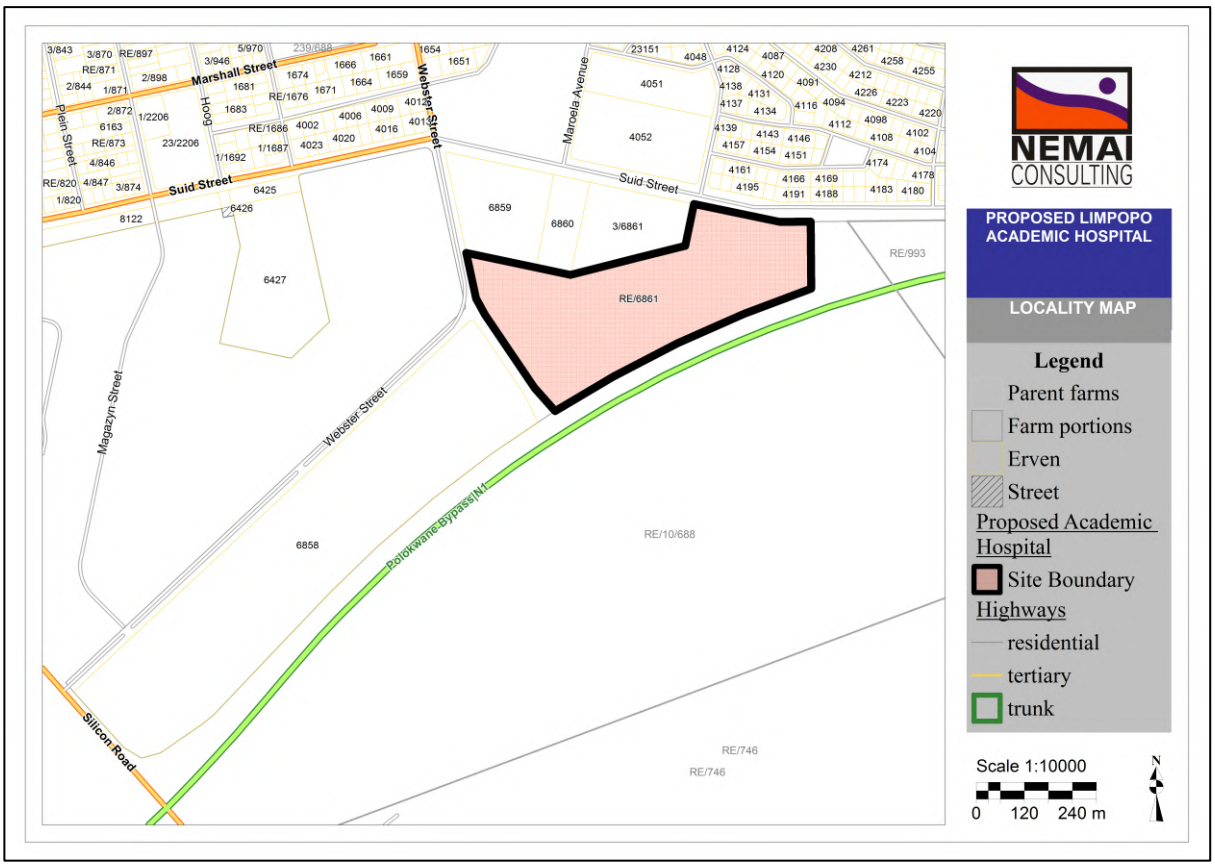

Figure 2: Locality Plan (Nemai Consulting, 2016).

The building of a new 488 bed central hospital, Limpopo Central Hospital, on a new site in Polokwane that will provide the tertiary care for the province and which will be the major teaching hospital for the University of Limpopo Faculty of Health Sciences and School of Medicine.

There will be provision of the following at the new facility:

- 488 beds clinical care capacity for a wide range of highly specialised care;
- Mostly arranged in 28 bed wards (comprising some single-bed, double-bed, four bed and six bed units);
- Specific intensive care units (ICU) and high care (HC) layouts;
- Maternal and child health (MCH) (Paediatrics and Obstetrics & Gynaecology) will be consolidated on the site separate to the adult component but sharing clinical and hospital support services;
- A mother's lodge (capacity of 24);
- A pregnant mothers lodge (capacity of 18);
- Transit – waiting (capacity of 12); and
- A day procedure beds (capacity of 12)

There will be support for a complete tertiary clinical care and academic complex core teaching capacity, compromising of a 488 x L3 beds at Limpopo Central Hospital delivering Provincial Tertiary Services (T1) and Central Referral Services (T2) care in most major clinical disciplines.

2.2 SITE DESCRIPTION

The proposed development is located on remainder of Erf 6861 of Pietersburg Extension 30 of Pietersburg. The proposed site borders the north east of the N1 bypass (*Figure 3*), situated to the east of the Peter Mokaba Soccer Stadium. The Edupark Complex is situated adjacent and on the south-western side of the proposed area. The Northern Academy Secondary School (*Figure 4*) borders the northern extent of the study area. The extent of the site is approximately 21 hectares (Ha). Access to the hospital site will be from Webster Street (*Figure 5*) where traffic circles will be introduced to regulate traffic congestion to the site.

The proposed site is relatively flat and slopes very gently from north to the south. It is covered with typical bushveld vegetation (*Figure 6*) and has red sandy soils. The southern section of the proposed site is largely undisturbed, but the northern section of the site is mostly covered with numerous mounds of dumped soil, rock and building rubble (*Figure 7* & *Figure 8*). The proposed site is Municipality Grounds and was most probably used as grazing facilities before any development occurred in the area.

Figure 3: View of the N1 eastern bypass under construction.

Figure 4: View of the Northern Academy Secondary School adjacent to the study area.

Figure 5: View of Webber Street on the north western side of the study area.

Figure 6: General view of the vegetation within the proposed study area.

Figure 7: View of the dumping within the northern section of the study area.

Figure 8: Another view of the dumping within the northern section of the study area.

3 ASSESSMENT METHODOLOGY

The section below outlines the assessment methodologies utilised in the study.

3.1 METHODOLOGY FOR ASSESSING HERITAGE SITE SIGNIFICANCE

The applicable maps, tables and figures are included, as stipulated in NHRA and NEMA. The HIA process consists of three steps:

Step I – Literature Review - The background information to the field survey relies greatly on the Heritage Background Research.

Step II – Physical Survey - A physical survey was conducted predominantly by vehicle along the proposed Newlands pipeline proposed area by a qualified archaeologist, which aimed at locating and documenting sites falling within and adjacent to the proposed development footprint.

Step III – The final step involved the recording and documentation of relevant archaeological resources, the assessment of resources in terms of the HIA criteria and report writing, as well as mapping and constructive recommendations.

The significance of the identified heritage sites are based on four main criteria -

- Site integrity (i.e. primary vs. secondary context),
- Amount of deposit, range of features (e.g., stonewalling, stone tools and enclosures),
- Density of scatter (dispersed scatter)
    - Low - <10/50m2
    - Medium - 10-50/50m2
    - High - >50/50m2
- Uniqueness; and
- Potential to answer present research questions.

Management actions and recommended mitigation, which will result in a reduction in the impact on the sites, will be expressed as follows -

A - No further action necessary;
B - Mapping of the site and controlled sampling required;
C - No-go or relocate development activity position;
D - Preserve site, or extensive data collection and mapping of the site; and
E - Preserve site.

Impacts on these sites by the development will be evaluated as follows –
Site Significance

Site significance classification standards prescribed by the SAHRA (2006) and approved by the ASAPA for the Southern African Development Community (SADC) region, were used for the purpose of this report.

Table 1: Site significance classification standards as prescribed by SAHRA.

FIELD RATING	GRADE	SIGNIFICANCE	RECOMMENDED MITIGATION
National Significance (NS)	Grade 1		Conservation; National Site nomination
Provincial Significance (PS)	Grade 2		Conservation; Provincial Site nomination
Local Significance (LS)	Grade 3A	High Significance	Conservation; Mitigation not advised
Local Significance (LS)	Grade 3B	High Significance	Mitigation (Part of site should be retained)
Generally Protected A (GP.A)		High / Medium Significance	Mitigation before destruction
Generally Protected B (GP.B)		Medium Significance	Recording before destruction
Generally Protected C (GP.A)		Low Significance	Destruction

3.2 METHODOLOGY FOR IMPACT ASSESSMENT

In order to ensure uniformity, a standard impact assessment methodology has been utilised so that a wide range of impacts can be compared. The impact assessment methodology makes provision for the assessment of impacts against the following criteria:

- Significance;
- Spatial scale;
- Temporal scale;
- Probability; and
- Degree of certainty.

A combined quantitative and qualitative methodology was used to describe impacts for each of the aforementioned assessment criteria. A summarised explanation of each of the qualitative descriptors along with the equivalent quantitative rating scale for each of the aforementioned criteria is given in **Table 2**.

Table 2: Impact Assessment Criteria

CRITERIA	CATEGORIES	EXPLANATION
Overall nature	**Negative**	Negative impact on affected biophysical or human environment.
	Positive	Benefit to the affected biophysical or human environment.
Type	**Direct**	Are caused by the action and occur at the same time and place.
	Indirect or Secondary	Are caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable. May include growth inducing effects and other effects related to induced changes in the pattern of land use, population density or growth rate, and related effects on air and water and other natural systems, including ecosystems.
	Cumulative	Is the impact on the environment, which results from the incremental impact of the action when added to other past, present and reasonably foreseeable future actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.
Spatial Extent over which impact may be experienced	**Site**	Immediate area of activity incorporating a 50m zone which extends from the edge of the affected area.
	Local	Area up to and/or within 10km of the 'Site' as defined above.
	Regional	Entire community, drainage basin, landscape etc.
	National	South Africa.
Duration of impact	**Short-term**	Impact would last for the duration of activities such as land clearing, land preparation, fertilising, weeding, pruning and thinning. Quickly reversible.
	Medium-term	Impact would after the project activity such as harvesting. Reversible over time.
	Long-term	Impact would continue beyond harvesting/ extraction of the trees.
	Permanent	Impact would continue beyond decommissioning.
Severity	**Low, Medium, High Negative**	Based on separately described categories examining whether the impact is destructive or benign, whether it destroys the impacted environment, alters its functioning or slightly alters the environment itself.
	Low, Medium, High Positive	

CRITERIA	CATEGORIES	EXPLANATION
Reversibility	**Completely Reversible**	The impact can be completely reversed with the implementation of correct mitigation and rehabilitation measures.
	Partly Reversible	The impact can be partly reversed providing mitigation measures are implemented and rehabilitation measures are undertaken
	Irreversible	The impact cannot be reversed, regardless of the mitigation or rehabilitation measures.
Irreplaceable Loss	**Resource will not be lost**	The resource will not be lost or destroyed provided mitigation and rehabilitation measures are implemented.
	Resource may be partly destroyed	Partial loss or destruction of the resource will occur even though all management and mitigation measures are implemented.
	Resource cannot be replaced	The resource cannot be replaced no matter which management or mitigation measures are implemented.
Probability of occurrence	**Unlikely**	<40% probability.
	Possible	40% probability.
	Probable	>70% probability.
	Definite	>90% probability.
Mitigation Potential **[i.e. the ability to manage or mitigate an impact given the necessary resources and feasibility of application.]**	**High or Completely Mitigatible**	Relatively easy and cheap to manage. Specialist expertise or equipment is generally not required. The nature of the impact is understood and may be mitigated through the implementation of a management plan or through 'good housekeeping'. Regular monitoring needs to be undertaken to ensure that any negative consequences remain within acceptable limits. The significance of the impact after mitigation is likely to be low or negligible.
	Moderate or Partially Mitigatible	Management of this impact requires a higher level of expertise and resources to maintain impacts within acceptable levels. Such mitigation can be tied up in the design of the Project. The significance of the impacts after mitigation is likely to be low to moderate. May not be possible to mitigate the impact entirely, with a residual impact(s) resulting.
	Low or Unmitigatible	Will not be possible to mitigate this impact entirely regardless of the expertise and resources applied.

CRITERIA	CATEGORIES	EXPLANATION
Impact Significance		The potential to manage the impact may be beyond the scope of the Project. Management of this impact is not likely to result in a measurable change in the level of significance.
	Negligible	-
	Low	Largely of HIGH mitigation potential, after considering the other criteria.
	Moderate	Largely of MODERATE or partial mitigation potential after considering the other criteria.
	Substantial	Largely of LOW mitigation potential after considering the other criteria.

4 ARCHIVAL AND DESKTOP RESEARCH FINDINGS

4.1 ARCHIVAL FINDINGS

The aim of the archival background research is to identify possible heritage resources that could be encountered during fieldwork, as summarised in **Table 3**.

Table 3: Summary of History of the study area

DATE	DESCRIPTION
2.5 million to 250 000 years ago	The Earlier Stone Age is the first and oldest phase identified in South Africa's archaeological history and comprises of two technological phases. The earliest of these is known as Oldowan and is associated with crude flakes and hammer stones. It dates to approximately 2 million years ago. The second technological phase is known as the Acheulian and comprises of more refined and better made stone artefacts, such as the cleaver and bifacial hand axe. The Acheulian dates back to approximately 1.5 million years ago. Excavations at several well-known sites in the region attest to ESA occupation. Makapansgat, 80 kilometres to the south-west, provided evidence of long occupation initially by Australopithecus africanus, from approximately 3.3 million years B.P. (Bergh 1999), while the Cave of Hearths produced stone tools and associated debris from a date of 400,000 B.P. The Olieboompoort shelter also indicates the presence of ESA people from between 1 million to 400 000 years B.P. (Birkholtz & Steyn 2002).
250 000 to 40 000 years ago	The Middle Stone Age is the second oldest phase identified in South Africa's archaeological history. This phase is associated with flakes, points and blades manufactured by means of the so-called 'prepared core' technique.

DATE	DESCRIPTION
	Also at Makapansgat, the upper strata are characterised by Middle Stone Age assemblages of 110,000 to 50,000 B.P. The site is one of the few to exhibit Acheulean assemblages in Southern Africa and contains overlying Middle Stone Age Howiessonspoort industry tools, with early evidence of fire use (Bergh, 1999; Mitchell, 2002).
40 000 years ago to the historic past	The Later Stone Age is the third archaeological phase identified and is associated with an abundance of very small artefacts known as microliths. Makapansgat's long occupation includes Late Stone Age assemblages dating from 10,000 to 5,000 years B.P., which is characterised by the Smithfield B industry (Bergh, 1999; Mitchell, 2002).
Rock Art	In Southern Africa, the Late Stone Age is characterised by the appearance of rock art in the form of paintings and engravings, and the LSA is represented in the Wolkberg by the presence of San rock paintings and engravings in the Mohlapitse River valley to the west of the study area (Changuion 2008). Further away and to the west, the Waterberg is known for its many rock art sites, including those containing shaded paintings such as at Haakdoorndraai (Pager, 1973) and the depiction of a fat tailed sheep at Dwaalhoek 185 KQ (van der Ryst 1998). To the north-west, the Makgabeng plateau has over 460 recorded rock art sites (Eastwood et. al., 2002). Evidence from Late Stone Age tool sites also attests to the long occupation of the wider area by hunter-gatherers. Very few rock art sites are known in the Pietersburg region, however Daskop is the only site that has been recorded to date (Eastwood 1999). Another site to the north-west of Pietersburg and south-west of the Makgabeng plateau, was reported by Walter Battiss in 1947. The Battiss 'Battle Site' is situated some 60 km south-west of the Makgabeng plateau, near the Makgalakwena River found north of Pietersburg (Eastwood 1999).
400-1000AD	The Early Iron Age includes the majority of the first millennium A.D. and is characterised by traditions such as "Happy Rest" and "Silver Leaves". A number of Early Iron Age sites are known from the wider area representative of two distinct pottery assemblages. The oldest assemblage belongs to the Mzonjani facies of the Urewe tradition and dates to between 450 and 750 A.D. The Kulundu tradition is represented in the wider area, by the Doornkop and Diamant facies, which dates to between 750 and 1000 A.D (Huffman, 2007).
1000-1300AD	The Middle Iron Age spans the 10th to the 13th Centuries A.D. and includes well known cultures, such as those present at K2 and Mapungubwe. The Middle Iron Age is represented in the area by the Eiland facies of the Kulundu tradition, dating from between 1000 and 1300 A.D (Huffman, 2007).

DATE	DESCRIPTION
1400-1800AD	The Late Iron Age is taken to stretch from the 14th Century up to the colonial period and includes traditions such as Icon and Letaba. Reconnaissance in the Molepo tribal area south-east of Pietersburg revealed a large number of smelting sites (13). One of these was selected for excavation, while the others were only visually inspected and this excavated site was dated to AD 1530 + 50 (Pta-418) (Van Schalkwyk 1987). Around the town of Mokopane to the south-west of the study area, several Late Iron Age sites are characteristic of the continuing Kalundu tradition, belonging either to the Icon facies (1300 to1500 A.D.) or the Madikwe facies (1500 to 1700 A.D.) (Huffman, 2007).
Early 1600s	Successive waves of both homogenous and heterogeneous groups entered and occupied the area since 1600 A.D., including the Ndebele, Shangaan and Koni people (Loubser, 1994). During the 17th Century Iron Age Nguni farmers moved from the Hlubi tribe in present day Kwa-Zulu Natal and settled in the former Transvaal as the Transvaal Ndebele. They were split into two major groupings of which the Northern Ndebele settled in the Mokopane - Polokwane region. While it is not clear which groups they settled alongside or displaced, several accounts of contact with the Northern-Sotho and Ba-Pedi are reported in the ethnology of these peoples. Bergh (1990) states that the Kekana Ndebele (Mathombeni/Yangalala) settled south-east of Potgietersrus at Moletlane. According to him this community had earlier split from the Ndzundza group. A further split within the Kekana community occurred when the Vaaltyn-Kekana established a separate community closer to the present day town of Potgietersrust (Mokopane) on the farm Pruissen.
c.1600-1900AD	The people currently living in the wider vicinity of the study site are mostly Bakoni of Matlala and Molepo, both of Northern Sotho origin, with the Mamabolo and Balobedu groups historically settled further to the east (Changuion 2008). The Bakoni of Matlala first settled in the area around modern day Polokwane around 1730 A.D. (Krige, 1937) before moving north and west towards Makgabeng and founding a settlement at Ga Matlala a' Thaba. The Koni are not a homogenous group and most of the Koni people regard their ancestry as being Nguni and originating in Swaziland (Mönnig, 1967). Excavations in 1980 by the University of the Witwaterstrand at the site of the Bokoni Malapa museum south of Polokwane indicated settlement from 1600 to 1900 A.D. comprising a sequence of Northern Ndebele, Northern Sotho and Shangaan people, finally being occupied by the Koni of Matlala (Jordaan, 1992). Loubser (1994) also excavated the site of Bambo Hill and six other Late Iron Age sites located to the north-east and south-east of Pietersburg.
Early 1800s	The beginning of the Historical Period overlaps the demise of the late Stone and Iron Ages and is characterised by the first written accounts of the region from 1600 A.D. A number of early European travellers visited the area from the early 19th Century onwards including Cowan & Donovan in 1808, David Hume in 1825, Cornwallis Harris

DATE	DESCRIPTION
	in 1836, Livingstone in 1847 and Carl Mauch in 1869 (Burke 1969; Birkholtz & Steyn 2002).
1852	British grant Transvaal Boers independence in terms of the Sand River Convention. Formation of the Zuid-Afrikaanse Republiek (http://www.sahistory.org.za/topic/polokwanepietersburg-timeline)
1860s	Many of the first white settlers in the area arrived in the 1860s as wood cutters attracted by the extensive indigenous forests on the escarpment to the west where saw-pits from these days can still be seen (Changuion 2008).
1870	Considerable tensions arose between the settlers and the local people and there were a number of skirmishes including the famous siege of the Ndebele ruler Mokopane in the Makapans caves and the forced abandonment of Potgietersrust in 1870. This site is located quite a distance from the study area (Wiener 2006).
1871	Gold was found in the Transvaal in 1871 on Franz du Preez's farm 'Eersteling' near Marabastad. This led to the first gold rush in the Transvaal (Wiener 2006).
1877	Annexation of the Transvaal by the British. Rise of nationalist political fervour among the Dutch population (http://www.sahistory.org.za/topic/polokwanepietersburg-timeline)
1880-81	The First Anglo-Boer War (1880-1881) broke out between the Transvaal and Britain, following the annexation of the Transvaal by the British in 1877. After a series of decisive victories by the Boers, the British gave back a large measure of self-rule to the Transvaal. The Boers' victory over the British was celebrated on 16 December 1881 in the Zoutpansberg district. (Wiener 2006; http://www.sahistory.org.za/topic/polokwanepietersburg-timeline).
1882-1883	Executive Council authorises the purchase of the farm Sterkloop. On 8 October 1883, Kommandant-Generaal Pieter Jacobus Joubert, the head of the South African Republic's defence force and Vice-President of the Transvaal Republic under President Paul Kruger, visited the Zoutpansberg district to decide where its capital should be established. Several meetings were held to discuss the various options for the new town. At the first meeting at Fort Klipdam [Rhenosterpoort], 72 men proposed that Sterkloop should be the site chosen. Joubert decided to establish the new town on Opzadel [Sterkloop], then owned by B J Vorster and Gert Emmenis. The Volksraad authorised Piet Joubert to investigate and finalise the siting of a new town north of Pretoria. The town was called Pietersburg, after Kommandant-Generaal Pieter Jacobus Joubert. (Wiener 2006; http://www.sahistory.org.za/topic/polokwanepietersburg-timeline)
1884-1886	On 29 January 1884, the Government bought the farm and the land-surveyor G R von Wielligh laid out 150 plots. Of these, 94 plots were given free of charge to people who

DATE	DESCRIPTION
	had owned property in Schoemansdal and the rest were sold to the public for £6 each. On 26 July 1886, the magistrate's office was moved from Marabastad to Pietersburg and on 31 July 1886, Pietersburg was officially established. (Wiener 2006; http://www.sahistory.org.za/topic/polokwanepietersburg-timeline).
1887	The town of Haenerstburg, 40 kilometres to the east of the study area, was established in 1887 after gold was found there. Old mine shafts and remains of buildings can still be seen in this area (Changuion 2008).
1888-1893	In 1888 the railway was completed from Pretoria to Pietersburg, opening up the North even further. The population of Pietersburg grew quickly from 200 whites in 1889, to 800 in 1893
1895	The history of the area also includes the 1895 war between Chief Makgoba and the ZAR. Relations between the whites and the Bavenda tribe under Magato deteriorated drastically because of disagreements over grazing and hunting grounds. The Zuid-Afrikaner Administration did not have sufficient funds to protect the whites. As a result, on 15 July 1867, the defenders of Schoemansdal under Commandant-General Paul Kruger, were forced to abandon the village, which was then burned by the Bavenda (Wiener 2006).
1889	In 1889 the famous postal coach service from Pietersburg via Haenertsburg to the Lowveld establishment of the by Doel Zeederberg (Changuion 2008).
1899-1902	The South African War (also known as the Anglo Boer War) was fought between Great Britain and the Boer republics of the Zuid-Afrikaansche Republiek and Orange Free State. In 1900 there was an historic gathering of the Transvaal and Orange Free State republics where Pietersburg was nominated as the temporary seat of Government of the United Boer Republics (http://www.sahistory.org.za/topic/polokwanepietersburg-timeline). In the Soutpansberg-Pietersburg area several incidents included a clash between the Bushveldt Carbineers and the Boers at W.H. Viljoen's farm Duiwelskloof in August 1901 (Woolmoore 2002), including the destruction of the last Long Tom guns near Haenertsburg in April 1901 (Changuion 2008). Bush Veldt Carbineers and Pietersburg Light Horse The Bush Veldt Carbineers were an irregular unit of the British forces raised in Pretoria in February 1901 and did useful work in the difficult country north of Pietersburg in that year. However, the unit gained an unfortunate notoriety by the conviction of officers Harry "Breaker" Morant, Handcock and Witton, on charges that they had committed acts not in accordance with the rules of civilised warfare. Harry 'Breaker' Morant was a drover

DATE	DESCRIPTION
	and horse-breaker and thus acquired the name 'Breaker'. He enlisted with the South Australian Mounted Rifles to fight in the Boer War. He and two other soldiers, Handcock and Witton were court-martialled and all three found guilty of executing several Boer prisoners and a German missionary. Handcock and Morant were executed by the firing squad on 27th February 1902. Kitchener commuted Witton's sentence to a lifetime of penal servitude. The Bush Veldt Carbineers were renamed to the Pietersburg Light Horse on 1 December 1901. (http://www.angloboerwar.com/unit-information/south-african-units/305-bush-veldt-carbineers-and-pietersburg-light-horse). April 1-15. The most important movement was the progress of a British force, under the command of Colonel Plumer, in an advance north from Pretoria, by the Pietersburg line, towards Nylstroom. No effective resistance was offered by opposing Boer forces, and the towns and districts in that region were occupied by the enemy with very little opposition. Pietersburg had been the seat of Transvaal Government for several months, and the purpose of the Plumer column was to attack the place. This was successfully done; General Schalk Burger and the acting members of the Transvaal Executive retiring from the town further east into the Zoutpansberg regions, where they were not pursued. (Conan Doyle 1902; http://www.angloboerwar.com/books/37-davitt-boer-fight-for-freedom/867-davitt-chapter-xxxvii-diary-of-the-warjanuary-to-june-1901) The war ended on 31 May 1902 with the British as the victors. The effects of the war were felt for years after the hostilities had actually ended.
Early 1900s	A notable pioneer in the area was Orlando Baragwanath who together with his partner Frank Lewis had discovered Zambia's copper belt. In the early 1900's Baragwanath and Lewis settled at The Downs in the mountains to the south west of the study area and constructed a now famous road over the mountain, the Ollie Baragwanath Pass (Changuion 2008).
1904	First Municipal election held. Pietersburg's population made up of 3,276 people of whom 1,620 were White http://www.sahistory.org.za/topic/polokwanepietersburg-timeline)
1925	Formation of Zion Christian Church (ZCC). The headquarters of the ZCC at Moria 40 kilometres to the west of the study area sees millions of worshippers congregate there every Easter in a major cultural event.
1984	In 1984 the then Pietersburg Town Council completed the construction of the Bakoni Malapa Northern Sotho Open Air Museum south of the town, having consulted and utilised the traditional knowledge and labour of the Matlala tribe (Jordaan, 1992).
2002	In February 2002, the city of Pietersburg became one of the first places in South Africa to change its name after the fall of apartheid, and was renamed to Polokwane, the Northern Sotho word which means "Place of Safety". (http://www.polokwane.gov.za/)

4.2 PALAEONTOLOGY

The SAHRIS database was used in order to observe the Palaeontology of the study area (http://www.sahra.org.za/sahris). As can be seen in **Figure 9** and **Figure 10**, the study area is underlain by insignificant palaeontology with a small section in the north-western corner that is rated as low significance. No further palaeontological studies are required however a protocol for incidental palaeontological finds is required. This protocol should include the termination of all development work if any palaeontological finds are discovered, and that SAHRA and a palaeontologist should be alerted to determine the way forward.

Figure 9: Palaeontological assessment of the study area (sahris, 2016).

Colour	Sensitivity	Required Action
RED	VERY HIGH	field assessment and protocol for finds is required
ORANGE/YELLOW	HIGH	desktop study is required and based on the outcome of the desktop study, a field assessment is likely
GREEN	MODERATE	desktop study is required
BLUE	LOW	no palaeontological studies are required however a protocol for finds is required
GREY	INSIGNIFICANT/ZERO	no palaeontological studies are required
WHITE/CLEAR	UNKNOWN	these areas will require a minimum of a desktop study. As more information comes to light, SAHRA will continue to populate the map.

Figure 10: Key of palaeontological map (sahris, 2016).

5 FIELD WORK FINDINGS

Due to the nature of cultural remains, with the majority of artefacts occurring below the surface, a controlled-exclusive surface survey was conducted over a period of 1 day, on foot, by an archaeologist and field assistant from PGS. The fieldwork was conducted on the 30th of August 2016.

The track logs (in blue) for the survey are indicated on the map below (Figure 11).

Figure 11: Map indicating track logs of the HIA conducted.

5.1 HERITAGE FINDINGS

The fieldwork team from PGS Heritage, traversed the study area on foot. The team conducted a controlled-exclusive surface survey, specifically focussing on undisturbed areas or areas not affected by dumping. GPS coordinates were taken of the identified heritage sites and such sites were recorded photographically. The track logs recorded during the fieldwork by the team from PGS Heritage, are depicted below. The field work was conducted on 30 August 2016 and most of the day was spent on the survey, performed by M. Hutten and T. Mulaudzi.

A total of nine heritage sites were identified within and just outside the proposed development area. Seven related Iron Age sites (LIM 003 to LIM 009).

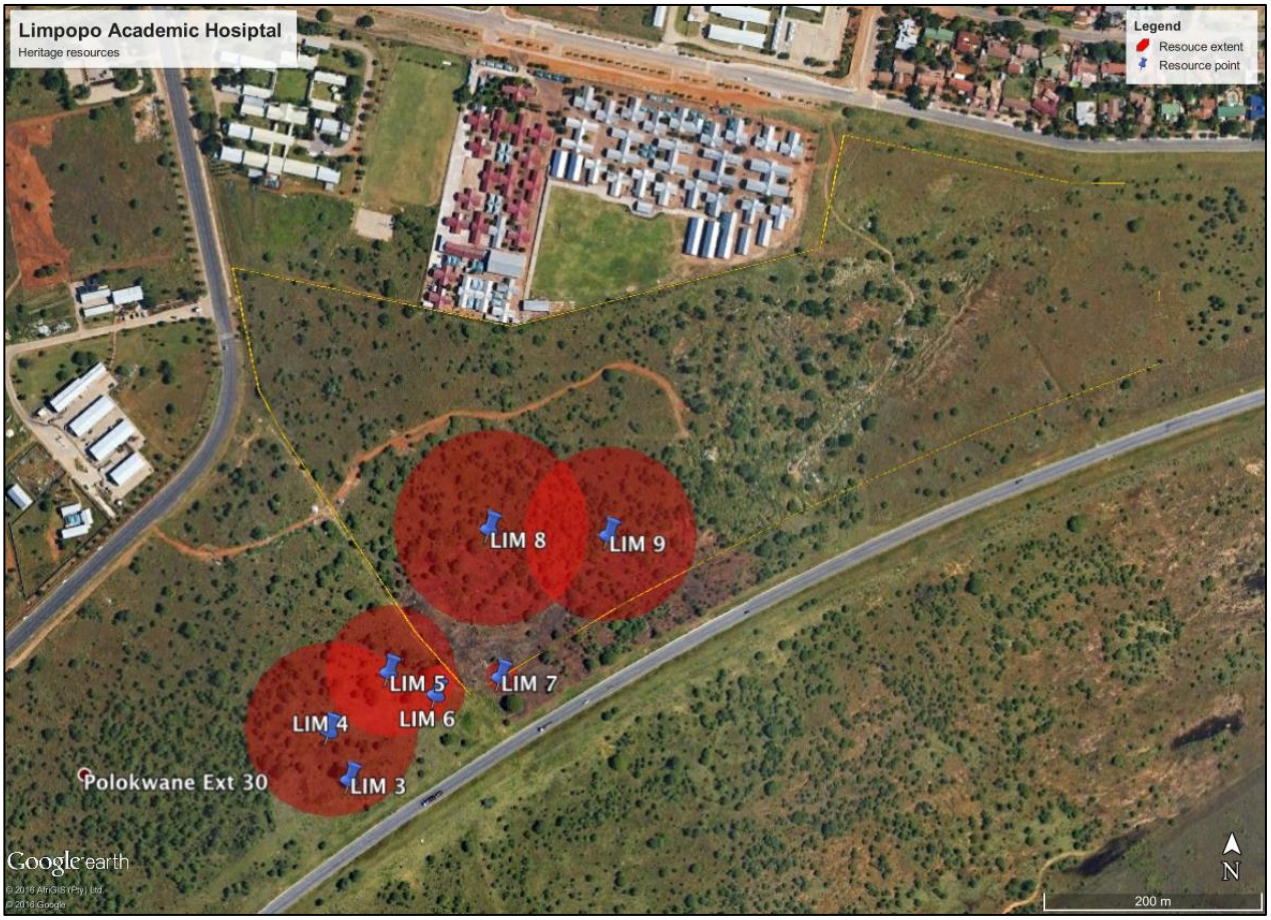

Figure 12: Heritage resources in relation to the study area.

5.2 FIELDWORK FINDINGS

5.2.1 LIM 003:

GPS Coordinates:

S 23^0 55’ 22.7” E 29^0 28’ 39.5”

Site Description:

Another stone walled enclosure was identified at this location. The enclosure measures approximately 6m in diameter and is situated within a cluster of trees (*Figure 13*). It consists of a low, double line of packed rocks which is damaged to some extent in some areas (*Figure 14*). The stone wall is also overgrown with grass and other vegetation making the identification of the size, shape and purpose of the stone wall difficult.

Figure 13: View of the stone walled enclosure identified at site LIM 003.

Figure 14: Close up view of the packed stone wall at site LIM 003.

Site Significance:

The identified site most probably formed a part of a settlement that was identified by Roodt (2001) directly to the south where the Edupark Complex is currently situated (see 5.2.1. LIM 001).

The identified site LIM 003 is deemed to be of **High/Medium Significance** and is rated as **Generally Protected A (GP.A)**. Mitigation measures and permits are therefore required before the site may be affected, moved or destroyed.

Please refer Section 7 for the required mitigation measures.

5.2.2 LIM 004:

GPS Coordinates:

S 23^0 55' 21.3" E 29^0 28' 38.8"

Site Description:

Another stone walled complex was identified at this location. It consists of several enclosures and sections of low, packed stone walls (*Figure 15*). The walls are disturbed in several places, but they form part of a larger, extensive settlement that extends further to the south and to the north (*Figure 16*). This identified section of stone walled enclosures measures approximately 80m in diameter and the walls consist of low, double or single line packed rocks, which are damaged to some extent in some areas (*Figure 17*). The stone walls are also overgrown with grass and other vegetation. This makes the identification of the size, shape and purpose of the stone walls difficult. Several potsherds were also identified within the stone walled enclosures (*Figure 18*).

Figure 15: View of the stone walled complex identified at site LIM 004.

Figure 16: Another view of the identified stone walled complex at site LIM 004.

Figure 17: View of the remains of the stone walls at site LIM 004.

Figure 18: View of some of the potsherds identified at site LIM 004.

Site Significance:

The identified site most probably formed a part of a settlement that was identified by Roodt (2001) directly to the south where the Edupark Complex is situated (see 5.2.1. LIM 001).

The identified site LIM 004 is deemed to be of **High/Medium Significance** and is rated as **Generally Protected A (GP.A)**. Mitigation measures and permits are therefore required before the site may be affected, moved or destroyed.

Please refer Section 7 for the required mitigation measures.

5.2.3 LIM 005:

GPS Coordinates:

S 23^0 55' 19.5" E 29^0 28' 40.8"

Site Description:

Another stone walled complex was identified at this location. This complex is similar to the one identified at site LIM 004. It also consists of several enclosures and sections of low, packed stone walls (*Figure 19*). The walls are also disturbed in several places, but they form part of a larger, extensive settlement which extents further to the south and to the north (*Figure 20*). This identified section of stone walled enclosures measures approximately 60m in diameter and consists of low, double or single line packed rocks, which are damaged to some extent in some areas (*Figure 21*). The stone walls are also overgrown with grass and other vegetation

making the identification of the size, shape and purpose of the stone walls difficult. Several potsherds were also identified from within the stone walled enclosures (*Figure 22*).

Figure 19: General view of the stone walled complex identified at site LIM 005.

Figure 20: View of some of the low stone walls identified at site LIM 005.

Figure 21: Another view of some of the identified stone walls at site LIM 005.

Figure 22: View of some of the potsherds identified at site LIM 005.

Site Significance:

The identified site most probably formed a part of a settlement that was identified by Roodt (2001) directly to the south where the Edupark Complex is situated (see 5.2.1. LIM 001).

The identified site LIM 005 is deemed to be of **High/Medium Significance** and is rated as **Generally Protected A (GP.A)**. Mitigation measures and permits are therefore required for the site before it is affected, moved or destroyed.

Please refer Section 7 for the required mitigation measures.

5.2.4 LIM 006:

GPS Coordinates:

S 23^0 55' 20.2" E 29^0 28' 42.3"

Site Description:

A large ash midden was identified at this location (*Figure 23*). It consists of a mound of ash mixed with soil (*Figure 24*) and it contains numerous potsherds, discarded animal bones and other archaeological material (*Figure 25*). The mound measures approximately 25m and is in close proximity of the stone walled complexes and enclosures identified at sites LIM 003, LIM 004 and LIM 005. The people who resided at the identified stone walled complexes, most probably used this area to dump their domestic rubbish.

Figure 23: View of the identified midden at site LIM 006.

Figure 24: View of the mixed ash and soil of the midden identified at site LIM 006.

Figure 25: View of some of the potsherds identified at site LIM 006.

Site Significance:

The identified site most probably formed a part of a settlement that was identified by Roodt (2001) directly to the south where the Edupark Complex is situated (see 5.2.1. LIM 001).

The identified site LIM 004 is deemed to be of **High/Medium Significance** and is rated as **Generally Protected A (GP.A)**. Mitigation measures and permits are therefore required before the site may be affected, moved or destroyed.

Please refer Section 7 for the required mitigation measures.

5.2.5 LIM 007:

GPS Coordinates:

S 23^0 55' 19.7" E 29^0 28' 44.4"

Site Description:

Another large ash midden was identified at this location (*Figure 26*). It also consists of a mound of ash mixed with soil (*Figure 27*) and it also contains numerous potsherds, discarded animal bones and other archaeological material (*Figure 28*). The mound measures approximately 15m, but a part of this site has been damaged during earth moving activities for the construction of the N1 by-pass right next to it (Figure 29). The full extent of this site could not be determined.

This site is in close proximity of the stone walled complexes and enclosures identified at sites LIM 008 and LIM 009. The people who resided at the identified stone walled complexes most probably used this area to dump their domestic rubbish.

Figure 26: General view of the identified ash midden at site LIM 007.

Figure 27: Close up view of the ash midden and artefacts identified at site LIM 007.

Figure 28: View of some of the potsherds identified at site LIM 007.

Figure 29: View of the earth moving activities from the adjacent N1 bypass development.

Site Significance:

The identified site most probably formed a part of a settlement that was identified by Roodt (2001) directly to the south where the Edupark Complex is situated (see 5.2.1. LIM 001).

The identified site LIM 004 is deemed to be of **High/Medium Significance** and is rated as **Generally Protected A (GP.A)**. Mitigation measures and permits are therefore required before the may be affected or moved/destroyed.

Please refer Section 7 for the required mitigation measures.

5.2.6 LIM 008:

GPS Coordinates:

S 23^0 55' 15.3" E 29^0 28' 44.0"

Site Description:

Another stone walled complex was identified at this location. This complex is similar to the one identified at site LIM 004. It also consists of several enclosures and sections of low, packed stone walls (*Figure 30*). The walls are also disturbed in several places, but they form part of a larger, extensive settlement which extents further to the south and to the north (Figure 31). This identified section of stone walled enclosures, extend from site LIM 007 and measure approximately 90m in diameter. The walls consist of low, double or single line packed rocks, which are damaged to some extent in some areas (*Figure 32*). The stone walls are also overgrown with grass and other vegetation which makes the identification of the size, shape and purpose of the stone walls difficult. Several potsherds were also identified from within the stone walled enclosures.

Figure 30: General view of the stone walled enclosures identified at site LIM 008.

Figure 31: Close up view of some of the stone walls identified at site LIM 008.

Figure 32: Another view of the stone walls identified at site LIM 008.

Site Significance:

The identified site most probably formed a part of a settlement that was identified by Roodt (2001) directly to the south where the Edupark Complex is situated (see 5.2.1. LIM 001).

The identified site LIM 005 is deemed to be of **High/Medium Significance** and is rated as **Generally Protected A (GP.A)**. Mitigation measures and permits are therefore required before the site may be affected, moved or destroyed.

Please refer Section 7 for the required mitigation measures.

5.2.7 LIM 009:

GPS Coordinates:

S 23^0 55' 15.5" E 29^0 28' 47.9"

Site Description:

Another stone walled complex was identified at this location (*Figure 33*). This complex is similar to the one identified at site LIM 004. It also consists of several enclosures and sections of low, packed stone walls (*Figure 34*). The walls are also disturbed in several places (*Figure 35*), but they form part of a larger, extensive settlement which extents further to the south and to the north. This identified section of stone walled enclosures measures approximately 80m in diameter. The walls consist of low, double or single line packed rocks which are damaged

to some extent in some areas (figure 41). The stone walls are also overgrown with grass and other vegetation which makes the identification of the size, shape and purpose of the stone walls difficult. Several potsherds were identified within the stone walled enclosures.

Figure 33: General view of the location of the identified stone walls at site LIM 009.

Figure 34: View of some of the stone walls identified at site LIM 009.

Figure 35: Another view of some of the stone walls identified at site LIM 009.

Figure 36: Another view of some of the stone walls identified at site LIM 009.

Site Significance:

The identified site most probably formed a part of a settlement that was identified by Roodt (2001) directly to the south where the Edupark Complex is situated (see 5.2.1. LIM 001).

The identified site LIM 005 is deemed to be of **High/Medium Significance** and is rated as **Generally Protected A (GP.A)**. Mitigation measures and permits are therefore required before they may be affected or moved/destroyed.

Please refer Section 7 for the required mitigation measures.

5.3 PALAEONTOLOGY

It was found that the palaeontological sensitivity for the study area was low and/or insignificant and that no palaeontological studies are required. A protocol, however, for incidental palaeontological finds is required. (see **Figure 9**)

6 OVERALL IMPACT EVALUATION

The study has identified that the proposed project activities will have a sustentative pre-mitigation impact on the identified heritage resources in the project area, however all the envisaged impacts on heritage resources, can be mitigated. The study has identified that the proposed project activities will have a high to medium impact on heritage resources.

6.1 STATUS QUO AND "NO GO" OPTION

6.1.1 Status Quo

A total of seven heritage sites were identified within and on the edge of the proposed development area.

The proposed development present possible impacts on some of the heritage resources identified. The identified heritage sites are rated of having High/Medium Significance, as well as being Generally Protected A (GP.A).

6.1.1.1 "No go" Option

During the heritage study, 7 heritage resources were located. The identified sites most probably formed part of a settlement that which was identified by Roodt (2001), directly to the south where the Edupark Complex is situated today. The archaeological sites at the Edupark Complex are dated between 1000AD and 1650AD and the earliest occupation can be linked to the Eiland phase, while the Moloko (Sotho-Tswana) and Letaba (Ndebele) Late Iron Age occupants arrived on the Pietersburg plateau in the 1600s. Roodt mentioned that the Edupark sites extended further to the north, although it was not documented in detail. Roodt also mentioned that a total of 13 burials or partial burials, were rescued from the Edupark site, most of which had been disturbed as a result of the construction activities. The excavations in the parking area also revealed seven hut floors, seven oval shaped cattle byres, as well as cultural

material such as pottery sherds, ostrich eggshell beads, glass beads, a single cowry shell and various concentrations of faunal skeletal material.

The sites are rated of having **High/Medium Significance** as well as being **Generally Protected A (GP.A)**. Mitigation measures and permits are therefore required before they may be affected or moved/destroyed, thus the sites identified are considered “no go” areas until further mitigation is implemented.

6.2 PROJECT IMPACT (UNMITIGATED)

During the construction, impacts may occur to Heritage and Palaeontological resources as identified for the project. These impacts will occur as a result of construction activities such as topsoil stripping, excavations and vegetation clearing.

The combined weighted project impact to the Heritage resources (prior to mitigation) will possibly be of a moderate to high negative significance. The impact will be permanent and is in all likelihood going to happen. The impact risk class is thus **moderate to high**.

However, the implementation of the recommended mitigation measures will minimise the impacts and reduce the overall impacts to **moderate to low**.

The combined weighted project impact to the Palaeontological resources (prior to mitigation) will be of a low negative significance. The impact will be insignificant.

6.3 CUMULATIVE IMPACT

The baseline impacts are considered to be moderate for Heritage resources, and additional project impacts (if no mitigation measures are implemented) will increase the significance of the existing baseline impacts., where the cumulative unmitigated impact will probably be of a moderate to high significance. The impact is going to happen and will be of short term in nature, therefore the impact risk class will be Moderate to High. However, with the implementation of the recommended management and mitigation measures this risk class can be minimized to a Low rating.

7 SUMMARY IMPACT ASSESSMENT TABLE

POTENTIAL IMPACTS (in order of impact as described in Impact Matrix)	ASPECT (refer to Impact Matrix)	Nature	Type	Extent	Duration	Severity	Reversibility	Irreplaceable Loss	Probability	MITIGATION POTENTIAL	IMPACT SIGNIFICANCE		MITIGATION MEASURES
											Without Mitigation	With Mitigation	
CONSTRUCTION PHASE													
Impacts on palaeontological resources	Heritage Resources	**Negative**	Direct	Site	Permanent	**Low**	Irreversible	Resource cannot be replaced	unlikely	High	**Low**	**Low**	Refer to Section 9
Impact on archaeological sites	Heritage resource	**Negative**	Direct	Local	Permanent	**High negative**	Irreversible	Resource cannot be replaced	Definite	Moderate or Partially Mitigatible	**High**	**Moderate to Low**	Documentation of the archaeological sites through excavations after which a destruction permit must be applied for.

8 CONCLUSIONS AND RECOMMENDATIONS

PGS was appointed by Nemai Consulting, to undertake a HIA that forms part of the EIA (EIA), for the proposed development of the Limpopo Central Hospital on the Remaining Extent of Erf no. 6861 – Extension 30 in the Polokwane Local Municipality area, Capricorn District, Limpopo Province.

A total of seven heritage sites were identified within the proposed development area. All related to Iron Age occupation (**LIM 003** to **LIM 009**) were identified.

The identified sites most probably formed part of a settlement, which was identified by Roodt (2001), directly to the south where the Edupark Complex is situated. The archaeological sites at the Edupark Complex were dated between 1000AD and 1650AD, and the earliest occupation can be linked to the Eiland phase. While the Moloko (Sotho-Tswana) and Letaba (Ndebele) Late Iron Age occupants arrived on the Pietersburg plateau in the 1600s. Roodt mentioned that the Edupark sites extended further to the north, although this was not documented in detail. Roodt also mentioned that a total of 13 burials or partial burials were rescued from the Edupark site, most of which had been disturbed as a result of the construction activities. The excavations in the parking area also revealed seven hut floors, seven oval shaped cattle byres, as well as cultural material such as pottery sherds, ostrich eggshell beads, glass beads, a single cowry shell and various concentrations of faunal skeletal material.

Both of the proposed development layouts present possible impacts on some of the heritage resources identified. The identified heritage sites are rated of having High/Medium Significance as well as being Generally Protected A (GP.A). Mitigation measures and permits are therefore required before they may be affected, moved or destroyed, thus the sites identified are considered as “no go” areas until further mitigation is implemented.

Extent of mitigation

- The extent of the Iron Age site needs to be documented through surveying of the site and the development of site layout maps;
- Identified structures must be excavated with the aim of determining age, cultural affinity and utilization areas;
- Specific attention must be give to the excavation and documentation of identified middens on the site;
- After completion of the excavation, the collected material must be analysed for reporting purposes and then curated in a recognised provincial repository;

- A destruction permit must then be applied for with the backing of the mitigation report;
- This application for destruction must be lodged with the SAHRA under section 35 of the NHRA.
- Upon issuing of the destruction permit construction can commence.
- During the construction an archaeologist must monitor the site clearing as the possibility of encountering subsurface cultural and human remains are deemed to be high.

Palaeontology

The SAHRIS online database (http://www.sahra.org.za/sahris) was accessed and the Palaeontological Sensitivity Map was also consulted.

It was found that the palaeontological sensitivity for the study area was low and/or insignificant and that no palaeontological studies are required. A protocol, however, for incidental palaeontological finds is required. This protocol should include the termination of all development work if any palaeontological finds are discovered on site, and SAHRA and a palaeontologist should be alerted to determine the way forward.

9 PREPARERS

Marko Hutten – Heritage Specialist
Wouter Fourie – Senior Heritage Specialist

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Appendix A

LEGISLATIVE REQUIREMENTS – TERMINOLOGY AND ASSESSMENT CRITERIA

1 General principles

In areas where there has not yet been a systematic survey to identify conservation worthy places, a permit is required to alter or demolish any structure older than 60 years. This will apply until a survey has been done and identified heritage resources are formally protected.

Archaeological and paleontological sites, materials, and meteorites are the source of our understanding of the evolution of the earth, life on earth and the history of people. In the NHRA, permits are required to damage, destroy, alter, or disturb them. People who already possess material are required to register it. The management of heritage resources is integrated with environmental resources and this means that before development takes place heritage resources are assessed and, if necessary, rescued.

In addition to the formal protection of culturally significant graves, all graves, which are older than 60 years and are not in a formal cemetery (such as ancestral graves in rural areas), are protected. The legislation protects the interests of communities that have an interest in the graves - they should be consulted before any disturbance takes place. The graves of victims of conflict and those associated with the liberation struggle are to be identified, cared for, protected and memorials erected in their honour.

Anyone who intends to undertake a development must notify the heritage resource authority and if there is reason to believe that heritage resources will be affected, an impact assessment report must be compiled at the construction company's cost. Thus, the construction company will be able to proceed without uncertainty about whether work will have to be stopped if an archaeological or heritage resource is discovered.

According to the National Heritage Act (Act 25 of 1999 section 32) it is stated that -
An object or collection of objects, or a type of object or a list of objects, whether specific or generic, that is part of the national estate and the export of which SAHRA deems it necessary to control, may be declared a heritage object, including –

- objects recovered from the soil or waters of South Africa, including archaeological and paleontological objects, meteorites and rare geological specimens;
- visual art objects;
- military objects;

- numismatic objects;
- objects of cultural and historical significance;
- objects to which oral traditions are attached and which are associated with living heritage;
- objects of scientific or technological interest;
- books, records, documents, photographic positives and negatives, graphic material, film or video or sound recordings, excluding those that are public records as defined in section 1 (xiv) of the National Archives of South Africa Act, 1996 (Act No. 43 of 1996), or in a provincial law pertaining to records or archives; and
- any other prescribed category.

Under the National Heritage Resources Act (Act No. 25 of 1999), provisions are made that deal with, and offer protection to, all historic and pre-historic cultural remains, including graves and human remains.

2 Graves and cemeteries

Graves younger than 60 years fall under Section 2(1) of the Removal of Graves and Dead Bodies Ordinance (Ordinance no. 7 of 1925) as well as the Human Tissues Act (Act 65 of 1983) and are under the jurisdiction of the National Department of Health and the relevant Provincial Department of Health and must be submitted for final approval to the Office of the relevant Provincial Premier. This function is usually delegated to the Provincial MEC for Local Government and Planning, or in some cases the MEC for Housing and Welfare. Authorisation for exhumation and reinterment must also be obtained from the relevant local or regional council where the grave is situated, as well as the relevant local or regional council to where the grave is being relocated. All local and regional provisions, laws and by-laws must also be adhered to. In order to handle and transport human remains, the institution conducting the relocation should be authorised under Section 24 of Act 65 of 1983 (Human Tissues Act).

Graves older than 60 years, but younger than 100 years, fall under Section 36 of Act 25 of 1999 (National Heritage Resources Act) as well as the Human Tissues Act (Act 65 of 1983) and are under the jurisdiction of the South African Heritage Resource Agency (SAHRA). The procedure for Consultation Regarding Burial Grounds and Graves (Section 36(5) of Act 25 of 1999) is applicable to graves older than 60 years that are situated outside a formal cemetery administrated by a local authority. Graves in the category located inside a formal cemetery administrated by a local authority will also require the same authorisation as set out for graves younger than 60 years, over and above SAHRA authorisation.

If the grave is not situated inside a formal cemetery but is to be relocated to one, permission from the local authority is required and all regulations, laws and by-laws set by the cemetery authority must be adhered to.

Appendix B

CURRICULUM VITAE OF TEAM

WOUTER FOURIE
Professional Heritage Specialist and Professional Archaeologist and Director PGS Heritage

Summary of Experience

Specialised expertise in Archaeological Mitigation and excavations, Cultural Resource Management and Heritage Impact Assessment Management, Archaeology, Anthropology, Applicable survey methods, Fieldwork and project management, Geographic Information Systems, including *inter alia* -

Involvement in various grave relocation projects (some of which relocated up to 1000 graves) and grave "rescue" excavations in the various provinces of South Africa
Involvement with various Heritage Impact Assessments, within South Africa, including -

- Archaeological Walkdowns for various projects
- Phase 2 Heritage Impact Assessments and EMPs for various projects
- Heritage Impact Assessments for various projects
- Iron Age Mitigation Work for various projects, including archaeological excavations and monitoring
- Involvement with various Heritage Impact Assessments, outside South Africa, including -
  - Archaeological Studies in Democratic Republic of Congo
  - Heritage Impact Assessments in Mozambique, Botswana and DRC
  - Grave Relocation project in DRC

Key Qualifications

BA [Hons] (Cum laude) - Archaeology and Geography - 1997
BA - Archaeology, Geography and Anthropology – 1996
MPhil – Conservation of the Built Environment - Current
Professional Archaeologist - Association of Southern African Professional Archaeologists (ASAPA) - Professional Member
Accredited Professional Heritage Specialist – Association of Professional Heritage Practitioners (APHP)
CRM Accreditation (ASAPA) -

- Principal Investigator - Grave Relocations
- Field Director – Iron Age
- Field Supervisor – Colonial Period and Stone Age
- Accredited with Amafa KZN

Key Work Experience

2003- current - Director – PGS Heritage (Pty) Ltd
2007 – 2008 - Project Manager – Matakoma-ARM, Heritage Contracts Unit, University of the Witwatersrand
2005-2007 - Director – Matakoma Heritage Consultants (Pty) Ltd
2000-2004 – CEO – Matakoma Consultants
1998-2000 - Environmental Coordinator – Randfontein Estates Limited. Randfontein, Gauteng
1997-1998 - Environmental Officer – Department of Minerals and Energy. Johannesburg, Gauteng

Worked on various heritage projects in the SADC region including, Botswana, Mozambique and the Democratic Republic of the Congo

MARKO HUTTEN
Professional Archaeologist

Name:	Marko Hutten
Profession:	Archaeologist
Date of birth:	1971-06-24
Parent Firm:	PGS Heritage a
Position at Firm:	Freelance Archaeologist
Years with firm:	6
Years of experience:	18
Nationality:	South African
HDI Status:	White Male

EDUCATION:

Name of University or Institution	**:**	University of Pretoria
Degree obtained	**:**	BA
Major subjects	**:**	Archaeology & Anthropology
Year	**:**	1996

Name of University or Institution	**:**	University of Pretoria
Degree obtained	**:**	BA [Hons]
Major subjects	**:**	Archaeology
Year	**:**	1997

Professional Qualifications:
Professional Archaeologist - Association of Southern African Professional Archaeologists - Professional Member
CRM Accreditation:
- Field Director - Iron Age
- Field Director - Grave Relocation

Languages:
Afrikaans
English – Speaking (Good) Reading (Good), Writing (Good)

KEY QUALIFICATIONS

Archaeological mitigation and excavations, Social consultation on grave relocation projects, Cultural Resource Management and Heritage Impact Assessment Management, Historical and Archival Research, Archaeology, Anthropology, Applicable survey methods, Fieldwork and project management.

EXPERIENCE

Archaeological Impact Assessments

1998 – 2008
Performed 300+ Archaeological Impact Assessments (1st phase). Clients include:
- Vodacom
- Telkom
- Eskom
- Roads Agency of Limpopo (RAL)
- Department of Water Affairs and Forestry (DWAF)
- South African National Parks (SANParks)

- Impala Platinum
- Various Environmental Impact Assessment Companies such as: Naledzi Environmental Consultants; Tekplan Environmental; Lokisa Environmental Consulting

Grave Relocation Projects:

- Nandoni Dam Grave Relocation Project, ± 1000 graves, 2000/01 (Field Director)
- Tavistock Colliery Grave Relocation Project, ± 700 graves, 2002 (Field Director)
- Marula Platinum Grave Rescue Project, x 2 graves, 2003 (Field Director)
- Silverlakes Grave Relocation Project, x 5 graves, 2005 (Field Director)
- Bela-Bela (Outpost) Grave Relocation Project, x 80 graves, 2008 (Field Director)
- Potgieters Rus Platinum Mine Grave Relocation Project, x 16 graves, 2008 (Field Director)
- New Vaal Colliery Grave Relocation Project, x 1700 graves, 2007 (Field Director)
- Shakadza Road Upgrade Grave Rescue Project, x 1 grave, 2007 (Field Director)
- Mapungubwe Grave Repatriation Project 2007 (Field Supervisor)

Second Phase Investigations/Excavations:
(Including Site Stabilization and Rehabilitation)

- Nandoni Dam Archaeological Project 1998 (Field Supervisor)
- Nandoni Dam Archaeological Project 1998 – 1999 (Field Director)
- Mapungubwe Rehabilitation Project 2003 (Field Director)
- Schroda Rehabilitation Project 2006 (Field Director)
- K2 Rehabilitation Project 2006 (Field Director)
- Mapungubwe Rehabilitation Project 2006 (Field Director)
- Shakadza Rescue and Rehabilitation Project 2007 (Field Director)

2008-2011

Archaeological Impact Assessments (1st phase):
(Projects in conjunction with, in brackets):

- Premier Mine Heritage Survey 2008 (PGS)
- Gope Transmission Line Survey 2008 (Botswana– Archaeology Africa)
- Argent Siding Heritage Survey 2008 (Archaeology Africa)
- Morgenzon Pipe Line Heritage Survey 2008 (Archaeology Africa)
- Klipfontein Heritage Survey 2008 (PGS)
- Spitzkop Mine Heritage Survey 2008 (PGS)
- Elandsfontein Heritage Survey 2008 (PGS)
- Makobe Township Heritage Survey 2008
- Tswinga Township Heritage Survey 2008
- Mankweng Borrow Pits Heritage Survey 2008
- Knapdaar Heritage Survey 2008 (PGS)
- Hotazel Heritage Survey 2008 (PGS)
- Lisbon Township Heritage Survey 2009
- Koert Louw Heritage Survey 2009 (PGS)
- Knapdaar Heritage Survey 2009 (PGS)
- De Wittekrans Heritage Survey 2009 (PGS)
- Ga-Kgapane Township Heritage Survey 2009
- Guernsey Eco-estate Heritage Survey 2009
- De Deur Heritage Survey 2009 (PGS)
- Bultfontein Heritage Survey 2009 (PGS)
- Optimum Mine Heritage Survey 2009
- Gorkum Eco-Estate Heritage Survey 2009
- Planknek Pipe line Heritage Survey 2009
- Regorogile Ext. 9 Heritage Survey 2009

- Haddon Agricultural Heritage Survey 2009
- Jansenpark Residential Development Heritage Survey 2009
- Klein Kariba Residential Development Heritage Survey 2009
- Kangala Mine Heritage Survey 2009 (PGS)
- Hoedspruit Juice Factory Heritage Survey 2009
- Kameelfontein Heritage Survey 2009 (PGS)
- Leolo Township Heritage Survey 2010
- Rietpol Agricultural Development Heritage Survey 2010
- Lwamondo Mining Heritage Survey 2010
- VanderBijlpark Heritage Survey 2010 (PGS)
- Kongoni Mine Heritage Survey 2010 (PGS)
- Lehating Mine Heritage Survey 2010 (PGS)
- Donkerpoort Township Heritage Survey 2010
- Klerksdorp Township Heritage Survey 2010 (PGS)
- Boikarabelo Heritage Survey 2010 (PGS)
- Mountain View Township Heritage Survey 2010
- De Put Township Heritage Survey 2010
- Vygeboomfontein Eco-Estate Heritage Survey 2010
- Vuyani-Neptune Power Line Heritage Survey 2010 (PGS)
- Gamma-Kappa Power Line Heritage Survey 2010 (PGS)
- Olifants River Bridge Heritage Survey 2010
- Bon Accord Mine Heritage Survey 2010 (PGS)
- Olifants River Water Scheme Heritage Survey 2010 (PGS)
- Buffelskloof Mine Heritage Survey 2010 (Gem-Science)
- Vlakvarkfontein Mine Heritage Survey 2010 (Gem-Science)
- Spitskop Solar Park Heritage Survey 2011
- Geluksfontein farm Heritage Survey 2011
- Leeuwvallei Town Development Heritage Survey 2011
- De Aar Solar Park Heritage Survey 2011 (PGS)
- Onbekend Mine Heritage Survey 2011 (Gem-Science)
- Witkop Solar Park Heritage Survey 2011
- Bel-Bela Solar Park Heritage Survey 2011
- Delta Solar Park Heritage Survey 2011
- Madibeng Pipe Line Heritage Survey 2011 (PGS)
- Soutpan Solar Park Heritage Survey 2011
- Vlakvarkfontein Mine Heritage Survey 2011 (PGS)
- Vuwani & Valdezia Pipe Lines Heritage Survey 2011

environmental affairs

Department:
Environmental Affairs
REPUBLIC OF SOUTH AFRICA

DETAILS OF THE SPECIALIST, DECLARATION OF INTEREST AND UNDERTAKING UNDER OATH

	(For official use only)
File Reference Number:	
NEAS Reference Number:	DEA/EIA/
Date Received:	

Application for authorisation in terms of the National Environmental Management Act, Act No. 107 of 1998, as amended and the Environmental Impact Assessment (EIA) Regulations, 2014, as amended (the Regulations)

PROJECT TITLE

Proposed Limpopo Central Hospital

Kindly note the following:

1. This form must always be used for applications that must be subjected to Basic Assessment or Scoping & Environmental Impact Reporting where this Department is the Competent Authority.
2. This form is current as of 01 September 2018. It is the responsibility of the Applicant / Environmental Assessment Practitioner (EAP) to ascertain whether subsequent versions of the form have been published or produced by the Competent Authority. The latest available Departmental templates are available at https://www.environment.gov.za/documents/forms.
3. A copy of this form containing original signatures must be appended to all Draft and Final Reports submitted to the department for consideration.
4. All documentation delivered to the physical address contained in this form must be delivered during the official Departmental Officer Hours which is visible on the Departmental gate.
5. All EIA related documents (includes application forms, reports or any EIA related submissions) that are faxed; emailed; delivered to Security or placed in the Departmental Tender Box will not be accepted, only hardcopy submissions are accepted.

Departmental Details

Postal address:
Department of Environmental Affairs
Attention: Chief Director: Integrated Environmental Authorisations
Private Bag X447
Pretoria
0001

Physical address:
Department of Environmental Affairs
Attention: Chief Director: Integrated Environmental Authorisations
Environment House
473 Steve Biko Road
Arcadia

Queries must be directed to the Directorate: Coordination, Strategic Planning and Support at:
Email: EIAAdmin@environment.gov.za

1. SPECIALIST INFORMATION

Specialist Company Name:	PGS Heritage Pty Ltd			
B-BBEE	Contribution level (indicate 1 to 8 or non-compliant)	5	Percentage Procurement recognition	80
Specialist name:	Wouter Fourie			
Specialist Qualifications:	BA Hon Archaeology			
Professional affiliation/registration:	ASAPA, APHP			
Physical address:	906 Bergarend Street, East Lynne, Pretoria			
Postal address:	PO Box 32542, Totiusdal			
Postal code:	0134	Cell:	0828513575	
Telephone:	012 332 5305	Fax:		
E-mail:	wouter@pgsheriage.co.za			

2. DECLARATION BY THE SPECIALIST

I, _____Wouter Fourie____, declare that –

- I act as the independent specialist in this application;
- I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant;
- I declare that there are no circumstances that may compromise my objectivity in performing such work;
- I have expertise in conducting the specialist report relevant to this application, including knowledge of the Act, Regulations and any guidelines that have relevance to the proposed activity;
- I will comply with the Act, Regulations and all other applicable legislation;
- I have no, and will not engage in, conflicting interests in the undertaking of the activity;
- I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing - any decision to be taken with respect to the application by the competent authority; and - the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority;
- all the particulars furnished by me in this form are true and correct; and
- I realise that a false declaration is an offence in terms of regulation 48 and is punishable in terms of section 24F of the Act.

Signature of the Specialist

PGS Heritage Pty Ltd

Name of Company:

31/10/2019.

Date

3. UNDERTAKING UNDER OATH/ AFFIRMATION

I, __Wouter Fourie_____, swear under oath / affirm that all the information submitted or to be submitted for the purposes of this application is true and correct.

Signature of the Specialist

PGS Heritage Pty Ltd

Name of Company

31/10/2019.

Date

SOUTH AFRICAN POLICE SERVICE
KRUGERSDORP
2019 -10- 31
SUID-AFRIKAANSE POLISIEDIENS

Signature of the Commissioner of Oaths

Date

APPENDIX E4

SOCIO-ECONOMIC IMPACT ASSESSMENT

PROPOSED LIMPOPO CENTRAL HOSPITAL

Socio-Economic Impact Assessment

December 2019

Final

Prepared for: National Department of Health

NEMAI CONSULTING

Environmental, Social and OHS Consultants

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Title and Approval Page

Project Name:	Proposed Limpopo Academic Hospital
Report Title:	Socio-Economic Impact Assessment
Authority Reference:	N/A
Report Status	Final

Applicant	National Department of Health

Prepared By:	Nemai Consulting			
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		www.nemai.co.za		
Report Reference:	10611			R-PRO-REP|20150514

Authorisation	Name	Signature	Date
Author:	Sameera Munshi		31 January 2017
Author:	Olebogeng Modibane		31 October 2019
Reviewed By:	Ciaran Chidley		09 December 2019

Amendments Page

Date:	Nature of Amendment	Amendment Number:
31 January 2017	First Draft	00
31 October 2019	Public Participation Draft	01
9 December 2019	Final, incorporating DEA Comments	02

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1 INTRODUCTION

Nemai Consulting was appointed by the National Department of Health as the Independent Environmental Assessment Practitioner (EAP) to undertake the Environmental Impact Assessment (EIA) for the proposed Limpopo Central Hospital in Polokwane, Limpopo Province.This Socio-Economic Impact Assessment serves as a specialist study to the EIA.

1.1 Terms of Reference

The terms of reference for the project is indicated below:

- Determine the specific local socio-economic, land utilisation and acquisition implications of the project.
- Collect baseline data on the current socio-economic environment.
- Assess socio-economic impacts (positive and negative) of the project,
- Undertake a thorough review of the following with the purpose of identifying landowner issues:
  - Minutes of public meetings and individual meetings; and
  - Comments and Response Report.
- Suggest suitable mitigation measures to address the identified impacts.
- Make recommendations on preferred options from a socio-economic perspective.

1.2 Structure of the report

The remainder of the report is structured as follows:

Section 2: ***Legal Framework*** – A description of the statutory and regulatory requirements that inform this report.

Section 3: ***Project Description*** – This section provides an introduction and motivation to the project.

Section 4: ***Methodology*** – Outline on the methodology used to determine the socio-economic impacts of the proposed project.

Section 5: ***Situational Analysis***– A desktop analysis into the baseline context on the study area. A discussion on the finding that result from community engagement, site visits and stakeholder participation.

Section 6: ***Identification of Activities, Aspects and Impacts*** – The identification of the project activities and an investigation into what aspects of these activities will result in socio-economic impacts.

Section 7: ***Impact Assessment*** – An impact assessment with proposed mitigation measure and recommendations.

Section 8: ***Conclusion*** – Final remarks and management guidelines for a way forward.

2 LEGAL FRAMEWORK

Legislated Acts, Policy, Plans and Strategy provide an important framework and governance of the SEIA. This section provides a summary of the important Acts, Policy, Plans and Strategy which were accounted for in this study.

2.1 Constitution of the Republic of South Africa (Act 108 of 1996)

As contained in the Constitution the rights of all South Africans are protected as outlined in Chapter 2: the Bill of Rights. These rights form the basis of democracy in South Africa. The Constitution (including the Bill of Rights) binds the Legislature, the Executive, the Judiciary and all organs of state and is the overriding legislation of South Africa.

While all items in the Bill of Rights are considered to be of equal importance, key items in the Bill of Rights that have a bearing on social rights and issues in this project include (but are not necessarily limited to):

- Life: Everyone has the right to life;
- Human Dignity: Everyone has inherent dignity and the right to have their dignity respected and protected;
- Equality: Everyone is equal before the law and has the right to equal protection and benefit from the law;
- Freedom of religion, belief and opinion: Everyone has the right of freedom of conscience, religion, thought, belief and opinion;
- Environment: Everyone has the right to an environment that is not harmful to their health or well-being, and to have the environment protected for the benefit of present and future generations, through reasonable legislative and other measures that prevent pollution and ecological degradation, promote conservation and secure ecologically sustainable development and the use of natural resources while promoting justifiable economic and social development;
- Property: No person may be deprived of property except in terms of the law of general application, and no law may permit arbitrary deprivation of property. Property may be expropriated only in terms of the law of general application for a public purpose or in the public interest. The public interest includes South Africa's commitment to land reform and to reforms to bring about equitable access to all South Africa's natural resources. Property is not limited to land;
- Health care, food, water and social security: Everyone has the right to have access to health care services, including reproductive health care, sufficient food and water and social security, including, if they are unable to support themselves and their dependents, appropriate social assistance;

- Language and culture: Everyone has the right to use the language and participate in the cultural life of their choice, but no one exercising these rights may do so in a manner inconsistent with any provision of the Bill of Rights;
- Cultural, religious and linguistic communities: Persons belonging to cultural, religious or linguistic communities may not be denied the right, with other members of the that community to enjoy their culture, practice their religion and use their language, and to form, join and maintain cultural, religious and linguistic associations and other organs of civil society. These rights must be exercised in a manner that is consistent with any provision in the Bill of Rights;
- Access to information: Everyone has the right of access to any information held by the state and any information that is held by another person and that is required for the exercise or protection of any rights; and,
- Just administrative action: Everyone has the right to administrative action that is lawful, reasonable and procedurally fair. Everyone whose rights have been adversely affected by administrative action has the right to be given written reasons. This right has been given effect via the Promotion of Administrative Justice Act ((PAJA) Act 3 of 2000).

2.2 National Environmental Management (Act 107 of 1998)

The National Environmental Management Act (NEMA) and the principles contained therein have a significant influence on the need to identify and assess socio-economic impacts. The NEMA principles are based on the basic rights as set out in Chapter 2 (Bill of Rights) of the Constitution.

According to Barber (2007:16) the following NEMA principles have an important impact on social issues:

- Environmental management must place people and their needs at the forefront of its concern, and serve their physical, psychological, developmental, cultural and social interests equitably;
- Development must be socially, environmentally and economically sustainable;
- Environmental management must be integrated, acknowledging that all elements of the environment are linked and interrelated, and it must take into account the effects of decisions on all aspects of the environment and all people in the environment by pursuing the selection of the best practicable environmental option;
- Environmental justice must be pursued so that adverse environmental impacts shall not be distributed in such a manner as to unfairly discriminate against any person, particularly vulnerable and disadvantaged persons;

- Equitable access to environmental resources, benefits and services to meet basic human needs and ensure human well-being must be pursued and special measures may be taken to ensure access thereto by categories of persons disadvantaged by unfair discrimination;
- The participation of all interested and affected parties in environmental governance must be promoted, and all people must have the opportunity to develop the understanding, skills and capacity necessary for achieving equitable and effective participation, and participation by vulnerable and disadvantaged persons must be ensured;
- Decisions must take into account the interests, needs and values of all interested and affected parties, and this includes recognising all forms of knowledge, including traditional and ordinary knowledge;
- Community well-being and empowerment must be promoted through environmental education, the raising of environmental awareness, the sharing of knowledge and experience and other appropriate means;
- The social, economic and environmental impacts of activities, including disadvantages and benefits, must be considered, assessed and evaluated, and decisions must be appropriate in light of such consideration and assessment;
- The right of workers to refuse work that is harmful to human health or the environment and to be informed of dangers must be respected and protected;
- Decisions must be taken in an open and transparent manner, and access to information must be provided in accordance with the law;
- The environment is held in public trust for the people. The beneficial use of environmental resources must serve the public interest and the environment must be protected as the peoples' common heritage; and
- The vital role of women and youth in environmental management and development must be recognised and their full participation therein must be promoted.

2.3 National Water Act (Act 36 of 1998)

The principles of the National Water Act (NWA) recognize that sustainability and equity are central guiding principles in the protection, use, development, conservation, management and control of South Africa's water resources.

These guiding principles also recognize the basic human needs of current and future generations and the need to promote social and economic development through the use of water. In this regard the purpose of the NWA is to ensure that South Africa's water resources are protected, used, developed, conserved, managed and controlled in ways that take into account factors that are central to the assessment of social issues, including (Barbour, 2007):

- Meeting basic needs of current and future generations;
- Promoting equitable access to water;
- Redressing the results of past racial and gender discrimination;
- Promoting the efficient, sustainable and beneficial use of water in the public interest;
- Facilitating, social and economic development; and,
- Providing for the growing demand for water.

2.4 Promotion of Administrative Justice Act (Act 3 of 2000)

The right to administrative action stated in the Bill of Rights has been given effect via the Promotion of Administrative Justice Act (PAJA). The provisions of the PAJA apply to all decisions of all organs of state exercising public power or performing a public function in terms of any legislation that adversely affects the rights of any person (Babour, 2007).

PAJA also prescribes the procedure that must be followed by an organ of state when it takes decisions. If an organ of state implements a decision that impacts on an individual or community without granting them an opportunity to comment, the ultimate decision will be unlawful and therefore may be set aside. The Act also imposes a duty on organs of state to explain and justify the manner in which they have reached their decisions and, in the case of social issues, how these issues were considered in the decision-making process (Babour, 2007).

2.5 Development Facilitation Act (Act 67 of 1995)

The Development Facilitation Act (DFA) outlines various principles concerning land development in Section 3 of the Act. Some of the relevant principles are briefly highlighted below (Babour, 2007). These principles include (but are not limited to:

- Promoting the integration of the social, economic, institutional and physical aspects of land development;
- Promoting integrated land development in rural and urban areas in support of each other;
- Promoting the availability of residential and employment opportunities in close proximity to or integrated with each other;
- Optimising the use of existing resources including such resources relating to agriculture, land, minerals, bulk infrastructure, roads, transportation and social facilities;
- Promoting a diverse combination of land uses, also at the level of individual erven or subdivisions of land;

- Discouraging the phenomenon of "urban sprawl" in urban areas and contributing to the development of more compact towns and cities;
- Contributing to the correction of the historically distorted spatial patterns of settlement in the Republic and to the optimum use of existing infrastructure in excess of current needs;
- Encouraging environmentally sustainable land development practices and processes;
- Promoting land development which is within the fiscal, institutional and administrative means of the Republic;
- Promoting the establishment of viable communities; and,
- Promoting sustained protection of the environment.

2.6 Restitution of Land Rights Act 22 Of 1994

The aim of the Restitution of Land Rights Act 22 of 1994 is as follows:

- To provide for the restitution of rights in land in respect of which persons or communities were dispossessed under or for the purpose of furthering the objects of any racially based discriminatory law;
- To establish a Commission on Restitution of Land Rights and a Land Claims Court; and
- To provide for matters connected therewith.

2.7 National Development Plan (2011)

The National Development Plan (NDP) of 2010 proposes to “invigorate and expand economic opportunity through infrastructure, more innovation, private investment and entrepreneurialism.

The Plan aims to ensure that all South Africans attain a decent standard of living through the elimination of poverty and reduction of inequality. The core elements of a decent standard of living identified in the Plan are:

- Housing, water, electricity and sanitation;
- Safe and reliable public transport;
- Quality education and skills development;
- Safety and security;
- Quality health care;
- Social protection;
- Employment;
- Recreation and leisure;
- Clean environment; and

- Adequate nutrition.

2.8 National Water Resources Strategy (June 2013)

This strategy provides a national framework against which water resources across the country will be managed and in this sense aims to;

" …ensure that national water resources are protected, used, developed, conserved, managed and controlled in an efficient and sustainable manner towards achieving South Africa's development priorities in an equitable manner over the next five to 10 years. This Strategy responds to priorities set by Government within the National Development Plan (NDP) and National Water Act (NWA) imperatives that support sustainable development. The NWRS2 acknowledges that South Africa is a water-stressed country and is facing a number of water challenges and concerns, which include security of supply, environmental degradation and resource pollution, and the inefficient use of water" (Department of Water Affairs, 2013a, p. iii).

2.9 International Organisation for Standardization, ISO 14001:2004

The International Organisation for Standardization (ISO) is used for identifying impacts. The ISO 14001: 2004 – Environmental Management Systems definitions for aspect, activity and impact are used in keeping with best practice.

ISO 14001:2004 specifies requirements for an environmental management system to enable an organization to develop and implement a policy and objectives and information about significant environmental aspects. It applies to those environmental aspects that the organization identifies as those which it can control and those which it can influence.

2.10 Prevention of Illegal Eviction from Unlawful Occupation of Land Act 19 of 1998 (PIE Act)

According to Section 4 (6) and (7) of the Prevention of Illegal Eviction from and Unlawful Occupation of Land Act, 1998 (PIE) with regards to the Eviction of unlawful occupiers states that:

- (6) If an unlawful occupier has occupied the land in question for less than six months at the time when the proceedings are initiated, a court may grant an order for eviction if it is of the opinion that it is just and equitable to do so, after considering all the relevant circumstances, including the rights and needs of the elderly, children, disabled persons and households headed by women.

- (7) If an unlawful occupier has occupied the land in question for more than six months at the time when the proceedings are initiated, a court may grant an order for eviction if it is of the opinion that it is just and equitable to do so, after considering all the relevant circumstances, including, except where the land is sold in a sale of execution pursuant to a mortgage, whether land has been made available or can reasonably be made available by a municipality or other organ of state or another land owner for the relocation of the unlawful occupier, and including the rights and needs of the elderly, children, disabled persons and households headed by women

3 PROJECT DESCRIPTION

The National Department of Health (NDoH) is proposing to develop a Central Hospital in Polokwane, Limpopo Province (**Figure 1**). The proposed project is being funded by the Hospital Revitalisation Programme and is administered by the National Department of Health. The project is being funded by the Hospital Revitalisation Programme out of a conditional grant administered by the National Department of Health (NDoH). It seeks to "transform and modernise infrastructure and equipment in hospitals in line with national policy and to achieve a sustainable infrastructure from which modern, equitable and sustainable services can be delivered".

Currently tertiary level health care services are provided at both the Pietersburg Hospital, located in the centre of Polokwane as well as the Mankweng Hospital situated approximately 30km east on the Turfloop Campus of the new University of Limpopo (**Figure 2**).

The decision to move tertiary health care services from the Pietersburg/Mankweng Complex to a new facility creates the opportunity to provide a better balance of specialist care in the province and for dedicated level two (2) facilities in the Capricorn District. In addition, there is a need to create teaching capacity within the province to address medical, and health services skills shortages. The proposed new hospital and research centre, geared towards specific requirements of a rural province, would further provide the opportunity to create an environment that would attract key teaching, Central and scarce professional staff.

The building of the new Limpopo Central Hospital on a new site in Polokwane that will provide the tertiary care for the province. The newly built hospital will consist of the following:

- 488 beds clinical care capacity for a wide range of highly specialised care;
- Mostly arranged in 28 bed wards (comprising some single-bed, double-bed, four bed and six bed units);
- Specific intensive care units (ICU) and high care (HC) layouts;

- Maternal and child health (MCH) (Paediatrics and Obstetrics & Gynaecology) will be consolidated on the site separate to the adult component but sharing clinical and hospital support services;
- A mother's lodge (capacity of 24);
- A pregnant mothers lodge (capacity of 18);
- Transit – waiting (capacity of 12); and
- A day procedure beds (capacity of 12)

The development is proposed to be built on the south-eastern boundary of Polokwane the proposed Limpopo Central Hospital is currently situated between Edupark Campus, the Northern Academy Secondary School and the N1 road. The proposed site is approximately 21 ha in extent and is situated on the remainder of Erf 6861 of Pietersburg Extension 30.

The site is nestled between Edupark Campus, Northern Academy School and the N1 road. Access to the hospital site will be obtained from Webster Street where traffic circles will be introduced to regulate ingress and egress to the site. The specific position of the hospital will ensure good visibility and exposure from a public point of view and for direct access for emergency traffic. Parking and taxi drop-off facilities will be erected west of the hospital and off the feeder road.

The project is still in the application phase and therefore no alternatives are assessed at this stage.

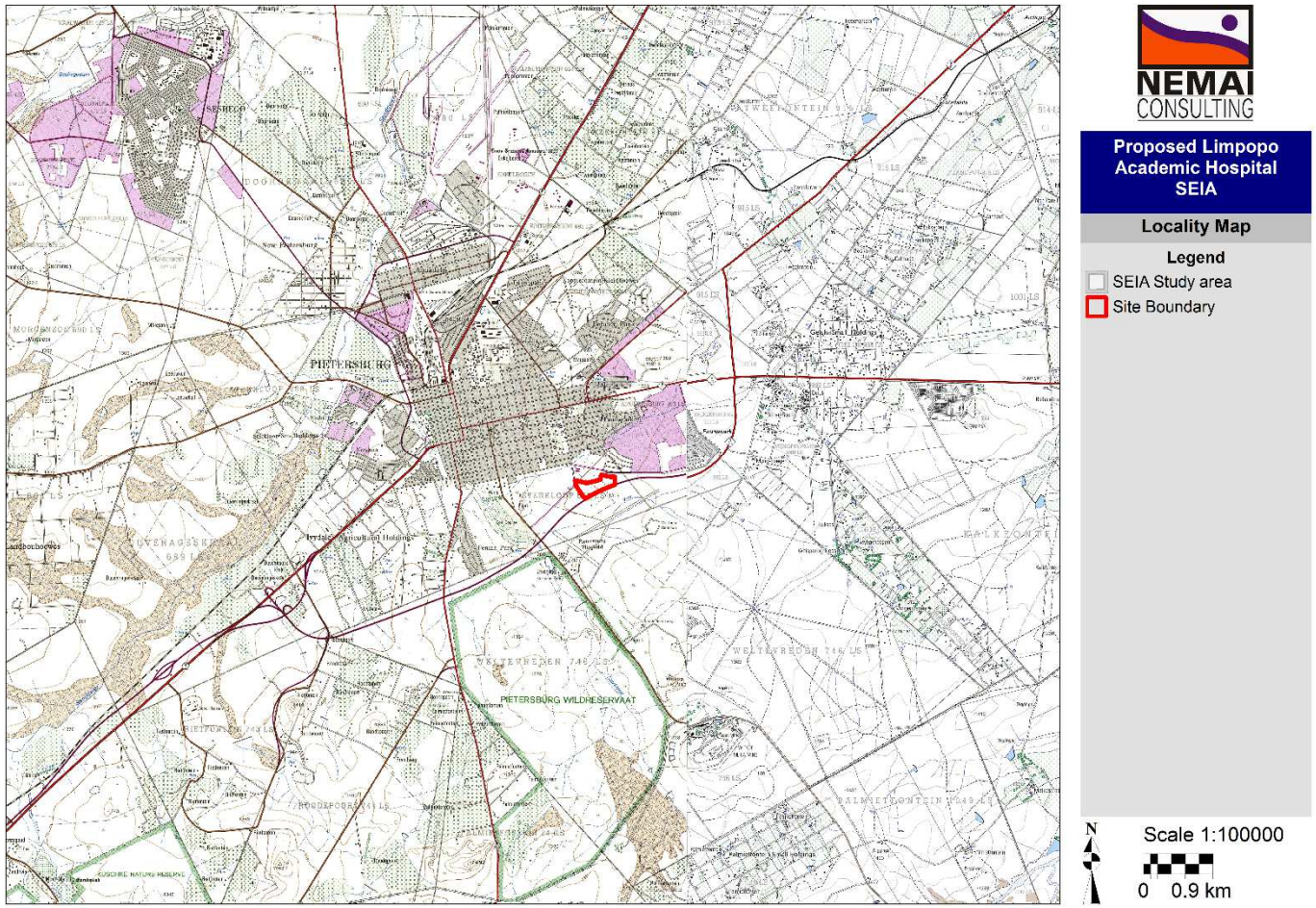


Figure 1: Locality Map

Figure 2: Google Earth areal image of the proposed development

4 METHODOLOGY

Socio-Economic Impact Assessment (SEIA) is an interactive process by nature which relies on both desktop research as well as input from the community. SEIA assist the community to be part of the environmental decision-making process, and empower communities to participate in decisions that will affect their livelihoods (DEAT, 2006).

The Australian Government Department of the Environment and Heritage (2005:5) states that Socio-economic Impact Assessment is a useful tool to help understand the potential range of impacts of a proposed change, and the likely responses of those impacted on if the change occurs.

An SEIA is used during the EIA process to identify and evaluate potential social, economic or cultural impacts of a proposed development. The SEIA recognises the important relationship between the economic, social and biophysical environment.

The SEIA will look at minimising adverse impacts of the proposed development while aiming to maximise the beneficial impacts. The SEIA sets out the socio-economic baseline, predicts impacts and makes recommendations for mitigation.

4.1 Sourcing of Information and Data Analysis

The socio-economic baseline level is based on both primary and secondary data. Primary data was collected directly from community members. Secondary data was accessed through South African Databases, available reports and articles, internet searches and are referenced in the text and in the reference section of this report.

The profile of the baseline conditions includes determining the current status quo of the community, including information on a number of social and economic issues such as Demographic factors; Socio-economic factors such as income and land tenure; and Statutory and Regulatory Environment.

The required information will be collected using different sources Statistics South Africa Census data; Quantec Research EasyData; through the review of municipal, district and private sector reports.

The 2010 Final Scoping Report for the proposed project provided the context for this report. The report assisted in provided the need and desirability of the project, the land use and information on the alternatives that required assessment. The Comments and Response Report which forms part of the Scoping Report highlighted the concerns from the community. The report was compiled using information from public meetings and correspondence.

The discussion of the demographics and the development profile of the municipality were carried out using Census 2011 data, produced by Statistics South Africa.

The Census 2011 data is the most comprehensive dataset available for the area, and it is currently the best data at hand. The sub-place and municipal data have been extracted using the project GIS, and the data for the affected areas will be presented in the table and figures.

Quantec Research (Pty) Ltd is a South African based consultancy which focuses on the marketing, distribution and support of economic and financial data, country intelligence and quantitative analytical software. Quantec Research maintains and distributes a comprehensive set of data collections covering macro and regional socio-economic, industry and international trade data. Data such as gross value added and the unemployment rate were sourced from Quantec Research.

A Geographic Information System (GIS) was used to conduct a thorough analysis of the area. The use of GIS brings together the demographic and economic data into graphic form, enabling a thorough and more accurate analysis.

4.2 Impact Assessment

Impact assessments allows for an estimate of the significance of the identified social and economic impacts to those who will be affected. In addition, the response of the affected parties to such impacts also needs to be clarified (Centre for Good Governance, 2006). All impacts will be analysed with regard to their nature, extent, magnitude, duration, probability and significance (Barbour, 2007). Section 8 lists the definitions that apply to the impact assessment.

The determined impacts are clustered around a common issue and are assessed before and after mitigation. The identification of the socio-economic impacts associated with the project is issues-based, with the main headings referring to a common theme addressing several related impacts. Under each of these issues the specific impacts and potential mitigation strategies are discussed for pre-construction, construction, operation and decommissioning phases.

4.3 Assumptions and Limitations

- The study was done with the information available to the specialist at the time of executing the study, within the available time frames and budget. The sources consulted are not exhaustive, and additional information which might strengthen arguments, and/or identify additional information might exist. However, the specialist did endeavour to take an evidence-based approach in the compilation of this report and did not intentionally exclude information relevant to the assessment.
- This report is the result of a short-term study; no long-term studies were conducted on site. As a result of the short-term nature of this study, the opportunity for primary data collection was limited. This study therefore depends heavily on secondary or existing data sources such as those listed above. It is assumed that these sources are dependable and of good quality;
- Regardless of the analytical and predictive method employed to determine the potential impacts associated with the project, the impacts are only predicted on a probability basis. The accuracy of the predictions is largely dependent on the availability of environmental data and the degree of understanding of the environmental features and their related attributes;
- It is assumed that all information provided by the Environmental Assessment Practitioner was accurate as was the information provided in other specialist studies used in this report;
- It was assumed that the information gathered through the public participation process was a true reflection of the attitude of the public towards the project and as such was accurately recorded;
- The study was completed using the Statics South Africa Census 2011 data. While it is acknowledged that they data is somewhat outdated, it is the most comprehensive primary data available;
- It must be assumed that all the interview reports are based on reflections provided by those present and may or may not necessarily be a reflection of future conditions.
- It is assumed that information obtained during the interviews provide an honest account of the community and community relationship for the hospital. It must be noted, however, that meetings are not statistically representative.
- An information gap for this study is the exact circumstances of the homeless dwellers on the site. Information was not able to be obtained with regards the duration of rough sleeping on the site, not their sources of income. This affects approximately four people, who will be impacted by the project. The information gap can be filled in the pre-construction phase, given the transient nature of the homeless dwellers.

5 SITUATIONAL ANALYSIS

The following section provides a detailed description of the social and economic environment. In this section, demographics such as population and gender, education, and utilities are discussed. An economic overview follows with information on employment and industry is also outlined.

There is a geographical impact related to the physical infrastructure. A vast majority of the impacts that are likely to occur from the proposed project will be geographically bound. The closer the proximity to the bulk infrastructure, the higher the impact will be. In order to assess this geographical impact, the Statistics South Africa 2011 Municipal Sub-place boundaries has been used to analyse data (**Table 1**). Sub-place data is the smallest official geographical data available to obtain context of the receiving environment.

Table 1: Affected Sub-places (1 kilometre radius) around the study area

SP CODE	SP NAME	Area
974044021	Polokwane Central	64.95224 km^2
974044022	Capricorn	64.83781 km^2
974044023	Fauna Park	22.88628 km^2
974044026	Flora Park	41.08358 km^2
974044027	Polokwane Ext 24	37.72240 km^2
974044028	Pietersburg Vliegveld	84.09139 km^2
974044029	Pietersburg Wildresevaat	20.92966 km^2

5.1 Land use

Existing land uses and infrastructure in the general area of the proposed development includes residential areas and industrial/commercial areas. The proposed site is also situated in an area which is classified as vacant/not specified (**Figure 3 and 4**).

Figure 3: Land use on site

Figure 3 above shows a typical land use at the proposed Limpopo Central Hospital site.

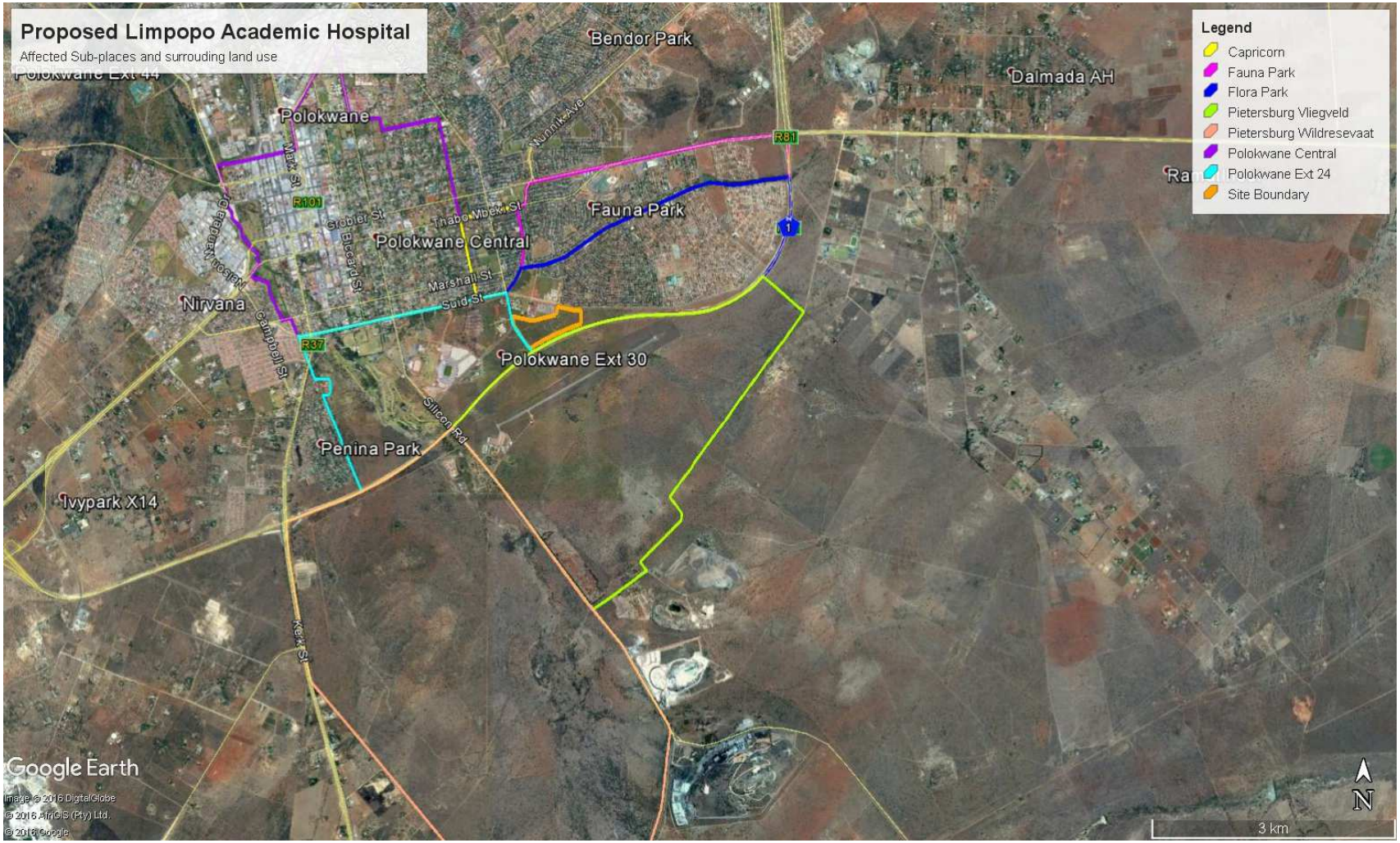


Figure 4: Google Earth image of the sub-places and land

As seen in **Figure 4**, the Polokwane Game Reserve (previously known as Petersburg Wildresevaat) is situated approximately 1.3 km from the proposed site, while the proposed site exhibits a key vegetation community for the Pietersburg False Grassland. The Peter Mokaba Soccer Stadium is located to the north of the proposed site, while the Edupark Campus (University of Limpopo) borders the proposed Limpopo Central Hospital site on the western see **Figures 5 and 6**.

Polokwane is the capital of Limpopo Province and a first order node for the province.

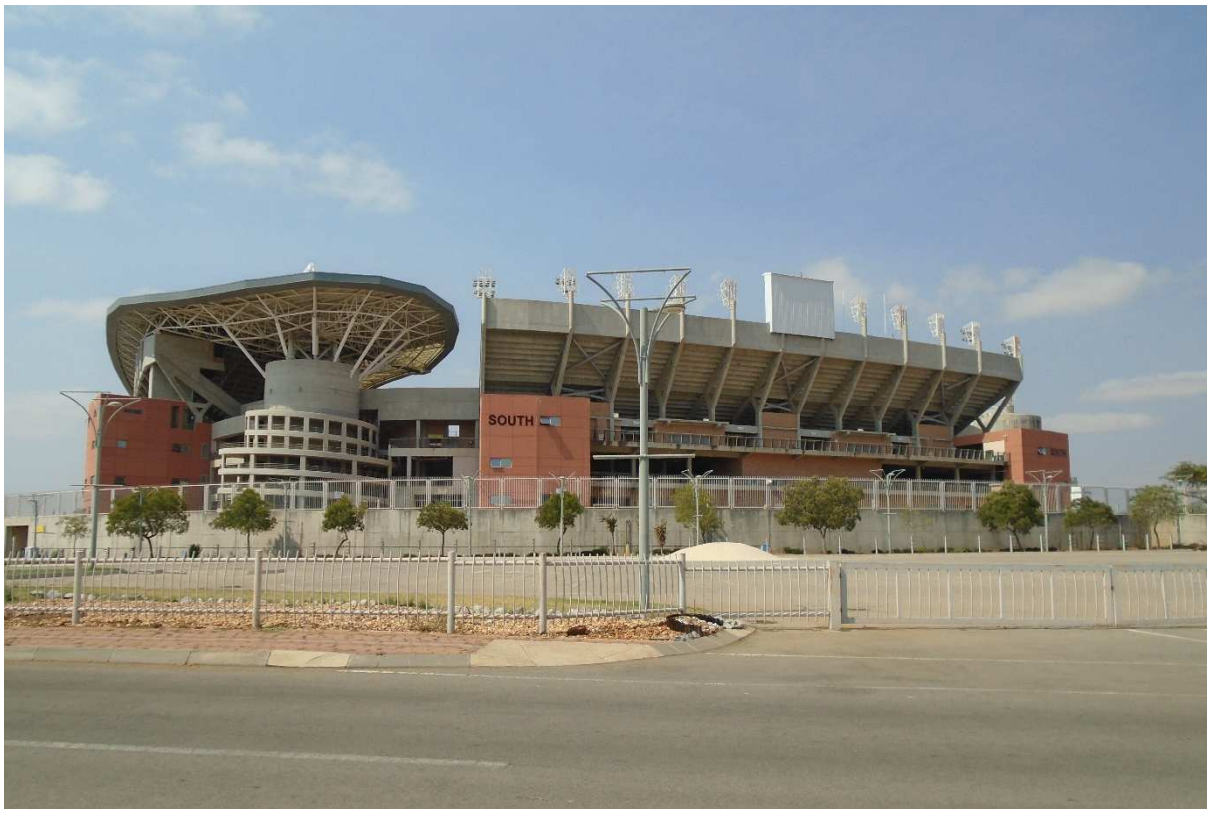


Figure 5: Peter Mokaba Stadium, opposite the site

Figure 6: The neighbouring Edupark complex

In consultation with Councillor Thilivhali Mashau, it was noted that the site was used as a hiding place by criminals and was also a hotspot or various criminal activities. In response to this, the site is now generally well maintained and is continuously cleared by the city of Polokwane Environmental Management Department. Their offices are located a few meters away from the site which makes it easier for them to maintain the site. **Figure 7** shows an image of the Environmental Management offices.

Figure 7: Polokwane Environmental Management Offices, opposite the site

Figure 8: A municipality borehole on site

During the site walk, a borehole was located and is owned by the Polokwane Local Municipality. The borehole is currently not being used and will benefit the hospital as it has the potential to be used as a sustainable water source while reducing the stress on the local piped water supply. **Figure 8** above shows an image of the borehole identified on site.

5.2 Population, Age and Gender

The total population for the two wards is 29 886 persons (**Table 2**). The sub-places that are densely population are located in the urban edge and include Polokwane Central and Flora Park who have 12 825 and 11 562 persons in the respective areas. The populations Pietersburg Vliegveld and Pietersburg Wildresevaat are almost insignificant at 42 and 69 persons living in each sub-place respectively.

Table 2: Population, Age and Gender in 2011

Sub-Place	Population	Population (%)
Polokwane Central	12 825	43%
Capricorn	771	3%
Fauna Park	4 161	14%
Flora Park	11 562	39%
Polokwane Ext 24	456	2%
Pietersburg Vliegveld	42	0%
Pietersburg Wildresevaat	69	0%
Total	29 886	100%

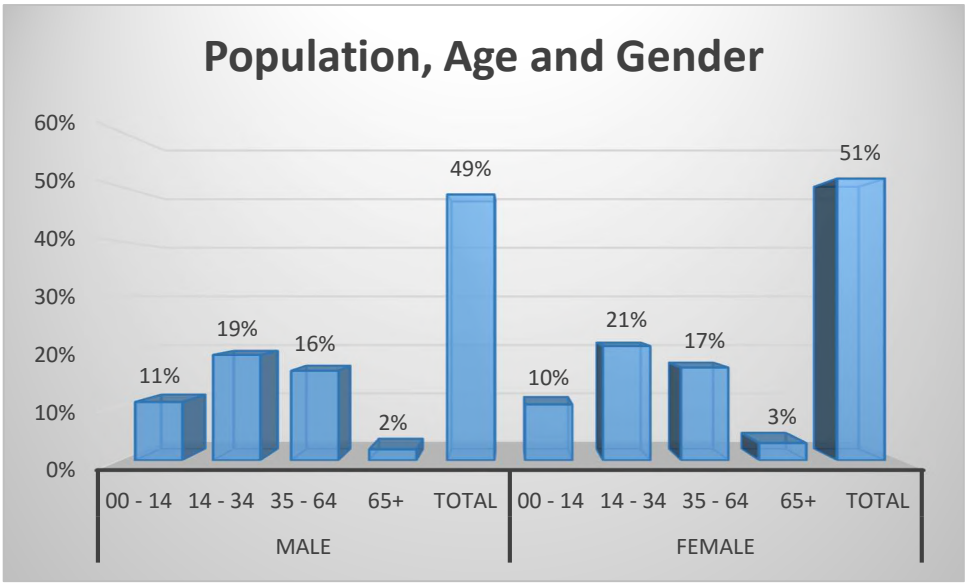


Figure 9: Population, age and gender in study area for 2011 (Statistics South Africa, 2013)

The age group 15 – 64 is defined as the working age population (**Figure 9**). In total, this group accounts for seventy-four percent of the population in the study area. The population is fairly young, with over sixty percent below the age of 35.

The gender data is representative of the South African Population which has slightly more females (fifty-one percent) than males (forty-nine percent).

5.3 Education

Education levels are assessed in order to understand the potential grade or level of employment as well as livelihood of the community. Furthermore, it indicates the functional literacy and skill level of a community. The table below shows the highest level of education reached by persons over age 20 in the study area in 2011(**Figure 9**).

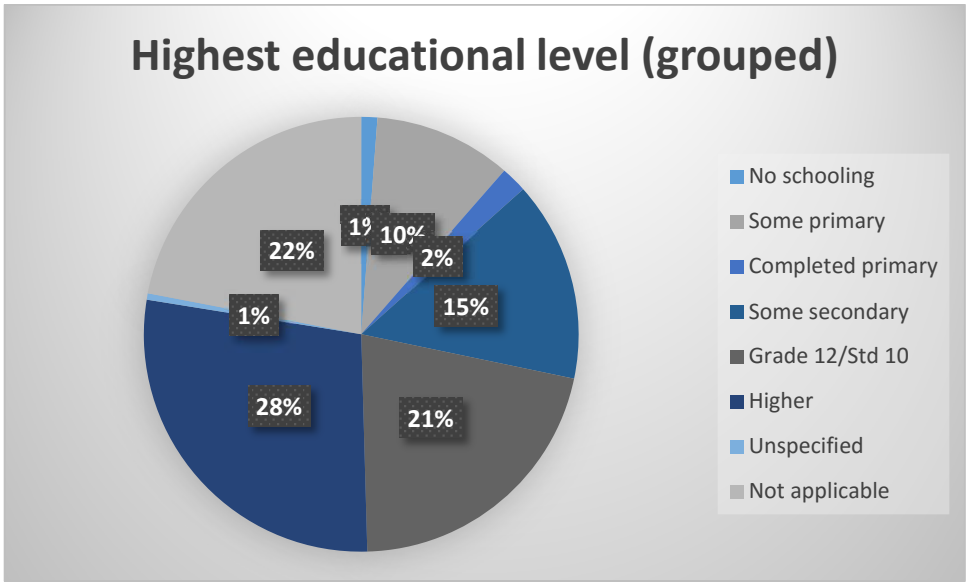


Figure 10: Highest level of education reached by persons in the study area (age 20+) (Statistics South Africa, 2013)

Education levels in the study area are quite high when considering education data for South Africa as a whole. Twenty-one percent of the population over age 20 has received a matric and a further twenty-eight percent have some form of higher qualification. In South Africa as a whole, only eighteen percent of the population have a matric while seven percent have higher education.

Thirteen percent of the population have no education or have not completed primary education and are considered to be functionally illiterate. Functional illiteracy is defined as a person who has received skills to read and write that are inadequate to manage daily living and employment tasks that require reading skills beyond a basic level. Usually persons who have a low level of education, up to primary education, are classified as functionally illiterate.

Economic theory proves that education improves the level and quality of human capital, in turn increasing the productivity of individuals. Thus, increasing the output generated per worker. Education facilitates long term growth and is critical to escape the poverty trap.

Economic theory is proven in practice in a study conducted by Altbeker and Storme (2013). The study shows that while the number of graduates in South Africa has more than doubled in the past fifteen years; the unemployment rate amongst graduates has declined to around five percent.

Furthermore, the study shows that the change of employment increases as the years of education increase. **Figure 11** below is a graph taken from the Altbeker and Storme study that shows the labour force participation (LFP), employment and unemployment rates by years of education in 2007 (Evelien & Altbeker, 2013). It demonstrates that only thirty-three percent of those who had less than secondary education (eleven years or fewer) had jobs. This rose by twenty percent on completion of secondary school. With one extra year of education after secondary school, employment increased to seventy-one percent. Those with higher education again enjoyed ten percent rise in employment while post-graduate degree holder's employment was the highest at ninety-six percent (Evelien & Altbeker, 2013).

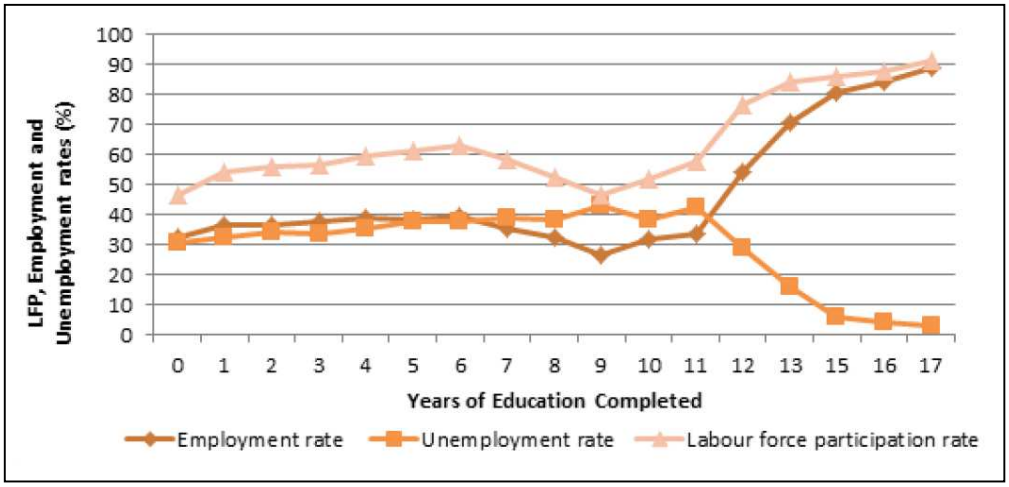


Figure 11: Labour force participation, employment and unemployment rates by years of education (2007) (Evelien & Altbeker, 2013)

The Altbeker and Storme study, in conjunction with the data shown above, reveal that education levels in the study area are so low and to a large extent the communities are structurally geared towards unemployment and thus poverty. The community is economically dependent on the forty-four percent of the population who have completed high school or higher education. It is only this group that is likely to earn an income in the middle or high income bracket, resulting in a perpetuating cycle of low education and low income levels.

5.4 Dwelling Types

The characteristics of the dwellings in which households live and their access to various services and facilities provide an important indication of the well-being of household members. It is widely recognised that shelter satisfies a basic human need for physical security and comfort.

According to the Statistics South Africa household classification, the following definitions apply to formal and informal housing (**Table 7**):

- **Formal dwelling** refers to a structure built according to approved plans, i.e. house on a separate stand, flat or apartment, townhouse, room in backyard, rooms or flatlet elsewhere. Contrasted with informal dwelling and traditional dwelling; and
- **Informal dwelling** is a makeshift structure not erected according to approved architectural plans, for example shacks or shanties in informal settlements or in backyards.

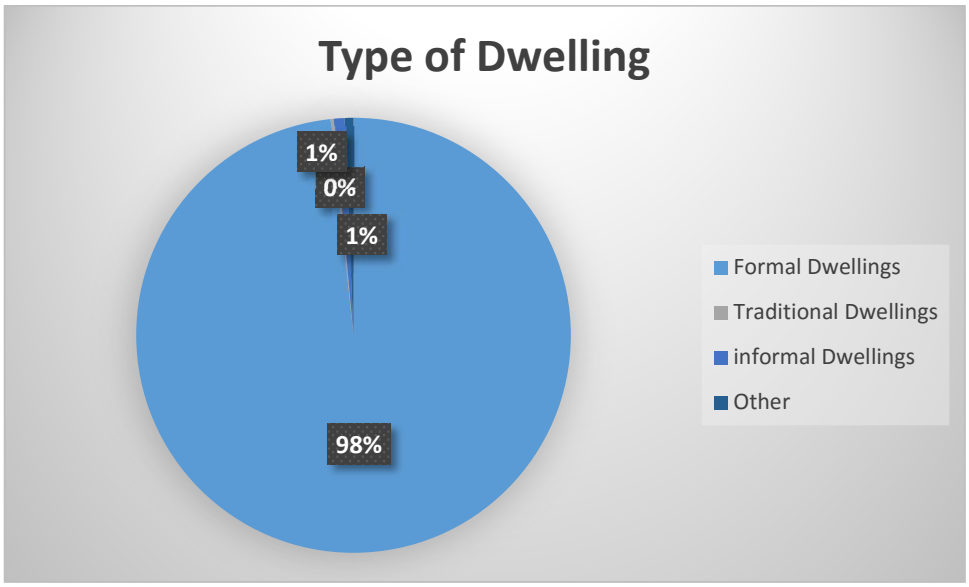


Figure 12: Dwelling Type (Statistics South Africa, 2013)

Majority of the households in the wards have formal dwellings with close to ninety-eight percent of dwellings being houses on a separate stand or yard on a farm.

5.5 Annual Household Income

Annual household income is important to assess as it provides information on the poverty level of the community. Unskilled communities tend to generate low incomes to the household, which contributes to poverty (**Figure 13**).

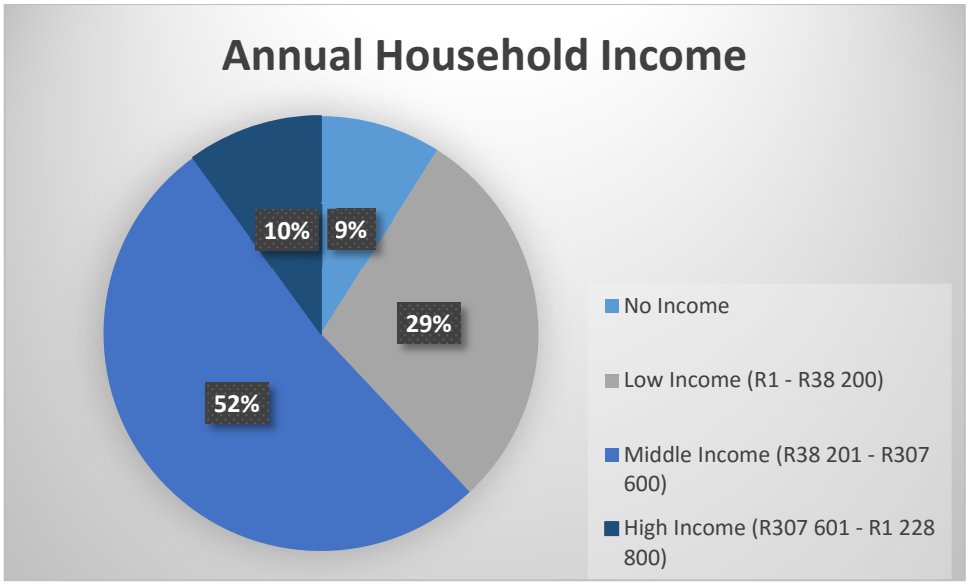


Figure 13: Annual Household Income in the study area (2011) (Statistics South Africa, 2013)

Nine percent of households in the study area receive no income. Twenty-nine percent of household earn in the lower income category. Combined, these two categories indicate that approximately forty-percent of households in the study area live in or are close to poverty.

Polokwane is a wealthy city in comparison to South Africa. Fifty-two percent of households each in the middle income category and ten percent of households have a high income.

5.6 Health

There are over fifty health care facilities in Polokwane Local Municipality (**Figure 13**). According to the Polokwane Local Municipality, the main health care facilities in the municipality are listed in the table below (**Table 3**):

Table 3: Health Care Facilities in Polokwane Local Municipality

Type of Facility	Name of facility	Location in Municipality
Regional Hospitals	Polokwane Mankweng Hospital Complex	Polokwane
	Mankweng Hospital	Sovenga
	Mokopane Hospital	Mokopane
District Hospitals	Voortrekker Hospital	Mokopane
	Botlokwa Health Centre	Dwarsriver
	Lebowakgomo Hospital	Chuenespoort
	Seshego Hospital	Seshego
	W.F.Knobel Hospital	Lonsdale
	Zebediela Hospital	Gompies
Specialized/ Psychiatric Hospitals	Thabamoopo Hospital	Chueniespoort
Private Hospitals	Limpopo Medi-Clinic	Polokwane
Clinics	Buite Street Clinic	Polokwane
HIV/Aids Training, Information and Counselling Centres	HIV/Aids Centre	Polokwane
	Environmental Health Inspectorate	Polokwane

In total Polokwane has nineteen public health clinics and two public hospitals, in addition there are numerous other private health care facilities in Polokwane.

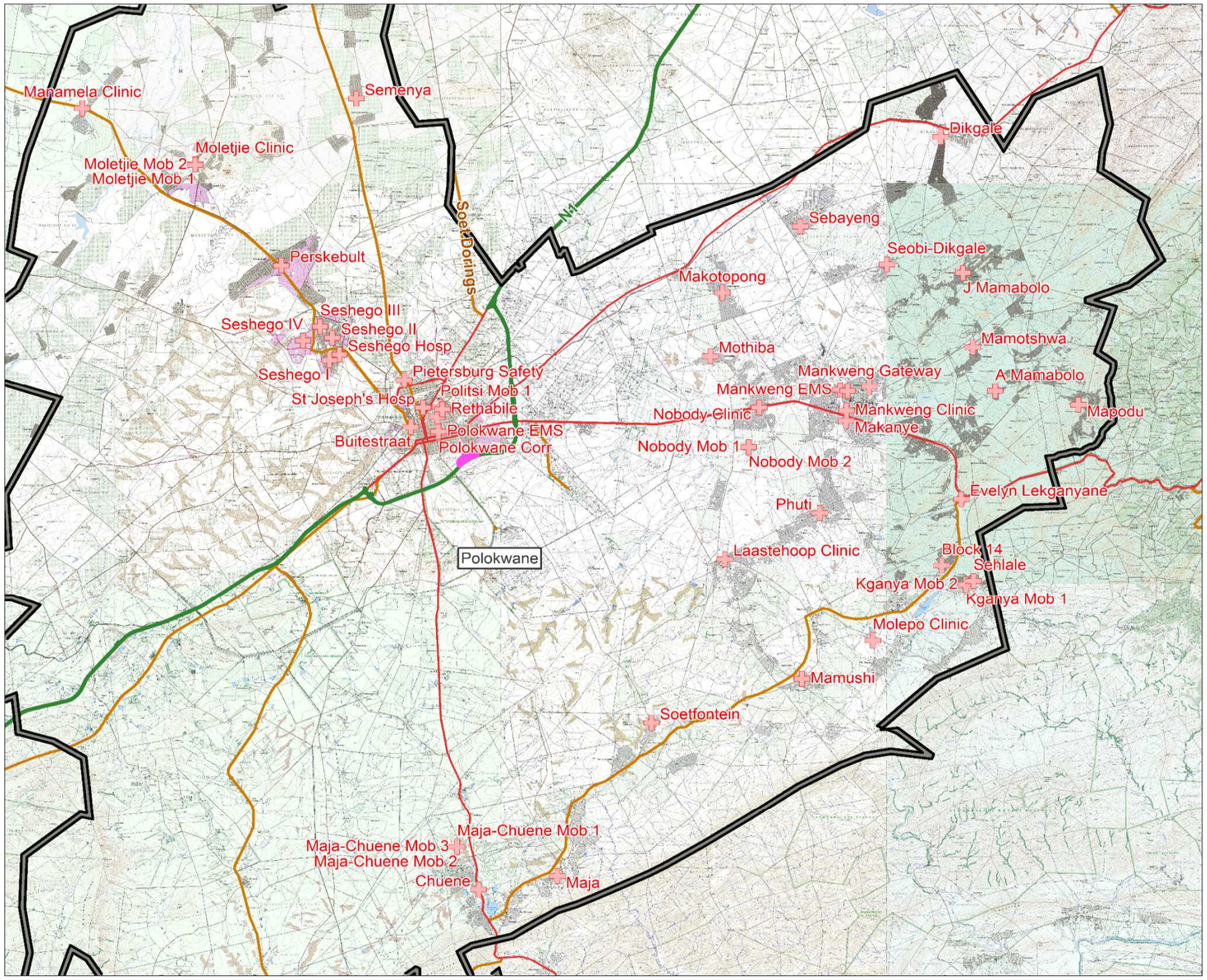


Figure 14: Health Care Facilities in Polokwane Local Municipality

5.7 Access to Piped Water

Understanding the water supply provides insight into the municipal level of service of a community as well on the standard of living (**Figure 15**).

Access to piped (tap) water is important to understand the level of health and standard of living in an area. In each of the wards, while household have access to piped water within the basic level of service, there is a need for improvement of water services in the study area as four percent households have no access to water services.

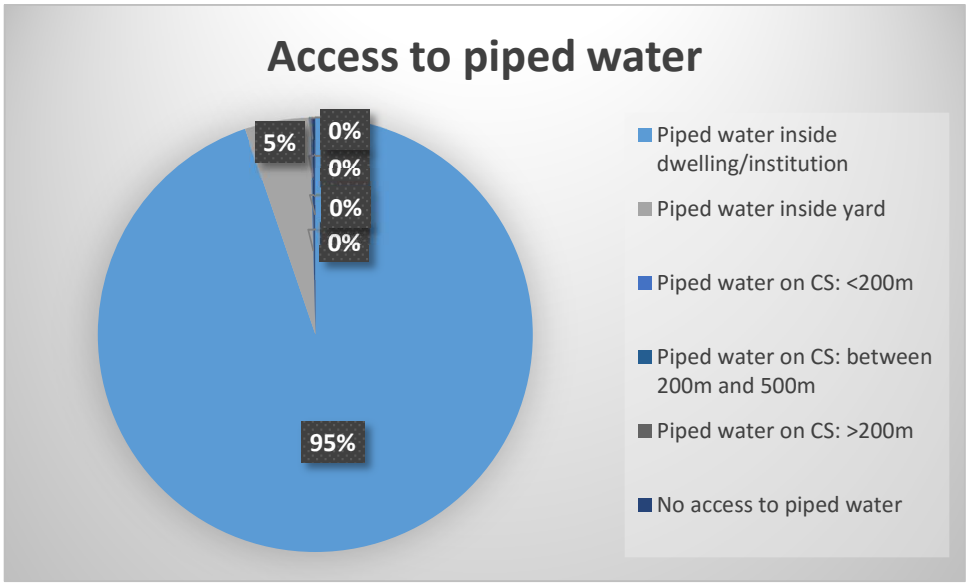


Figure 15: Access to pipes water

Ninety-five percent of households have access to piped water inside the dwelling while five percent of households have access to water through a yard connection. The sub-places that form the study area have access to piped water.

5.8 Homeless Dwellers on the Site

The EIA process is still in application process, and therefore limited information is available in terms of time frames, employment and finalisation of designs. In this light, stakeholder engagement has been limited to site visits and engagement with the Ward Councillor only.

A site visit was undertaken in 17 November 2016. During the walk down of the site, it was found that the land which is vacant is occupied by homeless people at certain areas (**Figure 19**). After consultation in 2016 with people living on the site, it was confirmed that they are homeless and sleep on hammock type structures erected in trees.

A follow up site visit was conducted on 30 October 2019. During the second walk down, Councillor Thilivhali Mashau confirmed that the homeless people who occupied the site in 2017 were removed by the Polokwane Local Municipality with the help of South African Police Service (SAPS). The Councillor stated that the homeless dwellers were identified as illegal immigrants and only resided on site for a period of approximately 3 – 4 months.

During the 2019 site visit, evidence of four areas of rough sleeping were found. The inhabitants were not present during the 2019 site visit, so it was impossible to determine if the current inhabitants were the same people as those inhabiting the site in 2016.

The follow-up site visits indicated that homeless people are again present on the site. **Figure 16, 17 and 18** are images of structures erected by the current occupants, the images were taken during the follow up site visit.

Figure 16: Hammocks erected in trees

Figure 17: Bedding on Site

Figure 18: Fireplace on the Site

Figure 18 shows a campfire on the site. This acts as the social centre for people living on the site and is where many of the footpaths on the site converge. In conclusion, the site is used as a transient sleeping area by between five and ten people, since the site is conveniently located to the centre of Polokwane.

According to a recent estimate by the Human Sciences Resource Centre (HSRC), South Africa is home to approximately 200 000 street homeless people, a significant portion of the nation's population of 53.5million (Rule-Groenewaldt et.al. 2015). Homelessness is a complex term, homeless people may have no shelter, access to a temporary roof, or an informal shack that is not secure (Rule-Groenewald et al, .2015). Homeless people are often faced with multiple challenges such as hunger, malnutrition, mental health issues, and chronic diseases.

Many community members do not usually understand the reasons for someone living on the streets. Many homeless people are involved in illegal activities to obtain food and shelter. When evicting homeless occupants, initiatives of the Department of Social Development in Limpopo such as Khuseleka One Stop Centre, launched by the minister of Social Development, may be used to offer assistance to the inhabitants. In addition, other existing Non-Governmental Organizations (NGOs) such as Abraham Kriel Children's home, Huis

Moroela and Ekuphumeleni Restoration House may also be used to arrange for formal shelter and security amongst other basic human rights.

Shelters such as Abraham Children's home receives and accommodate children aged 18 years and younger by means of a court order as a result of social challenges including child abuse, alcohol abuse, drug abuse, lack of parental skills, family violence and other factors that might endanger their lives.

To effectively achieve a successful relocation of the unlawful occupants, the client, NDoH would have to liaise with the municipality and work together in developing strategies to effectively relocate the affected inhabitants. This would assist in permanently relocating the inhabitants while ensuring that their basic human rights are catered for, e.g. having formal housing, food, water and sanitation.

Councillor Mashau mentioned that the community have been informed that the hospital will be developed in the ward. They have welcomed the project and are waiting for more information.

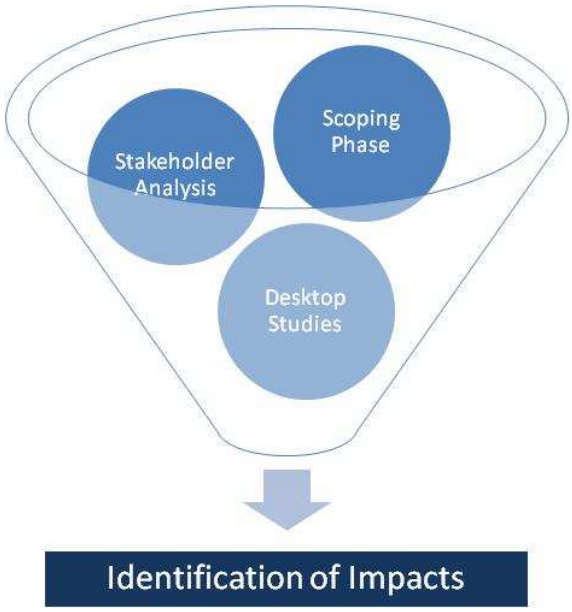
Figure 19: Areas where sleeping places were found during the site visit

Figure 19 above shows the October 2016 locations of the inhabitants. The locations are both within and outside the site boundary.

6 IDENTIFICATION OF IMPACTS

The methodology for the identification of impacts was threefold. Firstly, an assessment of the scoping phase took place. This was followed a desktop analysis. Finally, a stakeholder and site analysis was conducted.

The assessment of the project documents was important to understand the project details, location and possible impacts. In this section, the Geographic Information System was used to conduct a thorough analysed of the area. Project details were understood and located.



The second aspect to the identification of impacts was a desktop study. Data on the community such as population statistics; health; education; and services were analysed using Census 2011 data. The economic environment of the community was also analysed. A desktop study is important to understand the social and economic conditions of the area. It also allows one to identify the challenges faced by the community. Not only does the desktop study facilitate site visits; it also directs the discussion during interviews. Finally, stakeholder engagements were undertaken.

Using this methodology, aspects were identified from the activities that proposed. These aspects have triggered impacts which will be discussed in Section 7. In order to contextualise the impacts, the activity and aspects have been outlined and discussed below.

According to ISO 14001-2004 4.3.1 Environmental Aspects; the Organisation shall establish, implement and maintain a procedure(s)

- To identify the environmental aspects of its activities, products and services within the defined scope of the environmental management system that it can control and those it can influence taking into account planned new developments or new or modified activities, products and services, and
- To determine those aspects that have or can have significant impact(s) on the environment (i.e. significant environmental aspects) (International Organization for Standardization, 2011).

For the purposes of this section, ISO 14001-2004 definitions as applicable to the project include:

Activity Activity is defined as a distinct process or risks undertaken by an organisation for which a responsibility can be assigned activities also include facilities or pieces of infrastructure that are possessed by an organisation.

Aspect Elements of an organisation's activities or products or services that can interact with the environment. There are two types of aspects namely;

- Direct Environmental Aspect: Activities over which a company can be expected to have an influence and control; and
- Indirect Environmental Aspect: Actual or Potential activities over which the organisation can be expected to have an influence, but no control (International Organization for Standardization, 2011).

Impact Any change to the environment, whether adverse or beneficial, wholly or partially resulting from an organization's environmental aspects"

The proposed development will include the construction of various infrastructure more than

6.1 Sense of Place

Sense of place is primarily used to describe the emotions experienced or the association made with a geographical location. Although it appears to be a subjective concept, an exploration of various definitions can begin to narrow the concept sufficiently for analysis.

Taun (1977) believed that a space or geographic location can gradually move from being otherwise undifferentiated from other spaces into a unique location through the build-up of emotion associated with that place. In this process the place begins to be assigned emotional value.

With this background two definitions are offered for sense of place, those of Stokes, Watson, and Mastran, (1997) and of Ryden (1993). Stokes et al believe sense of place is.

"Those things that add up to a feeling that a community is a special place, distinct from anywhere else"

Whilst Ryden is of the view that sense of place results from:

"... gradually and unconsciously … inhabiting a landscape over time, becoming familiar with its physical properties, accruing history within its confines."

From these definitions is it clear that sense of place covers the aspects of a place that has emotional meaning to the inhabitants. These may range from the physical environment, the climate, the layout of the streets, location of the commercial centres, a particular lifestyle, the friends and neighbours that develop over time and a sense of shared history. This shared history would develop through informal folklore and personal narrative, not through official

histories. In this respect the defining of a sense of place is best left to a long term resident who is intimate with the history and culture associated with the place in question.

Owing to the nature of the above definitions, which rely on an emotional and human response to a geographic area, it is likely that the sense of place will differ according to experiences of the place. As people have different experiences of the place, so will the sense of place differ. This variation in response to a place adds a further level of complexity to an already difficult concept.

From the above discussion, a definition of the sense of place to be used for the purposes of the study can be derived. At the outset, it should be stated that the concept should be defined according to the dominant socio-cultural group inhabiting the geographic area. In the case of study area; the study area has a mix of income groups as the farmers are middle income and the low-income communities who works there. The sense of place in these areas can be said to have the following components:

- The location of the surrounding communities
  The study area is situated on the border to of the Polokwane urban edge. The area is largely built up and has an urban feel. The site is currently vacant.
- The physical environment; including the natural environment
  The proposed area currently vacant. The Polokwane Nature Reserve is located within a kilometre south of the site boundary. North of the site the area is built up and forms part of the urban centre of Polokwane.
- The layout of the streets; locations; and infrastructure in relation to the residential areas
  The area is formalised with the national route N1 providing access to Polokwane. The site is located adjacent to the N1 and is accessible from internal roads in the city.
- The socio-economic characteristics of the inhabitants
  The site area is dominated by urban dwellers. The population is diverse with a range of income groups living the city. Majority of residents have access to basic level of services such as water, healthcare, education, electricity and formal housing.

Mitigation measures and monitoring of sense of place on its own is difficult. The impact on Sense of Place is derived from a large number of variables. In this context, the mitigation measures for sense of place take place through site design, education, employment and other forms. As such this impact will not be analysed any further.

6.2 Impact from the Provision of Health Care

The project will positively impact health of citizens of Polokwane and surrounding areas easing access to healthcare. It will help to enhance access to diagnostic services for vulnerable

groups; improve capacity to provide specialized services and conduct monitoring services. Overall, there will be an improvement to public health in the receiving environment.

In addition, the economic benefits of improving public health, the local economy will be further enhancing through the creation of employment and upskilling opportunities presented by the proposed development.

Operation of the facility will create additional long-term technical and non-technical job opportunities for medical professionals, janitors, administration staff etc. Wherever feasible, local qualified people should be considered for job opportunities. Adequate occupational health and safety standards should be provided to ensure the work environment is conducive.

Negative implications of such a facility during its operation are tied to the management of the facility. Impacts created by the management of such aspects as preserving the dignity of patients, ensuring proper waste management; ensuring a skilled workforce and maintenance of the facilities are all critical factors to the long term benefits of improving access to health care. These impacts are post construction and therefore this report has limited influence over such factors.

6.3 Economic opportunities arising from the construction phase

The construction phase will commence once the environmental and other approvals are authorised. The construction activity will impact the social environment both positively and negatively.

Those who will benefit during the construction is limited to those who actively participate in the construction activity through employment, sub-contracting or other economic opportunities. Participation usually occurs by only a few members of the community and therefore the benefits are not widespread. In addition, this positive impact is reversible as it is limited to the construction phase.

The proposed hospital has the potential to create a number of job opportunities for existing and new local SMMEs. These range from site clearing, general construction work, as well the supply of materials. There are also opportunities existing for community members to provide catering, accommodation and other services to the new workers.

Development of the project will entail civil works requiring materials such as gravel, bricks, timber and cement. The construction labour would be local or national but medical equipment will most likely be procured internationally, this impact has a local, national and international extent. In order to enhance the impact on the local economy, materials needed for construction, should be obtained from local suppliers where possible.

If SMME opportunities are to be realised, the impact on the area will be quite significant. Profits generated will stay in the area raising the economic activity and increasing welfare. There is

also potential for skills upgrade and further employment. In South Africa, most employment is generated through small and medium business. Given the size of the proposed project, should contracts between with local SMMEs occur, it is likely that there will be a small increase in employment by SMMEs for the duration of the contracts. Furthermore, through the increase in employment by SMMEs, more skills are developed thus the community is more employable and better off.

SMME opportunities should be provided to everyone on an equal basis. Where possible, the client should support and encourage the development of SMMEs and local or regional suppliers. Where possible, procurement should come from local or regional business so that the profits stay in the area, increasing economic activity.

It is anticipated that there will be a positive impact on job creation during the construction phase. The construction itself will generate significant temporary employment as workers will be required. Potential secondary employment impacts can result as small business employs more persons to sell goods to labourers during the construction phase.

Employment is a sensitive issue and this project has the potential to positively impact upon the skills levels during the construction phase. However, low levels of education stunt the employment of local job seekers. Education affects the employability of an individual.

Education levels also indicate the level of skill one may have and the degree to which one can be skilled. In a study area where less than twenty percent of the population over age 20 have matriculated, it is not likely that many people are skilled and highly skilled.

Attempts to break the poverty cycle of the area require more than secondary school education. Higher education or further skills training is required. Thus it is important that the community under-go's skills development. For the communities in the region, acquiring skills and benefiting from the returns on education are unattainable without an intervention from public and private institutions. Thus it is strongly recommended that skills development programs are initiated by the NDoH.

Local employment should be encouraged to reduce the unemployment rate in the area. Furthermore, the local community will be able to benefit from a project that directly affects them.

The NDoH must monitor the employment process at all times. Employment audits should be conducted and there should be full transparency of the process. A Community Liaison Officer (CLO) should be employed to manage the process and report on issues. It is important that women are also provided employment opportunities. Audits should pay attention to the employment process of women to ensure that exploitation does not take place.

7 IMPACT ASSESSMENT

The following definitions apply:

Nature	The project could have a positive, negative or neutral impact on the environment.
Extent	**Local** – extend to the site and its immediate surroundings. **Regional** – impact on the region but within the province. **National** – impact on an interprovincial scale. **International** – impact outside of South Africa.
Magnitude	Degree to which impact may cause irreplaceable loss of resources: **Low** – natural and social functions and processes are not affected or minimally affected. **Medium** – affected environment is notably altered; natural and social functions and processes continue albeit in a modified way. **High** – natural or social functions or processes could be substantially affected or altered to the extent that they could temporarily or permanently cease.
Duration	**Short term** – 0-5 years. **Medium term** – 5-11 years. **Long term** – impact ceases after the operational life cycle of the activity either because of natural processes or by human intervention. **Permanent** – mitigation either by natural process or by human intervention will not occur in such a way or in such a time span that the impact can be considered transient.
Probability	**Almost certain** – the event is expected to occur in most circumstances. **Likely** – the event will probably occur in most circumstances. **Moderate** – the event should occur at some time. **Unlikely** – the event could occur at some time. **Rare/Remote** – the event may occur only in exceptional circumstances.
Significance	Provides an overall impression of an impact's importance, and the degree to which it can be mitigated. The range for significance ratings is as follows- **0** – Impact will not affect the environment. No mitigation necessary. **1** – No impact after mitigation. **2** – Residual impact after mitigation. **3** – Impact cannot be mitigated.
Mitigation	Information on the impacts together with literature from social science journals, case studies and field work will be used to provide mitigation recommendations to ensure that any negative impacts are decreased and positive benefits are enhanced.
Monitoring	Monitoring usually involves developing and implementing a monitoring programme to identify deviations from the proposed action and to manage any negative impacts. The recommended mitigation measures will also include monitoring measures.

7.1 Impact on Informal Inhabitants on Site

The construction of the hospital will have temporary impacts on informal habitants at the site which should not be overlooked.

A legal assessment should be carried out closer to construction to determine if the inhabitants have legal rights to the areas they are occupying. Consideration should be given to their living standards and duration of occupation.

With this background, the assessment should cover whether or not Section 26 (3) of the South African Constitution applies, which provides that no one may be evicted from their home without a court order authorising such eviction after having due regard to “all the relevant circumstances”. It is important to note that human rights apply to all those in South Africa and those who live in it. The SAPS must act in accordance with the Constitution and treat those to be evicted in a dignified and respectful manner.

The assessment should also consider whether Sections 4(6) and 4(7) of the Prevention of Illegal Eviction from and Unlawful Occupation of Land Act, 1998 (Act No.19 of 1998) apply. This act clearly differentiates between unlawful occupiers based on the duration of their occupation. The assessment should also consider the inhabitant’s status in terms of the Unlawful Occupation of Land Act 1998 (Act No.19 of 1998).

The site’s inhabitants would be displaced by the project, however the transient nature of the occupation, leaves the authors with the impression that the inhabitants don’t sleep on the site every day, or that they move around the city as economic circumstances dictate. In this sense, the inhabitants of the site are not traditionally defined informal dwellers and are rather classified as homeless or street dwellers. In addressing the question of their moving off site, the proponent should prepare a relocation plan in consultation with the site’s inhabitants, and the plan should be implemented with due regard to the legal position as well as the needs of the inhabitants themselves.

Environmental Feature	Impact on the Informal Inhabitants on Site
Project life-cycle	Pre-Construction phase
Potential Impact	Proposed Management Objectives / Mitigation Measures
Displacement of current inhabitants on the site	• NDOH and the Department of Social Development should arrange necessary social assistance with the local NGO's for the homeless people. • This assistance should be carried out with due consideration of the Prevention of Illegal Eviction from and Unlawful Occupation of Land Act, 1998 (Act No.19 of 1998). If this act is found to apply owing to the condition of the site occupation or of the duration of the occupation, then the provisions pf the act should applied, including, if applicable, the provision of alternative accommodation. • The contractor is to safely remove any and all temporary shelter material that discovered during site clearing. Where damage occurs or the material is un-usable, it should be replaced in the hands of the user.

	Nature	Extent	Magnitude	Duration	Probability	Significance
Before Mitigation	Negative	Local	Low	Permanent	Almost Certain	2
After Mitigation	Negative	Local	Low	Permanent	Almost Certain	1
Significance of Impact and Preferred Alternatives	The impacts can be successfully mitigated through the proponent's management of the displacement process, with the of various social partners. The mitigation measure, if unsuccessful, will impact upon each homeless dweller, making for an un-supported relocation process. The impacts of this process will vary for each of the four dwellers. The negative impacts apply to the chosen site extent.					

7.2 Impact on the Economy

The construction activity will impact the social environment both positively and negatively. Given the nature of the project area, construction activity is likely to cause a number of social nuisances to the nearby inhabitants at the Northern Academy Independent School, Edupark, the Environmental Management offices and nearby Flora Park residents. It is important to note that there are possible economic implications on the communities and commercial activities.

Cumulative impacts can be both positive and negative. Cumulative impacts refer to the impacts that are incremental on the environment that results from the impacts of the proposed action when added to the existing foreseeable future actions. These impacts will be temporary in nature (by being restricted to the construction phase).

Environmental Feature	Impact on the Economy
Project life-cycle	Pre-Construction phase, Construction Phase, Operational Phase
Potential Impact	Proposed Management Objectives / Mitigation Measures
Access to healthcare	• The provision of health care facilities will increase the public health of the area. • The disease burden will be decreased.
Increase in employment	• The development will result in employment generation at all skills levels from janitors to specialist medical professionals. • Preferential treatment for local job seekers before employing labour from outside the study area.
Skills development	• The central hospital will cater to tertiary education to address medical, and health services skills shortages

	Nature	Extent	Magnitude	Duration	Probability	Significance
Before Mitigation	Positive	Regional	High	Permanent	Likely	3
After Mitigation	Positive	Regional	High	Permanent	Likely	3
Significance of Impact and Preferred Alternatives	Mitigation is not necessary for this positive impact. This mitigation measure does not influence the alternatives considered in the study.					

7.3 Construction Impacts

Environmental Feature	Construction phase impacts
Project life-cycle	Pre-Construction phase, Construction Phase,
Potential Impact	Proposed Management Objectives / Mitigation Measures
Skills transfer	• NDoH must develop a skills development program for the duration of the construction activity. • Beneficiaries of educational programs should be residents who live close to the project area. • The selection process should be transparent. • In order to increase the size of local employment, women should also be employed in the construction of the hospital.
Increased employment	• Preferential treatment for local job seekers before employing labour from outside the study area. • One hundred percent of unskilled employment during the construction phase should come from local labourers who live in the study area. • In order to increase the size of local employment, women should also be employed in the construction of the hospital. • The selection process should be transparent. • Where possible, labour intensive methods should be used. • In order to increase the size of local employment, women should also be employed in the construction phase.
Local road condition	• A condition survey of the local roads to be used during the construction phase should be made prior to construction • Routes to be used should be defined and adhered to during the construction phase • Maintenance of local roads should take place during the construction phase to ensure that the local roads used by the contractor are left in the same or better condition than they were prior to the start of construction
Dust	• Dust and disturbance can be mitigated through the use of appropriate dust suppression mechanisms • Mitigation measures management should be adhered to according to the relevant specialist studies.
Impact on SMMEs	• Construction and other materials to be sourced from local suppliers to boost the regional economic and drive the creation of more sustainable jobs. • SMME opportunities should be provided to everyone on an equal basis. Where possible, NDoH should support and encourage the development of SMMEs and local or regional suppliers. • Where possible, procurement should come from local and regional business so that the profits stay in the area, increasing economic activity. • NDoH should make use of existing council structures to identify beneficiaries of the program.
Environmental Feature	Construction phase impacts
Project life-cycle	Pre-Construction phase, Construction Phase,
Potential Impact	Proposed Management Objectives / Mitigation Measures

Impact on Traffic	• Ensure that the necessary signage and traffic measures are implemented for safe and convenient access to the site. • Measures must also be put in place to ensure that these roads and any access points do not get built up with mud or sand. • Construction machinery drivers are to travel at appropriate speeds and have flashing lights attached to the roofs of the vehicles. • Applicable speed limits as set on regional roads must be observed at all times. • The number of vehicles present on site must be limited to the minimum.
Induced Migration	• NDoH must make a public announcement that imported labour will not take place on the project. • Contractors and sub-contractors must have strict conditions that prevent the importing of semi and unskilled labour without prior justification and approval • Employment of females and youth is encouraged to ensure the empowerment of the most vulnerable to unemployment and poverty. • People in search of work may move into the area. Locally based people should be given an opportunity • No staff accommodation should be allowed on site
Noise Impacts	• Prior notice should be given to surrounding communities of blasting events • Construction work should take place during working hours – defined as 07h00 to 17h00 on weekdays and 07h00 to 14h00 on Saturdays. Should overtime work be required, that will generate noise, consultation with the affected community and stakeholders • Working hours should cater for the Northern Academy Independent School adjacent to the site.
Worker Safety and security	• Erect signage and fences to deter theft. • During construction, the working site should be fenced to prevent trespassing and expansion of the working footprint • All contractors' staff should be easily identifiable through their uniforms • A security policy should be developed which amongst others requires that permission be obtained prior to entering any property (should the need arise), and provisions controlling trespassing by contractor staff • No staff, apart from security staff, should be allowed to reside at contractor camps • Contractors should establish a crime awareness programmes at their site camps
Damage to property	• The contractor is to make good any damage that occurs on any property as a result of construction work

	Nature	Extent	Magnitude	Duration	Probability	Significance
Before Mitigation	Negative	Local	Medium	Short Term	Almost Certain	3
After Mitigation	Negative	Local	Low	Short Term	Almost Certain	2

Significance of Impact and Preferred Alternatives	Disturbances during the construction phase can be successfully mitigated through contractor specifications issued at tender stage and through monitoring of contractor performance during the construction phase. Negative impacts owing to the construction will be experienced irrespective of the location of the site. Should these mitigation measures prove unsuccessful, the surrounding business community will experience inconvenience and disruption during the construction phase. It should be noted that there are no residential communities in the vicinity of the site and there are no vulnerable facilities near the site.

7.3.1 Noise and Dust

During construction phase communities may be exposed to increased dust, noise and visual and other nuisance disturbances.

The generation of dust stems from activities such as earthworks and trenching, as well as vehicular movement during construction phase. This situation will be worst during the dry season and during windy seasons. Airborne particulates may pose a hazard to residents in the vicinity or downwind of the construction sites that suffer from respiratory tract problems. Areas of particular concern are the Northern Academy Independent School, Edupark, and the Environmental management offices and nearby Flora Park settlement. Mitigation through dust suppression methods will allow for this impact to be effectively managed.

During construction, heavy equipment will be required for the site clearance, pipelines excavations and backfilling and general transport, noise generation will be unavoidable. The degree of noise, frequency of noise and individual perception are all important considerations when determining the impact on noise. Drilling; blasting and construction activities will also create noise pollution. Adequate warning of high noise events such as drilling and blasting should be communicated to the affected communities.

7.3.2 Worker Health and Safety

The impacts of constructing can affect the health and safety of those working on the construction site; disturbance, health and income of the host communities; and disturbance to the environment and animals. These impacts can be mitigated in the Environmental Management Programme (EMPr) and through adherence to the Occupational Health and Safety Act 85 of 1993.

An influx of worker is often characterised by higher health risks, particularly if the influx is male dominated. These include a higher disease burden and rise in HIV/AIDS rates. There should also be awareness and education campaigns on health and social risks such as HIV/AIDA and crime prevention. The awareness education should be extended to the pupils of the institution in the vicinity of the project.

7.3.3 Security

The machinery found at the Environmental Management offices, school furniture and appliances may be vulnerable to theft due to the influx of people during construction phase.

Mitigation measures include NDoH, prior to construction, must consult with the directly affected stakeholders ensure the safety of the properties, belongings and residents. A security policy must be drafted and strictly enforced by the contractors, this would include requirement to obtain landowner permission prior to any property should the need arise.in addition, Contractor staff should be identifiable as such through the use of common work uniforms.

7.3.4 Local Road Condition and Traffic Impact

Local road access will be used during the project, and as a result these roads may be subject to damage. The project is to maintain the local roads for the duration of the contract and should leave them in a state the same or better than they were prior to the start of the construction phase.

Heavy duty trucks and construction vehicles cause damage to the current road conditions as well as contribute to increased dust and congestion on the roads.

The greater the number of trucks on the road, the greater the risk of road accidents occurring. It is important that the contractors are sensitive to the road conditions and ensure that throughout the construction process that these roads are maintained and suitable for small vehicles.

8 ANALYSIS OF ALTERNATIVES

The following preferences are made from a socio-economic assessment perspective and do not take into account other project criteria. Having taken into consideration the project aim of providing easy access to improved medical healthcare, and considering the assessment above which does not indicate any fatal social impact flaws, the No-Go option is not supported.

The social benefits from the project, from a socio-economic perspective, will be larger than the project not proceeding.

With regards to single project alternative – go/no go, the table below describes the alternative and the reasons for its selection.

Table 4: Table illustrating Project Components and Alternatives

Component	Alternatives	Order of Preference (1: most preferred, 3: least preferred)	Comments
Go / No Go	To not carry out the proposed project	Not Supported	Adequate healthcare to the area will be less secure that if the project did not go ahead. A local and easily accessible healthcare facility is a fundamental input to the social and economic activities of the area.
Limpopo Academic Hospital Site	Proposed Site	1	The proposed Limpopo Academic Hospital site is largely unoccupied and is owned by the local municipality. Any negative impacts on the few current occupants of the site can be managed The proposed site creates no un-mitigatable impacts from a socio-economic perspective and is thus the most preferred option.

9 CONCLUSION

The study has assessed the socio-economic impacts of the proposed project. As expected of any construction project, there were several positive and negative socio-economic impacts identified.

Construction of the proposed academic hospital will positively impact health of citizens in Polokwane and surrounding areas in that it improves access to healthcare. It will help to enhance access to diagnostic services for vulnerable groups; improve capacity to provide specialized services, conduct monitoring services and create the opportunity to provide a better balance of specialist care in the province. Overall, there will be an improvement to public health in the receiving environment.

There is a need to create teaching capacity within the province to address medical, and health services skills shortages, as such, the proposed new hospital and research centre, geared towards specific requirements of a rural province, and the hospital would further provide the opportunity to create an environment that would attract key teaching, central and scarce professional staff.

The proposed project will create short term construction benefits to the receiving communities in the form of employment, skills and small business development.

The socio-economic impact assessment has identified the need for relocation of three or four homeless dwellers occupying the proposed site. It is recommended that the inhabitants should be relocated with due regard to the law and their particular circumstances.

If the relocation of identified unlawful inhabitants on site is successfully carried out, the remaining identified negative impacts can be successfully mitigated through the use of recommendations provided in this report and the positive impacts will bring economic and social benefits to the area such as operational benefits of access to health care. These impacts will occur mainly during the construction phase and are thus a relatively short-term impact.

The positive socio-economic impacts of this project are assessed to far outweigh the negative impacts. The negative impacts are short-term and local in extent and the positive impacts of the hospital are long-term and regional in extent.

As such, the proposed Limpopo Academic Hospital is sustainable from a socio-economic perspective.

10 REFERENCES

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environmental affairs

Department:
Environmental Affairs
REPUBLIC OF SOUTH AFRICA

DETAILS OF THE SPECIALIST, DECLARATION OF INTEREST AND UNDERTAKING UNDER OATH

	(For official use only)
File Reference Number:	DEFF 14/12/16/3/3/2/1132
NEAS Reference Number:	DEA/EIA/
Date Received:	

Application for authorisation in terms of the National Environmental Management Act, Act No. 107 of 1998, as amended and the Environmental Impact Assessment (EIA) Regulations, 2014, as amended (the Regulations)

PROJECT TITLE

Proposed Limpopo Central Hospital

Kindly note the following:

1. This form must always be used for applications that must be subjected to Basic Assessment or Scoping & Environmental Impact Reporting where this Department is the Competent Authority.
2. This form is current as of 01 September 2018. It is the responsibility of the Applicant / Environmental Assessment Practitioner (EAP) to ascertain whether subsequent versions of the form have been published or produced by the Competent Authority. The latest available Departmental templates are available at https://www.environment.gov.za/documents/forms.
3. A copy of this form containing original signatures must be appended to all Draft and Final Reports submitted to the department for consideration.
4. All documentation delivered to the physical address contained in this form must be delivered during the official Departmental Officer Hours which is visible on the Departmental gate.
5. All EIA related documents (includes application forms, reports or any EIA related submissions) that are faxed; emailed; delivered to Security or placed in the Departmental Tender Box will not be accepted, only hardcopy submissions are accepted.

Departmental Details

Postal address:
Department of Environmental Affairs
Attention: Chief Director: Integrated Environmental Authorisations
Private Bag X447
Pretoria
0001

Physical address:
Department of Environmental Affairs
Attention: Chief Director: Integrated Environmental Authorisations
Environment House
473 Steve Biko Road
Arcadia

Queries must be directed to the Directorate: Coordination, Strategic Planning and Support at:
Email: EIAAdmin@environment.gov.za

1. SPECIALIST INFORMATION

Specialist Company Name:				
B-BBEE	Contribution level (indicate 1 to 8 or non-compliant)		Percentage Procurement recognition	
Specialist name:	Ciaran Chidley			
Specialist Qualifications:	B.A. (Economic), MBA			
Professional affiliation/registration:				
Physical address:	147 Bram Fischer Drive, Ferndale			
Postal address:	P.O.Box 1673, Sunnighill			
Postal code:	2157	Cell:	082 788 1298	
Telephone:	011 781 1730	Fax:	011 781 1731	
E-mail:	CiaranC@nemai.co.za			

2. DECLARATION BY THE SPECIALIST

I, ___Ciaran Chidley_____, declare that –

- I act as the independent specialist in this application;
- I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant;
- I declare that there are no circumstances that may compromise my objectivity in performing such work;
- I have expertise in conducting the specialist report relevant to this application, including knowledge of the Act, Regulations and any guidelines that have relevance to the proposed activity;
- I will comply with the Act, Regulations and all other applicable legislation;
- I have no, and will not engage in, conflicting interests in the undertaking of the activity;
- I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing - any decision to be taken with respect to the application by the competent authority; and - the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority;
- all the particulars furnished by me in this form are true and correct; and
- I realise that a false declaration is an offence in terms of regulation 48 and is punishable in terms of section 24F of the Act.

Signature of the Specialist

e Nemai Consulting (PTY) Ltd

Name of Company:

2019-11-06

Date

3. UNDERTAKING UNDER OATH/ AFFIRMATION

I, Ciaran Chidley, swear under oath / affirm that all the information submitted or to be submitted for the purposes of this application is true and correct.

Signature of the Specialist

Name of Company

2019-11-06

Date

Signature of the Commissioner of Oaths

SOUTH AFRICAN POLICE SERVICE
COMMUNITY SERVICE CENTRE
2019 -11- 06
C.S.C
LINDEN
SUID-AFRIKAANSE POLISIEDIENS

2019-11-06

Date

Dr Neville Bews & Associates

Social Impact Assessors

Committed to building high trust environments

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01 November, 2019

Attention: Christian van der Hoven
Nemai Consulting
147 Bram Fischer Drive,
Ferndale,
Randburg

Re: Peer review of the Social Impact Specialists Report for the Proposed Limpopo Central Hospital

Having reviewed the above report I find that it provides a good description of the project and the social environment within which the project will unfold. It also provides a good indication of the social impacts that are likely to arise as a result of the proposed project and suggests appropriate optimisation and mitigation measure. The review was concluded on 01 November, 2019 and the following comments are made:

1. The terms of reference are acceptable.
2. The methodology is clearly explained and acceptable.
3. The findings are based on acceptable evidence.
4. The mitigation measures and recommendations are appropriate.
5. Consideration needs to be given to the issues raised in the attached schedule. See the comment column of the attached schedule.
6. The reference literature is appropriate.
7. No site-inspection was carried out as part of this peer review.
8. The report is well-written and easy to understand, however, the reasoned opinion as to whether the proposed activity should be authorized could be embellished.

Attached is a schedule, in accordance with Appendix 6 of the National Environmental Management Act, 1998 (ACT NO. 107 OF 1998). Environmental Impact Assessment Regulations, 2014, indicating the level of compliance of the report in respect of this regulation.

DECLARATION OF INDEPENDENCE

I, Neville Bews, as authorised representative of Dr Neville Bews & Associates hereby confirm my independence as a specialist and declare that neither I nor Dr Neville Bews & Associates have any interest, be it business, financial, personal or other, in any proposed activity, application or appeal in respect of which Dr Neville Bews & Associates was appointed as social impact assessment specialists in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998), other than fair remuneration for work performed. This declaration is specifically in connection with the review of the Social Impact Report for the Proposed Limpopo Central Hospital.

Signed:  Date: 01 November, 2019

Peer Review of Socio-Economic Impact Assessment for the Proposed Limpopo Central Hospital

Appendix 6: Specialist reports	Section	Comment
A specialist report prepared in terms of these Regulations must contain-		
(a) details of- (i) the specialist who prepared the report; and (ii) the expertise of that specialist to compile a specialist report including a curriculum vitae;	Not provided	To be inserted into the report.
(b) a declaration that the specialist is independent in a form as may be specified by the competent authority;	Not provided	To be inserted into the report.
(c) an indication of the scope of, and the purpose for which, the report was prepared;	Section 1 Page 1	
cA) An indication of the quality and age of base data used for the specialist report.	Section 4.3 Page 15	
cB) A description of existing impacts on the site, cumulative impacts of the proposed development and levels of acceptable change.	Section 6 Pages 36-37	Cumulative impacts were not considered
(d) the date and season of the site investigation and the relevance of the season to the outcome of the assessment;	Not applicable	
(e) a description of the methodology adopted in preparing the report or carrying out the specialised process;	Section 4 Pages 13-14	
(f) the specific identified sensitivity of the site related to the activity and its associated structures and infrastructure;	Sections 6	
(g) an identification of any areas to be avoided, including buffers;	No	
(h) a map superimposing the activity including the associated structures and infrastructure on the environmental sensitivities of the site including areas to be avoided, including buffers;	Figure 19 Page 35	Areas to be avoided and buffer zones not identified
(i) a description of any assumptions made and any uncertainties or gaps in knowledge;	Section 4.3 Page 15	
(j) a description of the findings and potential implications of such findings on the impact of the proposed activity, including identified alternatives on the environment;	Sections 7, 8 & 9 Pages 42-48	
(k) any mitigation measures for inclusion in the EMPr;	Section 7 Pages 43-48	
(l) any conditions for inclusion in the environmental authorisation;	None	
(m) any monitoring requirements for inclusion in the EMPr or environmental authorisation;	None	
(n) a reasoned opinion- (i) as to whether the proposed activity or portions thereof should be authorised; and (ii)if the opinion is that the proposed activity or portions thereof should be authorised, any avoidance, management and mitigation measures that should be included in the EMPr, and where applicable, the closure plan;	Sections 7 & 8 Pages 42-48	This section of the report could be slightly elaborated
(o) a description of any consultation process that was undertaken during the course of preparing the specialist report;	No	
(p) a summary and copies of any comments received during any consultation process and where applicable all responses thereto	Not included	
(q) any other information requested by the competent authority.	Not applicable	
2. Where a government notice gazetted by the Minister provides for any protocol or minimum information requirement to be applied to a specialist report, the requirements as indicated in such notice will apply.	Not applicable	

Dr Neville Bews & Associates
SOCIAL IMPACT ASSESSORS

Curriculum Vitae Neville Bews

Dr. Neville Bews & Associates – Johannesburg, South Africa

EDUCATION

- *B.A. (Soc), University of South Africa, 1980*
- *B.A. (Soc) (Hons), University of South Africa, 1984*
- *The Henley Post Graduate Certificate in Management, Henley Management College, United Kingdom*
- *M.A. (Cum Laude), Rand Afrikaans University, 1999*
- *D. Litt. et Phil., Rand Afrikaans University, 2000*

Dr Neville Bews is a senior social scientist and human resource professional with 38 years' experience. He consults in the fields of Social Impact Assessments and research, and human resource management. He has worked on a number of large infrastructure, mining and water resource projects. He at times lectures on social impact assessment for the Department of Sociology, University of Johannesburg.

EXPERIENCE – EXAMPLES

Water resources and regional planning Social Impact Assessments

Department of Water Affairs and Forestry **South Africa**

Social impact assessment for the Mokolo and Crocodile River (West) Water Augmentation Project for increased and assurance of water supply. Research socio-economic circumstances, data analysis, assessment, authored report.

Mzimvubu Water Project Eastern Cape. Research socio-economic circumstances, data analysis, assessment, authored report. Umkhomazi Water Project Phase 1 – Raw Water Component Smithfield Dam - 14/12/16/3/3/3/94; Water Conveyance Infrastructure - 14/12/16/3/3/3/94/1; Balancing Dam - 14/12/16/3/3/3/94/2.

Umkhomazi Water Project Phases 1 – Raw Water Components
Smithfield Dam – 14/12/16/3/3/3/94/
Water Conveyance Infrastructure – 14/12/16/3/3/3/94/1
Balancing Dam – 14/12/16/3/3/3/94/2

Umkhomazi Water Project Phases 2 – Potable Water Component – 14/12/16/3/3/3/95.

The Aveng (Africa) Group Limited (Grinaker LTA) **South Africa**
Assisting the construction company with the social management of the Mokolo and Crocodile River (West) Water Augmentation Project. Consult and mediate between contractors and affected parties advise on strategies to reduce tensions between contractors and the public.

Sedibeng District Municipality **South Africa**
Social impact assessment for the Environmental Management Plan for the Sedibeng District, on behalf of Felehetsa Environmental (Pty) Ltd. Research socio-economic circumstances, data analysis, assessment, authored report.

Felehetsa Environmental (Pty) Ltd **South Africa**
Social Impact Assessment for Waterfall Wedge housing and business development situated in Midrand Gauteng. Research socio-economic circumstances, data analysis, assessment, authored report.

NEMAI Consulting Environmental & Social Consultants **South Africa**
Ncwabeni: Off-Channel Storage Dam, KwaZulu-Natal. Research socio-economic circumstances, data analysis, assessment, authored report.

Social Assessments for mining clients

Vale **Mozambique**
Socio-economic impact assessment of proposed Moatize power plant, Tete. Research socio-economic circumstances, data analysis, assessment, authored report.

Exxaro Resources Limited **South Africa**
Social impact assessment for the social and labour plan for Leeuwpan Coal Mine, Delmas. Research socio-economic circumstances, data analysis, assessment, authored report.

Social impact assessment for the social and labour plan for Glen Douglas Dolomite Mine, Henley-on-Klip. Research socio-economic circumstances, data analysis, assessment, authored report.

Social impact assessment for the social and labour plan for Grootegeluk Open Cast Coal Mine, Lephalale. Research socio-economic circumstances, data analysis, assessment, authored report.

Social and labour plan for the Paardekraal Project, Belfast. Research socio-economic circumstances, data analysis, assessment, authored report.

Social impact assessment for the Paardekraal Belfast Project Belfast. Research socio-economic circumstances, data analysis, assessment, authored report.

Kumba Resources Ltd **South Africa**

Social Impact Assessments for the Sishen Iron Ore Mine in Kathu Northern Cape. Research socio-economic circumstances, data analysis, assessment, authored report.

Social Impact Assessments for the Sishen South Project in Postmasburg, Northern Cape. Research socio-economic circumstances, data analysis, assessment, authored report.

Social Impact Assessments for the Dingleton resettlement project at Sishen Iron Ore Mine Kathu, Northern Cape. Research socio-economic circumstances, data analysis, assessment, authored report.

Gold Fields **South Africa**

Social Impact Assessment for the Gold Fields West Wits Project. Research socio-economic circumstances, data analysis, assessment, authored report.

Anglo Coal **South Africa**

Review of social impact assessment for the proposed Waterberg Gas 37-spot coalbed methane (CBM) bulk yield test project.

Sekoko Mining **South Africa**

Sekoko Wayland Iron Ore, Molemole Local Municipalities in Limpopo Province. Research socio-economic circumstances, data analysis, assessment, authored report.

Memor Mining (Pty) Ltd **South Africa**

Langpan Chrome Mine, Thabazimbi, Limpopo. Research socio-economic circumstances, data analysis, assessment, authored report.

Prescali Environmental Consultants (Pty) Ltd **South Africa**

Vlakpoort Open Cast Mine – Thabazimbi, Limpopo. Research socio-economic circumstances, data analysis, assessment, authored report.

Afrimat Ltd **South Africa**

1. Marble Hall Lime Burning Project: Social Impact Assessment – Limpopo.
2. Glen Douglas Lime Burning Project: Social Impact Assessment - Henley-on Klip, Midvaal

Social assessments for regional and linear projects

Gautrans **South Africa**

Social impact for the Gautrain Rapid Rail Link, Pretoria to Johannesburg and Kempton Park. Managed a team of 10 field workers, research socio-economic circumstances, data analysis, assessment, and co-authored report.

South African National Road Agency Limited **South Africa**

Social Impact of tolling the Gauteng Freeway Improvement Project. Research socio-economic circumstances, data analysis, assessment, authored report.

Social Impact of the N2 Wild Coast Toll Highway. Managed a team of three specialists. Research socio-economic circumstances, data analysis, assessment, co-authored report.

SIA for the N3 Keeversfontein to Warden (De Beers Pass Section). Research socio-economic circumstances, data analysis, assessment, authored report.

Transnet **South Africa**

Social impact assessment for the Transnet New Multi-Product Pipeline Project (555 km) (Commercial Farmers). Research socio-economic circumstances, data analysis, assessment, authored report.

Expansion of Railway Loops at Arthursview; Paul; Phokeng and Rooiheuwel Sidings in the Bojanala Platinum District Municipality in the North West Province for Transnet Soc Ltd.

Eskom Holdings Limited **South Africa**

Social Impact Assessment for the Ubertas 88/11kV Substation in Sandton, Johannesburg. Research socio-economic circumstances, data analysis, assessment, authored report.

Nuclear 1 Power Plant. Assisted with the social impact assessment consulting to Arcus GIBB Engineering & Science. Peer review and adjusted the report and assisted at the public participation feedback meetings.

Social impact assessment for Eskom Holdings Limited, Transmission Division's Neptune-Poseidon 400kV Power Line in the Eastern Cape. Research socio-economic circumstances, data analysis, assessment, authored report.

Social Impact assessment for Eskom Holdings Limited, Transmission Division, Forskor-Mernsky 275kV±130km Powerline and Associated Substation Works in Limpopo Province. Research socio-economic circumstances, data analysis, assessment, authored report.

Eskom Holdings Limited, Transmission Division **South Africa**
Social Impact assessment for Eskom Holdings Limited, Transmission Division, Tubatse Strengthening Phase 1 – Senakangwedi B Integration in Limpopo Province. Research socio-economic circumstances, data analysis, assessment, authored report.

Basic SIA study for Proposed 1 X 400 kV Eskom Maphutha - Witkop 170 km Powerline.

Social Impact Assessment for the Mulalo Main Transmission Substation and Power Line Integration Project, Secunda

MGTD Environmental **South Africa**
Social impact assessment for a 150MW Photovoltaic Power Plant and Associated Infrastructure in Mpumalanga. Research socio-economic circumstances, data analysis, assessment, authored report.

10MWp Photovoltaic Power Plant & Associated Infrastructure, North West Province. Research socio-economic circumstances, data analysis, assessment, authored report.

eThekwini Municipality **South Africa**
Social impact assessment for the proposed infilling of the Model Yacht Pond at Blue Lagoon, Stiebel Place, Durban. Research socio-economic circumstances, data analysis, assessment, authored report.

Kennedy Road Housing Project, Ward 25 situated on 316 Kennedy Road, Clare Hills (Erf 301, Portion 5).

Afzelia Environmental Consultants and Environmental Planning & Design **South Africa**
Proposed Cato Ridge Crematorium In Kwazulu-Natal Province

MGTD Environmental **South Africa**
ABC Prieska Solar Project; Proposed 75 MWp Photovoltaic Power Plant and its associated infrastructure on a portion of the remaining extent of ERF 1 Prieska, Northern Cape. Research socio-economic circumstances, data analysis, assessment, authored report.

ABC Prieska Solar Project; Proposed 75 MWp Photovoltaic Power Plant and its associated infrastructure on a portion of the remaining extent of ERF 1 Prieska, Northern Cape.

Assessments for social projects and social research

Australia – Africa 2006 Sport Development Program **South Africa**
To establish and assess the impact of the Active Community Clubs Initiative on the communities of NU2 (in the township of Mdantsane)*and Tshabo (a rural village). Lead researcher social, data collection and analysis, assessment.

United Nations Office on Drugs and Crime **South Africa**
Evaluation of a Centre for Violence Against Women in Upington. Research socio-economic circumstances, data analysis, assessment, co-authored report.

University of Johannesburg **South Africa**
Research into research outputs of academics working in the various departments of the university. Research socio-economic circumstances, data analysis, assessment, authored report.

Human Resource and management training

Various national companied **South Africa**
Developed and run various management courses such as, recruitment selection & placement; industrial relations / disciplinary hearings; team building workshops; multiculturalism workshop. 1986-2007

University of South Africa, Department of Industrial Psychology **South Africa**
Developed the performance development study guide for industrial psychology 3. 2000

Authored Chapters in HR books **South Africa**
In Slabbert J.A. de Villiers, A.S. & Parker A (eds.). Managing employment relations in South Africa. Teamwork within the world-class organisation. 2005

In Muchinsky, P. M. Kriek, H. J. & Schreuder, A. M. G. Personnel Psychology 3rd Edition
Chapter 9 – Human resource planning.
Chapter 10 – The changing nature of work. 2005

In Rossouw, G. J. and van Vuuren, L. Business Ethics - Made in Africa 4th Edition.
Chapter 11 – Building Trust with Ethics. 2010

South African Management Development Institute (SAMDI) **Democratic Republic of the Congo**
Developed a course on Strategic Human Resource Planning for SAMDI and the Democratic Republic of the Congo as well as trainer's manuals for this course. 2006.

Competition Tribunal **South Africa**
Developed a Performance Management System and Policy for the Competition Tribunal South Africa. 2006

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MEMBERSHIP OF PROFESSIONAL BODIES

Member of South African Affiliate of the International Association for Impact Assessment (IAIAsa). Membership Number: 2399

Registered on database for scientific peer review of iSimangaliso GEF project outputs

APPENDIX E5

TERRESTRIAL ECOLOGICAL IMPACT ASSESSMENT

PROPOSED LIMPOPO CENTRAL HOSPITAL

Terrestrial Ecological Assessment Report

February 2020

Final

Prepared for: National Department of Health

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Title and Approval Page

Project Name:	Proposed Limpopo Central Hospital, Limpopo Province
Report Title:	Terrestrial Ecological Assessment Report
Authority Reference:	14/12/16/3/3/2/1132
Report Status:	Final

Applicant:	National Department of Health

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Executive Summary

Public health infrastructure is a fundamental pillar to building a successful national health insurance programme. However, according to the National Service Delivery Agreement, the current public health infrastructure cannot adequately support the service delivery needs of the country. Health facility planning, including providing new hospitals and clinics and upgrading established facilities, needs to be expedited to increase citizen's access to a high standard of health care facilities. The fact that there is a significant shortage of skilled practitioners and health care workers in South Africa exacerbates the situation. Currently, the existing medical schools are unable to produce the requisite number of health care professionals. If the country is to meet the requirements of the National Health Insurance (NHI) goals of more equitable access to high-quality health services for all South Africans, both the academic component and health service provisioning must be improved.

The building of a proposed new 488 bed hospital, Limpopo Central Hospital (LCH), on a new site in Polokwane will provide tertiary care for the province and will be the major teaching hospital for the University of Limpopo Faculty of Health Sciences and School of Medicine. The proposed Limpopo Central Hospital will be located on the remainder of Erf 6861 of Pietersburg Extension 30, and falls within the jurisdiction of the Capricorn District Municipality (DM), and the Polokwane Local Municipality (LM) in Limpopo Province. The study area is situated between Edupark, the Northern Academy Secondary School and the N1 road.

Nemai Consulting was appointed by the Sakhiwo Health Solutions as the independent Environmental Assessment Practitioner (EAP) to undertake the environmental assessment for the proposed Limpopo Central Hospital. A Terrestrial Ecological Assessment was undertaken as part of the Environmental Impact Assessment (EIA) process in order to assess the impacts that the proposed development will have on the receiving environment. The objective of this study was to identify sensitive species and their habitats in and around the study area. The current ecological status and conservation priority of vegetation on the site were assessed. Potential faunal habitats were investigated in the study area and all mammals, birds, reptiles and amphibians known to occur on site or seen on site were recorded.

The proposed Limpopo Central Hospital will be situated within the Limpopo Province. The study area falls within the jurisdiction of the Capricorn District Municipality (DM), and the Polokwane Local Municipality (LM). The study area is situated between Edupark, the Northern Academy Secondary School and the N1 road. The proposed site is approximately 21 ha in extent and is situated on the remainder of Erf 6861 of Pietersburg Extension 30. The centre of the Erf is approximately situated in 23°55'12.31"S and 29°28'51.41"E. No perennial rivers

were observed on or near the study area and the closest non-perennial rivers have no connectivity to the study area due to roads and human settlements.

The entire study area falls within the Savanna Biome. This biome is the largest biome in South Africa and covers approximately one third of the entire country. It is characterized by a grassy ground layer and distinct upper layer of woody plants. The study area is classified as falling within the endemic Polokwane Plateau Bushveld vegetation type, with a conservation status of Least threatened.

Threatened ecosystem types are categorised as “not protected”, “poorly protected”, “moderately protected” and “well protected” based on the proportion of each ecosystem type that occurs within a protected area recognised in the Protected Areas Act, 2003 (Act 57 of 2003), and compared with the biodiversity. According to LEDET, (2019), Polokwane Plateau Bushveld Ecosystem is listed as Vulnerable whereas in National Biodiversity Assessment (2018), it is denoted as Least Concern, with a poor level of protection on a provincial scale. Approximately 95% of the study area falls within the ‘Other Natural Areas’ category, while the remainder of the study area falls within the category ‘No Natural Habitat’ remaining. During the field investigation, it was verified that natural areas still exist on the study area, but disturbed or degraded by the illegal dumping of material and also by alien invasive plant species.

Survey methodology included a comprehensive desktop review, utilising available provincial ecological data, relevant literature, Geographic Information System (GIS) databases, topographical maps and aerial photography. This was then supplemented through a ground-truthing phase. A site visit was conducted on 17 November 2016, with a follow-up visit on 30 October 2019. The survey focused on flora (vegetation) and fauna (mammals, avifauna, and reptiles). Several Orange Listed floral and Red Data faunal species pertaining to the survey site were identified during the desktop review. Habitat suitability was assessed through the ground-truthing phase of the surveys.

Anthropogenic activities such as roads, foot paths, littering and most importantly, habitat fragmentation have completely degraded most sections of the study area. Few patches of natural grasslands and woodlands still exist on the study area. Several *protected trees* have distributions that include the study area. Of note is the presence of *Sclerocarya birrea* subsp*. caffra* (Marula) recorded in abundance on site. This species is a nationally protected tree species, and the disturbance to which should be avoided where possible and in terms of Section 15(1) of the National Forests Act, 1998: *no person may cut, disturb, damage or destroy any protected tree or possess, collect, remove, transport, export, purchase, sell, donate or in any other manner acquire or dispose of any protected tree or any forest product derived from a protected tree, except under a licence or exemption granted by the Minister to an applicant and subject to such period and conditions as may be stipulated*. A permit from Department of

Agriculture, Forestry and Fisheries (DAFF) is required before construction commences in order to remove or disturb these protected trees identified on the study area.

During the field survey, no threatened plant species were observed on site but only one species of conservation importance were noted, namely *Boophone disticha* and this species has a conservation status of *Declining.* It is thus recommended that the Search, Rescue and Relocation process should be conducted prior to construction activities taking place. The major concerns on site are alien invasive plant species, weeds and potential alien invasives. Newly cleared soils will have to be re-vegetated and stabilised as soon as construction has been completed and there should be an on-going monitoring program to control and/or eradicate newly emerging alien invasive plant species. The rehabilitation of disturbed areas should receive high priority and must be included in the Environmental Management Programme Report (EMPr) and recommendations regarding the specific plant species used during rehabilitation should be site specific and according to the surrounding vegetation composition. All development footprint areas should remain as small as possible and should not encroach onto surrounding areas.

According to this Animal Demographic Unit data and also historical distribution, Red Data mammal species such as the Common Tsessebe, Sable Antelope, Mountain Reedbuck and Brown Hyaena could possibly occur on the study area as they have been previously recorded in the region. Due to study area being located in an urban environment (*i.e* between the human settlements and the main road (N1), and a lack of suitable habitat available for the majority of the species listed in Appendix A, the list is likely to overestimate the occurrence of mammal species in the area and thus should be viewed with a degree of caution. The nearby Polokwane Game Reserve, which is situated less than a kilometre (km) from the study area, houses many of the species listed in Appendix A. During the field survey, three (3) mammal species were recorded on site, namely Common Molerat, Gerbil and House rat. Mammals recorded were common and are of no conservation importance in the area. No Red data mammal species were noted on the study area.

The Important Bird and biodiversity Areas (IBA) Programme identifies and works to conserve a network of sites critical for the long-term survival of bird species that are globally threatened, have a restricted range and are restricted to specific biomes/vegetation types. The nearby Polokwane Nature Reserve IBA, which is situated less 1.4 Km away from the study area, houses many of the bird species which could utilise the study area for foraging.

According to BirdLife South Africa, this reserve lies 3 km south of Polokwane and is situated in undulating open acacia savanna and grassland, and known to supports at least 350 bird species. It is the only reserve in South Africa in which the isolated eastern population of Short-clawed Lark *Certhilauda chuana* occurs. Bird species such as Secretarybird *Sagittarius serpentarius*, White-backed Vulture *Gyps africanus* and Cape Vulture *G. coprotheres* are occasional visitors. Other woodland bird species such as Korhaan *Eupodotis ruficrista*, White-

throated Robin-Chat *Cossypha humeralis*, Kalahari Scrub Robin *Erythropygia paena*, Burnt-necked Eremomela *Eremomela usticollis*, Barred Wren-Warbler *Calamonastes fasciolata*, Marico Flycatcher *Bradornis mariquensis*, Crimson-breasted Shrike *Laniarius atrococcineus*, Scaly-feathered Finch *Sporopipes squamifrons*, Violet-eared Waxbill *Uraeginthus granatinus*, Black-faced Waxbill *Estrilda erythronotus* and Shaft-tailed Whydah *Vidua regia* are known to be found in the Reserve.

Within the vegetation type found in the study area and immediate surrounding areas, two major bird habitat systems were identified, namely open *Acacia* savanna and overgrazed grasslands. Nineteen (19) bird species were recorded during the field survey. Species recorded were common and widespread and typical of savanna biome. No Red Data bird species associated with the study area were recorded.

According to the data sourced from the South African Reptile Conservation Assessment for the grid cell 2329CD, and historic distribution of reptile species, no reptile species of conservation concerns are known to occur in the vicinity of the study area. The study area supports limited suitable habitat for any arboreal species but provided suitable habitat for terrestrial reptile species such as Ground Agama. Termite mounds were present on the study area. Old termite mounds offer important refuges especially during veld fires as well as cold winter months for numerous frog, lizard, snake and smaller mammal species. Large number of species of mammal, birds, reptiles and amphibians feed on the emerging alates (winged termites). No termite mounds were destroyed during the brief field survey. All overturned rock material was carefully replaced in its original position. Only one reptile species, the Distant's Ground Agama (*Agama aculeata* subsp *distanti*) was recorded on the study area.

Generally, the negative impacts to the receiving environment resulting from the study area are probably of an acceptable significance and magnitude, if appropriate mitigations measures are implemented and construction is implemented in a sensitive manner. The proposed development will cause disruption during the construction phase, but as long as mitigation measures are implemented, these disruptions should have minimal lasting effect on the ecosystems of the study area. It is the opinion of the ecologist, that the proposed development be considered favourably, provided that the sensitivity map be considered during the planning and construction phases and also mitigations measures are implemented and adhered to and this will aid in the conservation of ecology on the study area. The methodologies used and results found during the field surveys, together with the impacts and mitigation measures provide confidence that the project can go ahead.

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List of Abbreviations

ADU	Animal Demography Unit
CBAs	Critical Biodiversity Areas
CARA	Conservation of Agricultural Resources Act
DAFF	Department of Agriculture, Forestry and Fisheries
EAP	Environmental Assessment Practitioner
EIA	Environmental Impact Assessment
EMPr	Environmental Management Programme
ESAs	Ecological Support Areas
GPS	Global Positioning System
GIS	Geographic information system
QDS	Quarter degree Squares
AIPs	Alien Invasive Plant species
IBA	Important Bird and Biodiversity Area
LM	Local Municipality
LCPv2	Limpopo Conservation Plan (version 2)
LEDET and Tourism	Limpopo Department of Economic Development, Environment
NBA	National Biodiversity Assessment, 2018
NEMA	National Environmental Management Act
NNR	No Natural (Habitat) Remaining
ONA	Other Natural Areas
PRECIS	Pretoria Computer Information Systems
SABS	South African Bureau of Standards
SANBI	South African National Biodiversity Institute
SARCA	Southern African Reptile Conservation Assessment
SCC	Species of Conservation Concern

1 BACKGROUND AND INTRODUCTION

Public health infrastructure is a fundamental pillar to building a successful national health insurance programme. However, according to the National Service Delivery Agreement, the current public health infrastructure cannot adequately support the service delivery needs of the country. Health facility planning, including providing new hospitals and clinics and upgrading established facilities, needs to be expedited to increase citizen's access to a high standard of health care facilities. The fact that there is a significant shortage of skilled practitioners and health care workers in South Africa exacerbates the situation. Currently, the existing medical schools are unable to produce the requisite number of health care professionals. If the country is to meet the requirements of the National Health Insurance (NHI) goals of more equitable access to high-quality health services for all South Africans, both the academic component and health service provisioning must be improved.

The building of a proposed new 488 bed hospital, Limpopo Central Hospital (LCH), on a new site in Polokwane will provide tertiary care for the province and will be the major teaching hospital for the University of Limpopo Faculty of Health Sciences and School of Medicine. The proposed Limpopo Central Hospital will be located on the remainder of Erf 6861 of Pietersburg Extension 30, and falls within the jurisdiction of the Capricorn District Municipality (DM), and the Polokwane Local Municipality (LM) in Limpopo Province. The study area is situated between Edupark, the Northern Academy Secondary School and the N1 road.

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1.1 Objectives of the assessment

- To review literature in order to determine the diversity and eco-status of the plants, mammals, birds, and reptiles on or near the study area;
- To carry out a survey to gain an understanding of the diversity of taxa which inhabit the development footprint (study area), as well as the presence of unique habitats that might require further investigation or protection;

- To assess the current habitat condition and conservation status of plants and animals species on the study area;
- To assess the potential impacts that the proposed development may have on plant and animals on the study area;
- To list the species on site and to recommend necessary actions in case of the occurrence of endangered, vulnerable or rare species or any species of conservation importance; and
- To provide management recommendations to mitigate negative and enhance positive impacts on the study area.

1.2 Declaration

I, Avhafarei Phamphe, declare that I –

- act as an independent specialist consultant in the fields of Biodiversity (Fauna and Flora) for the Terrestrial Impact Assessment Report for the proposed Limpopo Central Hospital;
- do not have and will not have any financial interest in the undertaking of the activity, other than remuneration for work performed in terms of the Environmental Impact Assessment Regulations 2014;
- have and will not have any vested interest in the proposed activity;
- have no, and will not engage in conflicting interests in the undertaking of the activity; and
- will provide the competent authority with access to all information at our disposal regarding the application, whether such information is favourable to the applicant or not.

Avhafarei Phamphe
Senior Biodiversity Specialist
Nemai Consulting (PTY) Ltd

2 Relevant Legislation and Guidelines

The legislation that has a possible bearing on the proposed project from an ecological perspective are listed below:

- Conservation of Agricultural Resources Act (Act No. 43 of 1983);

- Occupational Health & Safety Act (Act No. 85 of 1993);
  The Constitution (Act 108 of 1996)–Section 24;
- National Environmental Management Act (Act No. 107 of 1998);
- The white paper on the Conservation and Sustainable Use of South Africa's Biological Diversity (1997);
- National Forests Act (Act 84 of 1998);
- Limpopo Environmental Management Act (Act No. 7 of 2003);
- National Environmental Management Protected Areas Act 2003 (Act No 57 of 2003);
- National Environmental Management: Biodiversity Act (Act No.10 of 2004);
- Guidelines for Involving Specialists in the EIA Processes Series (Brownlie, 2005).
- Limpopo Conservation Plan v.2. Technical report (2013);
- National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004) - Alien and Invasive Species (AIS) Regulations which became law on 1 October 2014;
- Limpopo Environmental Outlook Report, 2016;
- Savanna and Thicket Biome Ecosystem Guidelines (2017);
- National Biodiversity Assessment (2018) and
- Capricorn District bioregional plan (2019).

3 STUDY AREA

The proposed Limpopo Central Hospital will be situated within the Limpopo Province. The study area falls within the jurisdiction of the Capricorn District Municipality (DM), and the Polokwane Local Municipality (LM). The study area is situated between Edupark, the Northern Academy Secondary School and the N1 road. The proposed site is approximately 21 ha in extent and is situated on the remainder of Erf 6861 of Pietersburg Extension 30 (**Figure 1**). The centre of the Erf is approximately situated in 23°55'12.31"S and 29°28'51.41"E. A collage of photographs taken from the study area is presented in **Figure 2** (2016) and **Figure 3** (2019) below. No perennial rivers were observed on or near the study area and the closest non-perennial rivers have no connectivity to the study area due to roads and human settlements (**Figure 4**).

Figure 1: Cadastral Map (based on 2017 cadastral information)

Figure 2. Photographs taken on the study area (2016)

Figure 3. Photographs taken on the study area (2019)

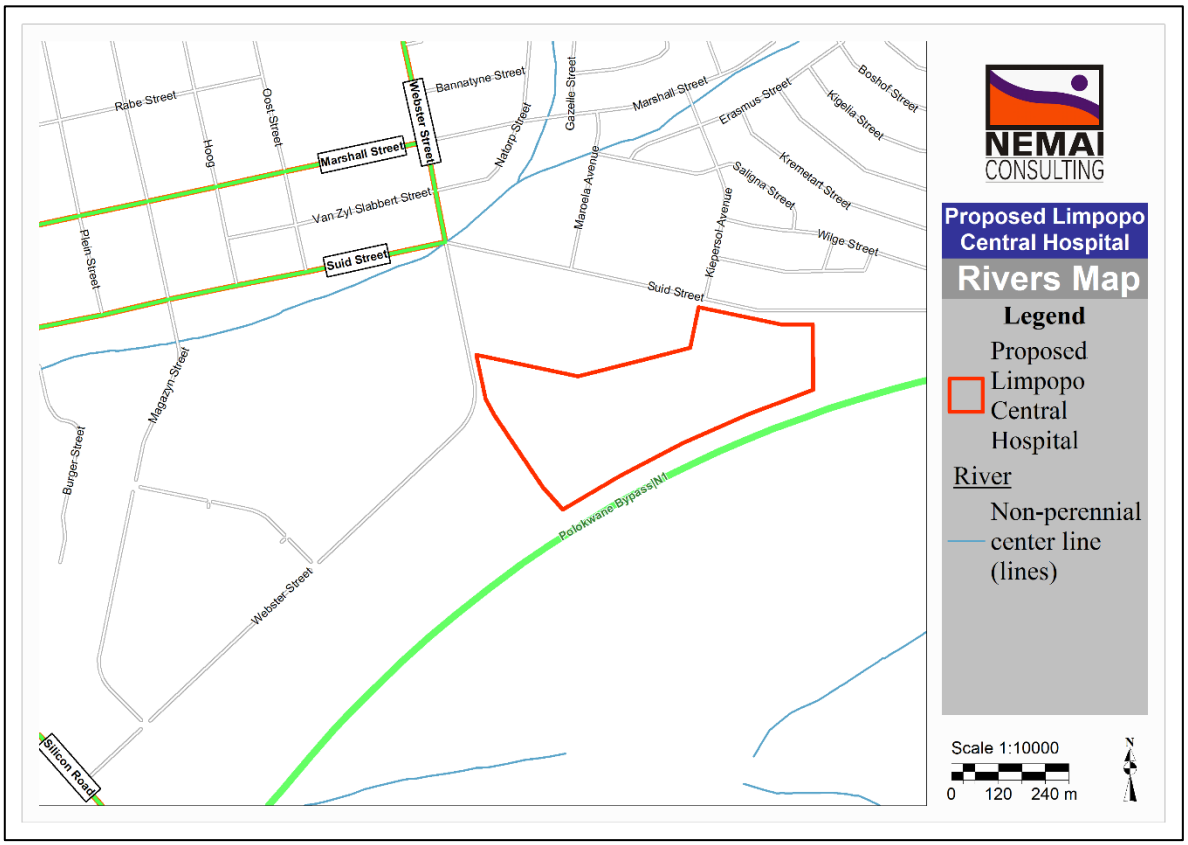

Figure 4. Non-perennial rivers in relation to the study area

4 LIMITATIONS AND GAPS

The following constraints/limitations were applicable to this assessment:

- The majority of threatened plant species are seasonal and only flower during specific periods of the year. Time constraints did not allow for repeated sampling over different seasons and so desktop surveys were used to provide additional information based on the current state of the receiving environment.
- Due to the brief duration of the survey, the species list provided for the study area cannot be regarded as comprehensive, but because of the season of the survey (summer), many of species present on site were identifiable at the time of the surveys.
- The ecological study process was undertaken prior to the availing of certain information which would only be derived from the final project design and layout. The design layout had not been finalised yet at the time of the ecological study.

- The potential of future similar developments in the same geographical area, which could lead to cumulative impacts cannot be meaningfully anticipated.
- No suitable habitats (watercourses) were found within the study area and therefore the Frog study was deemed not necessary. During the scoping report, no invertebrates of conservation concern are known to occur within or around the development site.
- Since environmental impact studies deal with dynamic natural systems additional information may come to light at a later stage and Nemai Consulting can thus not accept responsibility for conclusions and mitigation measures made in good faith based information gathered or databases consulted at the time of the investigation.

5 METHODOLOGY

5.1 Flora

The flora assessment consisted of two complementary approaches:

- A desktop analysis, which included literature review, local knowledge, topographical maps, and Google Earth imagery; and
- A site visit was conducted on 17 November 2016, with a follow-up visit on 30 October 2019, following very good rains in the area.

Satellite imagery of the area was obtained from Google Earth and was studied in order to acquire a three dimensional impression of the topography and land use and also to identify potential “hot-spots” or specialized habitats such as natural vegetation on or near the study area.

The computerized data storage and retrieval system, called PRECIS was consulted to retrieve a list of Red Data plants recorded from the 2329CD Quarter Degree Square (QDS) http://posa.sanbi.org/searchspp.php). This list was used to determine which Red data plant species could potentially occur on the study area.

The vegetation maps published by Mucina and Rutherford (2012 and 2018) were consulted to identify vegetation types that are found in the study area.

The site was traversed on foot and species listed as they were encountered. Attention was paid to the occurrence of medicinal, Red data plant species, protected trees, alien invasive and declared weed species. Field guides such as van Wyk *et al.* (1997), Pooley (1998), van Oudshoorn (1999) and Manning (2009) were consulted during the field work to aid in the identification of plant species.

Regulations published for the National Forests Act (Act 84 of 1998) as amended, provide a list of protected tree species for South Africa. The species on this list were assessed in order to determine which protected tree species have a geographical distribution that coincides with the study area and habitat requirements that may be met by available habitat in the study area. The distributions of species on this list were obtained from published sources (e.g. van Wyk & van Wyk 1997) and from the SANBI Biodiversity Information System website (http://sibis.sanbi.org/) for the quarter degree grid in which species have been previously recorded.

Alien Invasive plant species are controlled by the National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004) - Alien and Invasive Species (AIS) List, 2016 (and the latest revised edition of 2019-02-13) was consulted. The AIS Regulations list different categories of invasive species that must be managed, controlled or eradicated from areas where they may cause harm to the environment, or that are prohibited to be brought into South Africa.

Alien Invasive plant species are divided into four categories, namely:

- Category 1a: Invasive species which must be combatted and eradicated. Any form of trade or planting is strictly prohibited.
- Category 1b: Invasive species which must be controlled and wherever possible, removed and destroyed. Any form or trade or planting is strictly prohibited.
- Category 2: Invasive species, or species deemed to be potentially invasive, in which a permit is required to carry out a restricted activity. Category 2 species include commercially important species such as pine, wattle and gum trees.
- Category 3: Invasive species which may remain in prescribed areas or provinces. Further planting, propagation or trade, is however prohibited.

5.2 Mammals

The Animal Demographic unit website and Skinner & Chimimba (2005) were consulted to draw up a list of mammal species potentially occurring on the study area.

During the site visits, mammals were identified by spoor, burrows and visual sightings through random transect walks and documented. The habitat quality and quantity for Red Listed species potentially present were evaluated. The adjoining properties (approximately 200 m) were also scanned for the presence of Red Listed mammal species/habitat.

The confirmed list of presences were augmented with anecdotal information provided by the local community residing in the vicinity of the study area

5.3 Avifauna

The Southern African Bird Atlas Project (SABAP 1 & 2) were consulted as a means to determine which Red Listed bird species was previously recorded from the area.

During the site visits, this list was audited based on confirmed sightings of Red Listed bird species and the evaluation of suitable habitat for Red Listed bird species potentially present.

The study area, including the adjoining properties within 200 m from the study area was surveyed on foot during random transect walks and all sightings were documented.

Birds were identified through visual identification by using a 10 x 42 Bushnell Waterproof binocular, by call, and from feathers. Where necessary, identifications were verified using field guides such as Sasol birds of Southern Africa (Sinclair et al. 2002) and the Chamberlain Guide to Birding Gauteng (Marais & Peacock, 2008).

5.4 Reptiles

The Animal Demographic Unit website and historic distributions (Alexander & Marais, 2007) of reptile species were consulted in order to draw up lists of potential occurrences. During site visits, reptiles were identified by visual sightings during random transect walks. Possible reptile retreats such as burrows were inspected for any inhabitants. The habitat quality and quantity for Red Listed species potentially present were evaluated. The adjoining properties (approximately 200 m) were also scanned for sensitive reptile species and habitats. The list of confirmed presences were augmented with anecdotal information provided by the local community residing in the vicinity of the study area.

6 Limpopo Conservation Plan & Capricorn District Bioregional Plan

This systematic conservation planning process resulted in 40% of the province being identified as Critical Biodiversity Areas (CBA1 22% and CBA2 18%). Critical Biodiversity Areas (CBAs) within the bioregion are -a network of areas required to meet provincial conservation targets, and needs to be maintained in the appropriate condition for their category to ensure the protection of important biodiversity features contained within these areas.

Ecological Support Areas (ESAs) covers a further 22% of the province, of which 16% are intact natural areas (ESA1) and 7% are degraded or areas with no natural remaining which are nevertheless required as they potentially retain some value for supporting ecological processes (ESA2) (Desmet *et al*. 2013).

A map of CBAs for Limpopo was produced as part of this plan and sites were assigned to CBA and ESA categories based on their biodiversity characteristics, spatial configuration and requirement for meeting targets for both biodiversity pattern and ecological processes.

Approximately 95% of the study area falls within the 'Other Natural Areas' category, while the remainder of the study area falls within the category 'No Natural Habitat' remaining (**Figure 5**). During the field investigation, it was verified that natural areas still exist on the study area, but disturbed or degraded by the illegal dumping of material and also by invasive flora species. The general description of CBA map categories and associated land management objectives and recommendations are listed in **Table 1**.

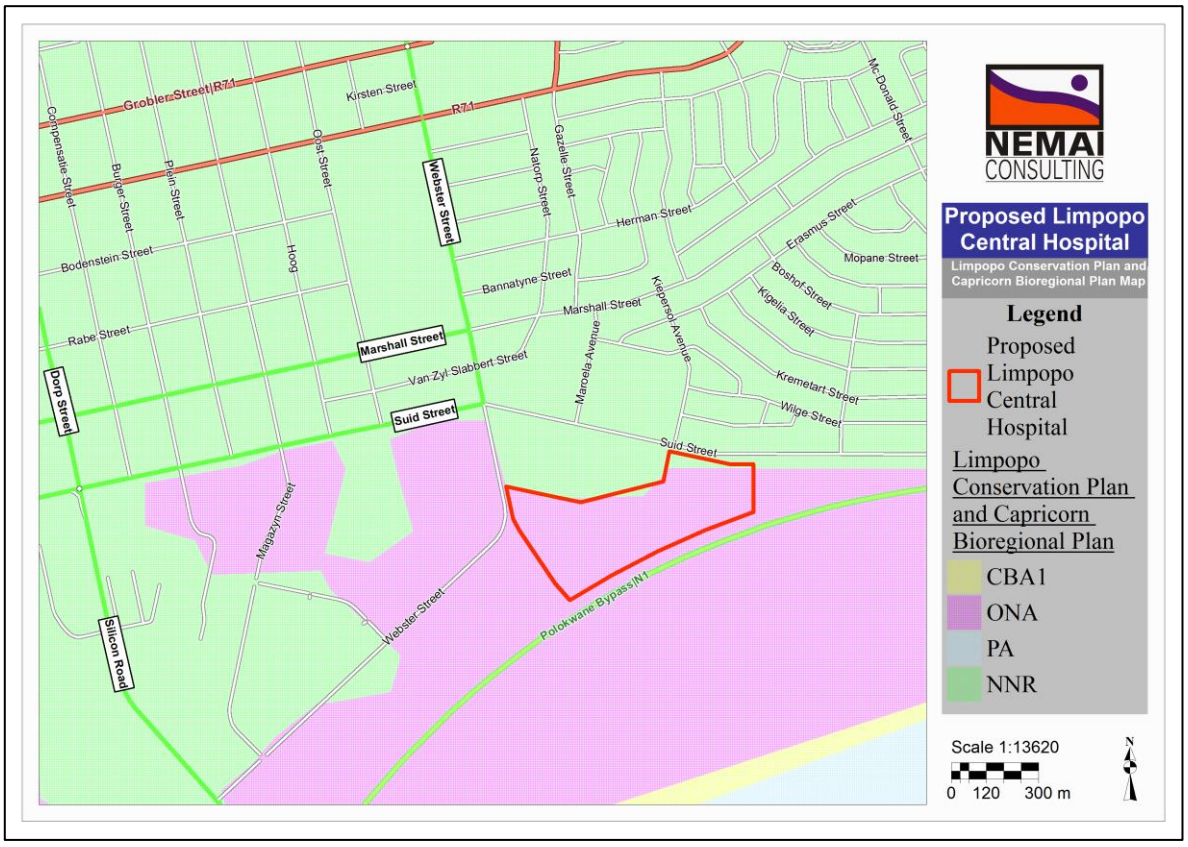

Figure 5: Limpopo Conservation Plan and Capricorn bioregional plan categories in relation to the study area.

Table 1. Summary of map categories and land management objectives (LEDET, 2019).

Category	Definition/ Description	Land Management Objective	Land Management Recommendations
Protected Areas	• Formal Protected Areas and Protected Areas pending declaration under the National Environmental Management Protected Areas Act (NEMPAA), including National Parks, Nature Reserves, Special Nature Reserves and Protected Environments.	• As per the relevant Protected Area Management Plan	• Maintain or obtain formal conservation protection
Critical Biodiversity Area 1 (CBA1)	• Irreplaceable sites. • Areas that are essential for meeting biodiversity targets. • No alternative sites are available to meet targets.	• Maintain in a natural state with limited or no biodiversity loss. • Rehabilitate degraded areas to a natural or near natural state, and manage for no further degradation.	• Obtain formal conservation protection where possible. • Implement appropriate zoning to avoid loss of intact habitat or intensification of land use.
Critical Biodiversity Area 2 (CBA2)	• Areas selected to meet biodiversity targets. • Alternative sites may be available to meet targets, but these are the optimal sites based on complementarity, connectivity and avoidance of conflict with other land uses.	• Maintain in a natural state with limited or no biodiversity loss. • Rehabilitate degraded areas to a natural or near natural state, and manage for no further degradation.	• Obtain formal conservation protection where possible. • Implement appropriate zoning to avoid loss of intact habitat or intensification of land use.
Ecological Support Area 1 (ESA1)	• Natural, near natural and semi-natural or degraded areas that support the ecological functioning of CBAs and protected areas and maintain ecological processes.	• Maintain ecosystem functionality and connectivity allowing for limited loss of biodiversity pattern.	• Implement appropriate zoning and land management guidelines to avoid impacts on ecological processes and connectivity. • Avoid intensification of land use. • Avoid fragmentation of natural landscape.
Ecological Support Area 2 (ESA2)	• Areas with no natural habitat that are nevertheless important for supporting ecological processes.	• Avoid additional / new impacts on ecological processes. • Ensure that land use is not intensified and that activities are	• Avoid intensification of land use, which may result in additional impact on ecological processes.

Category	Definition/ Description	Land Management Objective	Land Management Recommendations
		managed to minimise impact on threatened species.	• Avoid conversion of agricultural land to more intensive land uses to more intensive forms of agriculture, which may have a negative impact on threatened species or ecological processes.
Other Natural Areas (ONA)	• Natural and intact but not required to meet targets, and not identified as CBAs or ESAs.	• Subject to town and regional planning guidelines and policy.	• Subject to town and regional planning guidelines and policy.
No Natural Habitat Remaining (NNR)	• Areas with no significant direct biodiversity importance. • Areas with no natural habitat or degraded natural areas that are not required as ESAs, including intensive agriculture, urban, industry and built infrastructure.	• Subject to town and regional planning guidelines and policy.	• Subject to town and regional planning guidelines and policy.

7 REGIONAL VEGETATION

The entire study area falls within the Savanna Biome (Mucina and Rutherford, 2012; Figure 6). This biome is the largest biome in South Africa and covers approximately one third of the entire country. It is characterized by a grassy ground layer and distinct upper layer of woody plants (Low and Rebelo, 1996).

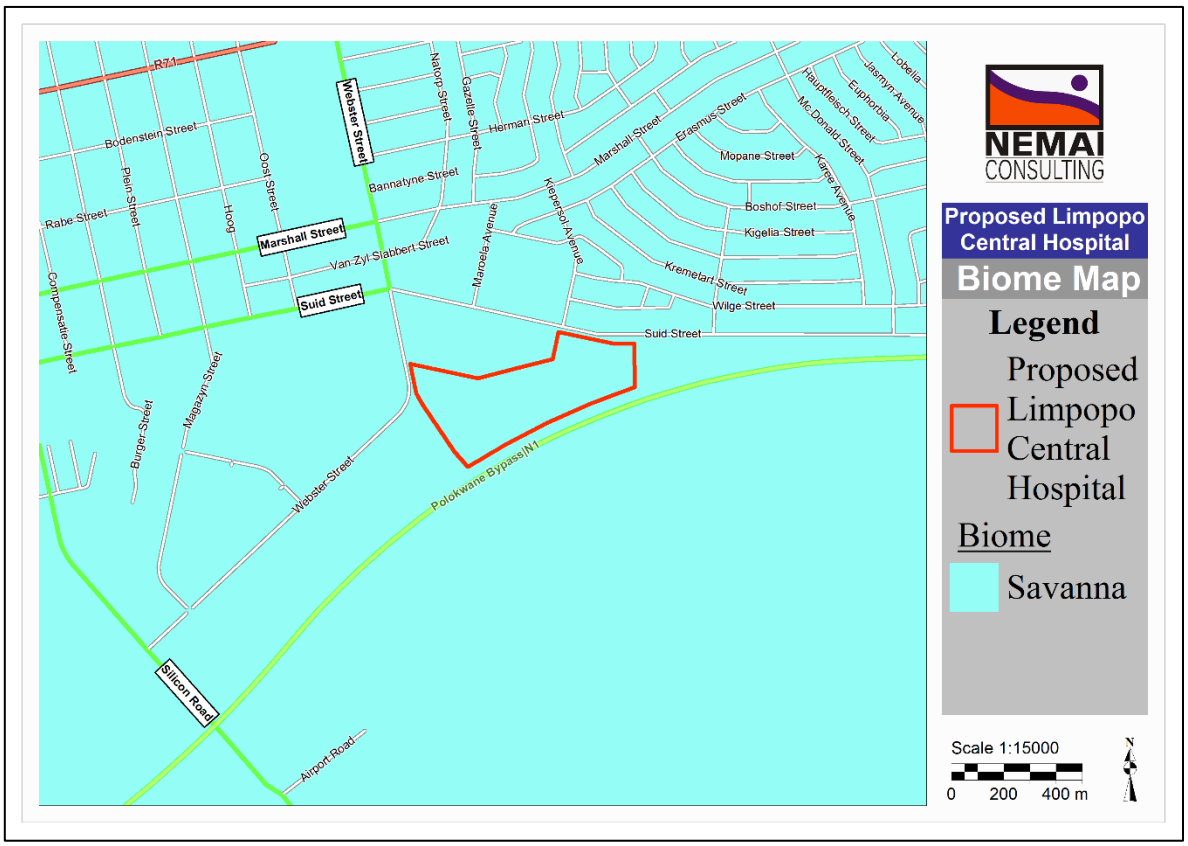

Figure 6. Biome in relation to the study area

Mucina and Rutherford (2012 & 2018) classified the study area as falling within the endemic Polokwane Plateau Bushveld vegetation type, as indicated in **Figure 7.**

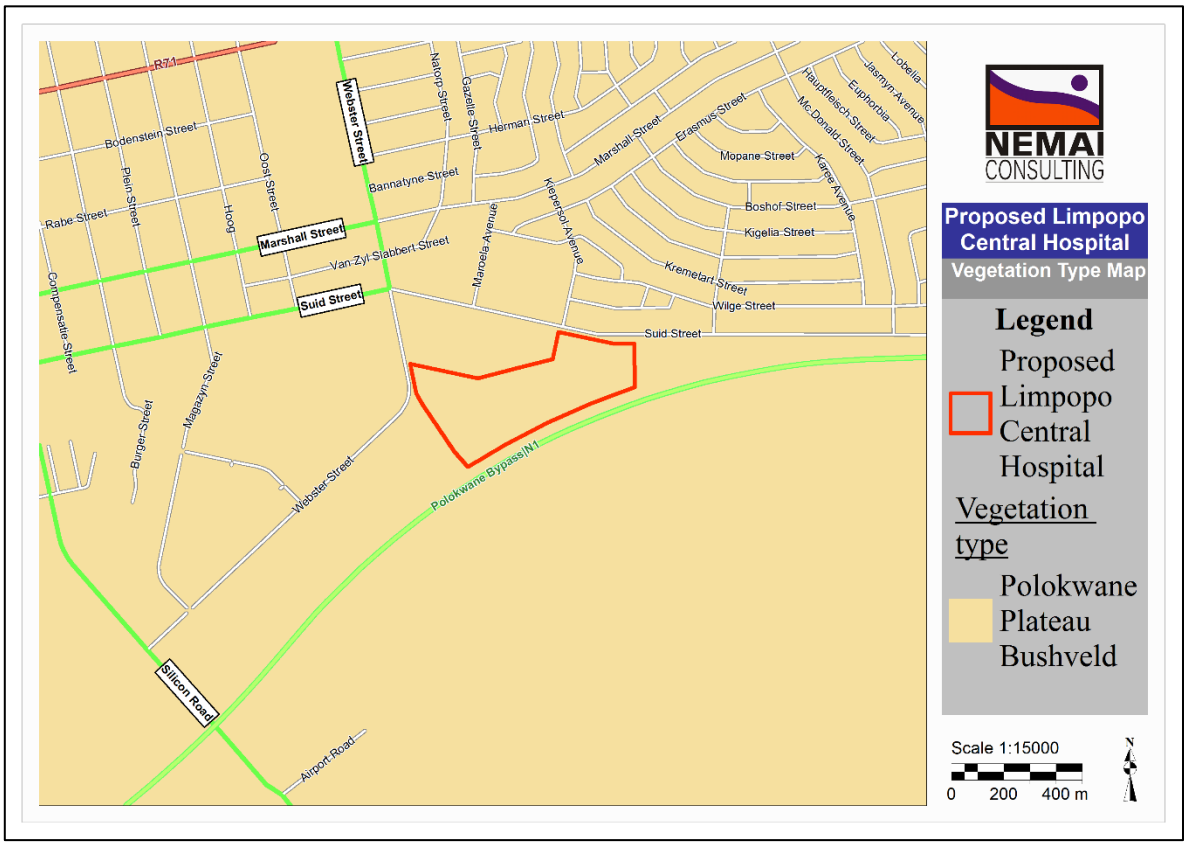

Figure 7. Vegetation type occurring in the study area

The description of the vegetation type follows below:

7.1 Polokwane Plateau Bushveld

The Polokwane Plateau Bushveld vegetation type is found in Limpopo Province in the higher-lying plains around Polokwane, north of the Strydpoort Mountains and south of the SVcb 20 Makhado Sweet Bushveld (Mucina and Rutherford, 2006).

Important taxa include plant species such as *Vachelia caffra,* (Mucina and Rutherford, 2006). *V. karroo, V. tortilis* subsp*. heteracantha, Ziziphus mucronata; Aloe marlothii* subsp*. marlothii, Diospyros lycioides* subsp*. sericea, Euclea crispa* subsp*. crispa, Lippia javanica, Searsia pyroides var, pyroides, Sida rhombifolia, Solanum panduriforme; Eragrostis curvula, Themeda triandra, Aristida congesta, Cymbopogon caesius, Cynodon dactylon, Aloe greatheadii* var*. greatheadii* etc (Mucina and Rutherford, 2006).

The conservation status of this vegetation type is classified as Least threatened with a national conservation target of 19%. Less than 2% is statutorily conserved mainly in the Percy Fyfe

and Kuschke Nature Reserves. In addition, 0.7% is conserved in other reserves, for example the Polokwane Game Reserve (Mucina and Rutherford, 2006).

Some 17% is transformed, including about 10% cultivated and 6% urban and built-up. Dense concentration of rural human settlements is found particularly in the eastern and north-western parts of the vegetation type. In some regions, scattered populations of alien *Agave*, *Jacaranda mimosifolia*, *Melia azedarach*, *Opuntia ficus-indica* and *Ricinus communis* are of concern (Mucina and Rutherford, 2006).

8 THREATENED TERRESTRIAL ECOSYSTEMS

In terms of section 52(1) (a), of the National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004), a national list of ecosystems that are threatened and in need of protection was gazetted on 9 December 2011 (Government Notice 1002 (Driver *et al.* 2004). The list classified all threatened or protected ecosystems in South Africa in terms of four categories; Critically Endangered (CR), Endangered (EN), Vulnerable (VU), or Protected. The purpose of categorising these ecosystems is to prioritise conservation areas in order to reduce the rates of ecosystem and species extinction, as well as preventing further degradation and loss of structure, function, and composition of these ecosystems.

It is estimated that threatened ecosystems make up 9.5% of South Africa, with critically endangered and endangered ecosystems accounting for 2.7%, and vulnerable ecosystems 6.8% of the land area. It is therefore vital that Threatened Terrestrial Ecosystems inform proactive and reactive conservation and planning tools, such as Biodiversity Sector Plans, municipal Strategic Environmental Assessments (SEAs) and Environmental Management Frameworks (EMFs), Environmental Impact Assessments (EIAs) and other environmental applications (Mucina *et al*. 2006).

Ecosystem threat status refers to the degree to which an ecosystem is still intact, or alternatively losing vital aspects of its structure, function or composition. Ecosystems are listed as threatened based on their risk of extinction as a result of irreversible loss of natural habitat, ecosystem degradation and loss of integrity. The main purpose of listing threatened ecosystems is, therefore, to counteract this risk (Limpopo Department of Economic Development, Environment and Tourism (LEDET), 2019).

Ecosystem types are categorised as “not protected”, “poorly protected”, “moderately protected” and “well protected” based on the proportion of each ecosystem type that occurs within a protected area recognised in the Protected Areas Act, 2003 (Act 57 of 2003), and compared with the biodiversity. According to LEDET (2019), Polokwane Plateau Bushveld Ecosystem is listed as Vulnerable whereas in National Biodiversity Assessment (2018), it is denoted as Least Concern, with a poor level of protection on a provincial scale (**Figure 8**).

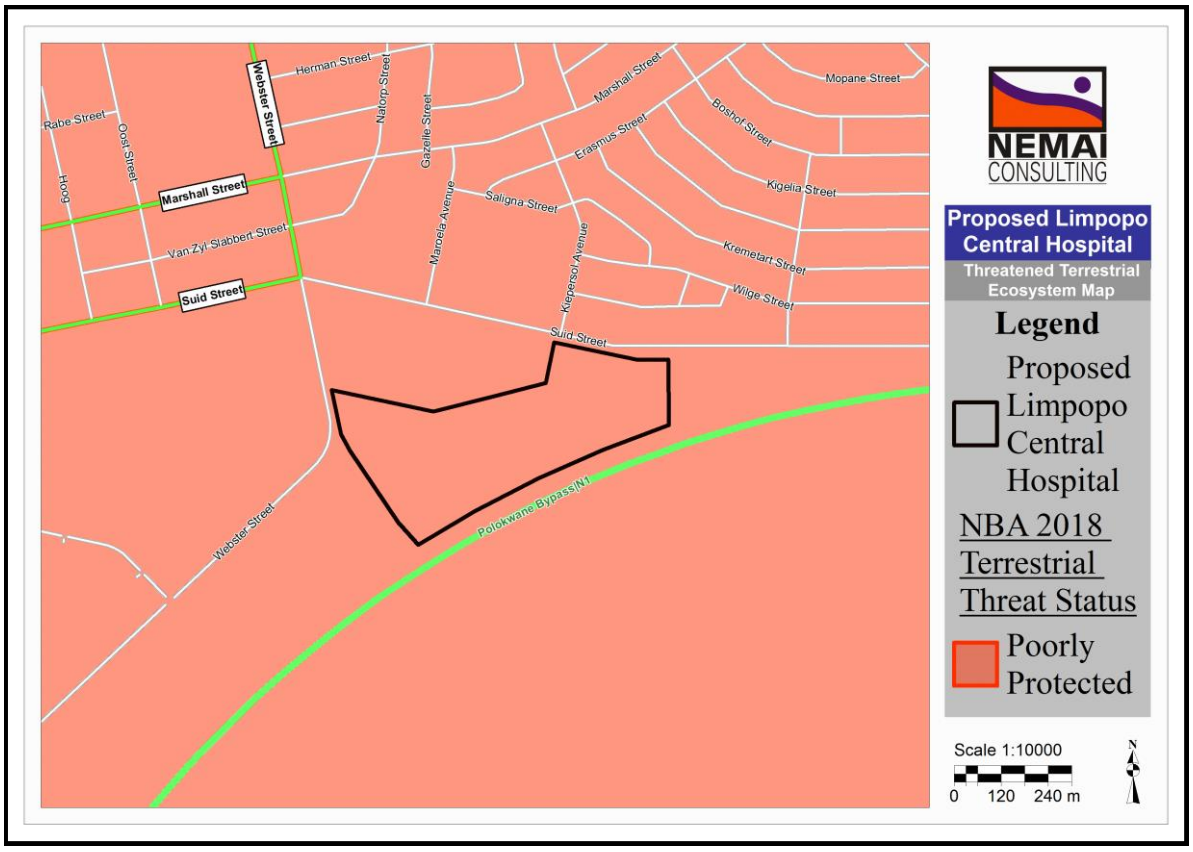

Figure 8. The Polokwane Plateau Bushveld Ecosystem is poorly protected

9 RESULTS AND DISCUSSION

9.1 Flora

9.1.1 Desktop study results

Table 2 indicates the Red data plants that are known to occur in the 2329CD Quarter Degree Square (QDS). The definitions of the conservation status are provided in **Table 3**.

Table 2. Red Data Plant species recorded in grid 2329CD which could potentially occur in the study area.

Species	Threat status	Flowering Season	Suitable habitat and ecology
Clivia caulescens	NT	Summer (October to November)	It occurs in forests in leaf mould, in leaf mould on rocks, even on old decaying tree stumps or on the branches of trees
Brachystelma minor	VU	From October to late March with a peak from November to the	It occurs mainly in shallow pockets of dolomite, tolerating both open and shady conditions

Species	Threat status	Flowering Season	Suitable habitat and ecology
		beginning of February.	
Elaeodendron transvaalense	NT	Summer (December to April)	It favours soils rich in lime, grows in various soils and is found in forests, bushveld, scrub, thornveld and woodland, along streams and often on termite mounds
Commelina rogersii	VU	October to March	Grassland and open woodland
Euphorbia groenewaldii	CR	Winter	It grows in sandstone and quartzite hills on extremely rocky and hard ground in Moist Mountain Bushveld vegetation with sparse *Acacia* scrub
Euphorbia restricta	Rare	Between May and June and the capsules are formed from July to August	It grows on shallow soil in rock crevices in the Wolkberg Dolomite Grassland characterised by short, closed grasslands rich in forb and grass species, and shares its habitat with *Aloe dolomitica*, *Aloe vryheidensis* and *Euphorbia schinzii.*
Hypoxis hemerocallidea	Declining	Summer	It occurs in open grassland and woodland and is widespread in South Africa in the eastern summer rainfall provinces (Eastern Cape, Free State, KwaZulu-Natal, Mpumalanga, Gauteng and Limpopo).
Crocosmia masoniorum	VU	Flowers from July to September	It is known from just a few localities in the mountains to the north of Engcobo and Umtata in Eastern Cape and grows on shaded, wet rock ledges at the head of mountain streams
Ophioglossum gracillimum	EN	Summer	Occurs in seasonally moist areas in open deciduous woodland

Note: CR=Critically Endangered; EN=Endangered, VU=Vulnerable, NT=Near Threatened

Table 3. Definitions of Red Data status (Raimondo *et al*. 1999)

Symbol	Status	Description
CR	Critically Endangered	A species is **Critically Endangered** when the best available evidence indicates that it meets any of the five International Union for Conservation of Nature (IUCN) criteria for Endangered, and is therefore facing a very high risk of extinction in the wild.
EN	Endangered	A species is **Endangered** when the best available evidence indicates that it meets any of the five IUCN criteria for Endangered, and is therefore facing a very high risk of extinction in the wild
VU	Vulnerable	A species is **Vulnerable** when the best available evidence indicates that it meets any of the five IUCN criteria for Vulnerable and it is therefore considered to be facing a high risk of extinction in the wild.

Symbol	Status	Description
NT	Near Threatened	A species is **Near Threatened** when available evidence indicates that it is close to meeting any of the five IUCN criteria for Vulnerable and it is therefore likely to qualify for a threatened category in the near future.
N/A	Declining	A species is **Declining** when it does not meet any of the five IUCN criteria and does not qualify for the categories Critically Endangered, Endangered, Vulnerable or Near Threatened, but there are threatening processes causing a continuing decline in the population.
N/A	Rare	A species is **Rare** when it meets any of the four South African criteria for rarity, but is not exposed to any direct or plausible potential threat and does not qualify for a category of threat according to the five IUCN.

9.1.2 Plant species recorded on the study area

The north eastern sections of the study area are degraded by illegal dumping of rubble (**Figures 9** and **10**) and dominated by alien invasive plant species. A list of plant species recorded on the study area are listed in **Table 4** below. Red Data listed plant species and protected trees are indicated in **BOLD**.

Figure 9. Illegal dumping of building rubble on the study area

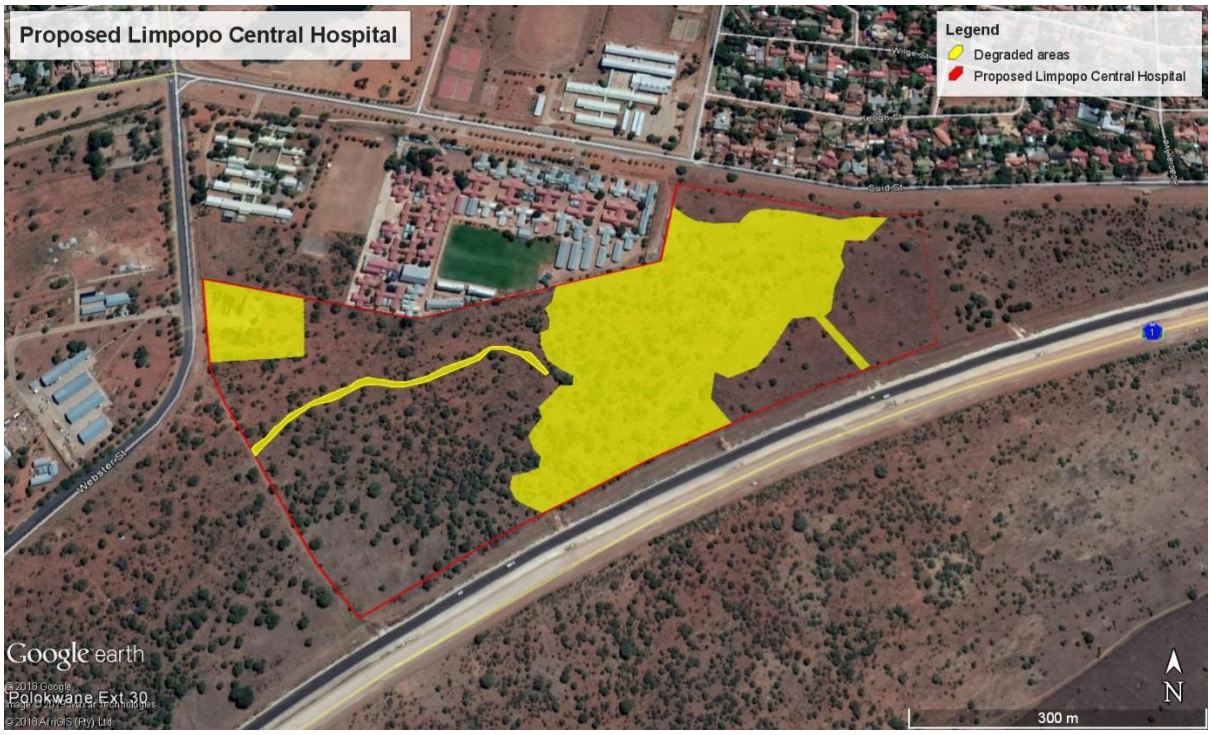

Figure 10. Degraded areas on the study area

Table 4. Plant species recorded on the study area

Scientific name	Common name	Conservation status	Ecological status	Growth Form
Senegalia burkei	Black monkey-thorn	Least Concern	Indigenous	Tree
Vachellia karroo	Sweet thorn	Least Concern	Indigenous	Tree
Vachellia rehmanniana	Silky Thorn	Least Concern	Indigenous	Tree
Agave americana	Century plant, American aloe		Category 2 AIS	Succulent
Agave sisalana	Sisal		Category 2 AIS	Succulent
Vachellia sieberiana	Paperbark Thorn	Least Concern	Indigenous	Tree
Aloe ferox	Bitter Aloe, Red Aloe	Least Concern	Indigenous /Medicinal	Succulent
Aloe greatheadii var. *davyana*	Spotted aloe	Least Concern	Indigenous/Medicinal	Succulent
Aloe marlothii	Mountain Aloe	Least Concern	Indigenous/Medicinal	Succulent
Aloe zebrina	Zebra leaf aloe	Least Concern	Indigenous/Medicinal	Succulent
Alternanthera pungens	Khakhiweed		Weed	Herb
Argemone ochroleuca	White-Flowered Poppy		Category 1b AIS	Herb
Asparagus laricinus	Bergkatbos	Least Concern	Indigenous	Herb
Bidens pilosa	Common Black-jack		Weed	Herb
Boophone disticha	**Century plant**	**Declining**	**Indigenous/Medicinal**	**Herb**
Bolusanthus speciosus	Tree wisteria; Elephant Wood	Least Concern	Indigenous/Medicinal	Tree
Clerodendrum glabrum	Tinderwood	Least Concern	Indigenous/Medicinal	Shrub
Cissus quadrangularis	Veldt grape	Least Concern	Indigenous/Medicinal	Herb
Conyza bonariensis	Flax-leaf fleabane		Weed	Herb
Cynodon dactylon	Couch Grass	Least Concern	Indigenous	Grass
Datura ferox	Large thorn apple		Category 1b AIS	Herb
Datura stramonium	Jimson weed		Category 1b AIS	Herb
Dichrostachys cinerea	Sicklebush	Least Concern	Indigenous	Shrub

Scientific name	Common name	Conservation status	Ecological status	Growth Form
Digitaria eriantha	Common Finger Grass	Least Concern	Indigenous	Grass
Dipcadi glaucum	Wild Onion	Least Concern	Indigenous	Herb
Ehretia rigida	Puzzle bush	Least Concern	Indigenous	Shrub
Ehretia rigida subsp. *nervifolia*	Cape Lilac	Least Concern	Indigenous	Herb
Euphorbia tirucalli	Pencil plant, Rubber-hedge *Euphorbia*	Least Concern	Indigenous	Succulent
Eragrostis curvula	Weeping Love Grass	Least Concern	Indigenous	Grass
Eragrostis plana	Tough Love Grass	Least Concern	Indigenous	Grass
Felicia muricata	Karoo-Aster	Least Concern	Indigenous	Herb
Ficus burkei	Common Wild Fig	Least Concern	Indigenous	Tree
Gymnosporia buxifolia	Common Spike-Thorn	Least Concern	Indigenous	Shrub
Gymnosporia senegalensis	Confetti Spike-thorn	Least Concern	Indigenous	Shrub
Helichrysum nudifolium	Hottentot's tea	Least Concern	Indigenous/Medicinal	Herb
Hibiscus trionum	Flower-of-an-hour	Least Concern	Indigenous	Herb
Hilliardiella oligocephala	Bicoloured Vernonia	Least Concern	Indigenous	Herb
Hyparrhenia hirta	Common Thatching Grass	Least Concern	Indigenous	Grass
Jatropha cf. zeyheri	Verfbol	Least Concern	Indigenous/Medicinal	Herb
Kalanchoe cf. paniculata	Hasieoor	Least Concern	Indigenous	Herb
Kigelia africana	Sausage tree	Least Concern	Indigenous/Medicinal	Tree
Kleinia longiflora	Sjambokbos	Least Concern	Indigenous	Herb
Lantana camara	Lantana		Category 1b AIS	Shrub
Leonotis leonurus	Wild Dagga	Least Concern	Indigenous/Medicinal	Herb
Lippia javanica	Fever tea/ Lemon Bush		Indigenous/Medicinal	Herb
Lycium sp.		Least Concern	Indigenous	Herb
Manihot cf. grahamii	Hardy Tapioca		Exotic	Herb
Melia azedarach	Persian Lilac/Syringa		Category 1b AIS	Tree

Scientific name	Common name	Conservation status	Ecological status	Growth Form
Melinis repens	Natal Red Top	Least Concern	Indigenous	Grass
Mirabilis jalapa	Four-o'clocks		Category 1b AIS	Herb
Morus alba	White mulberry		Category 3 AIS	Tree
Opuntia ficus-indica	Prickly pear		Category 1b AIS	Shrub
Opuntia imbicata	Imbricate prickly pear		Category 1b AIS	Shrub
Orbea sp. (either *Orbea lutea* or *O. melanantha)*		Least Concern	Indigenous	Succulent
Pseudognaphalium luteo-album	Jersey Cudweed	Least Concern	Indigenous/Medicinal	Herb
Pterodiscus ngamicus	Botswana Sandkambro	Least Concern	Indigenous	Herb
Peltophorum africanum	African wattle	Least Concern	Indigenous	Tree
Sclerocarya birrea* subsp *caffra	**Marula tree**	**Protected tree**	**Indigenous/Medicinal**	**Tree**
Searsia lancea	Karee	Least Concern	Indigenous	Tree
Searsia pyroides	Common wild currant, Fire-thorn karree	Least Concern	Indigenous	Shrub
Senecio pleistocephalus		Least Concern	Indigenous	Herb
Setaria sphacelata var. sphacelata	Common Bristle Grass	Least Concern	Indigenous	Grass
Sida cordifolia		Least Concern	Indigenous/Medicinal	Herb
Schkuhria pinnata	Feathery false threadleaf		Weed	Herb
Sonchus asper	Spiny sowthistle		Weed	Shrub
Solanum mauritianum	Bugweed		Category 1b AIS	Herb
Solanum panduriforme	Poison Apple	Least Concern	Indigenous	Herb
Sporobolus africanus	Ratstail Dropseed	Least Concern	Indigenous	Grass
Tagetes minuta	Tall Khaki Weed		Weed	Herb
Talinum sp.		Least Concern	Indigenous	Herb
Themeda triandra	Red Grass	Least Concern	Indigenous	Grass
Vangueria infausta	Wild Medlar	Least Concern	Indigenous	Tree
Ziziphus mucronata	Buffalo Thorn	Least Concern	Indigenous/Medicinal	Tree

9.1.3 Protected tree species recorded on the study area

In terms of the National Forests Act (NFA), 1998 (Act No 84 of 1998) GN 536 in GG 41887 of 7 September 2018, certain tree species are declared as protected. Trees are protected for a variety of reasons, and some species require strict protection while others require control over harvesting and utilization. The NFA affords protection to a number of tree species occurring within South Africa, listed as *Schedule A* protected trees. In terms of Section 15(1) of the National Forests Act, 1998, '*no person may cut, disturb, damage or destroy any protected tree or possess, collect, remove, transport, export, purchase, sell, donate or in any other manner acquire or dispose of any protected tree or any forest product derived from a protected tree, except under licence or exemption granted by the Minister to an applicant and subject to such period and conditions as may be stipulated'*.

Of the protected tree species that are known to occur within the region, only one tree, namely Marula tree (*Sclerocarya birrea* subsp*. caffra*) (**Figure 11)** was recorded during the field assessment. The GPS co-ordinates of this species is indicated in **Table 5** below. The distribution of Marula tree on the study area is indicated in **Figure 12** below. A permit from Department of Agriculture, Forestry and Fisheries (DAFF) is required before construction commences in order to remove or disturb these protected trees identified on site.

Figure 11. Marula tree recorded on the study area

Table 5. GPS co-ordinates of the Marula tree

Species	Common name	Latitude	Longitude
Sclerocarya birrea subsp. *caffra*	Marula tree	23°55'12.50"S	29°28'36.40"E
		23°55'10.90"S	29°28'41.30"E
		23°55'9.90"S	29°28'46.70"E
		23°55'10.30"S	29°28'53.20"E
		23°55'8.40"S	29°28'55.10"E
		23°55'4.50"S	29°29'0.20"E
		23°55'9.00"S	29°29'2.40"E
		23°55'15.80"S	29°28'35.10"E
		23°55'15.40"S	29°28'38.90"E
		23°55'16.10"S	29°28'35.60"E
		23°55'17.90"S	29°28'35.90"E
		23°55'18.30"S	29°28'35.80"E
		23°55'20.20"S	29°28'36.30"E
		23°55'13.60"S	29°28'36.20"E
		23°55'5.50"S	29°29'5.30"E

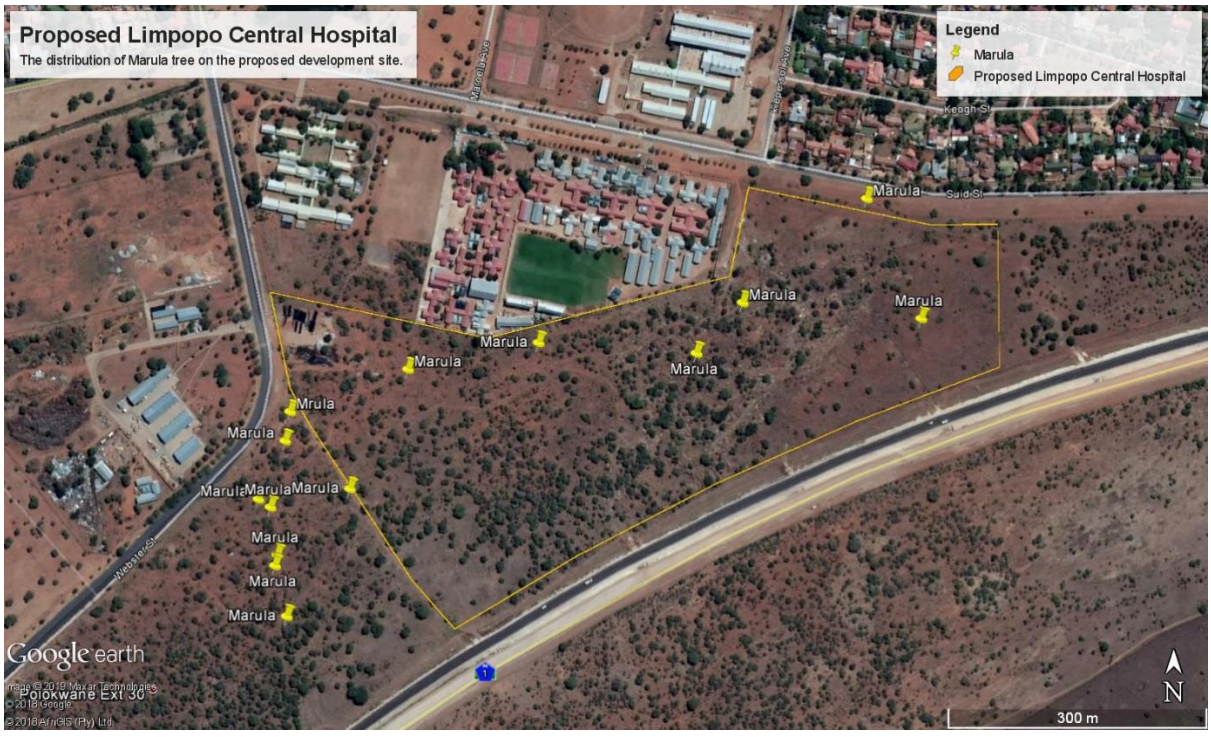

Figure 12. The distribution of Marula tree on the study area

9.1.4 Alien invasive plant species recorded on the study area

Alien invader plants are species of exotic origin that typically invade undeveloped or disturbed areas (Bromilow, 2010). AIS pose a threat to ecosystems because by nature they grow fast,

reproduce quickly and have high dispersal abilities allowing them to replace indigenous species (Henderson, 2001).

Alien invasive plant species on the study area (**Table 4**) were observed to occur in clumps, scattered distributions or as single individuals. Invader and weed species on site must be controlled to prevent further infestation and it is recommended that all individuals of invader and weeds species (especially Category 1b) must be removed and eradicated.

Alien plant species such as *Argemone ochroleuca* (**Figure 13**), *Opuntia ficus-indica* (**Figure 14**), *Melia azedarach* (**Figure 15**) and *Mirabilis jalapa* (**Figure 16**) (All Category 1b) were common on the study area.

Figure 13. *Argemone ochroleuca*

Figure 14. *Opuntia ficus-indica* recorded on the study area

Figure 15. *Melia azedarach* recorded on the study area

Figure 16. *Mirabilis jalapa* recorded on the study area

9.1.5 Threatened Species, Species of Conservation Concern and medicinal plants

According to the South African Red data list categories done by SANBI (**Figure 17**), **threatened species** are species that are facing a high risk of extinction. Any species classified in the IUCN categories Critically Endangered, Endangered or Vulnerable is a threatened species whereas **Species of conservation concern** are species that have a high conservation importance in terms of preserving South Africa's high floristic diversity and include not only threatened species, but also those classified in the categories Extinct in the Wild (EW), Regionally Extinct (RE), Near Threatened (NT), Critically Rare, Rare, Declining and Data Deficient - Insufficient Information (DDD).

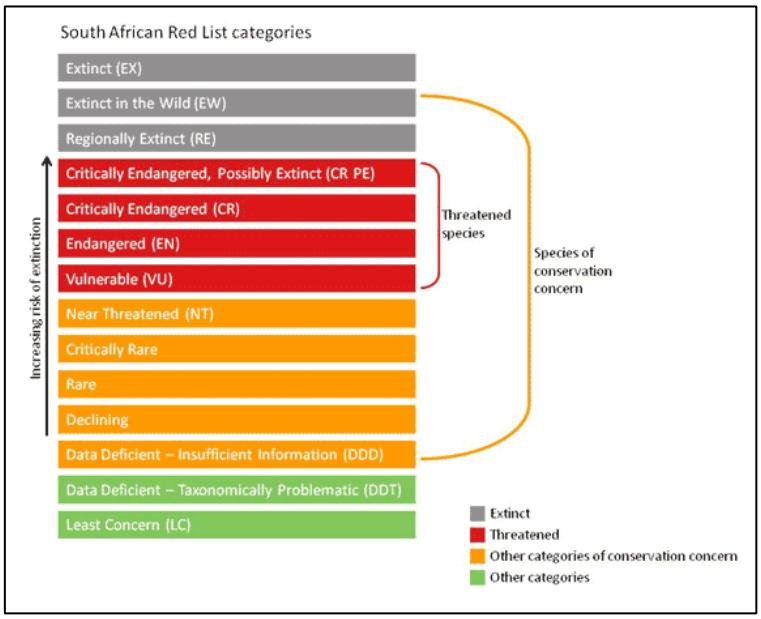

Figure 17. South African Red data list categories

During the field survey, no threatened plant species were observed on site but only one (1) species of conservation concern was noted, namely *Boophone disticha* (Century plant). According to Raimondo *et al.* (2009), this species is listed as *Declining* and it is therefore recommended that Search, Rescue and Relocation process should be conducted prior to construction activities taking place.

According to Williams *et al.* (2008), *Boophone disticha* (**Figures 18** and **19**) occurs in the Northern Cape, Eastern Cape, KwaZulu-Natal, Free State, Gauteng, Limpopo, Mpumalanga, and North West provinces, and north up to Uganda, in Albany Thicket, Fynbos, Grassland, Indian Ocean Coastal Belt, Nama Karoo, Savanna and Succulent Karoo habitats, in dry grassland and rocky areas. The GPS co-ordinates of this species is indicated in **Table 6** below.

Figure 18. *Boophone disticha* recorded on the study area

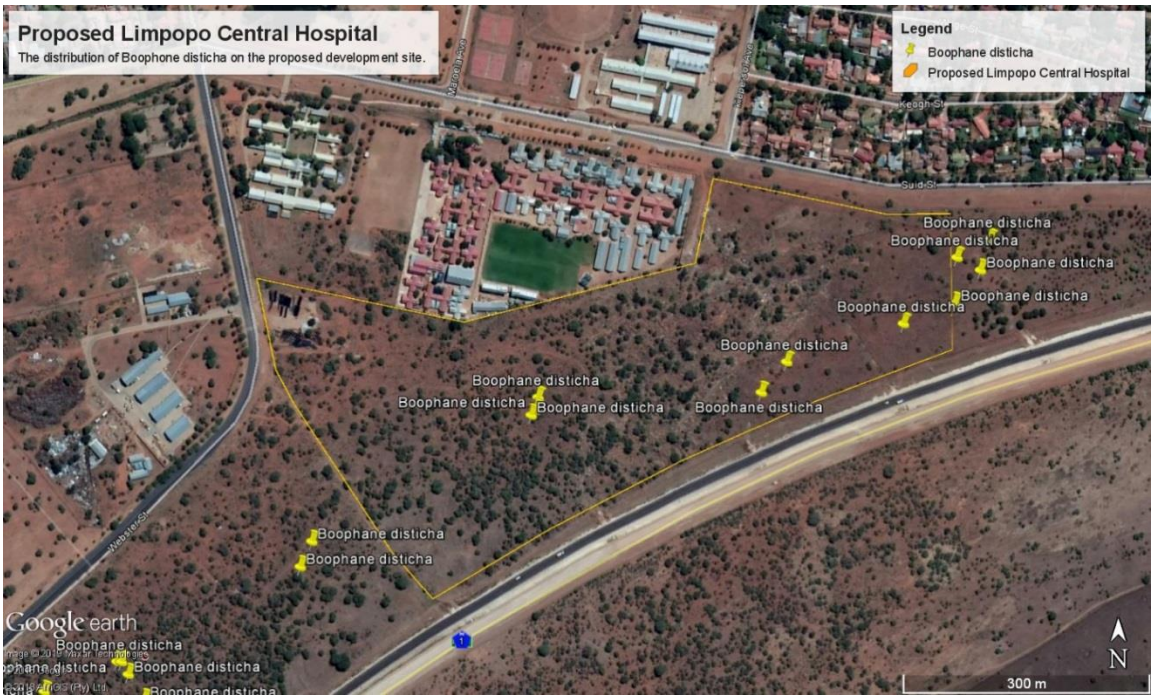

Figure 19. The distribution of *Boophone disticha* on and around the study area

Table 6. GPS co-ordinates of the *Boophone disticha*

Species	Common name	Latitude	Longitude
Boophone disticha	Century plant	23°55'24.40"S	29°28'26.30"E
		23°55'23.20"S	29°28'29.50"E
		23°55'23.20"S	29°28'29.70"E
		23°55'23.70"S	29°28'30.00"E
		23°55'24.70"S	29°28'30.70"E
		23°55'19.40"S	29°28'37.50"E
		23°55'18.40"S	29°28'38.00"E
		23°55'12.70"S	29°28'47.80"E
		23°55'12.70"S	29°28'47.80"E
		23°55'13.20"S	29°28'47.70"E
		23°55'13.40"S	29°28'47.50"E
		23°55'6.50"S	29°29'7.20"E
		23°55'7.70"S	29°29'6.80"E
		23°55'7.20"S	29°29'5.80"E
		23°55'9.00"S	29°29'5.70"E
		23°55'9.80"S	29°29'3.50"E
		23°55'11.30"S	29°28'58.50"E
		23°55'12.50"S	29°28'57.40"E

9.1.6 Potential occurrence of Red Data plant species

Data sourced from SANBI website indicates there are plant species on the Red Data List that are known to occur in or on areas surrounding the study area. The probability of occurrence is based on suitable habitat and known distribution ranges. These plant species and their probability of occurrence are indicated in **Table 7** below. Only plant species which have higher probability to occur on the study area are shown in the table below.

Table 7. Red listed plant species potentially occurring on the study area

Species	Threat status	Flowering Season	Suitable habitat and ecology	Probability of Occurrence
Commelina rogersii	VU	October to March	Grassland and open woodland	Medium
Hypoxis hemerocallidea	Declining	Summer	It occurs in open grassland and woodland and is widespread in South Africa in the eastern summer rainfall provinces (Eastern Cape, Free State, KwaZulu-Natal, Mpumalanga, Gauteng and Limpopo).	High

9.2 Fauna

9.2.1 Mammals

9.2.1.1 Desktop survey results

The potential mammal species that could be found on the study area are those which have been recorded in the grid cell 2329CD (ADU, 2016) and also from distributions based on records documented in Skinner and Chimimba (2005) (**Appendix A**). According to the ADU (2016) data, Red Data mammal species such as the Common Tsessebe, Sable Antelope, Mountain Reedbuck and Brown Hyaena could possibly occur on the study area as they have been previously recorded in the region. Due to study area being located in an urban environment (*i.e* between the human settlements and the main road (N1), and a lack of suitable habitat available for the majority of the species listed in Appendix A, the list is likely to overestimate the occurrence of mammal species in the area and thus should be viewed with a degree of caution. The nearby Polokwane Game Reserve, which is situated less than a kilometre (km) from the study area, houses many of the species listed in Appendix A.

9.2.1.2 Mammals recorded on the study area

Habitat transformation, together with elevated human presence in the area has negatively impacted on mammal occurrence. The disturbed and degraded area has lost the ecological ability to sustain many natural faunal assemblages or communities. **Table 8** lists three mammal species recorded during the survey. Mammals recorded are common and associated with human habitation and are of no conservation importance in the area. Mole hills (**Figure 20**), which indicate the presence of moles on site, were also observed in abundance.

Figure 20. Mole hills were recorded in abundance on the study area

Table 8. Mammals recorded on the study area

Family	Scientific name	English name	Status
Bathyergidae	*Cryptomys hottentotus*	Common Mole-rat	Least concern
Muridae	*Gerbilliscus* sp.	Bushveld gerbil/ Highveld gerbil	Least concern
Rodentia	*Rattus* sp.	House rat	Exotic

9.2.1.3 Potential occurrence of Red Data mammal species

The desktop assessment indicated that there is one mammal species which is known to occur in the general vicinity of the site. **Table 9** below indicates this animal's preferred habitat together with its probability of occurrence on the study area. The probability of occurrence was based on the consideration of the following factors:

- Known distribution;
- Overall abundance of a species;
- Availability of suitable habitat on the study area;

- Availability of prey items on the study area and surrounding areas;
- Level of anthropogenic disturbance; and
- Species tolerance to anthropogenic disturbance.

Only mammal species which have higher probability of occurrence on the study area are discussed in the table below. The rest of the species listed in Appendix A is unlikely to be present since the study area does not offer suitable habitat and/or are too degraded/disturbed.

Table 9. Red listed mammal species which could potentially occur on the study area

Common name	Red list category	Suitable habitat	Probability of occurrence
Brown Hyaena	Near Threatened	It inhabits desert areas, semi-desert, open scrub and open woodland savanna. It can survive close to urban areas and needs some type of cover in which to rest during the day, such as rocky areas and bush cover. It typically avoids agricultural and heavily urbanized habitats.	Low

9.2.2 Avifauna

9.2.2.1 Desktop survey results

The Important Bird and biodiversity Areas (IBA) Programme identifies and works to conserve a network of sites critical for the long-term survival of bird species that are globally threatened, have a restricted range and are restricted to specific biomes/vegetation types (Barnes, 2000). The nearby Polokwane Nature Reserve IBA (**Figures 21** and **22**), (which is situated 1.4km away) from the study area, houses many of the bird species which could utilise the study area for foraging. According to the National Protected Area Expansion Strategy Resource Document (2009), the study area is not considered as focus area in terms of expansion of the protected areas (**Figure 23**).

According to BirdLife South Africa (2016), this reserve lies 3 km south of Polokwane and is situated in undulating open acacia savanna and grassland, and known to supports at least 350 bird species. It is the only reserve in South Africa in which the isolated eastern population of Short-clawed Lark *Certhilauda chuana* occurs. Bird species such as Secretarybird *Sagittarius serpentarius*, White-backed Vulture *Gyps africanus* and Cape Vulture G. *coprotheres* are occasional visitors. Other woodland bird species such as Korhaan *Eupodotis ruficrista*, White-throated Robin-Chat *Cossypha humeralis*, Kalahari Scrub Robin *Erythropygia paena*, Burnt-necked Eremomela *Eremomela usticollis*, Barred Wren-Warbler *Calamonastes fasciolata*, Marico Flycatcher *Bradornis mariquensis*, Crimson-breasted Shrike *Laniarius atrococcineus*, Scaly-feathered Finch *Sporopipes squamifrons*, Violet-eared Waxbill *Uraeginthus granatinus*, Black-faced Waxbill *Estrilda erythronotus* and Shaft-tailed Whydah *Vidua regia* are known to be found in the Reserve.

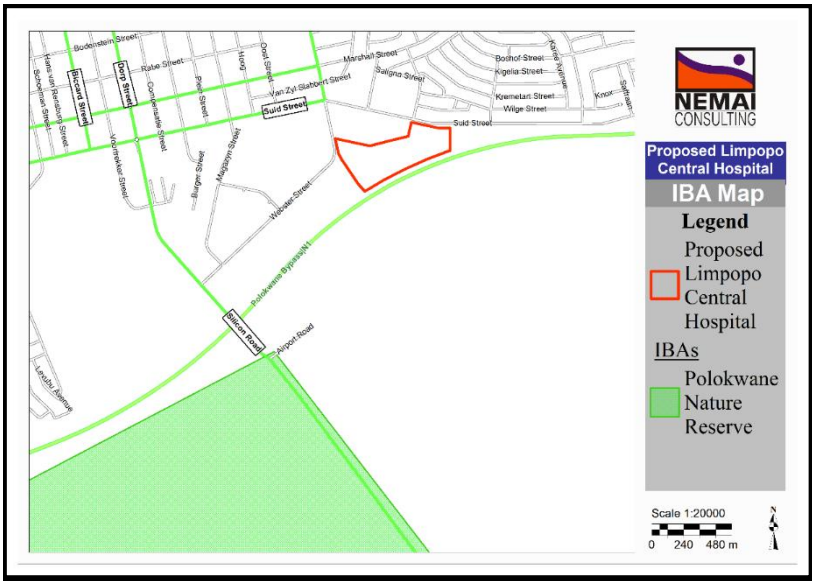

Figure 21. The study area does not fall within any of the IBAs

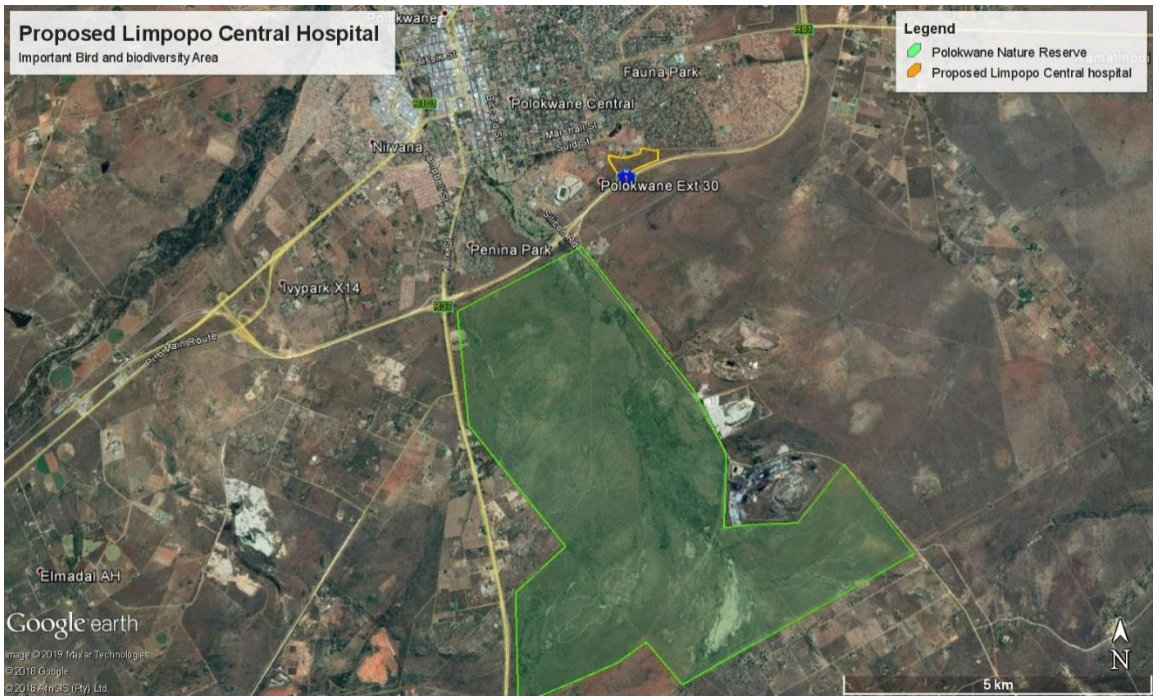

Figure 22. An aerial view of the nearby Polokwane Nature Reserve IBA

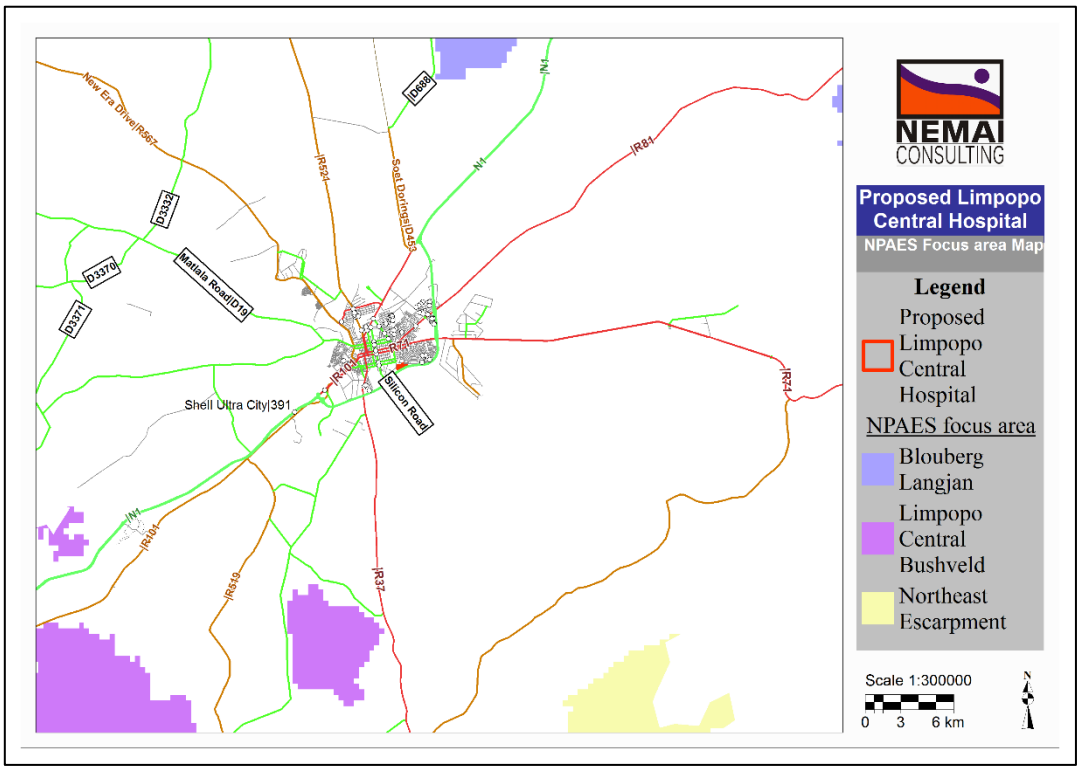

Figure 23. NPAES focus area in relation to the study area

The Red data bird species recorded in the quarter degree square 2329CD is indicated in **Appendix B**. Red Data status follows Taylor *et al.* (2015) nomenclature.

9.2.2.2 Field work results and discussion

A numbers of bird species in South Africa have declined mainly due to massive habitat transformation and degradation as well as increased levels of human disturbances, extensive habitat transformation due to mining, industrial and commercial and agricultural activities (Low and Rebelo 1996). Factors such as land-use alteration (urbanisation) contribute in the decline of many species. A number of avifaunal species are adaptable as they are habitat generalists and can therefore accommodate a certain degree of habitat degradation and transformation (Harrison *et al*. 1997). Other species are extremely habitat specific and have to rely on certain habitat units for breeding, hunting or foraging and roosting. Habitat-specific species are sensitive to environmental change, with destruction of habitat being the leading cause of species decline worldwide (Barnes, 2000). The study area has limited suitable habitat for any larger terrestrial birds as well as certain smaller raptor species.

Within the vegetation type found in the study area and immediate surrounding areas, two major bird habitat systems were identified, namely open acacia savanna and overgrazed grasslands (**Figures 24**).

Figure 24. The study area occurs on an open acacia savanna and overgrazed grasslands.

Nineteen (19) bird species (**Table 10**) were recorded during the field survey. Species recorded were common and widespread and typical of savanna biome. No Red Data bird species associated with the study area were recorded.

Table 10. Bird species recorded on and around the study area

Common name	Scientific name	Conservation status
Black-headed Heron	*Ardea cinerea*	Least concern
Cattle Egret	*Bubulcus ibis*	Least concern
Hadeda Ibis	*Bostrychia hagedash*	Least concern
Black-shouldered kite	*Elanus caerulus*	Least concern
Swainson's spurfowl (francolin)	*Pternistis swainsonii*	Least concern
Helmeted Guineafowl	*Numida meleagris*	Least concern
Blacksmith Lapwing (Plover)	*Vanellus armatus*	Least concern
Crowned Lapwing (Plover) (**Figure 25**)	*Vanellus coronatus*	Least concern
Rock Dove (Feral Pigeon)	*Columba livia domestica*	Least concern
Speckled (Rock) Pigeon	*Columba guinea*	Least concern
Red-eyed Dove	*Streptopelia semitorquata*	Least concern
Laughing Dove	*Streptopelia senegalensis*	Least concern
Grey go-away-bird (Lourie)	*Corythaixoides concolor*	Least concern
Pied Crow	*Corvus albus*	Least concern
Common bulbul	*Pycnonotus barbatus*	Least concern
Common Fiscal (Fiscal Shrike)	*Lanius collaris*	Least concern
Common (Indian) Myna	*Acridotheres zeylonus*	Introduced species
Cape Glossy Starling	*Lamprotornis nitens*	Least concern
House Sparrow	*Passer domesticus*	Least concern

Figure 25. The Crowned Lapwing (Plover) recorded on the study area

9.2.2.3 Potential occurrence of Red Data bird species

Table 11 below indicates the preferred habitat together with the probability of occurrence. The probability of occurrence is based on the availability of suitable habitat, known distribution, overall abundance, food availability, disturbance factors, anthropogenic change and the preferred habitats of the species. Only bird species which have higher probability of occurrence on the study area are discussed in the table below. The rest of the species listed in **Appendix B** is unlikely to be present since the study area does not offer suitable habitat, and/or are too degraded.

Table 11. Red Data Bird species recorded in grid cell 2329CD which could potentially occur in the study area

Common Name	Scientific name	Red list category	Preferred Habitat	Probability of Occurrence
Southern Bald ibis	*Geronticus calvus*	Vulnerable	It inhabits short grasslands at high altitudes, generally between 1,200 and 1,850 meters and also avoids medium to long grass and other vegetated areas, and so prefers recently burnt, ploughed, mowed or heavily grazed fields and cultivated pastures. It generally nests on cliffs along deep river gorges, or by waterfalls	Medium. Suitable foraging habitat
Secretarybird	*Sagittarius serpentarius*	Vulnerable	It is usually found in the open grasslands and savannah of the sub-Saharan region	Medium. This species is highly mobile
Lanner Falcon	*Falco biarmicus*	Vulnerable	Lanner falcon can be found in a wide range of habitats ranging from extreme desert to wet, forested mountains up to elevations of 5,000 metres. The species can be found in *Eucalyptus* stands in southern Africa and even in urban areas, as long as there are open or lightly wooded areas nearby for hunting, though it tends to avoid heavily forested or very wet areas	Medium. Suitable habitat due to open or light wooded areas
Short-clawed Lark	*Certhilauda chuana*	Near Threatened	It generally prefers semi-arid *Acacia* savanna with scattered grass clumps and bushes, with large patches of bare ground.	Medium. Suitable habitat available on site (Polokwane Plateau Bushveld)

9.2.3 Reptiles

9.2.3.1 Desktop survey results

According to the data sourced from the South African Reptile Conservation Assessment (ADU, 2016) for the grid cell 2329CD (Bates *et al.* 2014) and historic distribution (Alexander & Marais, 2007), the following species (**Appendix C**) may potentially occur on the study area. According to this list, no species of conservation concerns are known to occur in the vicinity of the study area.

9.2.3.2 Reptiles recorded on and around the study area

The study area supports limited suitable habitat for any arboreal species but provided suitable habitat for terrestrial reptile species such as Ground Agama. Termite mounds were present on site (**Figure 26**) and old termite mounds offer important refuges especially during veld fires as well as cold winter months for numerous snake species (Jacobsen, 2005). No termite mounds were destroyed during the brief field survey. All overturned rock material was carefully replaced in its original position. **Figure 27** indicates the Distant's Ground Agama (*Agama aculeata* subsp *distanti*) reptile species recorded in and around the study area.

Figure 26. Termite mounds recorded on the study area

Figure 27. Distant's Ground Agama recorded on the study area

10 TERRESTRIAL ECOLOGICAL SENSITIVITY ANALYSIS OF THE STUDY AREA

The determination of specific ecosystem services and sensitivity of ecosystem components and processes, both abiotic and biotic, is rather complex and no single overarching criterion will apply to all habitats investigated. Sensitivity analysis does not only consider aspects that are found on the study area, but also consider the possibility of reinstatement or reestablishment of the original environment and its biota, or at least the rehabilitation of ecosystem services resembling the original state after an area was significantly degraded. The main aspects of an ecosystem that need to be incorporated in the ecological sensitivity analysis included the following:

- Describing the nature and number of species present, taking into consideration their conservation value as well as the probability of such species to survive or re-establish itself following disturbances, and alterations to their specific habitats, of various magnitudes;
- Identifying the species or habitat features that are 'key ecosystem providers' and characterising their functional relationships (Kremen, 2005);

- Determining the aspects of community structure that influence function, especially aspects which influence the stability or rapid decline of communities (Kremen, 2005);
- Assessing key environmental factors that influenced the provision of services (Kremen, 2005)
- Gaining knowledge about the spatio-temporal scales over which these aspects operate (Kremen, 2005).

Based on the information above, sensitivity classes have been summarised as follows (**Table 12**):

Table 12. Sensitivity classes (Kremen, 2005).

CATEGORY	DESCRIPTION
High sensitivity	• Areas that are relatively undisturbed or pristine, and; o Very species-rich relative to immediate surroundings; o Or have a very unique and restricted indigenous species composition; o Otherwise, constitute specific habitats for fauna and flora of conservation concern, and where the total extent of such habitats and associated species of conservation concern remaining in southern Africa is limited; and o Excessive disturbance of such habitats may lead to species or ecosystem loss.
Medium sensitivity	• Areas where disturbances are at most limited and; o Areas with a species diversity representative of its natural state, but not exceptionally high or unique compared to its surroundings; o Areas of which the biotic or abiotic configuration does not constitute a very specific or restricted habitat or very high niche diversity; o Areas which provide ecosystem services needed for the continued functioning of the ecosystem and the continued use thereof (e.g. grazing); o while species of conservation concern may occur on the area, these are not restricted to these habitats only; o Areas which need to remain intact to ensure the functioning of adjacent ecosystems, or wildlife corridors or portions of land that prevent the excessive fragmentation of natural flora and fauna populations, or areas that will be difficult to rehabilitate to a functional state after physical alteration; o With a high species diversity and potentially higher number of species of conservation concern.
Low sensitivity	• Areas which have been previously disturbed or ; o Areas that have a low ecological value. o Areas which provide limited ecosystem services. o Species diversity may be low or all species present have a much wider distribution beyond this habitat or locality; o Plant SCC may be present on such areas, but these are not restricted to these habitats only and can be relocated with ease; o Further inputs may include landscapes where the abiotic nature is such that it can be rehabilitated relatively easy to allow the re-establishment of the original species composition, and where the development will not lead to any unjustified degradation of landscapes or ecosystem services if adequately mitigated.

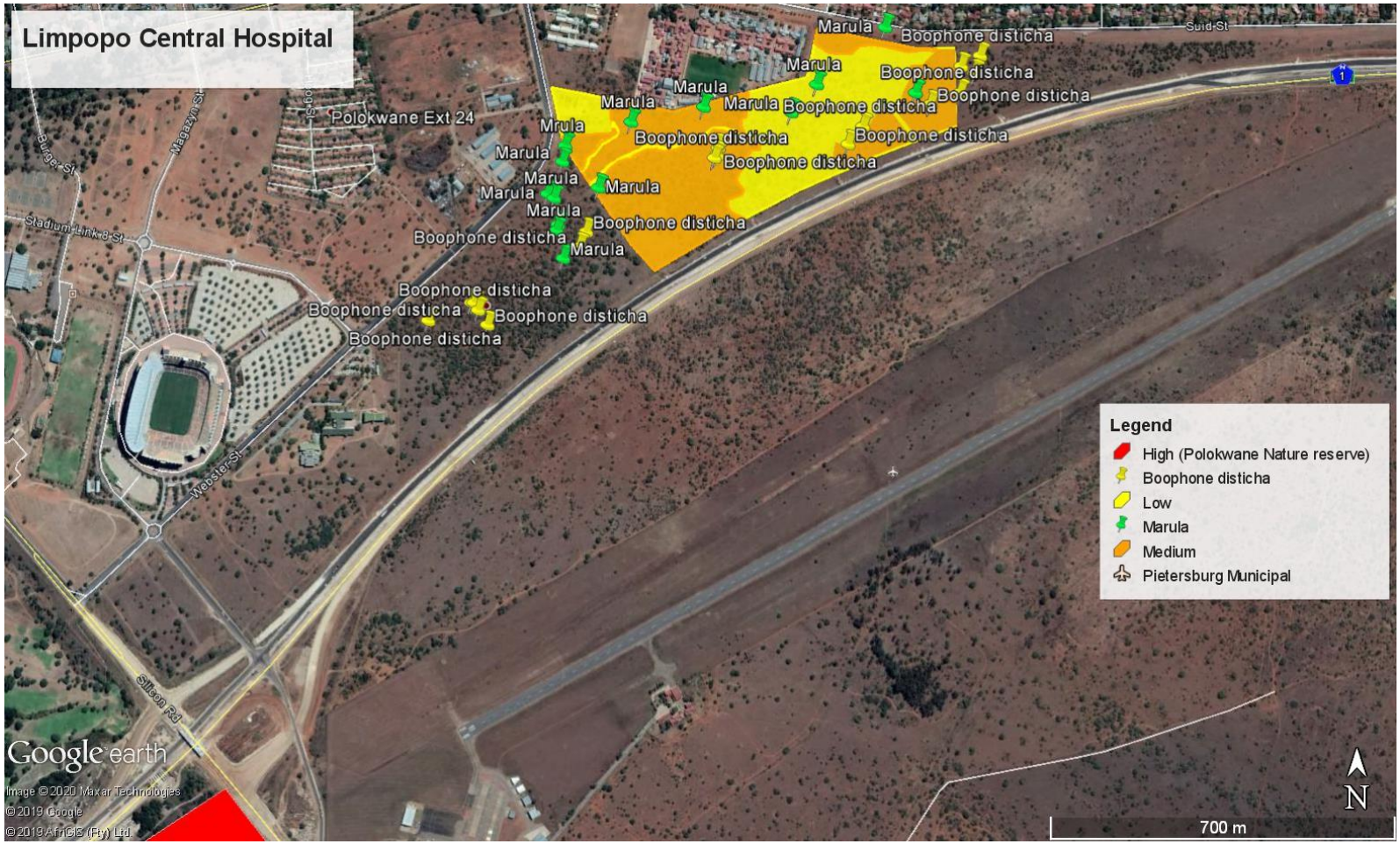

Figure 28. Terrestrial ecology sensitivity Map of the study area

11 ENVIRONMENTAL IMPACT ASSESSMENT

11.1 Methodology

The impacts and the proposed management thereof are first discussed on a qualitative level and thereafter quantitatively assessed by evaluating the nature, extent, magnitude, duration, probability and ultimately the significance of the impacts (refer to methodology provided in **Table 13**). The assessment considers impacts before and after mitigation measures

Table 13: Quantitative Impact Assessment Methodology

Status The project could have a positive, negative or neutral impact on the environment.
Nature The description of what causes the impact, what will be impacted on and how it will be affected.
Extent • Local - extend to the site and its immediate surroundings. • Regional - impact on the region but within the province. • National - impact on an interprovincial scale. • International - impact outside of South Africa.
Magnitude Degree to which impact may cause irreplaceable loss of resources. • Low - natural and social functions and processes are not affected or minimally affected. • Medium - affected environment is notably altered; natural and social functions and processes continue albeit in a modified way. • High - natural or social functions or processes could be substantially affected or altered to the extent that they could temporarily or permanently cease.
Duration • Short term - 0-5 years. • Medium term - 5-11 years. • Long term - impact ceases after the operational life cycle of the activity either because of natural processes or by human intervention. • Permanent - mitigation either by natural process or by human intervention will not occur in such a way or in such a time span that the impact can be considered transient.
Probability • Almost certain - the event is expected to occur in most circumstances. • Likely - the event will probably occur in most circumstances.

- Moderate - the event should occur at some time.
- Unlikely - the event could occur at some time.
- Rare/Remote - the event may occur only in exceptional circumstances.

Significance

Provides an overall impression of an impact's importance, and the degree to which it can be mitigated. The range for significance ratings is as follows-

0 – Impact will not affect the environment. No mitigation necessary.

1 – No impact after mitigation.

2 – Residual impact after mitigation.

3 – Impact cannot be mitigated.

11.2 Assessment of Environmental Impacts and Suggested Mitigation Measures

Only the environmental issues identified during the appraisal of the receiving environment and potential impacts are assessed below (**Table 14**). Mitigation measures are provided to prevent (first priority), reduce or remediate adverse environmental impacts.

11.2.1 Pre-construction / Construction Phases

Activities associated with the pre-construction and construction phases, include the following:

- Fencing off of the entire development footprint;
- Fencing off / marking of protected flora;
- Vegetation clearance of the site;
- Removal of topsoil, and topsoil/spoil stockpiling;
- Site establishment, such as construction camps, laydown and storage areas on site;
- Installation of foundations and construction of the lower ground floor, ground floor, first floor and second floor;
- Installation of the hospitals' clinical spaces and supporting services;
- Construction of dedicated internal access roads and parking areas for staff and visitors;
- Installation of a service road leading to the lower ground floor for deliveries and service/supporting units;
- Installation of administration facilities;
- Installation of bulk services (water, sewer, power supply), storage facilities (including general and hazardous waste) and stormwater management infrastructure; and
- Landscaping and rehabilitation of the site.

Potential impacts to flora and fauna during the construction phase, include the following:

- Loss of plant Species of Conservation Concern (SCC) and protected trees due to vegetation clearance;

- Destruction of indigenous flora during site establishment;
- Inadvertent killing and injury of fauna species during vegetation clearance;
- Potential loss of soil due to fuel and chemical spills (soil contamination);
- Encroachment, proliferation and spread of weeds and alien invasive plant species;
- Loss/displacement of Red listed and protected fauna species potentially present on site;
- Loss of topsoil and increased erosion;
- Disturbance of local fauna populations due to construction activities and
- Loss of flora and fauna habitat due to vegetation clearance.

The potential impacts associated with the pre-construction and construction activities are discussed in Table 14 below.

11.2.2 Operational Phases

Activities associated with the operational phase, include the following:

- Stormwater management; and
- Waste Management

Potential impacts associated with the operational phase, include the following:

- AIPs and weeds
- Erosion caused by inadequate/failing stormwater management measures/designs;
- Disturbance of local faunal communities ; and
- Soil contamination from hazardous substance spillages outside their primary and secondary containment during maintenance work.

The potential disturbance of soil and vegetation during construction within natural vegetation encourages the establishment of pioneer vegetation, in many cases creating an ideal opportunity and optimal conditions for weeds and alien invasive plants to invade both disturbed and adjacent undisturbed areas after construction has ended. Alien Invasive plants can have far reaching detrimental effects on indigenous vegetation and has been widely accepted as being a leading cause of biodiversity loss. The large amount of disturbance created during construction will leave the study area and adjacent undeveloped areas vulnerable to alien plant invasion. Failure to manage rehabilitation and landscaping well can lead to serious alien invasive plant infestation.

If disturbed areas are not rehabilitated/re-vegetated post construction, erosion may continue throughout the operational phase of the development. This is likely to be exacerbated by stormwater runoff from any hardened/impermeable surfaces such as roads, compacted soil, etc. Due to the extensive disturbance likely to be created by construction within the facility,

this impact is most likely to occur within the facility, but could potentially occur outside the facility as well if suitable avoidance and mitigation measures were not implemented during construction.

Increased levels of noise, disturbance and human activity during operation may be detrimental to fauna. The risk of illegal hunting/poaching/trapping of wildlife for various uses is likely to remain as long as humans occupy the facility. Many species would however become habituated to the facility and would return to normal activity after some time. Direct faunal impacts during operation are likely to be limited to the facility. The operational phase of the proposed development will be permanent. The proposed development is bordered by an existing residential development to the north and a national road to the south. It is likely that faunal species in the area are habituated to human activity. Therefore, the operational phase of the proposed development is unlikely to result in any significant increase in disturbance to local faunal populations. Potential impacts on local faunal species as a result of disturbance/displacement has been assessed as not significant at a local scale.

During operation, hazardous waste stored and handled at the facility could enter the environment through improper waste management or spillages and potentially cause harm to fauna and flora. Exposure to contaminants, could lead to mortality, the destruction of their habitat, food and resources. This impact is most likely to occur within the facility, but could potentially occur outside the facility as well if suitable management measures are not implemented.

Table 14. Potential impacts and recommended mitigation measures with significance rating before and after mitigation for the proposed construction of Limpopo Central hospital

FLORA PRE – CONSTRUCTION PHASE						
Potential Impact			Mitigation			
Loss of plant species of conservation concern and protected trees due to vegetation clerance. In the case of this study area, vegetation is fairly disturbed, but still maintains a cover of some indigenous plant species. No loss of specific unique ecosystems or important and sensitive habitats are anticipated. It is anticipated that the whole study area will be cleared of vegetation and in case where the *Boophone disticha* and Marula trees could not be avoided, it is recommended that *Boophone disticha* and other geophytes/succulents (such as *Aloes*) found within the study area, be translocated to the outside of the development footprint with a similar habitat. These plant species are not endemic to the province and their densities within the study area are low. The distribution of these plant species within the study area is indicated in Tables 5 & 6. The impact is site specific and localised. With the implementation of mitigation measures (notably the medium sensitivity, which is where these plant species were recorded in abundance), the impact significance of the loss of important species may further be reduced.			• It is recommended that search, rescue and relocation be conducted taking into consideration species of conservation concern noted on the study area, namely *Boophone disticha*. In order to successfully search, rescue and relocate this plant SCC, a Plan of Action/Guideline has been developed and is attached in Appendix D. A rescue and relocation plan must be implemented, and all rescue and relocation activities should be overseen by a suitably qualified specialist. • As far as possible, large specimens of the Marula trees, should be preserved and incorporated into the landscaping around the proposed infrastructure. Where this proves not to be possible, a permit will be required from the LEDET/DAFF to destroy or damage the trees • Development planning must ensure that loss of vegetation due to clearing is restricted to within the footprint. • Commencement of construction must be preceded by a plant rescue programme which must be conducted only when plant permits and licences have been issued by the relevant authorities. • Pre-construction environmental induction for all construction staff on site to ensure that basic environmental principles are adhered to. This includes awareness as to conservation and importance of plant SCC, no littering, appropriate handling of pollution and chemical spills, avoiding fire hazards, remaining within demarcated construction areas etc. • Temporary lay-down areas and construction camps should be located within areas that have been identified as being of low sensitivity. • Environmental Control Officer (ECO) should provide supervision and oversight of vegetation clearing activities.			
Without Mitigation	Status	Extent	Magnitude	Duration	Probability	Significance
	Negative	Local	Medium	Permanent	Almost certain	2
With Mitigation	Status	Extent	Magnitude	Duration	Probability	Significance
	Negative	Local	Low	Short-term	Likely	1

FLORA PRE – CONSTRUCTION PHASE	
Potential Impact	Mitigation
Destruction of indigenous flora during site establishment. The Contractor is to produce a site plan for the approval by the Project Manager/Engineer prior to the establishment of the site, which will aim to identify construction activities, facilities and structures in relation to areas with natural vegetation. Facilities and structures shall be located with due cognisance of the terrain and geographical features of the study area. However, the study area falls within the Polokwane Plateau Bushveld, which is listed as least threatened. The site is already degraded due to illegal dumping of materials and access routes. Alien invasive plant species and weeds dominate the study area. According to the Limpopo Conservation plan, the study area is situated in Other Natural area, and no CBAs or ESAs are present on site.	• Development planning must ensure loss of vegetation and disturbance is restricted to within the recommended site layout footprint. • All laydown, storage areas, site camps etc. should be restricted to within the project area and should preferably be situated within areas of low sensitivity. • Clearly demarcate the construction footprint prior to clearing of vegetation. Only areas earmarked for site establishment should be cleared during pre-construction stage. Areas cleared of vegetation must be re-vegetated prior to contractor leaving the site. • Rehabilitate all disturbed areas outside of the proposed hospital footprint, which were affected by site clearance, as soon as the construction is completed. • Ensure that all construction personnel have the appropriate level of environmental awareness and competence. • Building material, ablution facilities or construction vehicles should not be stored in areas containing natural vegetation. • Vehicles and construction workers should under no circumstances be allowed outside the construction footprint to prevent impact on the surrounding natural vegetation. • Proliferation of alien invasive plant species is expected within the disturbed areas and they should be eradicated and controlled to prevent further spread. • Surrounding areas with indigenous vegetation should under no circumstances be fragmented or disturbed further or used as an area for dumping of waste. • Topsoil removed during site establishment should be not be mixed with subsoil. Wind and water erosion-control measures are to be implemented to prevent loss of this topsoil. • Exposed areas should be rehabilitated with a grass mix that blends in with the surrounding vegetation. The grass mix should consist of indigenous grasses adapted to the local environmental conditions. The grass seeds should have a variety of grass species including several pioneer species.

Without Mitigation	Status	Extent	Magnitude	Duration	Probability	Significance
	Negative	Local	Medium	Long-term	Almost certain	2
With Mitigation	Status	Extent	Magnitude	Duration	Probability	Significance
	Negative	Local	Low	Short-term	Likely	2

FAUNA PRE – CONSTRUCTION PHASE	
Potential Impact	Mitigation
Loss and displacement of animals on site due to habitat loss and mortality. Based on the results of the field surveys, the study area offers little or no suitable habitat for fauna species of conservation concern to occur. Birds and medium-sized mammals would be able to flee at the start of construction. However, small mammals (e.g. rodents) and much of the herpetofauna may hide in leaf litter and are likely to be killed by construction machinery. Other common causes of fauna mortality include vehicle-wildlife collision, hunting, snare, poisoning by construction workers. Blasting and vibrations noise can also negatively affect fauna, particularly nesting and roosting birds. Even though the Polokwane Plateau Bushveld on site is disturbed and degraded, suitable foraging habitat for Red data bird species such as Southern Bald ibis, Secretarybird, Lanner Falcon and Short-clawed Lark still exists. The use of vehicles and heavy machinery on site, especially during the early stages of construction, may result in death or disturbance of fauna. However, due to modified and degraded nature of the study area, this impact is rated as low. The implementation of the proposed mitigation measures would ensure that the potential impact remains of very low significance	• Training of construction personnel to recognise threatened animal species will reduce the probability of fauna being harmed unnecessarily. • The contractor must ensure that no faunal species are disturbed, trapped, hunted or killed during the pre-construction phase. • Vehicles must adhere to the set speed limit. • All construction vehicles must use designated access roads. Off-road driving should be strictly prohibited. • No dogs or other domestic pets should be allowed at the site. • Fauna (mammals and reptiles) that become trapped in any excavation or in any construction related activity may not be harmed and must be rescued and relocated by a suitably qualified person. • During site preparation, special care must be taken during the clearing of the works area in order to minimise damage or disturbance of roosting and nesting sites. • Ground clearing should preferably take place at the beginning of winter in order to minimise impacts on young of burrowing animals and nesting birds. • Where possible, work should be restricted to one area at a time, as this will give the smaller birds, mammals and reptiles a chance to weather the disturbance in an undisturbed area close to their natural territories. • Informal fires by construction personnel should be prohibited, and no uncontrolled fires whatsoever should be allowed. • Any fauna threatened by the construction activities should be removed to safety by the ECO or any suitable qualified person.

Without Mitigation	Status	Extent	Magnitude	Duration	Probability	Significance
	Negative	Local	Medium	Medium-term	Likely	2
With Mitigation	Status	Extent	Magnitude	Duration	Probability	Significance
	Negative	Local	Low	Short-term	Likely	1

FLORA CONSTRUCTION PHASE						
Potential Impact	Mitigation					
Potential loss of soil due to fuel and chemical spills (soil contamination). Groundwater quality may also be impacted by inappropriate waste disposal and spillages during construction. Inadequate management of construction materials and fuel could lead to spillages, notably of machine oil. Other hazardous substances that may be in use during the construction include paints. With mitigation measures, this impact is likely to have a low significance and it is site specific/localised.	• The application of prevention measures, in addition to proper handling of hazardous waste will be mandated to each personnel operating on the site to ensure protection of the environment. • Storage containers must be regularly inspected to enable early detection of leaks. • Mixing of all chemicals and hazardous substances must take place on a tray, shutter boards or on an impermeable surface and must be protected from the ingress and egress of storm water. • The spillage of harmful or toxic substances can be mitigated by the implementation of best practice management measures for the storage and handling of all hazardous substances as well as through the implementation of a sound emergency spillage containment plan, which can be implemented as soon as the spill of harmful or toxic stance occurs. • Make sure construction vehicles are maintained and serviced to prevent oil and fuel leaks. • Emergency on-site maintenance should be done over appropriate drip trays and all oil or fuel must be disposed of according to waste regulations. Drip-trays must be placed under vehicles and equipment when not in use. • Material Safety Data Sheets (MSDSs) shall be available on site for all hazardous substances used on site. • Cement/concrete batching is to be located in an area to be hardened and must first be approved by the ECO and no batching activities shall occur directly on the ground. • The Contractor must ensure that all hazardous storage containers and storage areas comply with the relevant SABS standards to prevent leakage. All vehicles must be regularly inspected for leaks. Re-fuelling must take place on a sealed surface area to prevent ingress of hydrocarbons into topsoil. • Vehicle maintenance should not take place on site unless a specific lined and bunded area is constructed within the construction camp for such a purpose. • Spillages of fuels, oils and other potentially harmful chemicals should be cleaned up immediately and contaminants properly drained and disposed of using proper solid/hazardous waste facilities (not to be disposed of within the natural environment). Any contaminated soil from the construction site must be removed and rehabilitated timeously and appropriately. • Contaminated water containing cement, fuel, oil or other hazardous substances must never be released into the environment. It must be disposed of at a registered hazardous landfill site.					
Without Mitigation	Status	Extent	Magnitude	Duration	Probability	Significance
	Negative	Local	Medium	Medium-term	Almost certain	2
With Mitigation	Status	Extent	Magnitude	Duration	Probability	Significance
	Negative	Local	Low	Short-term	Likely	1

FLORA CONSTRUCTION PHASE	
Potential Impact	Mitigation
Encroachment, proliferation and spread of weeds and alien invasive plant species. Alien invasive plants growing on the site can result in the further spread of the species to surrounding areas through dispersal pathways that may develop through daily construction activities. Before mitigation, the establishment of invasive alien plant species is considered as high but with effective development and ongoing implementation of an invasive control plan, it can be reduced to a low impact. A method statement for invasive alien control is shown in Appendix E. A list of Alien invasive plants and weeds found within the study area is shown in Table 4.	• Alien invasive plants (listed in this study) can be removed manually or with the help of simple tools. This entails damaging or removing the plant by physical action. Different techniques could be used, e.g. uprooting, ring-barking or bark stripping. These control options are only really feasible in sparse infestations or on small scale, and for controlling species that do not coppice after cutting. Species that tend to coppice, need to have the cut stumps or coppice growth treated with herbicides following the mechanical treatment. It would be preferable to uproot alien vegetation to limit regrowth after cutting. • Topsoil stockpiles, in particular, should be kept free of alien and alien invasive plant species. • A 'Tree Popper' can be used to remove shrubs and smaller trees or alternatively, the top growth can be cut off and then the stem and roots can be removed from the soil. • For large stands of trees on site should they are too large for physical removal, ring-barking the tree should be considered • To prevent unnecessary alien plant infestations, an alien plant monitoring and eradication programme needs to be developed by a suitable person with a botanical expertise of the region. • Promote awareness of all personnel. • Chemical control should only be used as a last resort, since it is hazardous for natural vegetation. It should not be necessary if regular monitoring is undertaken, which should be effective for controlling alien invasive plants. • Regular monitoring for alien invasive plants within the study area as well as adjacent areas which receive runoff from the facility as there are also likely to be prone to invasion problems.

Without Mitigation	Status	Extent	Magnitude	Duration	Probability	Significance
	Negative	Local	High	Long-term	Almost certain	2
With Mitigation	Status	Extent	Magnitude	Duration	Probability	Significance
	Negative	Local	Low	Short-term	Likely	1

FLORA CONSTRUCTION PHASE	
Potential Impact	Mitigation
Loss of topsoil and increased erosion. The large amount of disturbance created during construction will leave the site vulnerable to soil erosion. In addition, the large amount of hardened surface created by the development will generate significant amounts of runoff during occasional storm events and this will also pose a potential erosion hazard to those areas receiving the runoff. With mitigation measures, this impact will be low and localised.	• The construction activities should be set up in such a way that the area of exposed soil is minimised during times of the year when the potential for erosion is high, e.g. during the summer when intense rainstorms are common in Limpopo province. • Stripped topsoil, after removal of vegetation, shall be stockpiled separately in the designated areas and must not be compacted in any way, nor should any object be placed or stockpiled upon it. • During site preparation, topsoil and subsoil are to be stripped separately from each other and must be stored separately from spoil material for later use in the rehabilitation phase. It should be protected from wind and rain, as well as contamination from diesel, concrete or wastewater. • Sediment barriers or sediment traps such as silt fences, sandbags etc. must be established to curb erosion and sedimentation where necessary. • Topsoil stockpiles are not be used as storm water control features. • Storm water runoff from the stockpile sites and other related areas must be directed into the storm water system with the necessary pollution prevention measures such as silt traps and may not run freely into the surrounding areas. • Stockpiles are to be stabilised if signs of erosion are visible. • Topsoil stockpiles must be monitored for alien invasive plants growth. • All temporarily stockpiled material must be stockpiled in such a way that the spread of materials are minimised. • No plant, workforce or any construction-related activities may be allowed onto the topsoil stockpiles. • Topsoil stockpiles must be clearly demarcated as no-go areas. • Stockpiles must not be higher than 2 m in order to avoid compaction, and thereby maintain the soil integrity and chemical composition. • All slopes that are disturbed during construction shall immediately be stabilised to prevent erosion. Where revegetation of slopes is undertaken, this shall be done in consultation with the landscape architect (or appointed landscaper).

Without Mitigation	Status	Extent	Magnitude	Duration	Probability	Significance
	Negative	Local	Medium	Medium-term	Almost certain	2
With Mitigation	Status	Extent	Magnitude	Duration	Probability	Significance
	Negative	Local	Low	Short-term	Likely	1

FAUNA CONSTRUCTION PHASE	
Potential Impact	Mitigation
Inadvertent killing and injury of fauna species during vegetation clearance. Blasting and vibrations noise can also negatively affect fauna, particularly nesting and roosting birds. The use of vehicles and heavy machinery on site, especially during the early stages of construction, may result in death or disturbance of fauna. Traffic on the access and service roads poses a significant risk to many animals, particularly during the construction phase when traffic volumes on the roads are likely to be heavy. Any fauna accidentally killed should be reported and a log of such mortalities maintained. Species such as rats observed on site are tolerant to disturbances and will easily move away. Due to modified and degraded nature of the study area, this impact after mitigation measures is rated as low.	• If possible, the clearance of vegetation should commence during non-breeding season of fauna species (i.e. winter). • Before and during the vegetation clearance, any larger fauna species noted on site should be given a chance to move away from the construction activities. • Any fauna threatened by the construction activities should be removed to safety by a suitable qualified ECO or an Ecologist. • All personnel should undergo an environmental induction with regards to fauna, in particular awareness about harming or collecting species such as snakes, tortoises. • The Contractor and his/her employees shall not bring any domestic animals onto site. • Caution should be taken to ensure construction footprints are kept to an absolute minimum, including storage of materials, stockpiling etc. • If trenches are to be dug for water pipelines or electrical cabling, these should not be left open for extended periods of time as fauna may fall in and become trapped in them. Trenches which are left open should have places where there are soil ramps, which will allow fauna to escape the trench. • No animals should be intentionally destroyed or killed, and no hunting or poaching of animals is allowed in the project site or adjacent areas. • No food or similar waste that may attract wild animals should be disposed of at the site. All food and litter waste should be placed in sealed bins and removed from the site each day. • Where construction vehicles must traverse the site, they must remain on demarcated roads. If vehicles must leave the road for construction purposes, they should utilize a single track and should not take multiple paths. • In order to reduce collisions of vehicles with fauna, speed limits should apply to all roads and vehicles using the site, a maximum of 40 km/h is recommended. Animals should have right of way.

Without Mitigation	Status	Extent	Magnitude	Duration	Probability	Significance
	Negative	Local	Medium	Medium-term	Almost certain	2
With Mitigation	Status	Extent	Magnitude	Duration	Probability	Significance
	Negative	Local	Low	Short-term	Unlikely	1

FAUNA CONSTRUCTION PHASE	
Potential Impact	Mitigation
Loss/displacement of Red listed and protected fauna species potentially present on site In principle, the study area offers suitable habitat and foraging areas for bird species such as Southern Bald ibis, Secretarybird, Lanner Falcon and Short-clawed Lark. However, the study area does not provide breeding habitats for these bird species. The project area supports relatively low faunal diversity, due the high proportion of modified habitat present and the high level of fragmentation of natural habitat. During construction phase, noise, pollution, disturbance and human presence will be detrimental to fauna. Sensitive and shy fauna would move away from the area as a result of the noise and human activities present	• The contractor must ensure that no fauna species are trapped, hunted or killed during the construction phase. Conservation-orientated clauses should be built into contracts for construction personnel, complete with penalty clauses for non-compliance. • Where construction vehicles must traverse the site, they must remain on demarcated roads. If vehicles must leave the road for construction purposes, they should utilize a single track and should not take multiple paths. No construction should take place during the night in order to avoid collisions with nocturnal fauna (eg Brown hyaena, owls, nightjars etc) • In order to reduce collisions of vehicles with fauna, speed limits should apply to all roads and vehicles using the site, a maximum of 40 km/h is recommended. Animals should have right of way. • No dogs or cats should be allowed on site. Stray animals must be rehomed or taken to the SPCA and not allowed to inhabit the site • If trenches are to be dug for water pipelines or electrical cabling, these should not be left open for extended periods of time as fauna may fall in and become trapped in them. Trenches which are left open should have places where there are soil ramps, which will allow fauna to escape the trench. • Reduce direct mortalities by allowing for fauna to cross the haul roads safely. • If possible, the clearance of vegetation should commence during non-breeding season of fauna species (i.e. winter). Should the clearance of vegetation falls within the breeding season (September to March), a qualified Ecologist should conduct a pre-construction survey of all potential Red data bird nesting habitats in the project area. If no nests are present, then no further mitigations are required. However, if nests are found on site, site specific mitigations measures must be provided, which could include appropriate buffer zones. • Due to excessive dust generated during construction activities, a dust monitoring system should be implemented. Water or dust control agents should be used in working areas and haul roads should be sprayed on a regular basis. • Education and training of construction workers to ensure that they do not hunt, or otherwise disturb, bird populations.

Without Mitigation	Status	Extent	Magnitude	Duration	Probability	Significance
	Negative	Local	Medium	Medium-term	Almost certain	2
With Mitigation	Status	Extent	Magnitude	Duration	Probability	Significance
	Negative	Local	Low	Short-term	Likely	1

<table>
<tr><th colspan="7">CONSTRUCTION PHASE</th></tr>
<tr><td>Potential Impact</td><td colspan="6">Mitigation</td></tr>
<tr><td>Loss of flora and fauna habitat due to vegetation clearance.

During construction, the study area will be cleared from all vegetation to accommodate the project infrastructure. However, the site is highly fragmented and degraded and as such the impact is not expected to be high. Although protected trees and SCC were noted on site, these species are not restricted to the study area or endemic to the region. The study areas falls within the Polokwane Plateau Bushveld vegetation type, which is listed as least threatened. The site is already degraded due to illegal dumping of materials and access routes. Alien invasive plant species and weeds dominate the study area. According to the Limpopo Conservation plan, the study area is situated in Other Natural area, and no CBAs or ESAs are present on site. Potential impacts on the available habitat will be of local extent, of long-term duration There would be a residual impact after mitigation measures due to permanent loss of natural vegetation.</td><td colspan="6">• No clearing of vegetation outside of development and infrastructure footprint are to take place.
• Indigenous plants naturally growing within the project area, but that would be otherwise destroyed during clearing for development purposes, should be incorporated into rehabilitation and landscaping areas. Species commonly occurring within the Polokwane Plateau Bushveld vegetation type should be considered for rehabilitation measures. Marula trees should be re-planted as part of landscaping in order to compensate for those tree species destroyed during the construction activities.
• Clear the area of all waste (including inert waste) and contaminated soil in preparation for landscaping.
• All areas to be affected by the project will be landscaped after construction and all waste generated by the construction activities will be stored in a temporary demarcated storage area, prior to disposal thereof at an approved landfill site. All waste and construction material must be removed post construction prior to landscaping.
• No open cooking or heating fires should be allowed as there is a significant risk of runaway fires on site.
• Provide adequate ablution facilities to avoid use of natural areas as toilets.
• Vehicles and construction workers should under no circumstances be allowed outside the construction footprint to prevent impact on the surrounding natural vegetation.
• Proliferation of alien invasive species is expected within the disturbed areas and they should be eradicated and controlled to prevent further spread.
• Surrounding areas with indigenous vegetation should under no circumstances be fragmented or disturbed further or used as an area for dumping of waste.
• Exposed areas should be rehabilitated with a grass mix that blends in with the surrounding vegetation. The grass mix should consist of indigenous grasses adapted to the local environmental conditions. The grass seeds should have a variety of grass species including several pioneer species.</td></tr>
<tr><td>Without Mitigation</td><td>Status</td><td>Extent</td><td>Magnitude</td><td>Duration</td><td>Probability</td><td>Significance</td></tr>
<tr><td></td><td>Negative</td><td>Local</td><td>Medium</td><td>Long-term</td><td>Almost certain</td><td>2</td></tr>
<tr><td>With Mitigation</td><td>Nature</td><td>Extent</td><td>Magnitude</td><td>Duration</td><td>Probability</td><td>Significance</td></tr>
<tr><td></td><td>Negative</td><td>Local</td><td>Low</td><td>Medium-term</td><td>Likely</td><td>2</td></tr>
</table>

OPERATIONAL PHASE						
Potential Impact		Mitigation				
Erosion caused by inadequate/failing stormwater management measures/designs.		• All roads and other hardened surfaces should have runoff control features which redirect water flow and dissipate any energy in the water which may pose an erosion risk. • Regular monitoring for erosion after construction to ensure that no erosion problems have developed as result of the disturbance. • All erosion problems observed should be rectified as soon as possible, using the appropriate erosion control structures and revegetation techniques. • All cleared areas should be revegetated with indigenous perennial grasses from the local area. • Ensure that there is compliance with all national, regional and local legislation with regard to the disposal of hydrocarbons, chemicals, solvents and any other harmful and hazardous substances and materials.				
Without Mitigation	Status	Extent	Magnitude	Duration	Probability	Significance
	Negative	Local	Medium	Medium-term	Almost certain	2
With Mitigation	Nature	Extent	Magnitude	Duration	Probability	Significance
	Negative	Local	Low	Short-term	Unlikely	1

OPERATIONAL PHASE	
Potential Impact	Mitigation
Soil contamination from hazardous substance spillages outside their primary and secondary containment during maintenance work.	• Hazardous substances must be stored and handled in accordance with the appropriate legislation and standards, which include the Hazardous Substances Act (Act No. 15 of 1973), the Occupational Health and Safety Act (Act No. 85 of 1993), relevant associated Regulations, and applicable SANS and international standards. • A copy of the Material Safety Data Sheet (MSDS) for each hazardous substance stored or used must be available and communicated to the relevant persons who might be exposed to the hazards thereof. • Areas where flammable liquids are being used, applied or stored, must be effectively ventilated. • Install an adequate number of fire-fighting equipment in suitable locations around the flammable liquids store. • All storage tanks containing hazardous substances must be placed in bunded containment areas with impermeable surfaces. The bunded area must be able to contain 110% of the total volume of the stored hazardous substance. • Hazardous substances will be disposed of at registered sites or handed to registered hazardous waste disposal facilities for disposal / recycling. • No flammable material (e.g. paper, cleaning rags or similar material) may be stored together with flammable liquids. • Staff that will be handling hazardous materials must be trained to do so. In case of accidental leakages and spillages, the following procedure will be followed: • Proper emergency response procedure to be in place and communicated to designated persons for dealing with spills and leaks. • Ensure that the necessary materials and equipment for dealing with spills and leaks are available on site in the form of a Spill Kit/s. • Remediation of the spill areas will be undertaken to the satisfaction of the Engineer and ECO. • In the event of a hydrocarbon spill, the source of the spillage will be isolated and contained. The area will be cordoned off and secured. The Contractor will ensure that there is always a supply of an appropriate absorbent material readily available to absorb, breakdown and where possible, encapsulate a minor hydrocarbon spillage. • All staff on site will be made aware of actions to be taken in case of a minor or major spillage. • Provide contact details of person to be notified in a case of spillages – signage to be displayed at strategic points within the construction domain (e.g. workshop, fuel storage area, hazardous material containers). • Construction vehicles and mobile plant to be maintained in a safe operating condition to prevent any possible hydrocarbon leakages resulting in spillages.

OPERATIONAL PHASE						
Potential Impact		Mitigation				
		• Drip trays to be positioned underneath the hydrocarbon substance containment components of all stationary construction vehicles and mobile plant.				
Without Mitigation	Status	Extent	Magnitude	Duration	Probability	Significance
	Negative	Local	Medium	Medium-term	Almost certain	2
With Mitigation	Nature	Extent	Magnitude	Duration	Probability	Significance
	Negative	Local	Low	Short-term	Unlikely	1

<table>
<tr><th colspan="7">OPERATIONAL PHASE</th></tr>
<tr><td colspan="2">Potential Impact</td><td colspan="5">Mitigation</td></tr>
<tr><td colspan="2">Disturbance of local fauna populations due to construction activities.

During operational phase, noise, pollution, disturbance and human presence will be detrimental to fauna. Sensitive and shy fauna would move away from the area as a result of the noise and human activities present. Species such as rats observed on site are tolerant to disturbances and will easily move away. The impacts on these species are considered to be low.</td><td colspan="5">• Animals residing within the designated area shall not be unnecessarily disturbed. However, any fauna threatened by operation activities should be removed to safety by a suitable qualified person.
• Snake handling should be strictly limited to qualified staff or a dedicated external snake handler.
• When accessing the facility, vehicles are to utilise the existing roads.
• Ensure that no unnecessary clearing of faunal habitat occurs during maintenance activities.
• No fires by maintenance personnel are allowed.
• No wild animal may be fed on site.
• Ensure that the facility is kept clean, tidy and free of rubbish that would attract animal pests.
• The collection or hunting of any animals at the facility or in the surrounding areas should be strictly forbidden.
• All vehicles accessing the site should adhere to a low speed limit (40km/h max) to avoid collisions with susceptible species such as snakes and small rodents.
• Ensure that staff understand that no form of wildlife poaching, killing, collecting or other form of disturbance can be permitted on the construction site or the adjacent areas.
• Monitoring impacts of operational activities on fauna so that adaptive management practises can be implemented if and when required.
• All waste generated at the facility should be kept in scavenger proof bins and removed from site at regular intervals.
• If the facility must be lit at night for security purposes, low-UV type lights (such as most LEDs), should be utilised as they do not attract insects.</td></tr>
<tr><td>Without Mitigation</td><td>Status</td><td>Extent</td><td>Magnitude</td><td>Duration</td><td>Probability</td><td>Significance</td></tr>
<tr><td></td><td>Negative</td><td>Local</td><td>Medium</td><td>Medium-term</td><td>Almost certain</td><td>2</td></tr>
<tr><td>With Mitigation</td><td>Nature</td><td>Extent</td><td>Magnitude</td><td>Duration</td><td>Probability</td><td>Significance</td></tr>
<tr><td></td><td>Negative</td><td>Local</td><td>Low</td><td>Short-term</td><td>Unlikely</td><td>1</td></tr>
</table>

12 CONCLUSION AND RECOMMENDATIONS

The entire study area falls within the Savanna Biome and this biome is the largest biome in South Africa and covers approximately one third of the entire country. It is characterized by a grassy ground layer and distinct upper layer of woody plants. The study area is classified as falling within the endemic Polokwane Plateau Bushveld vegetation type, with a conservation status of Least threatened.

Threatened ecosystem types are categorised as “not protected”, “poorly protected”, “moderately protected” and “well protected” based on the proportion of each ecosystem type that occurs within a protected area recognised in the Protected Areas Act, 2003 (Act 57 of 2003), and compared with the biodiversity. According to LEDET, (2019), Polokwane Plateau Bushveld Ecosystem is listed as Vulnerable whereas in National Biodiversity Assessment (2018), it is denoted as Least Concern, with a poor level of protection on a provincial scale. Approximately 95% of the study area falls within the ‘Other Natural Areas’ category, while the remainder of the study area falls within the category ‘No Natural Habitat’ remaining. During the field investigation, it was verified that natural areas still exist on the study area, but disturbed or degraded by the illegal dumping of material and also by alien invasive flora species.

Anthropogenic activities such as roads, foot paths, littering and most importantly, habitat fragmentation have completely degraded most sections of the study area. Few patches of natural grasslands and woodlands still exist on the study area. Several *protected trees* have distributions that include the study area. Of note is the presence of *Sclerocarya birrea* subsp. *caffra* (Marula) recorded in abundance on site. This species is a nationally protected tree species, and the disturbance to which should be avoided where possible and in terms of Section 15(1) of the National Forests Act, 1998: *no person may cut, disturb, damage or destroy any protected tree or possess, collect, remove, transport, export, purchase, sell, donate or in any other manner acquire or dispose of any protected tree or any forest product derived from a protected tree, except under a licence or exemption granted by the Minister to an applicant and subject to such period and conditions as may be stipulated*. A permit from Department of Agriculture, Forestry and Fisheries (DAFF) is required before construction commences in order to remove or disturb these protected trees identified on the study area.

During the field survey, no threatened plant species were observed on site but only one species of conservation importance were noted, namely *Boophone disticha* and this species has a conservation status of *Declining.* It is thus recommended that the Search, Rescue and Relocation process should be conducted prior to construction activities taking place. The major concerns on site are alien invasive plant species, weeds and potential alien invasives. Newly cleared soils will have to be re-vegetated and stabilised as soon as construction has been

completed and there should be an on-going monitoring program to control and/or eradicate newly emerging alien invasive plant species. The rehabilitation of disturbed areas should receive high priority and must be included in the Environmental Management Programme Report (EMPr) and recommendations regarding the specific plant species used during rehabilitation should be site specific and according to the surrounding vegetation composition. All development footprint areas should remain as small as possible and should not encroach onto surrounding areas.

Generally, the negative impacts to the receiving environment resulting from the study area are probably of an acceptable significance and magnitude, if appropriate mitigations measures are implemented and construction is implemented in a sensitive manner. The proposed development will cause disruption during the construction phase, but as long as mitigation measures are implemented, these disruptions should have minimal lasting effect on the ecosystems of the study area. It is the opinion of the ecologist, that the proposed development be considered favourably, provided that the sensitivity map be considered during the planning and construction phases and also mitigations measures are implemented and adhered to and this will aid in the conservation of ecology within the study area.

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Appendix A: List of mammal species previously recorded from the 2329CD QDGS

Family	Genus	Species	Subspecies	Common name	Red list category	Endemic species (SA)
Bovidae	*Aepyceros*	*melampus*		Impala	Least Concern	No
Bovidae	*Alcelaphus*	*caama*		Red Hartebeest	Least Concern	No
Bovidae	*Connochaetes*	*taurinus*	*taurinus*	Blue wildebeest	Least Concern	No
Bovidae	*Hippotragus*	*niger*		Sable Antelope	Vulnerable	No
Bovidae	*Kobus*	*ellipsiprymnus*		Waterbuck	Least Concern	No
Bovidae	*Raphicerus*	*campestris*		Steenbok	Least Concern	No
Bovidae	*Redunca*	*arundinum*		Southern Reedbuck	Least Concern	No
Bovidae	*Redunca*	*fulvorufula*	*fulvorufula*	Mountain Reedbuck	Endangered	No
Bovidae	*Sylvicapra*	*grimmia*		Common Duiker	Least Concern	No
Bovidae	*Tragelaphus*	*angasii*		Nyala	Least Concern	No
Bovidae	*Tragelaphus*	*oryx*		Common Eland	Least Concern	No
Bovidae	*Tragelaphus*	*scriptus*		Bushbuck	Least Concern	No
Bovidae	*Tragelaphus*	*strepsiceros*		Greater Kudu	Least Concern	No
Canidae	*Canis*	*mesomelas*		Black-backed Jackal	Least Concern	No
Cercopithecidae	*Cercopithecus*	*pygerythrus*	*pygerythrus*	Vervet Monkey	Least Concern	No
Equidae	*Equus*	*quagga*		Plains Zebra	Least Concern	No
Herpestidae	*Herpestes*	*sanguineus*		Slender Mongoose	Least Concern	No
Hystricidae	*Hystrix*	*africaeaustralis*		Cape Porcupine	Least Concern	No
Pedetidae	*Pedetes*	*capensis*		South African Spring Hare	Least Concern	No
Suidae	*Phacochoerus*	*africanus*		Common Warthog	Least Concern	No

Appendix B: Red Data Bird species recorded in grid cell 2329CD

Common Name	Endemism	Scientific name	Red list category	Preferred Habitat
Black Stork	N/A	*Ciconia nigra*	Vulnerable	Associated with rivers, dams and cliffs.
Saddle-billed Stork	N/A	*Ephippiorhynchus senegalensis*	Endangered	Occupies vast open spaces along wetlands and bodies of water so that they have easy access to a food source. There are trees scattered throughout their optimal natural habitat
Yellow-billed Stork	N/A	*Mycteria ibis*	Endangered	Associated with water – dams, wetlands, rivers, marshes, even small pools.
Southern Bald ibis	SLS	*Geronticus calvus*	Vulnerable	It inhabits short grasslands at high altitudes, generally between 1,200 and 1,850 meters and also avoids medium to long grass and other vegetated areas, and so prefers recently burnt, ploughed, mowed or heavily grazed fields and cultivated pastures. It generally nests on cliffs along deep river gorges, or by waterfalls
Lesser Flamingo	N/A	*Phoenicoparrus minor*	Near Threatened	Lesser Flamingo breeds in brackish or salty lakes and lagoons in Southern Africa, and highly alkaline lakes in Eastern Africa. Non breeding birds may be found on coastal mudflats, salt works and sewage treatment works where salinities are high.
Secretarybird	N/A	*Sagittarius serpentarius*	Vulnerable	It is usually found in the open grasslands and savannah of the sub-Saharan region
Cape Vulture (Griffon)	N/A	*Gyps coprotheres*	Endangered	Inhabits open grassland, savanna and shrubland, and is often found roosting on crags in mountainous regions
Martial Eagle	N/A	*Polemaetus bellicosus*	Endangered	It tolerates a wide range of vegetation types, being found in open grassland, scrub, Karoo, agricultural lands and woodland. It relies on large trees (or electricity pylons) to provide nest sites as well as windmills and even cliffs in treeless areas.
Lanner Falcon	N/A	*Falco biarmicus*	Vulnerable	Lanner falcon can be found in a wide range of habitats ranging from extreme desert to wet, forested mountains up to elevations of 5,000 metres. The species can be found in *Eucalyptus* stands in southern Africa and even in urban areas, as long as there are open or lightly wooded areas nearby for hunting, though it tends to avoid heavily forested or very wet areas

Common Name	Endemism	Scientific name	Red list category	Preferred Habitat
Blue Crane	N/A	*Anthropoides paradiseus*	Near Threatened	This crane breeds in dry grasslands at high elevations where there is less disturbance. They may roost and breed in wetlands if available and some individuals prefer to nest in arable and pastureland. In autumn and winter they usually move to lower altitudes.
White-bellied Korhaan	N/A	*Eupodotis senegalensis*	Vulnerable	It generally prefers fairly tall, dense sour or mixed grassland, either open or lightly wooded, occasionally moving into cultivated or burnt land
Greater Painted-snipe	N/A	*Rostratula benghalensis*	Near Threatened	It is typically found in the wetlands of tropical and subtropical lowlands, occurring in areas such as swamps, overgrown rice fields, freshwater lakes and mangroves.
Half-collared Kingfisher	N/A	*Alcedo semitorquata*	Near Threatened	It feeds almost exclusively on fish and can be found near water at all times. It can be found on shores and around larger bodies of water in southern and eastern Africa.
Short-clawed Lark	N/A	*Certhilauda chuana*	Near Threatened	It generally prefers semi-arid *Acacia* savanna with scattered grass clumps and bushes, with large patches of bare ground.

Note: SLS = Endemic to South Africa, Lesotho and Swaziland

Appendix C: Reptile species recorded in grid cell 2329CD

Family	Genus	Species	Subspecies	Common name	Red list category	SA endemism
Agamidae	*Agama*	*aculeata*	*distanti*	Distant's Ground Agama	Least Concern (SARCA 2014)	Yes
Chamaeleonidae	*Chamaeleo*	*dilepis*	*dilepis*	Common Flap-neck Chameleon	Least Concern (SARCA 2014)	
Colubridae	*Dasypeltis*	*scabra*		Rhombic Egg-eater	Least Concern (SARCA 2014)	
Colubridae	*Philothamnus*	*semivariegatus*		Spotted Bush Snake	Least Concern (SARCA 2014)	
Cordylidae	*Cordylus*	*vittifer*		Common Girdled Lizard	Least Concern (SARCA 2014)	
Cordylidae	*Platysaurus*	*intermedius*	*intermedius*	Common Flat Lizard	Least Concern (SARCA 2014)	Yes
Elapidae	*Naja*	*mossambica*		Mozambique Spitting Cobra	Least Concern (SARCA 2014)	
Gekkonidae	*Chondrodactylus*	*turneri*		Turner's Gecko	Least Concern (SARCA 2014)	
Gekkonidae	*Hemidactylus*	*mabouia*		Common Tropical House Gecko	Least Concern (SARCA 2014)	
Gekkonidae	*Lygodactylus*	*capensis*	*capensis*	Common Dwarf Gecko	Least Concern (SARCA 2014)	
Lacertidae	*Nucras*	*holubi*		Holub's Sandveld Lizard	Least Concern (SARCA 2014)	
Lamprophiidae	*Aparallactus*	*capensis*		Black-headed Centipede-eater	Least Concern (SARCA 2014)	
Lamprophiidae	*Atractaspis*	*duerdeni*		Duerden's Stiletto Snake	Least Concern (SARCA 2014)	
Lamprophiidae	*Boaedon*	*capensis*		Brown House Snake	Least Concern (SARCA 2014)	
Lamprophiidae	*Lycophidion*	*capense*	*capense*	Cape Wolf Snake	Least Concern (SARCA 2014)	
Lamprophiidae	*Prosymna*	*bivittata*		Two-striped Shovel-snout	Least Concern (SARCA 2014)	
Lamprophiidae	*Psammophis*	*brevirostris*		Short-snouted Grass Snake	Least Concern (SARCA 2014)	
Lamprophiidae	*Psammophylax*	*tritaeniatus*		Striped Grass Snake	Least Concern (SARCA 2014)	
Lamprophiidae	*Pseudaspis*	*cana*		Mole Snake	Least Concern (SARCA 2014)	
Pythonidae	*Python*	*natalensis*		Southern African Python	Least Concern (SARCA 2014)	
Scincidae	*Trachylepis*	*punctatissima*		Speckled Rock Skink	Least Concern (SARCA 2014)	
Testudinidae	*Stigmochelys*	*pardalis*		Leopard Tortoise	Least Concern (SARCA 2014)	
Typhlopidae	*Afrotyphlops*	*schlegelii*		Schlegel's Beaked Blind Snake	Least Concern (SARCA 2014)	
Typhlopidae	*Rhinotyphlops*	*lalandei*		Delalande's Beaked Blind Snake	Least Concern (SARCA 2014)	

Family	Genus	Species	Subspecies	Common name	Red list category	SA endemism
Varanidae	*Varanus*	*albigularis*	*albigularis*	Rock Monitor	Least Concern (SARCA 2014)	
Viperidae	*Bitis*	*arietans*	*arietans*	Puff Adder	Least Concern (SARCA 2014)	

Appendix D: Search and Rescue Plan of Action/Guideline

Action	Responsible person
Once the final site development plan has been determined the botanist/ECO will be consulted in order to finalise the plant relocation and vegetation clearing plan.	ECO/Botanist
Areas to be cleared of vegetation will be clearly demarcated before clearing commences.	Contractor
No plants should be removed from areas that will otherwise not be disturbed by the construction activities.	Contractor
All labour involved in the relocation of the plants must attend an awareness training on the significance and importance of the plant species of conservation concern.	ECO/Contractor/ Landscape Architect actor/Landscape Architect
Before the translocation takes place, all the plant species to be relocated must be photographed.	ECO/Contractor/ Landscape Architect
Plants to be rescued should include both Species of Conservation Concern requiring removal for relocation as well as species that would be suitable for use in rehabilitation and that are amenable to transplanting.	ECO/Contractor/ Landscape Architect
In order to successfully remove plant species such as Boophone disticha and Aloes from the site, the soil must be loosened on all sides of the plant, without breaking or damaging the roots and bulbs, and dug out at approximately 20 - 30cm deep. A pickaxe could be used to dig out the plants and store them in potting bags/containers. This process should be supervised by a qualified individual such as a horticulturist and/or the landscape architect.	ECO/Contractor/ Landscape Architect
For each individual plant that is rescued, soil from where this species is found must be used to fill up the container bag. The soil must be packed firmly, but not too tightly to restrict water and oxygen. The plants must be watered before relocation.	ECO/Contractor/ Landscape Architect
Rescued plants must be planted into a container to be kept within a temporary nursery on site or immediately planted into the target habitat. If planted into natural habitat, it must be protected from construction activities and monitored to ensure survival. Monitoring should be undertaken on a monthly basis for two years after transplanting to evaluate the success thereof.	Contractor/ Landscape Architect
In cases where the rescued plants cannot be relocated on the same day, a nursery must be established. The Landscape Architect must inspect all plant materials on a regular basis for rodents, excessive sun, wind, or weeds. If any are identified, appropriate control measures must be applied. The nursery shall be adequately secured to prevent loss or theft of the plant species.	Contractor/Landscape Architect

Action	Responsible person
In the area designated for the replanting of these species, a hole must be dug which is slightly larger and deeper than the plant which must be placed therein. The plant must be placed in the hole and ensure that it is deep enough that the roots are covered. The plants should not be planted in straight lines, but rather randomly as in the natural environment.	ECO/Contractor/ Landscape Architect
Should there be a need to translocate these plant species off site, an agreement should be in place between the receiver and the Contractor concerned. The receiving site must be matched as closely as possible with the origin of the plants and, where possible, be placed as near as possible to where they originated.	Contractor/Receiver site
Post construction monitoring of plants relocated/translocated during search and rescue should be undertaken monthly in order to evaluate as to whether the intervention was successful or not and there should be a proper document of how many plant species were rescued and their survival rate.	ECO/Contractor/ Landscape Architect

Appendix E: Alien invasive plant control

Description of maintenance activity	Alien invasive plant eradication
Actions	• Removal of the alien invasive plants should be according to the appropriate invasive plant clearing guidelines/methods provided by the Working for Water Programme. A number of methods are used across the country for alien vegetation clearing and management. These include the following: ✓ Mechanical methods - felling, removing or burning invading alien plants. ✓ Chemical methods - using environmentally safe herbicides. ✓ Biological control - using species-specific insects and diseases from the alien plant's country of origin. ✓ Integrated control - combinations of the above three approaches. Often an integrated approach is required in order to prevent enormous impacts. • Alien invasive plant species should be removed manually as far as possible from the construction footprint. All work should be done by hand (manually), either by pulling, using shears, hand saws or chainsaws (depending on the size of the tree). • The use of herbicides should be avoided. • Removed alien plant material should be covered when transported to prevent it from being blown away. • It is recommended that all vegetation that was removed must be transported off-site for disposal to reduce fire hazard. • One should always consider the natural gradient of the area being cleared, all operations should follow the slope. • All manually cleared alien plants must be disposed of carefully and must not be dumped in any areas of indigenous vegetation, even temporarily.

Description of maintenance activity	Alien invasive plant eradication
	• Less dense areas should be targeted to prevent the build-up of species and the development of dense alien clumps. This will also help prevent the build-up of seed banks. • Any soil stockpiles that have become invaded should be cleared through manual control methods (weeding). • Introduction of alien plant species to the site should be prevented as far as practicable. Vehicles entering should be inspected, outside sources of soil and sand should be clear of alien invasive plant species. • Surveys of the site for alien invasive plant species must be conducted throughout the life of the project. These include new invasions by recorded species and new species on site.
Impact of actions	It is anticipated that clearing of alien invasive plant species will result improvement in the ecological health of the site.
Time period of maintenance activity & Monitoring	The maintenance management activity should be undertaken on a regular basis by the Contractor/Applicant after initial site clearing in order to monitor and control seedlings and regrowth.

environmental affairs
Department:
Environmental Affairs
REPUBLIC OF SOUTH AFRICA

DETAILS OF THE SPECIALIST, DECLARATION OF INTEREST AND UNDERTAKING UNDER OATH

	(For official use only)
File Reference Number:	
NEAS Reference Number:	DEA/EIA/
Date Received:	

Application for authorisation in terms of the National Environmental Management Act, Act No. 107 of 1998, as amended and the Environmental Impact Assessment (EIA) Regulations, 2014, as amended (the Regulations)

PROJECT TITLE

Proposed Limpopo Central Hospital

Kindly note the following:

1. This form must always be used for applications that must be subjected to Basic Assessment or Scoping & Environmental Impact Reporting where this Department is the Competent Authority.
2. This form is current as of 01 September 2018. It is the responsibility of the Applicant / Environmental Assessment Practitioner (EAP) to ascertain whether subsequent versions of the form have been published or produced by the Competent Authority. The latest available Departmental templates are available at https://www.environment.gov.za/documents/forms.
3. A copy of this form containing original signatures must be appended to all Draft and Final Reports submitted to the department for consideration.
4. All documentation delivered to the physical address contained in this form must be delivered during the official Departmental Officer Hours which is visible on the Departmental gate.
5. All EIA related documents (includes application forms, reports or any EIA related submissions) that are faxed; emailed; delivered to Security or placed in the Departmental Tender Box will not be accepted, only hardcopy submissions are accepted.

Departmental Details

Postal address:
Department of Environmental Affairs
Attention: Chief Director: Integrated Environmental Authorisations
Private Bag X447
Pretoria
0001

Physical address:
Department of Environmental Affairs
Attention: Chief Director: Integrated Environmental Authorisations
Environment House
473 Steve Biko Road
Arcadia

Queries must be directed to the Directorate: Coordination, Strategic Planning and Support at:
Email: EIAAdmin@environment.gov.za

1. SPECIALIST INFORMATION

Specialist Company Name:	Nemai Consulting (Pty) Ltd			
B-BBEE	Contribution level (indicate 1 to 8 or non-compliant)		Percentage Procurement recognition	
Specialist name:	Avhafarei Phamphe			
Specialist Qualifications:	M.Sc. (Botany)			
Professional affiliation/registration:	Professional Natural Scientist: South African Council for Natural Scientific Professions Ecological Science (400349/2) Professional Member of South African Institute of Ecologists and Environmental Scientists Professional Member: South African Association of Botanists.			
Physical address:	147 Bram Fischer Drive, Ferndale, Randburg, 2194			
Postal address:	P O Box 1673, Sunninghill,			
Postal code:	2157	Cell:	082 783 6724	
Telephone:	011 781 1730	Fax:	011 781 1731	
E-mail:	AvhafareiP@nemai.co.za			

2. DECLARATION BY THE SPECIALIST

I, AVHAFAREI PHAMPHE, declare that –

- I act as the independent specialist in this application;
- I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant;
- I declare that there are no circumstances that may compromise my objectivity in performing such work;
- I have expertise in conducting the specialist report relevant to this application, including knowledge of the Act, Regulations and any guidelines that have relevance to the proposed activity;
- I will comply with the Act, Regulations and all other applicable legislation;
- I have no, and will not engage in, conflicting interests in the undertaking of the activity;
- I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing - any decision to be taken with respect to the application by the competent authority; and - the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority;
- all the particulars furnished by me in this form are true and correct; and
- I realise that a false declaration is an offence in terms of regulation 48 and is punishable in terms of section 24F of the Act.

Signature of the Specialist

NEMAI CONSULTING

Name of Company:

29/10/2019

Date

3. UNDERTAKING UNDER OATH/ AFFIRMATION

I, Nthatheni Phamohe, swear under oath / affirm that all the information submitted or to be submitted for the purposes of this application is true and correct.

Signature of the Specialist

Nemai Consulting

Name of Company

29/10/2019

Date

Akhele Maki

Signature of the Commissioner of Oaths

29/10/2019

Date

...MINISTRATION

[illegible] Randburg 2125

2019 -10- 29

[illegible] RANDBURG [illegible]

JOHANNESBURG NORTH MAGISTERIAL DISTRICT

RANDBURG MAIN COURT

1. Is u vertroud met die inhoud van bostaande verklaring en begryp u dit?

Antwoord..............

2. Het u enige beswaar teen die aflê van die voorgeskrewe eed?

Antwoord..............

3. Beskou u die voorgeskrewe eed as bindend vir u gewete?

Antwoord..............

A. Ek sertifiseer dat bovermelde vrae aan my gevra was en my antwoorde daarop soos hierbo weergegee in my teenwoordigheid neergeskryf is.

1. Do you know and understand the contents of the declaration?

Answer: Yes

2. Do you have any objection to taking the prescribed oath?

Answer: No

3. Do you consider the prescribed oath to be binding on your conscience?

Answer: Yes

A. I certify that the above-mentioned questions were put to me and that the answers thereto as reflected above were written down in my presence.

X ....

Handtekening van verklaarder/Signature of deponent

B. Ek sertifiseer dat die verklaarder erken dat hy/sy vertroud is met die inhoud van die verklaring en dit begryp. Hierdie verklaring is beëdig/bevestig voor my en verklaarder se handtekening/duimafdruk/merk is in my teenwoordigheid daarop aangebring.

B. I certify that the deponent has acknowledged that he/she knows and understands the contents of this declaration which was [illegible] before me and the deponent's signature/thumb print/mark was placed thereon in my presence.

....

Vrederegter/Justice of the Peace

Kommissaris van Ede/Commissioner of Oaths

Volle voorname en van / Full first names and surname: Akhele Maki

(DRUKSKRIF/BLOCK LETTERS)

Amp (rang) / Designation (rank): Senior [illegible]

[illegible] van Suid-Afrika / Republic of South Africa

Besigheidsadres / Business address: 18 Hilliard Avenue

(Straatadres moet ingevul word/Street address must be stated)

Randburg Mag Court

29/10/2019 Plek / Place: Randburg

Revised peer review summary report of the

'Proposed Limpopo Central Hospital Terrestrial Ecological Assessment' (Draft)

(Authority Reference: 14/12/16/3/3/2/1132)

Prepared by:

Please direct any queries to:
Anita Rautenbach
Cell: 083 305 1516
Email: rabiodiversity@gmail.com

CONTENTS

REVIEWER DETAILS AND DECLARATION OF INDEPENDENCE

Document title	Proposed Limpopo Central Hospital. Terrestrial Ecological Assessment (Draft).
Report reviewer	Anita Rautenbach
Qualifications	MSc. Biological Science
Professional affiliations	Professional Natural Scientist (400725/15)
Email address	rabiodiversity@gmail.com
Cell	+27 83 305 1516

I, **Anita Rautenbach** *Pr. Sci. Nat*. declare that I:

- act as an independent reviewer of this report;
- do not have and will not have any vested interest (either business, financial, personal or other) in the undertaking of the proposed activity;
- have performed the review of this report in an objective manner, even had this resulted in views and findings that are not favourable to the EAP/applicant;
- declare that there were no circumstances that compromised my objectivity in performing this work;
- have expertise in conducting the specialist report relevant to this review, including knowledge of the Act, regulations and any guidelines that have relevance to the proposed activity; and that I
- have no, and will not engage in, conflicting interests in the undertaking of the activity.

A. Rautenbach Date: 24 January 2020

1. INTRODUCTION

Rautenbach Biodiversity Consulting was appointed by The Biodiversity Company to conduct a revised peer review of the report titled the "Proposed Limpopo Central Hospital: Terrestrial Ecological Assessment (October 2019) as prepared by Nemai Consulting (Pty) Ltd.

Below follows a summary of the various components that was taken into consideration during the revised review process (adapted from DEAT, 2004; DEAT, 2002; Brownlie, 2005). This report should be read in conjunction with the comments provided on the report reviewed.

Summary appraisal of the terrestrial ecological assessment report:

	JUDGEMENT		
COMPONENT	**COMPLETE (C)**	**ACCEPTABLE (A)**	**INADEQUATE (I)**
1. Non-technical summary			✓
2. Background and introduction		✓	
3. Legal compliance and guidelines		✓	
4. Limitations, assumptions and gaps in knowledge			✓
5. Establishment of baseline environmental conditions			✓
6. Field surveys, data collection and presentation			✓
7. Impact identification			✓
8. Development of mitigation measures			✓
9. General approach			

Complete – all information required for decision-making is available. No additional information is required even though more information might exist.

Acceptable – the information presented is incomplete, but the omissions do not prevent the decision-making process from proceeding.

Inadequate – the information presented contains major omissions. Additional information is necessary before the decision-making process can proceed.

The overall report is therefore graded as follows:

EXCELLENT: The EIA report contains everything required for decision-making on the project. There are no gaps.	
GOOD: The EIA report contains most of the information required as far as it is relevant in the circumstances of the project; any gaps are minor.	
SATISFACTORY: The information presented is not complete; there are significant omissions but in the context of the proposed project, these are not so great as to prevent a decision being made on whether the project should be allowed to proceed.	
INADEQUATE: Some of the information has been provided, but there are major omissions; in the context of the proposed project these must be addressed before a decision on whether the project should be allowed to proceed can be taken.	✓
POOR: The information required has not been provided or is far from complete and, in the context of the proposed project, the omissions must be addressed before a decision on whether the project should be allowed to proceed can be taken.	

TABLE 1: Technical summary

	JUDGEMENT (C/A/I)	COMMENTS
1. NON-TECHNICAL SUMMARY		To be updated upon final completion of the report.
• Does the report contain a brief but concise non-technical summary that clearly explains the project and the environment, the main issues and mitigation measures to be undertaken, and any remaining or residual impacts?	I	
• Does the summary include a brief explanation of the overall approach to the assessment?	I	
• Does the summary provide an indication of the confidence which can be placed in the results?	I	
• Does the summary indicate whether the project is or is not environmentally acceptable**?**	I	
2. BACKGROUND AND INTRODUCTION		
• Scope of the project	A	The information presented is incomplete with regards to a detailed project descripion, but the omissions will probably not prevent the decision-making process from proceeding. Site lay-out plan not included.
• Background and history of the project.	C	
• Has the land required for the project and any associated services, been described and clearly shown on a scaled map?	C	
3. LEGAL COMPLIANCE AND GUIDELINES		
• Relevant environmental legislation	A	
• Relevant environmental guidelines	I	Not listed. Failure to include the *Ecosystem Guidelines for the Savanna Biome* (prepared by CEN Integrated Environmental Management Unit). These guidelines should be consulted to understand the characteristics and functioning of biodiversity on the study area and to determine how best to manage biodiversity on a local and landscape scale. Ecosystem These guidelines should be used in conjunction with the other relevant biodiversity tools and plans to guide land use planning, with biodiversity management in mind.
4. LIMITATIONS, ASSUMPTIONS, GAPS IN KNOWLEDGE	I	Limitations and assumptions incomplete. Gaps in knowledge not identified. Seasonal constraints not adequately addressed.
5. ESTABLISHMENT OF BASELINE ENVIRONMENTAL CONDITIONS		
• Consideration of all available documentary records, research papers and other relevant information.	I	Literature review inadequate and incomplete. Literature source used to compile potential reptile distributions not suitable. Failure to take all species listed in the Capricorn Bioregional Plan and supplementary information into consideration. Failure to include all taxa (i.e. frogs, invertebrates for example). No justification presented in the report as to why these taxa was not assessed. Failure to take provincial protected fauna and flora into account (Limpopo Environmental Management Act No. 7 of 2003).

	JUDGEMENT (C/A/I)	COMMENTS
• Use of recognized survey and analysis techniques.	A	Vague description of methodology. Methodology described for field assessments not repeatable; duration of field assessments not reported, thus making the adequacy of the field investigation questionable.
• Identification and provision of appropriate descriptions of the baseline environmental conditions	I	The Capricorn Bioregional plan (dated February 2019) clearly indicated that since the Limpopo Conservation plan is outdated the Capricorn District CBA map should replace the Limpopo Conservation plan until the Limpopo Conservation plan has been updated. This was not considered and presented in this assessment (refer to page 19 of the Capricorn District Bioregional Plan Final).
• Identification of key environmental features that may enhance, constrain or limit the direction and rate of environmental change.	I	Refer to above comment.
• Explanation of links, interactions and dependencies between environmental components.	I	None evaluated and described. Refer to above comment with regards to Capricorn District CBA areas.
• Verification of desktop and other information by systematic field surveys.	I	Literature review incomplete. Inadequate review of Red Listed reptile species occurring in the province. Not all taxa reviewed (i.e. frogs and invertebrates). No justification provided for the omission of these taxa.
6. FIELD SURVEYS, DATA COLLECTION AND PRESENTATION		
• Temporal considerations, particularly survey timing and duration	I	No indication of time spent in the field during the 2016 and 2019 suveys. Temporal considerations with regards to seasonality not adequately addressed.
• The use of standard methods and techniques for information recording and surveying.	A	
• The degree of sampling effort and the intensity of the survey applied.	I	Not indicated.
• Indication of the levels of precision and measures of confidence or uncertainty associated with the data presented	I	Not indicated.
• Habitat sensitivity analysis	I	Incorrect habitat sensitivity analysis. Lack of understanding of sensitivity classes resulted in an incorrect presentation of sensitive habitats on the study area and adjacent areas (Figure 27).
7. IMPACT IDENTIFICATION		
• Identification of indirect, cumulative, secondary, short-, medium and long-term, permant or temporary and positive or negative effects.	I	Cumulative impacts not considered
• Description and quantification of potential impacts for all phases of the proposed project (construction, operation, decommissioning).	I	Refer to comments on project report.
• Assessment of the significance of impacts likely to arise from the project against the reference condition, rather than against the present state revealed by the field surveys.	I	Not considered. Impacts was assessed based on current environmental conditions.
• Evaluation of impacts according to prescribed impact assessment and evaluation techniques and criteria.	A	
• Provision of information on impact reversibility and the potential for	I	Mitigation provided but often incomplete and unfeasible.

	JUDGEMENT (C/A/I)	COMMENTS
mitigating the identified impacts.		
• Provision of details on how uncertainties and limitations in predicting potential impacts were dealth with.	I	None provided.
• Statement of all assumptions made for assessing potential impacts.	I	None provided.
• Statement of the predicted post-mitigation significance of impacts, i.e. the significance of residual impacts after all proposed mitigation measures have been considered.	I	Significance of impacts incorrectly calculated. The significance of residual impacts not considered.
8. DEVELOPMENT OF MITIGATION MEASURES		
• Has the mitigation of negative impacts been considered and, where feasible, have specific measures been proposed to address each impact?	I	Mitigation measures often unfeasible or vague/inappropriate. The impact on the Pongolo Nature Reserve not considered.
• Are the mitigation measures proposed affordable, feasible and achievable with defined criteria for success?	I	Mitigation measures often unfeasible or vague/inappropriate.
• Are significance ratings with and without mitigation measures provided?	I	To be recalculated once the impact assessment section has been extensively revised.
• Provision of precise descriptions for each recommended mitigation action to be implemented and the time span for which they are necessary	I	Incomplete and vague.
• Is it clear to what extent the mitigation methods are likely to be effective?	I	Unclear
• Provision of quantifiable standards (performance criteria) for reviewing or tracking the effectiveness of proposed mitigation actions.	I	None provided
9. GENERAL APPROACH		
Organisation of the information		
• Is the information logically arranged in sections?	A	
• Is the location of the information identified in an index or table of contents?	C	
• When information from external sources has been introduced, has a full reference to the source been included?	A	
Presentation of the information		
Has information and analysis been offered to support all conclusions drawn?	I	Unsubstantiated comments throughout the report.
• Has information and analysis been presented to be comprehensible to the non-specialist, using maps, tables and graphical material as appropriate?	A	
• Has superfluous information (i.e. information not needed for the decision) been avoided?	I	Refer to numerous comments on the project report.

	JUDGEMENT (C/A/I)	COMMENTS
• Have prominence and emphasis been given to severe adverse impacts, to substantial environmental benefits, and to controversial issues?	I	None identified although present, specifically with regards to the location of the Polokwane Nature Reserve and IBA near the site.
• Is the information objective?	I	Not all information available for the area is presented in the report, consequently the information provided, and conclusions drawn cannot be regarded as objective.

2. CONCLUSIONS

In general, specialist studies should provide a clear description of the project and the affected environment, provide a description of relevant legislation, policies and plans, evaluate all the key issues identified during scoping, to inform the impact assessment, evaluate potential significant positive and negative impacts, provide mitigation options for negative impacts and the enhancement of positive impacts, as well as the provision of practical recommendations for management actions and monitoring proposals. The study should highlight risks, uncertainties, and gaps in information, irreversible impacts or irreplaceable loss of resources.

Given the above general requirements, it was therefore concluded that the information provided in the report reviewed is far from complete. Key components that diminished the quality and reliability of this report included the following:

- Failure to take into consideration and present all relevant biodiversity features present in Capricorn district (Capricorn District Bioregional Plan Final (2019);
- Failure to take the distribution of provincial protected species into account (Limpopo Environmental Management Act No 7 of 2003; Table 4 of the report);
- Failure to report on permit requirements with regards to provincial protected species that may be potentially present;
- Incorrect habitat sensitivity analysis. Lack of understanding of sensitivity classes resulted in an incorrect presentation of sensitive habitats on the study area and surroundings (Figure 27). For example, the report states that the site is degraded and of low ecological value. Although 2 species of conservation importance were identified on the study area, these species are widely distributed across South Africa and not limited to the study area and surrounding areas (Refer to the description of the Low sensitivity class presented in Table 12). Yet Figure 27 delineated large areas on the study area as of Medium ecological sensitivity, which is in contradiction with the sensitivity class descriptions provided in Table 12. A major concern is the omission of the Polokwane Nature Reserve and IBA close to the study area on the habitat sensitivity map. Based on the close proximity of the study area to this Nature Reserve, it is likely that the study area falls within a protective area buffer zone of the Nature Reserve. Should this be the case, there is a clear conflict between conservation and development objectives. This issue should be addressed in the text accompanying Figure.
- Inadequate attention given to the impact assessment, analysis and evaluation and the proposal of suitable and feasible mitigation measures. This entire section needs extensive revision, including impact identification, threat assessment, mitigation measures and the evaluation of residual impacts.

A summary of the most significant findings related to the key components assessed is described below. For detailed comments refer to the project report.

1. Non-technical summary

To be reviewed and updated once all required information/corrections has been attended to. The non-technical summary should be clearly written in a way that assists the stakeholders and decision-makers to fully understand the findings of the report, and to enable the decision-maker to make an impartial decision.

2. Project description and background

Adequate, although more information with regards to construction related activities should be provided.

3. Legal compliance and guidelines

Failure to include the *Ecosystem Guidelines for the Savanna Biome* (prepared by CEN Integrated Environmental Management Unit). These guidelines should be consulted to understand the characteristics and functioning of biodiversity on the study area and to determine how best to manage biodiversity on a local and landscape scale.

Ecosystem These guidelines should be used in conjunction with the other relevant biodiversity tools and plans to guide land use planning, with biodiversity management in mind.

4. Limitations, assumptions, gaps in knowledge

Gaps in knowledge not identified; Limitations with regards to seasonality and the duration of the surveys not adequately addressed.

5. Establishment of baseline environmental conditions (i.e. desktop assessment)

- Failure to provide suitable methodology for the desktop assessment and take all sensitive environmental features into account;
- Failure to take all relevant and most recent information related to the study area and surroundings into account (i.e. Capricorn District Bioregional Plan) and supplementary information. Significant ommissions included the following:
    - Failure to address and elaborate on the proximity of the study area to sensitive ecological features within Capricorn District (i.e. protected areas; important ecological processes; protected area expansion strategy; biosphere reserves; areas of plant endemism, corridors, NPAES focus areas). Details with regards to these biodiversity features is provided in Part 2 of the final Capricorn Bioregional plan;
    - The Polokwane Nature Reserve and IBA falls within a 1.4 km radius of the study area. It is therefore likely that the study area will fall within the protective area buffer zone of the Polokwane Nature Reserve. The report failed to identify the width of the buffer zone and the implications this will have on future developments and on the fauna (more so sensitive bird species) present in the Polokwane Nature Reserve;
- Evaluation of the historic distribution of all reptile species not considered adequately. Inappropriate data source used. Refer to comments on the project report;
- Potential occurrence of taxa such as frogs and invertebrates not considered. No justification provided for the exclusion of these groups;
- Endemic/near-endemic species for all taxa not considered;
- CBA and ESA areas: Failure to address limitations with regards to the Limpopo Conservation plan and present the most up to date information for the district. The Capricorn Bioregional plan clearly states the following" ***It should be noted that the Limpopo Conservation Plan V2, 2013 is due to be revised. In this regard, the Capricorn District CBA Map will be incorporated into the revised document. However, until such a time when this is done, the Capricorn District CBA Map should replace the LCPv2 for all local, provincial and national decision-making pertaining to Capricorn District Municipality*****".** Refer to the Process and Consultation Report for the Capricorn District Bioregional Plan (available from the SANBI BGIS website) with regards to potential misalignment of CBA and ESA areas on areas surrounding the town of Polokwane.
- CBA and ESA data from the Limpopo Conservation Plan is presented in the project report and should therefore be replaced by the most up to date information as presented in the Capricorn District CBA and ESA map.

6. Field survey, data collection and presentation

No indication of time spent in the field during the 2016 and 2019 suveys, thus making the adequacy of the field investigation questionable. Temporal considerations with regards to seasonality not adequately addressed for all taxa.

7. Impact identification

- Failure to address the potential impacts the poposed development may have on the Polokwane Nature Reserve which is located close to the study area (1.4 km);

- Failure to address the potential impacts that the proposed development may have on the isolated population of the Short-clawed lark (for example, this species was listed as having a Medium probability of occurring on the study area - Table 9 of the report), and other IBA trigger species that is known to be present at Polokwane Nature Reserve;
- The description and explanation of the nature and consequence of potential impacts are inadequate;
- Failure to identify indirect, cumulative, secondary impacts;
- This entire section needs extensive revision, including impact identification, threat assessment, mitigation measures and the evaluation of residual impacts.

8. Development of mitigation measures

Proposed mitigation measures are inadequate, generic, vague, in some cases inappropriate and unfeasible and lack sufficient details with regards to implementation and monitoring requirements.

9. General approach

- Unsubstantiated and contradictory statements;
- Insufficient level of detail.

environmental affairs
Department:
Environmental Affairs
REPUBLIC OF SOUTH AFRICA

DETAILS OF THE SPECIALIST, DECLARATION OF INTEREST AND UNDERTAKING UNDER OATH

	(For official use only)
File Reference Number:	
NEAS Reference Number:	DEA/EIA/
Date Received:	

Application for authorisation in terms of the National Environmental Management Act, Act No. 107 of 1998, as amended and the Environmental Impact Assessment (EIA) Regulations, 2014, as amended (the Regulations)

PROJECT TITLE

Proposed Limpopo Central Hospital

Kindly note the following:

1. This form must always be used for applications that must be subjected to Basic Assessment or Scoping & Environmental Impact Reporting where this Department is the Competent Authority.
2. This form is current as of 01 September 2018. It is the responsibility of the Applicant / Environmental Assessment Practitioner (EAP) to ascertain whether subsequent versions of the form have been published or produced by the Competent Authority. The latest available Departmental templates are available at https://www.environment.gov.za/documents/forms.
3. A copy of this form containing original signatures must be appended to all Draft and Final Reports submitted to the department for consideration.
4. All documentation delivered to the physical address contained in this form must be delivered during the official Departmental Officer Hours which is visible on the Departmental gate.
5. All EIA related documents (includes application forms, reports or any EIA related submissions) that are faxed; emailed; delivered to Security or placed in the Departmental Tender Box will not be accepted, only hardcopy submissions are accepted.

Departmental Details

Postal address:
Department of Environmental Affairs
Attention: Chief Director: Integrated Environmental Authorisations
Private Bag X447
Pretoria
0001

Physical address:
Department of Environmental Affairs
Attention: Chief Director: Integrated Environmental Authorisations
Environment House
473 Steve Biko Road
Arcadia

Queries must be directed to the Directorate: Coordination, Strategic Planning and Support at:
Email: EIAAdmin@environment.gov.za

1. SPECIALIST INFORMATION

Specialist Company Name:	Rautenbach Biodiversity Consulting			
B-BBEE	Contribution level (indicate 1 to 8 or non-compliant)		Percentage Procurement recognition	
Specialist name:	Anita Rautenbach			
Specialist Qualifications:	MSc. Biological Science			
Professional affiliation/registration:	SACNASP (400725/15)			
Physical address:	13 Killarney Valley Road, Cato Ridge, Durban, KwaZulu-Natal Province			
Postal address:	As above			
Postal code:	3680	Cell:	+27 83 305 1516	
Telephone:		Fax:		
E-mail:	rabiodiversity@gmail.com			

2. DECLARATION BY THE SPECIALIST

I, Anita Rautenbach, declare that –

- I act as the independent specialist in this application;
- I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant;
- I declare that there are no circumstances that may compromise my objectivity in performing such work;
- I have expertise in conducting the specialist report relevant to this application, including knowledge of the Act, Regulations and any guidelines that have relevance to the proposed activity;
- I will comply with the Act, Regulations and all other applicable legislation;
- I have no, and will not engage in, conflicting interests in the undertaking of the activity;
- I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing - any decision to be taken with respect to the application by the competent authority; and - the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority;
- all the particulars furnished by me in this form are true and correct; and
- I realise that a false declaration is an offence in terms of regulation 48 and is punishable in terms of section 24F of the Act.

Signature of the Specialist

Rautenbach Biodiversity Consulting

Name of Company:

5/11/2019

Date

3. UNDERTAKING UNDER OATH/ AFFIRMATION

I, Anita Rautenbach, swear under oath / affirm that all the information submitted or to be submitted for the purposes of this application is true and correct.

Signature of the Specialist

Rautenbach Biodiversity Consulting

Name of Company

SA POST OFFICE.

Date

Signature of the Commissioner of Oaths

Date

Signature NOBUHLE Full Names

COMMISSIONER OF OATHS EX OFFICIO
BRANCH MANAGER - CAMPERDOWN
CAMPERDOWN SPAR CENTRE
DATE: 2019 NOVEMBER 05

CAMPERDOWN 2019-11-05 3720

ANITA RAUTENBACH (Pr.Sci.Nat)

Gender	Female
Date of Birth	18 March 1971
Languages	Afrikaans and English
Driver's license	Code 08
Mobile number	(+27) 83 305 1516
Email	rabiodiversity@gmail.com & akkedis1@gmail.com
Physical/Postal address	13 Killarney Valley View road, Cato Ridge, 0132

BACKGROUND

Anita graduated with a Master's degree in Biological Science from the School of Life Sciences, University of KwaZulu-Natal Durban. Her Master's dissertation investigated patterns and processes of rodent and shrew assemblages in the Savanna Biome of KwaZulu-Natal. Her main interest involves fauna taxonomy, distribution patterns and ecology. She has been involved in various research projects and ecological assessments in southern Africa. Anita has approximately 12 years of in the environmental field and is currently registered as a Professional Natural Scientist with the South African Council for Natural Scientific Professions (SACNASP).

ACADEMIC QUALIFICATIONS

University of KwaZulu Natal – MSc. Biological Science, Durban.
University of KwaZulu Natal - Bachelor of Science Honours (Biological Science)
University of South Africa – Bachelor of Science (Zoology & Geography)

SKILLS

- Fauna, flora and vegetation assessments;
- Threatened species assessments;
- Small mammal assessments, trapping and identification;
- Desk-based assessments;
- Training – small mammal trapping, handling of live specimens, processing and identification;
- Sample design set-up;
- Data collection and analyses;
- Radiotracking;
- GIS Mapping.

PROJECT EXPERIENCE (Selected projects)

2019

- Retrospective assessment for the unauthorized construction of an irrigation dam on farm Neederland 202 HT
  Ecological assessment – Mpumalanga
- Retrospective assessment for the unauthorized enlargement of an irrigation dam on the Farm Witklip 4/207 HT
  Ecological assessment -Mpumalanga
- Proposed housing development on Erf 2082, Shelley Beach
  Terrestrial ecological assessment – KwaZulu-Natal
- Specialist input to the wetland offset plan for the proposed Richcards Bay Combined Cycle Gas Turbine Power Plant
  Threatened species assessment – KwaZulu-Natal
- Proposed development of a business park on Erf 947, Port Edward
  Botanical assessment – KwaZulu-Natal
- Proposed mining development on the farm 'The Corner RE/11328, Umzumbe
  Botanical assessment – KwaZulu-Natal
- Proposed housing development, Kwamathukuza, Newcastle
  Ecological opinion – KwaZulu-Natal

2018

- Proposed development of an opencast pit and underground decline shaft, ZAC Colliery
  Ecological assessment – KwaZulu-Natal
- Proposed development of a hospital, Newcastle
  Vegetation and flora assessment, KwaZulu-Natal
- Proposed closed-cycle gas plant development
  Ecological assessment – KwaZulu-Natal
- Proposed development of a new abattoir, Inkosi Langibalele municipality
  Biodiversity assessment – KwaZulu-Natal
- Retrospective assessment for the unauthorized construction of a dam on Portion 5 of the Farm Tweefontein 3344
  Biodiversity assessment – Newcastle

2017

- Proposed Craigside Housing Development
  Ecological assessment – KwaZulu-Natal
- Proposed development of a housing Estate, Coral Lagoon (Pty) Ltd
  Threatened species assessment – Black headed dwarf chameleon - KwaZulu-Natal
- Proposed open-cast mining development – Mdzonyane
  Ecological assessment – Limpopo Province
- Proposed Umzimkhulu Housing development
  Ecological assessment – KwaZulu-Natal
- Proposed development of the Pavua Dam Hydropower facility
  Terrestrial fauna assessment – Mozambique
- Proposed development of the Maphumulo Integrated Energy Centre (IEC), Glendale
  Vegetation assessment – KwaZulu-Natal
- Proposed development of Portion 1 of Erf 286, Forest Hills
  Botanical assessment – KwaZulu-Natal
- Proposed development of macadamia orchards on the Farm Witkloof 456 HU
  Ecological opinion – KwaZulu-Natal
- Proposed housing development – Amaoti
  Ecological assessment – KwaZulu-Natal
- Proposed Thukela-Goedertrou pipeline development
  Ecological assessment – KwaZulu-Natal
  Retrospective assessment on Farm Stefco 4/428 for the unauthorized construction of a dam
  Ecological assessment – KwaZulu-Natal

2016

- Proposed development of the Shixini 3 Macadamia Orchard
  Ecological Assessment – Eastern Cape
- Proposed construction of Ilanga Secondary School, Nkomazi Municipality
  Ecological assessment - Mpumalanga
- Illovo Sugar Cane Estate, Iove Sugar Ltd.
  Biodiversity assessment – KwaZulu-Natal
- Buffelsdraai Landfill site, University of KwaZulu-Natal
  Small mammal assessment – KwaZulu-Natal
- Proposed development of the Mkhuhlu Quarry
  Ecological survey - Mpumalanga
- Proposed bridge construction – Standerton
  Development of construction work method statements for in-stream works across water courses – Mpumalanga Province
- Proposed upgrade of road infrastructure
  Avian assessment - Ladysmith
- Proposed housing Development – Kingsburg housing Development
  Ecological assessment – KwaZulu-Natal
- Proposed Ingogo Dams Development
  Ecological assessment – KwaZulu-Natal

2015 - 2007

- University of KwaZulu-Natal
  Small mammal assessment – KwaZulu-Natal
- Proposed development of a township on the Farm Impala, Nkomazi Municipality
  Ecological assessment – Mpumalanga Province
- Proposed development of Mapulaneng hospital, Bushbuckridge Municipality
  Ecological assessment – Mpumalanga Province
- Proposed development of an Eco-housing Estate
  Ecological assessment – Mpumalanga Province
- Proposed construction of a bridge, Umjindi Municipality
  Ecological assessment – Mpumalanga Province
- Proposed construction of the Frank Maghinyane School, Bushbuckridge Municipality
  Ecological assessment – Mpumalanga Province
- Upgrade of Queen Nandi, Kwamashu and Inanda Interchanges, SANRAL
  Fauna assessment – KwaZulu-Natal
- Proposed development of a new dig-out Port in Durban, Transnet Capital Projects
  Mammal assessment – KwaZulu-Natal
- Proposed development of a new mine, Base Titatium
  Mammal assessment – Kenya
- Bioblitz, Operation Wallacea
  Small mammal assessment, Mkhuze Game Reserve – KwaZulu-Natal
- University of KwaZulu-Natal
  Small mammal assessment – KwaZulu-Natal
- University of Swaziland - Swaziland
  Radio tracking of Wahlberg's epauletted fruit bat - Swaziland
- Durban Natural Science Museum
  Bat assessment Paradise Valley – KwaZulu-Natal
- Durban Natural Science Museum
  Small mammal assessment – Madagascar
- &Beyond
  Small mammal assessments - Phinda Private Game Reserve – KwaZulu-Natal
- Phelindaba – Gauteng
  Rodent assessment - Gauteng
- Durban Natural Science Museum
  Small mammal assessment - Albert Falls Dam – KwaZulu-Natal
- Durban Natural Science Museum
  Small mammal assessments – Ecorat - Swaziland

EMPLOYMENT HISTORY

Rautenbach Biodiversity Consulting – Durban *(Independent Specialist Consultant)*
March 2015 – present (full-time)

- Fauna and Flora Assessments;
- Ecological Assessments;
- Biodiversity Assessments;
- Threatened Species Assessments;
- GIS mapping;
- Small mammal assessments;
- Desktop assessments;
- Sample design set-up;
- Data collection and analyses;
- Report writing.

Rautenbach Biodiversity Consulting – Durban *(Independent Specialist Consultant)*
2012 March – March 2015 (part-time)

- Fauna, flora and vegetation assessments;
- Sample design, data collection, data analyses;
- GIS mapping;
- Report writing;
- Desk-based assessments;
- Training;
- ISO 14001 compliance monitoring and auditing (construction).

GVK Siya Zama Building and Renovations – Durban *(Regional Safety Manager)*
March 2013 – March 2015

- Development of HSE Plans;
- Hazard identification and risk assessments;
- Data analyses;
- Report writing;
- Training;
- Quarterly safety meetings;
- Monthly OHSAS 18001 and ISO 14001 compliance audits.

GVK Siya Zama Building and Renovations - Durban *(Roaming Safety Officer)*
March 2012 – February 2013

- Ensure on-site subcontractor compliance,
- Conduct risk assessments;
- Monthly safety meetings;
- Induction training;
- Incident investigation and report writing;
- Training

Durban Natural Science Museum (Mammal technician)
April 2007 – August 2011

- Acceptance, accessioning, care and loan of mammal specimens;
- Preparation of specimens for addition to museum collections;
- Data entry;
- Biological sampling;
- Co-ordination, organizing and conducting field surveys;
- Assistance with research;
- Mammal identification.
- Training

Dr D Storm *(Receptionist)*
1997 - 2007

- Setting up appointments;
- Ordering;
- Accounts;
- Filing, typing of medical reports.

Drs Smith, Snyman and Partners Diagnostic Radiologists – Pretoria *(Medical typist)*

1992 - 1997

- Making of appointments;
- Typing

Drs Brits and Griessel Pathologists – Pretoria (Medical typist)
1990 - 1991

- Typing of pathology reports.

Professional Affiliations

South African Council for Natural Scientific Professions (400725/15).

Publications

- Solano, E., Taylor, P,J., Rautenbach, A., Ropiquet, A., Castiglia, R. 2014. Cryptic speciation and chromosomal repatterning in the African climbing mice Dendromus (Rodentia, Nesomyidae). PloS One (DOI:10.1371/journal.phone.0088799).
- Rautenbach, A., Dickerson, T., Schoeman, M.C. 2013. Diversity of rodents and shrew assemblages in different vegetation types of the savannah biome in South Africa: no support for nested subset or competition hypotheses. African Journal of Ecology 5(1) pp. 30-40.
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SACNASP

South African Council for Natural Scientific Professions

herewith certifies that

Anita Rautenbach

Registration number: 400725/15

is registered as a

Professional Natural Scientist

in terms of section 20(3) of the Natural Scientific Professions Act, 2003
(Act 27 of 2003)
in the following field(s) of practice (Schedule I of the Act)

Zoological Science — **18 November 2015**

18 November 2015
Pretoria

President

Executive Director

UNIVERSITY OF KWAZULU-NATAL ™

INYUVESI YAKWAZULU-NATALI

This is to certify that

Anita Rautenbach

was admitted this day
at a congregation of the University
to the degree of

Master of Science
(Biological Sciences)

having satisfied the conditions prescribed for the degree.

M W Makgoba
Vice-Chancellor

J J Meyerowitz
Registrar

S Mukaratirwa
Dean

17 April 2013

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VOORNAME/FORENAMES
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GEBOORTEDISTRIK OF LAND/
DISTRICT OR COUNTRY OF BIRTH
SUID-AFRIKA

GEBOORTEDATUM/
DATE OF BIRTH
1971-03-18

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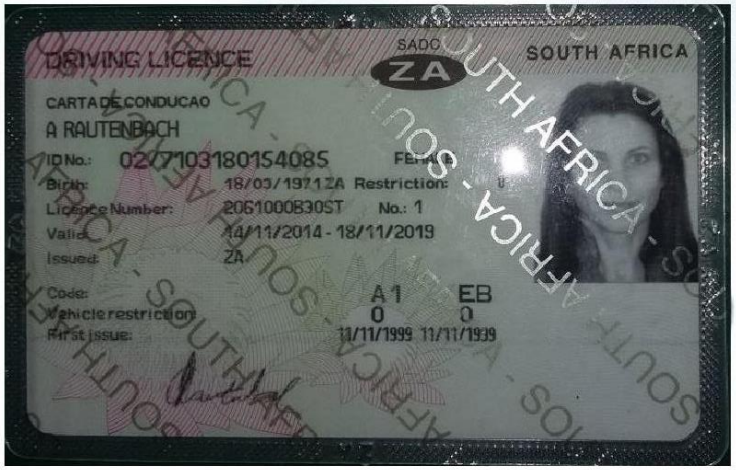

PROPOSED LIMPOPO CENTRAL HOSPITAL

TERRESTRIAL ECOLOGY COMMENTS AND RESPONSES REPORT

FEBRUARY 2020

PREPARED FOR: NATIONAL DEPARTMENT OF HEALTH

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1 INTRODUCTION

Nemai Consulting was appointed by Sakhiwo Health Solutions, on behalf of the National Department of Health (The Applicant) as the Independent Environmental Assessment Practitioner (EAP) to conduct the Scoping and Environmental Impact Assessment (EIA) Process for the proposed Limpopo Central Hospital, in terms of Government Notice (GN) No. R. 982 of 4 December 2014, as amended.

As part of the EIA process, a Terrestrial Ecological Impact Assessment report was conducted by an in-house Terrestrial Ecological Specialist and the Department of Environment, Forestry and Fisheries (DEFF) requested that the report be externally peer reviewed. Ms. Anita Rautenbach (Rautenbach Biodiversity Consulting) was tasked to provide an external review.

This report attempts to address comments and inputs received from the external reviewer.

2 COMMENTS AND RESPONSES REPORT

All the comments received from the external peer reviewer were addressed adequately as shown in Table1 below. The mitigation measures were updated to be site-specific, which have been successfully implemented in various similar projects in the Province.

Table 1: Comments by Peer Review Specialist and the responses

Comments by Peer Review Specialist		**Response**
Report Component	**Judgement and Comment**	**Report Author Response**
Non-technical summary	Does the report contain a brief but concise non-technical summary that clearly explains the project and the environment, the main issues and mitigation measures to be undertaken, and any remaining or residual impacts?	The report contains a non-technical summary in the form of an Executive Summary on page iii. The summary provides a brief project description, explains the receiving environment. The impact assessment is contained in Chapter 11 and all the mitigation measures are indicated in Table 14. The clearance of vegetation on site will result in residual impacts. The natural vegetation that still exists on site will be permanently removed. Figure 28 shows the natural vegetation (Medium). However, this vegetation on site is not endemic to the study area or Limpopo province.
	Does the summary include a brief explanation of the overall approach to the assessment?	The Executive summary has been sub-divided into sections for easy reference with regards to flora and fauna, and impact assessment. Methodologies used were summarised in the Executive summary.
	Does the summary provide an indication of the confidence which can be placed in the results?	The report covers all potentially Red data occurring flora and fauna, and in cases were these species were not found on site, their probability of occurrences were mentioned. Refer to Tables 7, 11 and Appendix B. The confidence which are

Comments by Peer Review Specialist		**Response**
Report Component	**Judgement and Comment**	**Report Author Response**
		placed on the results and methodologies used are scientifically sound.
	Does the summary indicate whether the project is or is not environmentally acceptable?	Refer to last paragraph of the Executive summary and Conclusions and recommendations (Chapter 12) wherein it was mentioned that the project can proceed pending the implementations of the mitigations measures mentioned in Table 14.
Introduction and Background	Scope of the project	The scope of the project has been updated using both Scoping and EIA reports. The report is structured in such a way that a cadastral map is included under Chapter 3 Study Area.
Legal compliance and guidelines	Relevant environmental guidelines	The Savanna and Thicket Biome Ecosystem Guidelines (2017) was added to the guidelines consulted. Refer to Chapter 2
Limitations, assumptions and gaps in knowledge	Limitations and assumptions incomplete. Gaps in knowledge not identified. Seasonal constraints not adequately addressed.	The initial survey was conducted in November 2016, which is considered a favourable time to conduct ecological studies and this was following very good rains in the area (Chapter 4). The Gaps and limitations to the study have been updated
Establishment of baseline environmental conditions	Literature review inadequate and incomplete. Literature source used to compile potential reptile distributions not suitable. Failure to take all species listed in the Capricorn Bioregional	According to the National Protected Area Expansion Strategy Resource Document (2009), the study area is not considered a

Comments by Peer Review Specialist		**Response**
Report Component	**Judgement and Comment**	**Report Author Response**
	Plan and supplementary information into consideration. Failure to include all taxa (i.e. frogs, invertebrates for example). No justification presented in the report as to why these taxa was not assessed. Failure to take provincial protected fauna and flora into account (Limpopo Environmental Management Act No. 7 of 2003).	*focus area* in terms of expansion of the protected areas. Refer to Figure 23 The Capricorn Bioregional Plan was used for the land management objectives, recommendations. Refer to Table 1. Also in terms of the terrestrial threatened ecosystem (Chapter 8), the Capricorn Bioregional Plan was utilised. No suitable habitats (watercourses) were found within the study area and therefore the Frog study was deemed not necessary. During the scoping report, no invertebrates of conservation concern are known to occur within or around the development site (Refer to Limitations and Gaps: Chapter 4).
	The Capricorn Bioregional plan (dated February 2019) clearly indicated that since the Limpopo Conservation plan is outdated the Capricorn District CBA map should replace the Limpopo Conservation plan until the Limpopo Conservation plan has been updated. This was not considered and presented in this assessment (refer to page 19 of the Capricorn District Bioregional Plan Final).	With regards to the Capricorn Bioregional plan and Limpopo Conservation plan in terms of the sensitivity of the study area, the development footprint falls within the No Natural habitat remaining and Other Natural Areas (Refer to Figure 5). The sensitivity of the study area after ground truthing, it was found that there are no areas of higher sensitivity within the development site (Refer to Figure 28). It should be noted that in as far as the two Plans mentioned above are concerned,

Comments by Peer Review Specialist		**Response**
Report Component	**Judgement and Comment**	**Report Author Response**
		they are based on a provincial scale with little or no ground-truthing being undertaken and therefore Figure 28 is the true reflection of what is actually found on site.
	Literature review incomplete. Inadequate review of Red Listed reptile species occurring in the province. Not all taxa reviewed (i.e. frogs and invertebrates). No justification provided for the omission of these taxa.	The data sourced from the South African Reptile Conservation Assessment (ADU, 2016) for the grid cell 2329CD (Bates et al. 2014) and historic distribution (Alexander & Marais, 2007), were used for species which could potentially occur on the study area (Section 9.2.3.1). The data covers the larger area and some of the species mentioned in this data sets are found within the Nature Reserve.
Field surveys, data collection and presentation	No indication of time spent in the field during the 2016 and 2019 surveys. Temporal considerations with regards to seasonality not adequately addressed	This was updated. Refer to Section 5.1 of the report
	Incorrect habitat sensitivity analysis. Lack of understanding of sensitivity classes resulted in an incorrect presentation of sensitive habitats on the study area and adjacent areas (Figure 28).	A scientific method to determine habitat sensitivity was adapted from Kremen (2005), and divides areas into three categories, namely: *High, Medium and Low*. Low sensitivity indicates areas which are highly degraded due to illegal dumping of materials and invasion of alien plants on site. No areas were considered to be of *High* sensitivity. Most plant SCC and protected trees were found within natural vegetation, which is considered as

Comments by Peer Review Specialist		**Response**
Report Component	**Judgement and Comment**	**Report Author Response**
		Medium sensitivity. Trees such as marula can be found even in residential areas and it was not surprising that a few such trees were found in areas denoted as *Low* in terms of sensitivity. Refer to Figure 28
Impact identification	Identification of indirect, cumulative, secondary, short-, medium and long-term, permeant or temporary and positive or negative effects. Cumulative impacts not considered.	The potential of future similar developments in the same geographical area, which could lead to cumulative impacts cannot be meaningfully anticipated.
	Description and quantification of potential impacts for all phases of the proposed project (construction, operation, decommissioning).	The potential impacts have been subdivided into pre-construction, construction and operational phase. No mitigations measures for decommissioning. Refer to Table 14
	Assessment of the significance of impacts likely to arise from the project against the reference condition, rather than against the present state revealed by the field surveys. Not considered. Impacts was assessed based on current environmental conditions.	The potential impacts are based on the status quo and what was found during the field surveys, and also what could arise due to development activities. Refer to Table 14
	Provision of information on impact reversibility and the potential for mitigating the identified impacts. Mitigation provided but often incomplete and unfeasible.	Mitigation measures have been bolstered and are now site-specific, and also conformed to the SMART principle –

Comments by Peer Review Specialist		**Response**
Report Component	**Judgement and Comment**	**Report Author Response**
		Specific, Measurable, Attainable, Realistic, and Time-bound. Refer to Table 14
Development of mitigation measures	Has the mitigation of negative impacts been considered and, where feasible, have specific measures been proposed to address each impact? Mitigation measures often unfeasible or vague/inappropriate. The impact on the Pongolo Nature Reserve not considered	The Pongolo nature reserve is situated in KZN, not in Limpopo province However, the Polokwane Nature Reserve is situated 1.4 km away from the study area. It should also be noted that there is a N1 road, an Airstrip between the reserve and the study area (Refer to Figures 21 and 22). However, mitigation measures have been provided for Red data fauna which could utilise the study area for foraging (Table 14). Permit requirements with regards to provincial protected species that may be potentially present are indicated in Section 9.1.3 and Table 14
	Are the mitigation measures proposed affordable, feasible and achievable with defined criteria for success? Mitigation measures often unfeasible or vague/inappropriate.	The mitigation measures were updated to be site-specific and have been successfully implemented in various similar projects Refer to Table 14
	Are significance ratings with and without mitigation measures provided?	Refer to Table 14

Comments by Peer Review Specialist		**Response**
Report Component	**Judgement and Comment**	**Report Author Response**
	To be recalculated once the impact assessment section has been extensively revised.	
	Provision of precise descriptions for each recommended mitigation action to be implemented and the time span for which they are necessary. Incomplete and vague.	Timeframes for specific mitigation measures such as search, rescue and relocation process and alien invasive programme are indicated in Appendix D and Appendix E respectively.
	Is it clear to what extent the mitigation methods are likely to be effective? Unclear	The mitigation measures have been successfully implemented in various similar projects
	Provision of quantifiable standards (performance criteria) for reviewing or tracking the effectiveness of proposed mitigation actions. None provided.	Monitoring measures are in place for search, rescue and relocation process and alien invasive programme and are indicated in Appendix D and Appendix E respectively. The targets and performance criteria are included as part of the EMPr.
General approach	Have prominence and emphasis been given to severe adverse impacts, to substantial environmental benefits, and to controversial issues? None identified although present, specifically with regards to the location of the Polokwane Nature Reserve and IBA near the site. Has information and analysis been offered to support all conclusions drawn? Has superfluous information (i.e. information not needed for the decision) been avoided	The Polokwane Nature Reserve IBA is situated 1.4 km away from the study area. It should also be noted that there is a N1 road and an Airstrip between the reserve and the study area (Refer to Figures 21, 22 and 27). However, mitigation measures have been provided for Red data fauna which could utilise the study area for foraging (Table 14). The impacts and mitigation measures have addressed thoroughly addressed in Table 14 and were discussed in Chapter 11.

Comments by Peer Review Specialist		**Response**
Report Component	**Judgement and Comment**	**Report Author Response**
	Is the information objective? Not all information available for the area is presented in the report, consequently the information provided, and conclusions drawn cannot be regarded as objective.	The information provided in this report is a standard and scientifically sound and objective for assessing the terrestrial ecology associated with the study area. The following information have been taken into account, namely: • Savanna and Thicket Biome Ecosystem Guidelines (2017) was added to the guidelines consulted. • The Capricorn Bioregional Plan was used for the land management objectives, recommendations • The data sourced from the South African Reptile Conservation Assessment (ADU, 2016) for the grid cell 2329CD (Bates et al. 2014) and historic distribution (Alexander & Marais, 2007), were used for species which could potentially occur on the study area. A scientific method to determine habitat sensitivity was adapted from Kremen (2005)