LOTUS GARDENS EXTENSIONS 18 TO 27

Heritage Impact Assessment For The Proposed Construction Of A Residential Development Located On Two Adjacent Properties: Portion 523 Of The Farm Pretoria Town & Townlands No.351-JR And Portion 540 Of The Farm Pretoria Town & Townlands No. 351-JR, In Pretoria West, Tshwane Metropolitan Municipality, Gauteng Province

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DECLARATION OF INDEPENDENCE

The report has been compiled by PGS Heritage, an appointed Heritage Specialist for Tambura 69 Trust. The views stipulated in this report are purely objective and no other interests are displayed in the findings and recommendations of this Heritage Impact Assessment.

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Report Title	**Heritage Impact Assessment For The Proposed Construction Of A Residential Development, Lotus Gardens Extensions 18 to 27, Located On Two Adjacent Properties: Portion 523 Of The Farm Pretoria Town & Townlands No.351-JR, and Portion 540 Of The Farm Pretoria Town & Townlands No. 351-JR, In Pretoria West, Tshwane Metropolitan Municipality, Gauteng Province.**		
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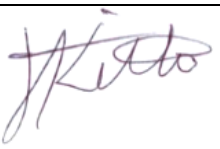
	Jennifer Kitto		**Heritage Specialist / PGS Heritage**
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EXECUTIVE SUMMARY

PGS Heritage was appointed by Tambura 69 Trust to undertake a Heritage Impact Assessment (HIA) which forms part of the Environmental Impact Assessment (EIA) for the proposed construction of a new residential development, Lotus Gardens Extensions 18 to 27, located on two adjacent properties: Portion 523 of the farm Pretoria Town & Townlands No.351-JR; and Portion 540 of the farm Pretoria Town & Townlands No. 351-JR, in Pretoria West, Tshwane Metropolitan Municipality, Gauteng Province.

An archival and historical desktop study was undertaken which was used to compile a historical layering of the study area within its regional context. This component indicated that the landscape within which the project area is located has a rich and diverse history. However, the desktop study did not reveal any historic or heritage sites from within the study area.
The desktop study work was followed by fieldwork which comprised a walkthrough of the study area. A total of two heritage sites were identified within the northern section of the study area. The two identified sites are Late Iron Age stonewalled sites.

Impact risk calculations were undertaken on the expected impact of the proposed development on these two sites, which indicated that the proposed development poses a Very Low Impact Risk to Site 1 but a High Impact risk to Site 2. The following mitigation measures would be required:

Archaeological Sites

Site 1:

- Since the site is located in the Public Open Space area, no mitigation is required.
- However, as the site is more than likely part of an Iron Age settlement and as a result older than 100 years, it is protected under the National Heritage Resources Act from any damage or destruction without a permit from SAHRA.

Site 2:

- The first mitigation measure would be to clear the stonewalled site of vegetation. The reason for this is twofold: firstly to allow for the recording of the site layout plan (see next

mitigation measure) and secondly to allow for a visual assessment of the surface of the site to confirm whether any associated cultural material such as middens are located here. It is important to note that vegetation clearing should only be undertaken by a team under the supervision of a professional and experienced archaeologist.

- Once the vegetation clearing is complete a site layout plan must be recorded using archaeological best practice techniques. At the same time photographic recording should also be undertaken.
- Depending on the findings of the assessment of the site after it had been cleared of vegetation, two parallel mitigation alternatives exist. If no associated cultural material are identified or if no potential for the presence of such cultural material is noted, no further archaeological mitigation would be required and only the last listed item comprising a destruction permit application would be required. However, if archaeological middens, concentrations of cultural material or the potential for such features are identified, further mitigation measures comprising Shovel Test Pits (STP's) and Archaeological Excavations may be required. These measures can only be undertaken after receipt of an archaeological excavation permit.
- A permit from SAHRA will also be required before the site can be destroyed.

Palaeontology

A palaeontological impact study (desktop) was conducted by Dr. Gideon Groenewald. The findings of this report are that the study area is underlain by Vaalian aged shale of the Strubenkop Formation, volcanic rocks of the Hekpoort Formation and quartzite of the Boshoek Formation, Pretoria Group. No fossils have been recorded from these formations in the study area and a **Low Palaeontological Sensitivity** is allocated to the development footprint.

In terms of the palaeontological assessment, the developer and the ECO of the project must be informed of the fact that stromatolites have been recorded from rock units in the Pretoria Group and that sedimentary structures that might resemble trace fossils have been described from quartzite formations in the group. If any fossils or fossil structures are recorded in the study area, SAHRA needs to be notified. No further action is needed in terms of the Palaeontological heritage of the development site.

General Recommendations

The desktop study has revealed the existence of a military camp known as Quagga Camp. The camp appears to have been associated with the South African War (1899-1902) as well as the years directly after the cessation of hostilities and was used as a training camp by the Prince of Wales's Leinster Regiment as well as the 2nd Norfolk Volunteer Active Service Company. While some references suggest that the camp was located at Phillip Nel Park (roughly 4.7 km east of the present study area) (archive-za.com/za/t/tekkieraces.co.za/Tekkieraces/), the published history of the Leinster Regiment describes the position of the camp as "...*bounded by a sewage farm, a leper hospital and a dump of condemned tin meat*." (Whitton, 2012). This latter description would place the position of the camp much closer to the present study area, and potentially within the study area. As a result, it is recommended that an archaeological watching brief is implemented during the construction phase.

On the condition that the recommendations above are adhered to, the development is not expected to have a severe negative impact on the identified heritage sites. From a heritage point of view the proposed development may be allowed to continue.

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1 INTRODUCTION

PGS Heritage was appointed by Tambura 69 Trust to undertake a Heritage Impact Assessment (HIA), which forms part of the Environmental Impact Assessment (EIA) for the proposed construction of a residential development known as Lotus Gardens Extensions 18 to 27. The proposed development is located on two adjacent properties namely Portion 523 of the farm Pretoria Town & Townlands No.351-JR and Portion 540 of the farm Pretoria Town & Townlands No. 351-JR, in Pretoria West, Tshwane Metropolitan Municipality, Gauteng 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. The Heritage Impact Assessment (HIA) aims to inform the Environmental Impact Assessment (EIA) in the development of a comprehensive Environmental Management Plan (EMP) to assist the developer in managing the identified heritage resources in a responsible manner in order to protect, preserve, and develop them within the framework provided by the National Heritage Resources Act of 1999 (Act 25 of 1999) (NHRA).

1.2 Specialist Qualifications

This Heritage Impact Assessment was compiled by PGS Heritage, the staff of which has a combined experience of nearly 40 years in the heritage consulting industry and extensive experience in managing Heritage Impact Assessment (HIA) processes.

The project manager and lead consultant for this project is Polke Birkholtz whereas the palaeontologist is Dr. Gideon Groenewald. A short overview of each of these two individuals is provided below:

- Mr. Polke Birkholtz, project manager and heritage specialist, is registered with the Association of Southern African Professional Archaeologists (ASAPA) as a professional archaeologist and is also a registered member of the Cultural Resource Management (CRM) Section of ASAPA. He has more than 15 years of experience in the industry. Mr Marko Hutten is registered with the Association of Southern African Professional Archaeologists (ASAPA) as a professional archaeologist and is also a registered member of the Cultural Resource Management (CRM) Section of ASAPA.

- Dr Gideon Groenewald has a PhD in Geology from the Nelson Mandela Metropolitan University (1996) and the National Diploma in Nature Conservation from the University of South Africa (1990). He specialises in research on South African Permian and Triassic sedimentology and macrofossils with an interest in biostratigraphy, and palaeoecological aspects. He has extensive experience in the locating of fossil material in the Karoo Supergroup and has more than 20 years of experience in locating, collecting and curating fossils, including exploration field trips in search of new localities in the southern, western, eastern and north-eastern parts of the country. His publication record includes multiple articles in internationally recognized journals. Dr Groenewald is accredited by the Palaeontological Society of Southern Africa (society member for 25 years).

1.3 Assumptions and Limitations

The following assumptions and limitations to this study can be identified:

- Not detracting in any way from the comprehensiveness of the fieldwork undertaken, it is necessary to realise that the heritage sites located during the fieldwork do not necessarily represent all the heritage sites present within the area. It is also important to note that extremely dense vegetation covered the whole of the study area, especially the smaller southern section. This dense vegetation found on the southern section of the study area made access very difficult and in some instances impossible. In addition, many areas had been used as dump sites for rubbish and building rubble. Therefore, it is always possible that additional heritage sites may be located within the study area.

- Should any such heritage features or objects not included in the 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. This applies to graves and cemeteries as well.

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
iv. Development Facilitation Act (DFA) Act 67 of 1995

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. EMP (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 National Heritage Resources Act (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*…". The NEMA (No 107 of 1998) 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 and legally compatible HIA report is compiled.

1.5 Terminology and Abbreviations

Archaeological resources

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 a 10m buffer area;
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 according to the heritage agency result in a change to the nature, appearance or physical nature of a place or influence its stability & 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

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

Later Stone Age

The archaeology of the last 20 000 years, associated with fully modern people.

Late Iron Age (Early Farming Communities)

The archaeology of the last 1000 years up to the 1800's associated with ironworking and farming activities such as herding and agriculture.

Middle Stone Age

The archaeology of the Stone Age, dating to between 20 000-300 000 years ago, associated with early modern humans.

Palaeontology

Any fossilised remains or fossil trace of animals or plants which lived in the geological past and any site which contains such fossilised remains or trace.

EXPLANATION OF ABBREVIATIONS USED IN THIS DOCUMENT

Abbreviations	*Description*
AIA	Archaeological Impact Assessment
ASAPA	Association of Southern African Professional Archaeologists
CMP	Conservation Management Plan
CRM	Cultural Resource Management
EIA	Environmental Impact Assessment
EMPR	Environmental Management Programme Report
ESA	Early Stone Age
GPS	Global Positioning System
HIA	Heritage Impact Assessment
LIA	Late Iron Age
LSA	Later Stone Age
MSA	Middle Stone Age
NEMA	National Environmental Management Act
NHRA	National Heritage Resources Act
PGS	PGS Heritage
PHRA	Provincial Heritage Resources Authority
SAHRA	South African Heritage Resources Agency
SAHRIS	South African Heritage Resources Information System

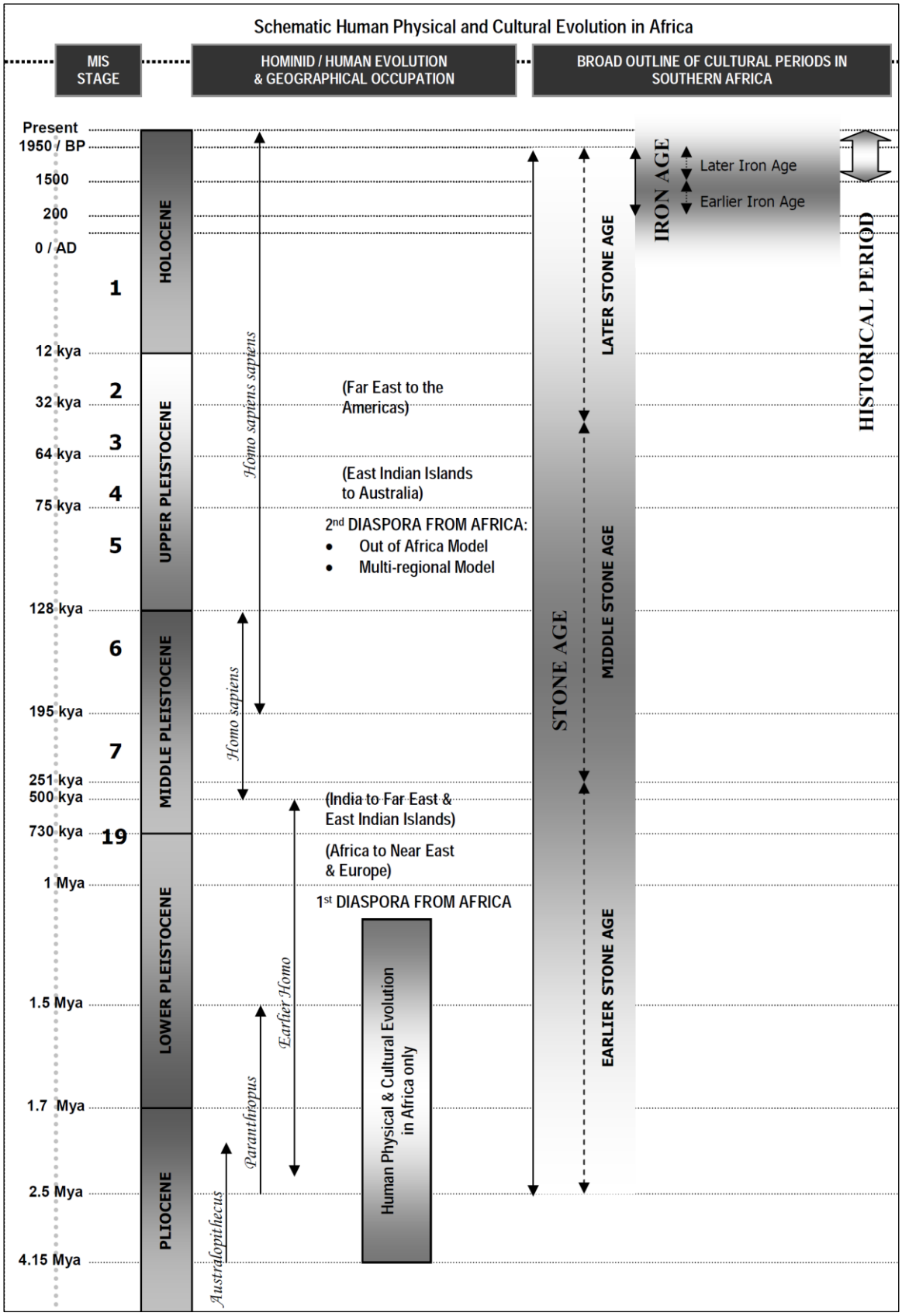

Figure 1–Human and Cultural Time line in Africa (Morris, 2008)

2 TECHNICAL DETAILS OF THE PROJECT

2.1 Site Location and Description

Coordinates	Northern section (Portion 523): NW cnr: S25˚44'04.52"; E28˚05'43.46" NE cnr**:** S25˚44'02.12"; E28˚06'17.41" SE cnr: S25˚44'39.14"; E28˚06'07.64" SW cnr: S25˚44'23.44"; E28˚05'44.63"	Southern section (Portion 540): NW cnr: S25˚44'39.49"; E28˚05'44.63" NE cnr: S25˚44'39.08"; E28˚06'07.58" SW cnr: S25°45'2.44"; E28° 05'42.33" SSW cnr: S 25°45'5.67"; E 28° 05'43.59"
Property	Portion 523 of the farm Pretoria Town & Townlands No.351-JR (previously known as a part of the remainder of Portion 6 of the farm Pretoria Town & Townlands No.351-JR) and Portion 540 of the farm Pretoria Town & Townlands No.351-JR.	
Location	The study area is located approximately 9km west of the centre of Pretoria. In a wider context the study area is situated roughly between the existing residential areas of Lotus Gardens and Danville and is located north of the N4 highway.	
Extent	The total extent of the study area is roughly 89, 6074 hectares, with the northern section 75,9662 hectares and the southern section approximately 13,6412 hectares.	
Land Description	The land is not currently utilised and consists of fairly flat open terrain interposed with dense vegetation and thorn bushes. The northern section of the study area rises to a slope on its northern boundary. The southern section is covered in extremely dense vegetation.	

Figure 2 – Google Earth image depicting the study area within its regional context.

2.2 Technical Project Description

The client proposes to establish a new residential development known as Lotus Gardens Extensions 18 to 27. The proposed development will be located on Portion 523 of the farm Pretoria Town & Townlands No.351-JR (previously known as a part of the remainder of Portion 6 of the farm Pretoria Town & Townlands No.351-JR) and Portion 540 of the farm Pretoria Town & Townlands No.351-JR, in Pretoria West, Tshwane Metropolitan Municipality, Gauteng Province.

The proposed township will consist of nine residential areas (Extensions 18-26) and one educational area (Extension 27). A Public Open Space will be created on the northern end of the development area. The total extent of the township development will be 89,6074 hectares.

Refer Figure 3 below for the proposed development layout plan.

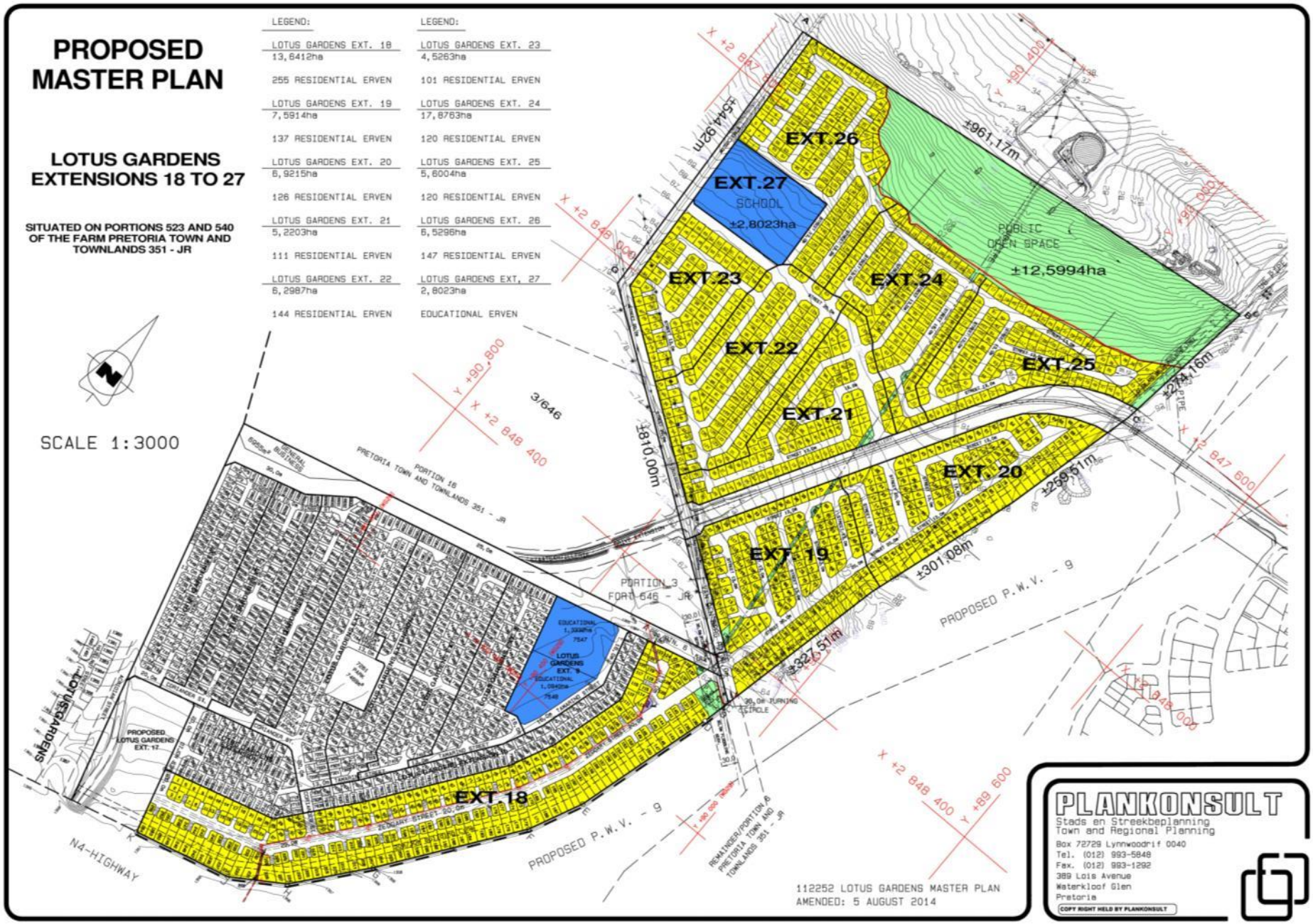

Figure 3– Proposed Development Layout Plan that was supplied by the client.

3 ASSESSMENT METHODOLOGY

3.1 Methodology for Assessing Heritage Site Significance

This report was compiled by PGS Heritage for a proposed new residential development known as Lotus Gardens Extensions 18 to 27. The proposed development will be located in Pretoria West, Tshwane Metropolitan Municipality, Gauteng. The applicable maps, tables and figures are included as stipulated in the NHRA (no 25 of 1999) and the National Environmental Management Act (NEMA) (no 107 of 1998). The HIA process consisted of three steps:

Step I – Literature Review: The background information to the field survey leans greatly on the archival and historical cartographic material assessed as part of the study, as well as a study of the available literature.

Step II – Physical Survey: A physical survey was conducted over a period of two days. The survey was undertaken by a team comprising a professional archaeologist (Marko Hutten) and field assistant (Thomas Mulaudzi) and was undertaken on foot and partially by vehicle. As indicated elsewhere, dense vegetation characterising the southern end of the study area made it impossible to cover this end of the study area in any detail on foot. Due to potential security issues, a security company was employed for protection purposes during the survey of the study area.

Step III – Report: The final step involved the recording and documentation of relevant heritage resources, as well as the assessment of resources regarding the heritage impact assessment criteria and report writing, as well as mapping and recommendations.

The significance of heritage sites was based on five 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, but may require destruction permit;
B - Mapping of the site and controlled sampling required;
C - No-go or relocate development position
D - Preserve site, or extensive data collection and mapping of the site; and
E - Preserve site

Site Significance

Site significance classification standards prescribed by the South African Heritage Resources Agency (2006) and approved by the Association for Southern African Professional Archaeologists (ASAPA) for the Southern African Development Community (SADC) region, were used for the purpose of this report (see **Table 1**).

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	Conservation; Mitigation not advised
Local Significance (LS)	Grade 3B	High	Mitigation (Part of site should be retained)
Generally Protected A (GP.A)	Grade 4A	High/Medium	Mitigation before destruction
Generally Protected B (GP.B)	Grade 4B	Medium	Recording before destruction
Generally Protected C (GP.C)	Grade 4C	Low	Destruction, may require permit

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 summary 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: Quantitative rating and equivalent descriptors for the impact assessment criteria

RATING	SIGNIFICANCE	EXTENT SCALE	TEMPORAL SCALE
1	VERY LOW	*Isolated site/s / proposed corridor*	Incidental
2	LOW	*Study area*	Short-term
3	MODERATE	*Local*	Medium-term
4	HIGH	*Regional / Provincial*	Long-term
5	VERY HIGH	*Global / National*	Permanent

A more detailed description of each of the assessment criteria is given in the following sections.

Significance Assessment

The significance rating (importance) of the associated impacts embraces the notion of extent and magnitude, but does not always clearly define these, since their importance in the rating scale is very relative. For example, 10 structures younger than 60 years might be affected by a proposed development, and if destroyed the impact can be considered as VERY LOW in that the structures are all of Low Heritage Significance. If two of the structures are older than 60 years and of historic

significance, and as a result of High Heritage Significance, the impact will be considered to be HIGH to VERY HIGH.

A more detailed description of the impact significance rating scale is given in **Table 3** below.

Table 3: 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 some 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 some 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 possible. 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 on a party or system.

Spatial Scale

The spatial scale refers to the extent of the impact i.e. will the impact be felt at the local, regional, or global scale. The spatial assessment scale is described in more detail in **Table 4**.

Table 4: Description of the spatial significance rating scale

RATING		DESCRIPTION
5	Global/National	The maximum extent of any impact.
4	Regional/Provincial	The spatial scale is moderate within the bounds of possible impacts, and will be felt at a regional scale (District Municipality to Provincial Level). The impact will affect an area up to 50 km from the proposed site / corridor.
3	Local	The impact will affect an area up to 5 km from the proposed site.
2	Study Area	The impact will affect an area not exceeding the boundary of the study area.
1	Isolated Sites / proposed corridor	The impact will affect an area no bigger than the site.

Temporal/Duration Scale

In order to accurately describe the impact, it is necessary to understand the duration and persistence of an impact in the environment.

The temporal or duration scale is rated according to criteria set out in **Table 5**.

Table 5: Description of the temporal rating scale

RATING		DESCRIPTION
1	Incidental	The impact will be limited to isolated incidences that are expected to occur very sporadically.
2	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.
3	Medium-term	The environmental impact identified will operate for the duration of life of the project.
4	Long-term	The environmental impact identified will operate beyond the life of operation of the project.
5	Permanent	The environmental impact will be permanent.

Degree of Probability

The probability or likelihood of an impact occurring will be outlined in **Table 6** below.

Table 6: Description of the degree of probability of an impact occurring

RATING	DESCRIPTION
1	Practically impossible
2	Unlikely
3	Could happen
4	Very likely
5	It's going to happen / has occurred

Degree of Certainty

As with all studies, it is not possible to be 100% certain of all facts, and for this reason a standard "degree of certainty" scale is used, as discussed in **Table 7**. The level of detail for specialist studies is determined according to the degree of certainty required for decision-making.

Table 7: Description of the degree of certainty rating scale

RATING	DESCRIPTION
Definite	More than 90% sure of a particular fact.
Probable	Between 70 and 90% sure of a particular fact, or of the likelihood of that impact occurring.
Possible	Between 40 and 70% sure of a particular fact, or of the likelihood of an impact occurring.
Unsure	Less than 40% sure of a particular fact or the likelihood of an impact occurring.
Can't know	The consultant believes an assessment is not possible even with additional research.

Quantitative Description of Impacts

To allow for impacts to be described in a quantitative manner, in addition to the qualitative description given above, a rating scale of between 1 and 5 was used for each of the assessment criteria. Thus the total value of the impact is described as the function of significance, spatial and temporal scale, as described below:

$$\textbf{\textit{Impact Risk}} = \frac{(\text{SIGNIFICANCE} + \textit{Spatial} + \text{Temporal})}{3} \times \frac{\text{Probability}}{5}$$

An example of how this rating scale is applied is shown below, in **Table 8**:

Table 8: Example of Rating Scale

IMPACT	SIGNIFICANCE	SPATIAL SCALE	TEMPORAL SCALE	PROBABILITY	RATING
	Low	Local	Medium Term	Could Happen	**Low**
Heritage structures	2	3	3	3	**1.6**

Note: The significance, spatial and temporal scales are added to give a total of 8, which is divided by 3 to give a criterion rating of 2.67. The probability (3) is divided by 5 to give a probability rating of 0.6. The criteria rating of 2.67 is then multiplied by the probability rating (0,6) to give the final rating of 1,6.

The impact risk is classified according to five classes as described in the table below.

Table 9: Impact Risk Classes

RATING	IMPACT CLASS	DESCRIPTION
0.1 – 1.0	1	Very Low
1.1 – 2.0	2	Low
2.1 – 3.0	3	Moderate
3.1 – 4.0	4	High
4.1 – 5.0	5	Very High

Therefore, with reference to the example used for heritage structures above, an impact rating of 1.6 will fall in the Impact Class 2, which will be considered to be a low impact.

4 CURRENT STATUS QUO

4.1 Description of Study Area

The proposed development comprises the construction of a new residential development known as Lotus Gardens Extensions 18 to 27. The proposed development is located on two adjacent properties namely Portion 523 of the farm Pretoria Town & Townlands No.351-JR (previously known as a part of the remainder of Portion 6 of the farm Pretoria Town & Townlands No.351-JR) and Portion 540 of the farm Pretoria Town & Townlands No.351-JR, in Pretoria West, Tshwane Metropolitan Municipality, Gauteng Province. The proposed township will consist of nine residential areas (Extensions 18-26) and one educational area (Extension 27). The development will also include a Public Open Space. The total extent of the township development will be 89,6074 hectares.

The land is not currently utilised and consists of fairly flat open grassy areas interposed with dense vegetation and thorn bushes. The northern section of the study area rises to a slope on the northern boundary. This is due to the fact that the study area is located on the southern slope of the Daspoortrand Ridge. Evidence for past earthmoving activities was noted on the ridge where a reservoir was constructed in the past. In addition, a tar road runs up the western boundary of the study area to provide access to the reservoir. Other disturbances observed within the study area include the dumping of both general and building waste at several locations. An informal settlement is located in the south-eastern corner of this northern section. The southern section is covered in extremely dense vegetation. Refer Figures 6 to 15 below.

The wider surroundings of the study area is characterised by established residential developments to the south-west (Lotus Gardens) and south-east (Danville). The old Westfort Leprosy Hospital is located to the west of the development, with the South African War fortification known as West Fort located on the crest of the ridge which is known as the Daspoortrand ridge. Refer Figure 5.

Figure 4 – Google Earth image of the study area within its immediate context. The study area boundaries are depicted in red.

Figure 5 - General view of the study area (northern section)

Figure 6 - View of the ridge on the northern boundary (northern section)

Figure 7 – View of dumped soil from past earthmoving activities (northern section)

Figure 8 – Tar road along western boundary of northern section

Figure 9 – View showing dumped building rubble (northern section)

Figure 10 – View showing dumped refuse (northern section)

Figure 11 – View of northern border of southern section showing houses of Lotus Gardens Ext 11

Figure 12 – General view of southern section

5 DESKTOP STUDY FINDINGS

5.1 Archival and Historic Maps of the Study Area and Surrounding Landscape

5.1.1 Pretoria-Sheet of the Major Jackson Map Series

This map forms part of the series of British Military maps produced under supervision of Major Jackson by the Mapping Section of the Field Intelligence Department, Army Headquarters. The sheet depicted here is the Pretoria (No. 1) Sheet of the said map series, and although its original production date was August 1900, the sheet depicted here represents a revised edition which is dated to June 1902 (National Archives, Maps, 3/551).

An image overlay of the relevant section of the Major Jackson map sheet was made over the contemporary satellite image and study area boundaries using Google Earth. By using this method the position of the study area on the Major Jackson Sheet was established (see figure below). The following observations can be made from the depicted map:

- No heritage sites are depicted within the study area boundaries.
- In the surrounding landscape a Z.A.R. fort known as Westfort (A) is depicted some distance to the north-west, the historic Leper Hospital (B) is shown a short distance to the west whereas a “Sanitary Farm” (C) is depicted to the east of the present study area. It can be expected that the night carts used in domestic sewage management in towns such as Pretoria at the time would have deposited night soil (sewage) at this latter facility on a daily basis. All three historic aspects from the landscape are located outside of the study area.

- Two secondary roads cross over the study area. One of these roads crosses over the study area's northern end and appears to have been an access road to the Leper Hospital.

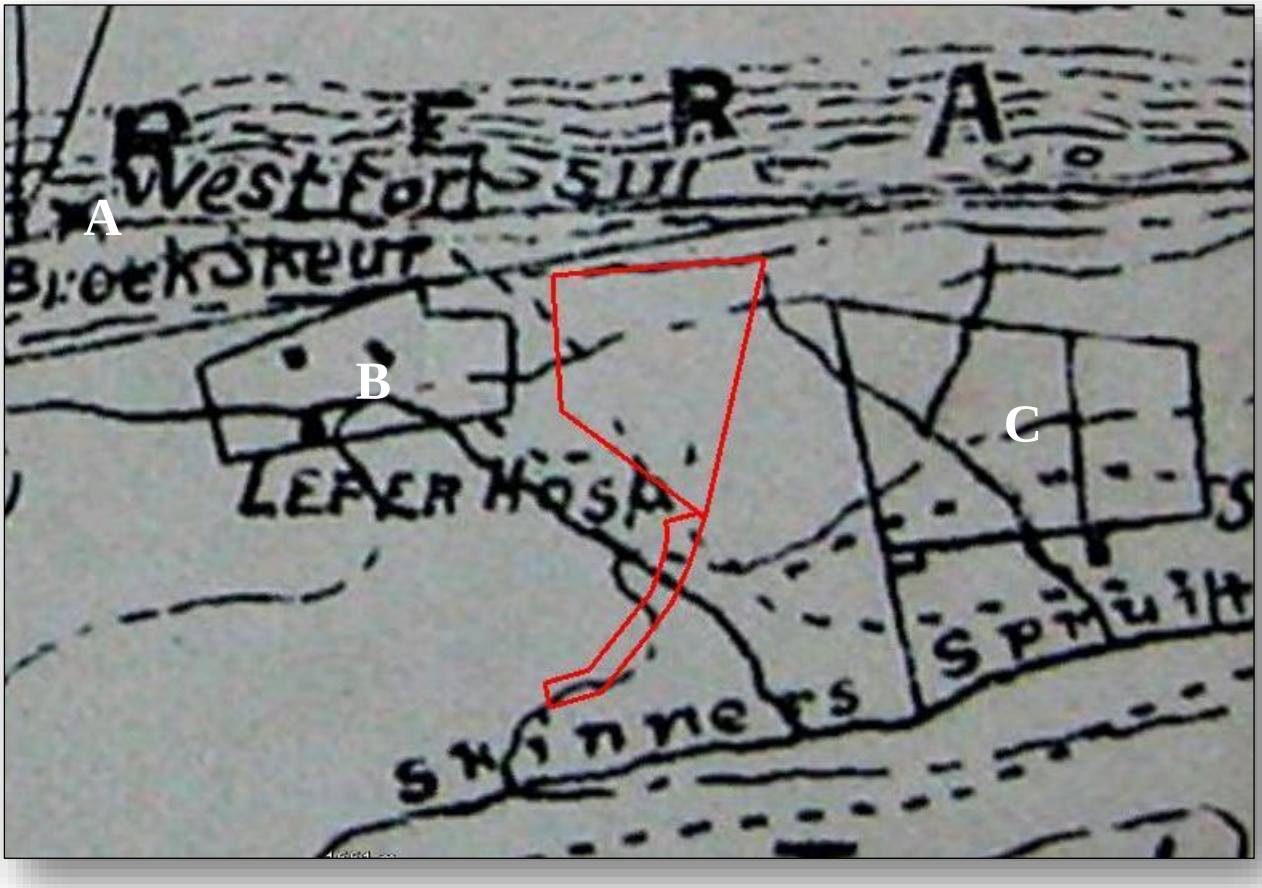

Figure 13 – Google Earth overlay of the study area boundaries (in red) over the Pretoria-sheet of the Major Jackson Series. This map sheet was compiled during June 1902.

5.1.2 First Editions of the 2528CA and 2528CC Topographical Sheets

Portions of the First Editions of the 2528CA and 2528CC Topographical Sheets are depicted below. The 2528CA sheet was surveyed in 1939 and 1940 and drawn by the Trigonometrical Survey Office in 1943. The 2528CC sheet was surveyed and drawn in 1938 and 1939 by the Trigonometrical Survey Office. The following observations can be made from the map:

- No heritage sites are depicted within the study area.
- A secondary road is shown crossing over the northern section of the study area.
- The entire southern section of the study area appears to have been covered by a plantation of eucalyptus trees at the time.

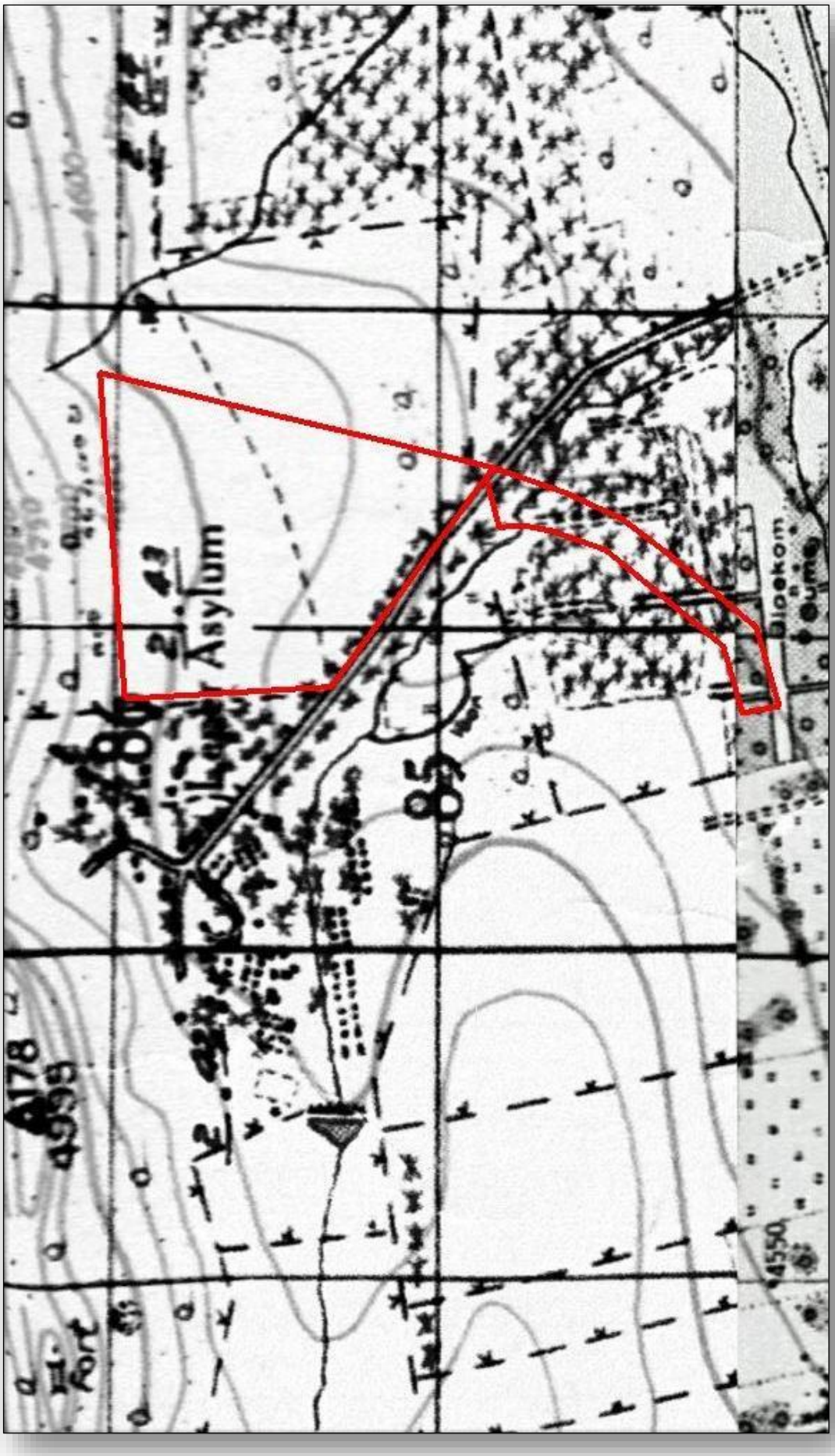

Figure 14 – The study area as depicted on the First Editions of the 2528CA and 2528CC Topographical Sheets. These maps were both surveyed during the late 1930s. The approximate position of the study area is shown in red.

5.2 Historic Overview of the Study Area and Surrounding Landscape

DATE	DESCRIPTION
2.5 million to 250 000 years ago	The **Earlier Stone Age** (ESA) is the first and oldest phase identified in South Africa's archaeological history and comprises 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. Examples of such tools have been excavated from the sites of Sterkfontein and Coopers D in the 'Cradle of Humankind' (Hilton-Barber & Berger, 2002). The second technological phase is the Acheulian and comprises 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 and examples of this phase have been found at Swartkrans and in the river gravels of the 'Cradle of Humankind' (Hilton-Barber & Berger, 2002). An archaeological site associated with the Earlier Stone Age closer to the general vicinity of the study area, is the quartzite ridge above the Pretoria Zoo, which was used as a quarry for the manufacture of tools such as handaxes and cleavers. Excavations for the Zambezi Drive toll gate at the east end of the ridge uncovered the same type of artefacts (SAHO). These two sites are located approximately 9 km east of the closest point of the study area.
250 000 to 40 000 years ago	The **Middle Stone Age** (MSA) 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. Examples of such artefacts have been found in the 'Cradle of Humankind' at Swartkrans (Hilton-Barber & Berger, 2002). At least two sites with material associated with the Middle Stone Age are known from the wider vicinity of the study area. The first of these is the site known as Boulders in Midrand. Here Mason excavated Middle Stone Age artefacts which he associated with similar material from the Cave of Hearths at Makapan and from Olieboompoort (Mason, 2000). The second example is the intact Middle Stone Age sealed cave context at Pietkloof Cave, located a short distance north of the Skurweberge. This cave is located roughly 25 km south-west of the study area (Mason, 1951). .
40 000 years ago to the historic past	The **Later Stone Age** (LSA) is the third archaeological phase identified and is associated with an abundance of very small artefacts known as microliths. A large number of Later Stone Age sites are known from the 'Cradle of Humankind' (Hilton-Barber & Berger, 2002) and the general surroundings of the study area. Some of the latter sites include Boulders, Glenferness Cave, Pietkloof Cave and Hennops River Cave. Glenferness is a cave situated above the Jukskei River (roughly 30 km south of the study area), while Hennops River Cave is located above the Hennops River (and is roughly 18 km south-west of the study area) (Mason, 1951; Mason, 2000).

AD 450 – AD 750	The earliest **Iron Age** presence for which archaeological evidence has been found in the surroundings of the study area is a pottery style known as the Mzonjani facies of the Kwale Branch of the Urewe Ceramic Tradition. One of the well-known sites from this period in the general region of the study area is the site known as Broederstroom, located on a farm roughly 23km west of the present study area. The earliest evidence of metal working in the region comes from this site. Archaeologists have uncovered the remains of at least two stratified villages there that date back to between AD 550 and 700, each with evidence of iron forging (Huffman, 2007).
AD 1500 - AD 1700	The Olifantspoort facies of the Moloko Branch of the Urewe Ceramic Tradition is the second Iron Age facies to be identified within the surroundings of the study area. The Olifantspoort facies can likely be dated to between AD 1500 and AD 1700. The key features of the decoration used on the ceramics from this facies include multiple bands of fine stamping or narrow incision separated by colour (Huffman, 2007). The type site for this facies is located on the farm Olifantspoort 328 JQ, which is situated roughly 80km west of the present study area. The Olifantspoort facies holds an important position in the sequence of the Moloko or Sotho-Tswana group. The earliest facies to be associated with the Moloko is the Icon facies (AD 1300 – 1500), with sites found across large sections of what is today the Limpopo Province. The Icon facies resulted in three different and parallel Iron Age facies, namely the Madikwe facies (AD 1500 – 1700) (which in turn led to the Buispoort facies between AD 1700 and 1850), the Letsibogo facies (AD 1500 – 1700) and thirdly the Olifantspoort facies. The Olfantspoort facies developed into the Thabeng facies (AD 1700 – 1850) (Huffman, 2007). It is therefore evident that the Olifantspoort facies represents a key pillar in our understanding of the origins and sequence of the Sotho-Tswana people of today (Huffman, 2007).
AD 1650 – AD 1850	The Uitkomst facies of the Moloko Branch of the Urewe Ceramic Tradition represents the third Iron Age period to be identified for the surroundings of the study area. This facies can likely be dated to between AD 1650 and AD 1820. The decoration on the ceramics associated with this facies is characterised by stamped arcades, appliqué of parallel incisions, stamping and cord impressions and is described as a mixture of the characteristics of both Ntsuanatsatsi (Nguni) and Olifantspoort (Sotho) (Huffman, 2007). The type-site is Uitkomst Cave, located approximately 30 km south-west of the study area (Huffman, 2007). Based on the available archaeological and oral evidence from this period, the sixteenth and seventeenth centuries saw the movement of Sotho/Tswana communities from the lower lying Bushveld habitats in the north (where they had been settled since AD 1500) toward the higher, predominantly grassland areas to the south. By AD 1650, these communities had successfully settled in these areas (Hall, 2007).

AD 1700 – AD 1840	The Buispoort facies of the Moloko branch of the Urewe Ceramic Tradition is the next phase to be identified within the study area's surroundings. It is most likely dated to between AD 1700 and AD 1840. The key features on the decorated ceramics include rim notching, broadly incised chevrons and white bands, all with red ochre (Huffman, 2007).It is believed that the Madikwe facies developed into the Buispoort facies. The Buispoort facies is associated with sites such as Boschhoek, Buffelshoek, Kaditshwene, Molokwane and Olifantspoort (Huffman, 2007).
1827 - 1832	In c. 1827 the Khumalo Ndebele (Matabele) of Mzilikazi settled along the Magaliesberg after leaving their settlements on the Vaal River. Five years later they moved to the Marico River (Bergh, 1999). Mzilikazi built two military kraals near the Magaliesburg: "enDinaneni" on the road to Hartebeespoort Dam and "enKungweni" along the Daspoortrand Range (http://www.sahistory.org.za/topic/prehistory-pretoria; after Huffman 2010).

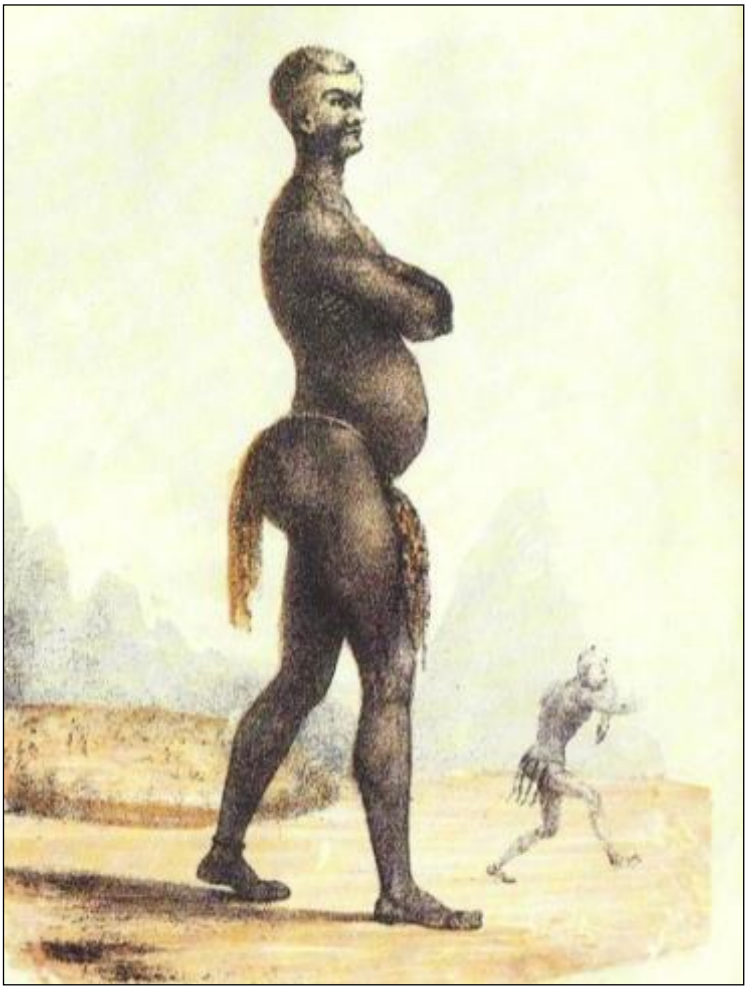

Figure 15 – Historic image depicting King Mzilikazi of the Khumalo Ndebele, as published by Cornwallis Harris (Harris, 1839).

1836	The first Voortrekker parties started crossing the Vaal River (Bergh, 1999).
1840s – 1855	The first white people to settle in Pretoria on a more permanent basis were the brother Lucas and Gert Bronkhorst who registered the farms Groenkloof and Elandspoort in 1840. Groenkloof encompassed the Fountains Valley area, while Elandspoort extended from the south to Daspoortrand in the north and from Pretoria west through to Hatfield in the east. Later, a trek led by Andries Pretorius from Ohrigstad, together with a few stragglers from Natal and the present Free State Province also settled in the area. In 1853, the son of Andries Pretorius, Marthinus Wessels Pretorius, purchased two farms, Elandspoort and Koedoespoort, with the intention of establishing a town that would be the centre of the new Afrikaner Republic of the Transvaal. In November 1855, the two farms were declared a town and named Pretoria. In 1857 the District of Pretoria was also proclaimed (Bergh, 1999; http://www.sahistory.org.za/topic/prehistory-pretoria).
1880-1881	During the **Anglo-Transvaal War** (1880 – 1881), the British garrison of Pretoria was besieged by Boer forces encamped at eight laagers positioned in a circle around Pretoria. These camps included Wonderboompoort (north), Derderpoort (north-east), Zwartkopje on the Pienaar's River (east), Swavelpoort (south-east), Doornkloof (Irene) (south), Roohuiskraal (south-west) and Elandsfontein (Davey, 1956). This latter laager is of some significance to the present study as the farm Elandsfontein 352 JR is located directly west of the farm Pretoria Town & Townlands 351 JR on which the study area is located. The exact location of the Boer laager at Elandsfontein is not presently known, but appears to have been located roughly 16 km to the west of Pretoria. With the present study area situated roughly 9 km west of Pretoria it is evident that the laager would have been located some 7 km to the west of the present study area. On 16 January 1881 a battle took place when the Elandsfontein laager held by no more than 100 Boers under the command of Commandant Henning Pretorius was attacked by a British force consisting of 170 mounted men (including members of the Mounted Infantry, Nourse's Horse and Pretoria Carbineers), 300 infantry (including members of the Royal Scots Fusiliers, 94th Regiment and Pretoria Rifles) and supported by two field guns and one mounted gun that was carried on a cart (Kinsey, 1980). The British force fell under the overall command of Colonel William Bellairs and Lieutenant-Colonel George Frederick Gildea. Although the British almost overran the defences of the laager, the timeous arrival of mounted reinforcements under the command of Commandant General Hendrik Schoeman turned the battle the other way and the British commanders ordered a retreat. Although the retreat was followed almost all the way to Pretoria by the Boer forces, it was conducted with such discipline and skill on the part of the commanding offices and artillery, that almost the entire force managed to return to Pretoria. While

	the casualties on Boer side were not recorded, the British suffered two killed namely Private James Byrne of the 2/21st Royal Scots Fusiliers and Corporal James Long of Nourse's Horse. Private Davis of the 2/21st Royal Scots Fusiliers had been wounded in the battle and died five days later (Du Val, 1882) (Kinsey, 1980). It is not presently known how many British soldiers were wounded in the battle.

Figure 16 – Historic photograph of men from the 2/21st Royal Scots Fusiliers during the siege of Pretoria (1880-1881) (Bennett, 2001:137). The Royal Scots Fusiliers had 120 men at the Battle of Elandsfontein on 16 January 1881.

Late 1880s	During the late 1880s a hospital was established by the republican government on the southern foot of the Daspoortrand Ridge for the treatment of smallpox patients. The hospital became known as the Daspoortrand Hospital. Contrary to its original intent, the hospital became to be used primarily for the treatment of leprosy patients (De Jong, 1999). The earliest reference to the hospital dates to 1888 and mentions S. W. Wierda, the official architect of the ZAR Government. At that stage the hospital consisted of four rooms (accommodating eight patients) with a detached outdoor toilet. Although leprosy barracks were added in 1890, additional accommodation was again required in 1892. By 1896 the Daspoort Hospital accommodated as many as 99 patients. In 1898 the hospital was incorporated into the newly constructed Westfort Hospital (De Jong, 1999). The Westford Hospital is located a short distance to the west of the present study area.

1895 – 1898	On 29 December 1895 an armed force under the command of Dr. Leander Starr Jameson and comprising volunteers from the Mashonaland Mounted Police and the Bechuanaland Border Police conducted a daring raid into the Transvaal Republic. Their aim was to overthrow the government of President Kruger. On 2 January 1896 the raiders were soundly beaten at Doornkop, roughly 24 km west of Johannesburg (Danziger, 1978) (Saks, 2003). While none of the events of the Jameson Raid occurred anywhere in the proximity of the present study, one of the consequences of the raid was that the Transvaal Republican Government realised how vulnerable the country and capital was to military attacks. This resulted inter alia in the decision to construct eight forts around Pretoria. Eventually, only four of these forts were completed namely Fort Schanskop, Fort Klapperkop, Fort Wonderboompoort and Fort Daspoortrand. The first three forts were designed by Otto Albert von Dewitz and Heinrich C. Werner of the German company Krupp. The two German engineers were assisted by the architect Christiaan Kuntz whereas the building contractor on all three "German Forts" was Celso Girl. 'in contrast, Fort Daspoortrand was designed and built by a French team in the French tradition. The team tasked with the design and construction of this fort comprised two French engineers namely Leon Grunberg and Sam Léon. By July 1897 the construction of this fort had already commenced and on 12 November 1898 it was handed over to the Government of the *Zuid-Afrikaansche Republiek* (Van Vollenhoven, 1999).
1898	Westfort Hospital was originally built as an extension of Daspoort Hospital (see above), but the two facilities soon merged to become known as the Pretoria Leprosy Hospital. The first buildings of the new hospital were erected in 1898 and consisted of an administration complex, smallpox clinic and staff accommodation. Initially, lay people were tasked to manage the hospital, but in 1900 Dr von Gernet was appointed as medical officer in charge on a part-time basis (De Jong, 1999). As indicated above, the Westfort Institution is located a short distance west of the study area.
1899 - 1902	A number of battles and skirmishes associated with the **South African (Anglo Boer) War** (1899-1902) are known from the wider vicinity of the study area. These include the Battle of Kalkheuvel Pass (3 June 1900) (located 27 km south-west of the present study area), the First Battle of Silkaatsnek (11 July 1900) (Silkaatsnek is located roughly 19.5 km north-west of the present study area) as well as the Second Battle of Silkaatsnek (2 August 1900). However, sections of the actual battle for Pretoria (known as the Battle of Six Mile Spruit) occurred in the general vicinity of the present study area. While the overall details of this battle are not relevant for this study, the western end of the Boer defensive lines were held by General Koos de la Rey on the Quaggasrand Ridge to the west of Quaggaspoort. This ridge is located roughly 3 km south of

	the study area. The British attack on this position commenced on 4 June 1900. As the Boer position was deemed too strong for a frontal attack, General Ian Hamilton subsequently ordered Brigadier-General R.G. Broadwood with the 2nd Cavalry Brigade and Colonel de Lisle with the 2nd Mounted Infantry Corps to attempt to outflank the Boer position on its western (right) end by aiming for an apparent opening in the Quaggasrand Ridge visible to the British offices on their left horizon. Colonel De Lisle managed to outflank the Boer position in this way. With the main British army firing from the south, the appearance of De Lisle on his rear right flank left General De la Rey with no alternative but to order his men to retreat into Pretoria. At 4 p.m. on the afternoon of 4 June 1900, Colonel De Lisle with his Mounted Infantry occupied a hill today known as Proclamation Hill (roughly 3.6 km south-east of the present study area) and sent an officer under a flag of truce into the town to demand its surrender. Lord Roberts and the main British army occupied Pretoria on the morning of 5 June 1900 (Amery, 1906). At 10:00 on the morning of 5 June 1900 Fort Daspoortrand (located roughly 1.2km north-west of the present study area) was occupied by a division of the 11th Cavalry Brigade (Van Vollenhoven, 1999).

Figure 17 – The occupation of Pretoria: British troops on Church Square (5 June 1900) (Raath, 2007:361).

1899 – 1902 **(Continued)**	The Anglo Boer War was not only a chronology of famous battles, but also smaller skirmishes and the hum-drum of war. In this regard the literature study has revealed that some lesser known events and sites can also be found in proximity to the present study area. For example, during the night of 19 March 1901, a group of Boer forces raided cattle from "...*a sanitary farm six miles west of Pretoria*." (The London Standard, 22 March 1901). It is evident that the "sanitary farm" referred to here is the same as the one depicted directly to the east of the present study area on the Major Jackson Map (see above). Another example of a site associated with the war that was located in close proximity to the present study area, is a military camp known as Quagga Camp. The camp appears to have been the regimental training camp of the Prince of Wales's Leinster Regiment during the period from March 1902 to 1905. However, available references indicate that the camp was also used by other regiments during the war years, including the 2nd Norfolk Volunteer Active Service Company (Atthill, 1909). While some references indicate that the location of the camp was where the Phillip Nel Park is located today (roughly 4.7km east of the present study area) (archive-za.com/za/t/tekkieraces.co.za/Tekkieraces/), the published history of the Leinster Regiment describes the position of the camp as "...*bounded by a sewage farm, a leper hospital and a dump of condemned tin meat*." (Whitton, 2012). This latter description would place the position of the camp much closer to the present study area, and potentially within the study area. Furthermore, during the war years a blockhouse was built by the British as part of their process of fortified defences around Pretoria. This blockhouse is located on top of the Daspoortrand Ridge and was connected to Fort Daspoortrand via a pathway (Van Vollenhoven, 2000). The blockhouse is located roughly 1.1 km north-west of the present study area.
1939	Atteridgeville was established in 1939 as a "location" for black residents of Pretoria (Engelbrecht, 1955). Atteridgeville is located roughly 1.2 km south-by-southwest of the present study area.
1942	The suburb of Danville was established in 1942 (Engelbrecht, 1955). According to Hopkins (2003), the development of the iron industry (including ISCOR) to the west of Pretoria provided a significant impetus for the establishment of a number of suburbs on this side of Pretoria, including Danville. As indicated above, this suburb is located to the south-east of the present study area.
Early 1990s	Lotus Gardens was established (http://en.wikipedia.org/wiki/Laudium) to the west of the study area. During this same period the Magalies Toll Road (N4) was also built a short distance south of the study area.

5.3 Significant Aspets Regarding the History and Archaeology of the Study Area

5.3.1 Fort West Village/Westfort Leprosy Hospital

5.3.1.1 Overview of the history of the hospital

The information from this section is primarily derived from the Phase 1 Heritage Survey of the Historic Wesfort Leprosy Hospital Site conducted and compiled by Mauritz Naudé (2012).

During the late 1880s a hospital for researching the treatment of smallpox was established on the outskirts of Pretoria. It was named the Daspoort Hospital because of its location on the southern foot of the ridge known as Daspoortrand. The location of the Daspoort Hospital was in the same overall position where the institution known as the Westfort Hospital is still located. Contrary to its original intent, the Daspoort Hospital became to be used primarily for the treatment of leprosy patients. The earliest reference to the hospital dates to 1888 and mentions S. W. Wierda, the official architect of the ZAR Government. At that stage the hospital consisted of four rooms with a detached outdoor toilet and accommodated eight patients. Although leprosy barracks were added in 1890, additional accommodation was again required in 1892. By 1896 the Daspoort Hospital accommodated as many as 99 patients.

Westfort Hospital was originally built as an extension of Daspoort Hospital, but the two facilities soon merged to become known as the Pretoria Leprosy Hospital. The first buildings of the second phase development were erected in 1898 and consisted of an administration complex, smallpox clinic and staff accommodation. Initially, lay people were appointed to manage the hospital, but in 1900 Dr von Gernet was appointed on a part-time basis as the medical officer in charge. During the first year of the new hospital's existence, 99 patients from Daspoort, 100 from Pankop and six from Rietfontein were transferred there. By 1902, 328 patients were accommodated here. The institution was divided into white, black and coloured sections, with males and females housed separately.

The hospital owned a farm during the early years of the 20th century. Furthermore, with its own post-office, police station, churches, schools and shops, it could be regarded as a fairly independent village. By 1918, all the leprosy patients in the Transvaal and the Orange Free State were transferred to Westfort. By this point in time the institution accommodated 892 patients. In 1931 the leprosy hospital on Robben Island was closed down and the patients were then all transferred to Westfort. These additional patients increased the total number of patients at Westfort to 2000.

After 1931, as treatment for leprosy became more effective, the number of patients gradually decreased. Westfort was finally closed down in 1996, as the policy regarding the treatment of leprosy patients had changed after it was discovered that leprosy is not a contagious disease and the best treatment for sufferers was to be found in their own community (Naude, 2012).

Since 1996, the Westfort Hospital village has been left vacant and has gradually become used as housing as part of an informal community that is not formally recognised. During the early 2000s there were plans to develop the property into a formal residential estate which would have incorporated the Fort and identified Iron Age settlement remains into private open spaces. However, this project seems to have since been superseded by various other residential development projects.

Figure 18 – The Administration Building at the Westfort Hospital. This building was designed in June 1895 (Photograph: Mauritz Naudé).

5.3.1.2 The position of the hospital in relation to the proposed development

The present study area shares a boundary with the property on which the Westfort Hospital is located. However, the closest building to the study area that is associated with the hospital appears to be located 70 m from the study area. This building is a dwelling located some distance from the central cluster of buildings comprising the core of the old hospital and dates to the early days of the hospital and appears to be depicted on a historic map compiled in 1890. In terms of the central cluster of

hospital buildings, the nearest examples to the study area appears to be the church and adjacent watchtower which are located roughly 320 m west of the study area boundary. A possible cemetery was also identified on Google Earth, and based on what is visible on the Google Earth map the closest point on this cemetery to the present study area appears to be located 162 m away.

It is evident that the present development will represent a very low to zero impact on the hospital.

Figure 19 – Google Earth image depicting the old Westfort Leprosy Hospital on the left and the study area on the right. The white dotted line encloses an area consisting of all the heritage features associated with the hospital which could be identified on Google Earth including buildings, structures and possible cemeteries. This line can of course not be viewed as an exact boundary for the hospital and all of its components, but provides an indication of the extent and location of the site. A distance of 70 m separates the closest building from the study area. This building (see yellow marker) is a dwelling that is somewhat isolated from the main hospital cluster. However, it is located within the northern end of the hospital grounds which had been used as accommodation for doctors, nurses and other staff since at least the 1890s. In fact, the dwelling under discussion is depicted on the 1890 plan of the site and as a result it is more than likely that the dwelling under discussion is as old the hospital itself. One of the closest buildings forming part of the main hospital cluster to the study area, is a watchtower with an adjacent church (see blue marker).These buildings are located roughly 320 m to the west of the present study area. A possible cemetery appears to be located in the open area to its east (see green marker). As far as can be ascertained from Google Earth, the closest point of this cemetery to the study area is roughly 162 m to the west of it.

5.3.2 Fort Daspoortrand

5.3.2.1 Overview of the history of the fort

As a direct result of the abortive Jameson Raid of 1896, the Zuid-Afrikaansche Republiek realised that they would have to make better arrangements for the defence of the Transvaal and its capital. During the raid the attackers had penetrated to within 19 km of Johannesburg. Although General Piet Cronje had succeeded in trapping the raiders at Doornkloof on 2 January 1896 and forcing their surrender, the assembling of the commandos as well as the supply of food and ammunition during the Republic's counter-measures had been slow and had revealed serious deficiencies. As a means of improving the defence of Pretoria, the decision was made for the construction of eight forts in strategic localities all around the town. However, the excessive cost of building so many forts resulted in the decision to construct only four: Klapperkop, Schanskop and Wonderboompoort (built by the German company Krupp) and Daspoortrand (built by the French company Schneider) (Panagos, 2004). The fort was known either as Wesfort or as Fort Daspoortrand. Since it is the only fortification that was designed and built by a French firm, the design differs significantly from the other three forts. By July 1897 work had commenced and the building was officially completed and fully functional on 12 November 1898 (Van Vollenhoven, 1994).

The main differences between Wesfort and the other fortifications was that it was larger and had a different floor plan and spatial configuration. The fort had a hexagonal plan with a bastion at each corner with ammunition rooms that were partly below ground. Passages connected these rooms with the central courtyard and ammunition was transferred via two lifts. A telegraph cable was installed between the central telegraph room and the fort with a second telegraph and telephone system located outside. Two dynamos supplied the fort with electricity, including the power needed for two searchlights. The fort had its own pump station and pump house with a steam engine and was protected by lightning conductors. The fort appears to have had 'heavy' (155mm Long-Tom or 120mm rapid fire cannons) and three 'light' cannons. However, all artillery from forts around Pretoria had been removed when the British troops arrived in Pretoria on 5 July 1900. At 10 am on this day, the fort was occupied by a division of the 11th Cavalry Brigade (Van Vollenhoven, 1999).

5.3.2.2 The position of the fort in relation to the proposed development

The fort is located roughly 1.2 km north-west of the present study area. As a result, the proposed development is not expected to have any impact on the fort.

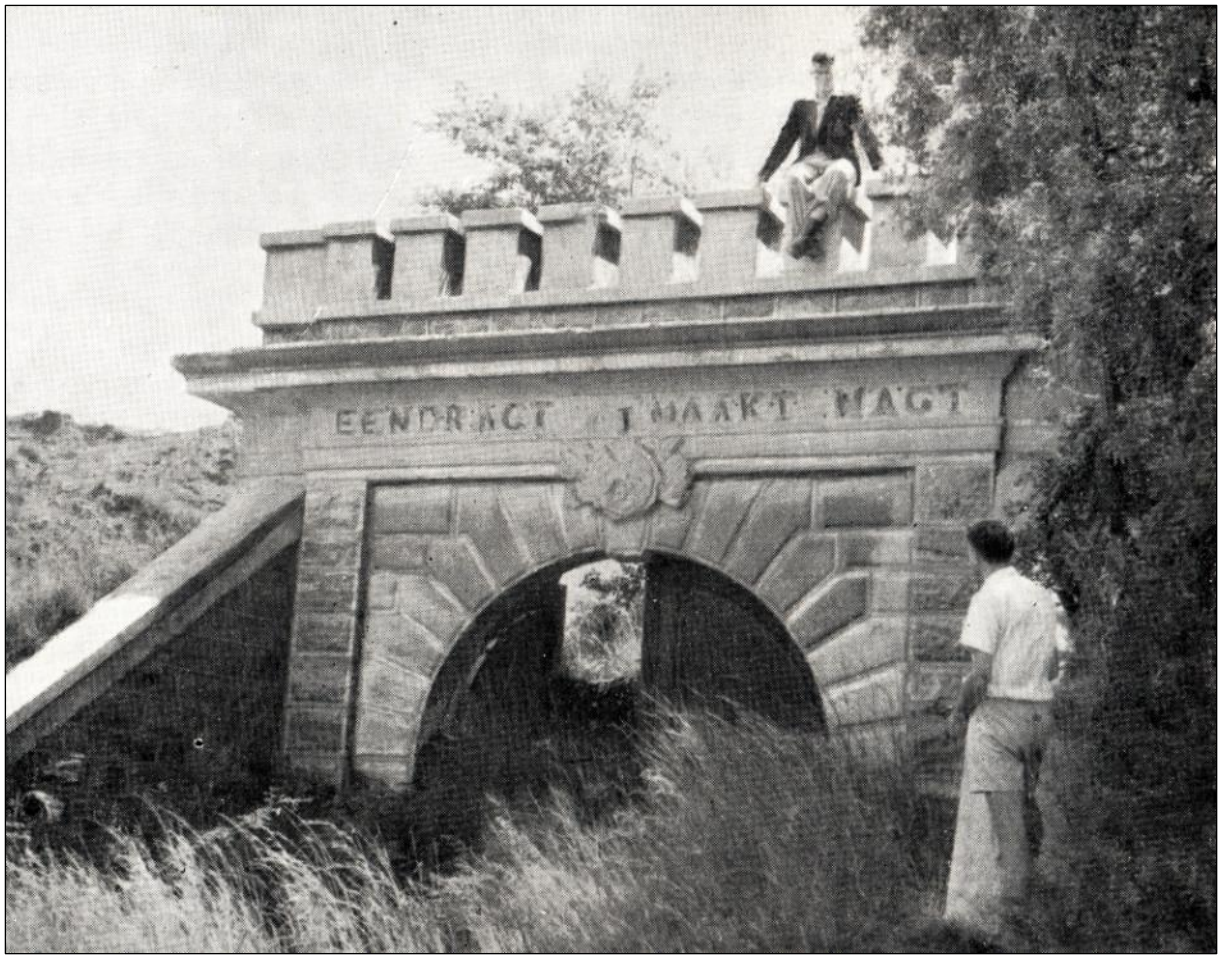

Figure 20 – The main entrance to Fort Daspoortrand. Photograph taken in c. 1955 (Engelbrecht, 1955:100).

Figure 21 – Historic photograph of the garrison at Fort Daspoortrand. The photograph was taken in 1898 at the fort (Engelbrecht, 1955:101).

5.4 Previous Archaeological and Heritage Studies in Proximity to the Study Area

5.4.1 Reports and Studies identified on SAHRIS

The following archaeological and heritage reports were located on SAHRIS (South African Heritage Resources Information System). The reports and their findings are individually discussed below.

5.4.1.1 Phase 1 Archaeological Impact Assessment for a Proposed Township Development at Lotus Gardens, Pretoria, Gauteng. Prepared for Bohlweki Environmental (Pty) Ltd by Frans Roodt in 2002

This project area was located immediately south of the Westfort Hospital and some distance south-west of the present study area. The report identified two Late Iron Age stonewalled settlements, one of which was a relatively well-preserved complex of circular stone enclosures with the second site poorly preserved. Roodt indicated that the two sites were related to the Uitkomst Sotho-Tswana tradition dating to the 16th and 17th centuries. An old farm house was also identified (Roodt, 2002).

5.4.1.2 Heritage Impact Assessment for the Proposed Fort West Phase 1 Development, Pretoria Magisterial District, Gauteng Province. Prepared for Seedcracker Environmental Consulting by J van Schalkwyk in 2012

The site consists of Portion 1 of the Farm Fort 646JR in the City of Tshwane Metro Municipality. It is an irregular shaped section of land located south of the Daspoortrand Ridge and north of the suburb of Lotus Gardens in the western part of Pretoria.The study area is located immediately west of the Westfort Hospital and north-west of the existing Lotus Gardens township.

Seven areas containing stone walled settlements dating to the Late Iron Age were identified in the study area. Based on their layout it seems as if the sites all formed part of a larger whole, i.e. a large settlement structure with a cattle enclosure close by as well as some others structures, probably for keeping small stock. These Late Iron Age sites can probably be linked to Tswana- or Ndebele-speakers who settled here within the last 300 years (Van Schalkwyk, 2012).

5.4.1.3 Phase 1 Heritage Survey of the Historic Wesfort Leprosy Hospital Site, Pretoria. Prepared by Mauritz Naudé in 2012

The report is a first phase heritage assessment of the Wesfort Hospital. It provides a historic overview of the site and gives a general architectural historical assessment of the site. The report also presents recommendations and divides the hospital site into various zones of significance.
The author of the report summarises the significance of the Wesfort Hospital as follows:

"The site is of exceptional cultural significance not only because of the age of the village and age of the bulk of the buildings on the site. It is not only significant because of the architectural fabric and historic buildings but as an institution. The Wesfort leprosy hospital facility was the successor of a similar facility on Robben Island and eventually became the only facility of its kind in South Africa. This makes the facility and former institution to be classified as 'rare' according to the criteria for cultural significance of the National Heritage Resources Act. Any heritage related planning should therefore be focused on the re-use of the village and if not the entire village, areas, zones and precincts that must reflect the heritage significance, the variety and character of the architectural and built fabric of the village".

5.4.1.4 Phase 1 Archaeological Impact Assessment for the proposed Lotus Gardens Primary School, Lotus Gardens Extension 2, Gauteng Province. Prepared for La Terra Earth Sciences (Pty) Ltd by J van der Walt in 2008.

The study area for this development is located roughly 3.4 km south-west of the present study area. No archaeological or heritage sites were identified during the study.

5.4.2 Previous Archaeological Research in the Study Area and Surrounding Landscape

The following archaeological research studies are known from the surroundings of the study area.

5.4.2.1 Archaeological Research and Excavations undertaken at Fort Daspoortrand

Dr. A.C. van Vollenhoven conducted archaeological research and excavations on the fortifications around Pretoria for his MA Thesis at the University of Pretoria. At Fort Daspoortrand, the research focussed on the compilation of a layout plan drawing for the fort and for this purpose three excavations were undertaken namely at the western munition shaft, the provisions room as well as the gateway (Van Vollenhoven, 1998).

5.5 Palaeontological Desktop Summary

5.5.1 Overview

Dr. Gideon Groenewald was appointed by PGS Heritage to undertake a desktop survey, assessing the potential palaeontological impact of the proposed development. The study has found that the site is

underlain by Vaalian aged iron rich shales of the Strubenkop Formation, volcanic rocks of the Hekpoort Formation and quartzite of the Boshoek Formation, Pretoria Group, Transvaal Supergroup.

No fossils have been recorded from the shale units of the Strubenkop Formation or the volcanic rocks of the Hekpoort Formation. Stromatolite structures have however been reported from various formations in the Pretoria Group and might be present in the site. Sedimentary structures that might resemble trace fossils have been described from quartzites of the Magaliesberg Formation, in this region, and it is therefore possible that similar structures might be present in the quartzites of the Boshoek Formation. To date, there is however no proof of trace fossils in these units.

5.5.2 Recommendations

The developer and the ECO of the project must be informed of the fact that stromatolites have been recorded from rock units in the Pretoria Group and that sedimentary structures that might resemble trace fossils have been described from quartzite formations in the group. If any fossils or fossil structures are recorded in the study area SAHRA need to be notified. No further action is needed in terms of the Palaeontological heritage of the development site.

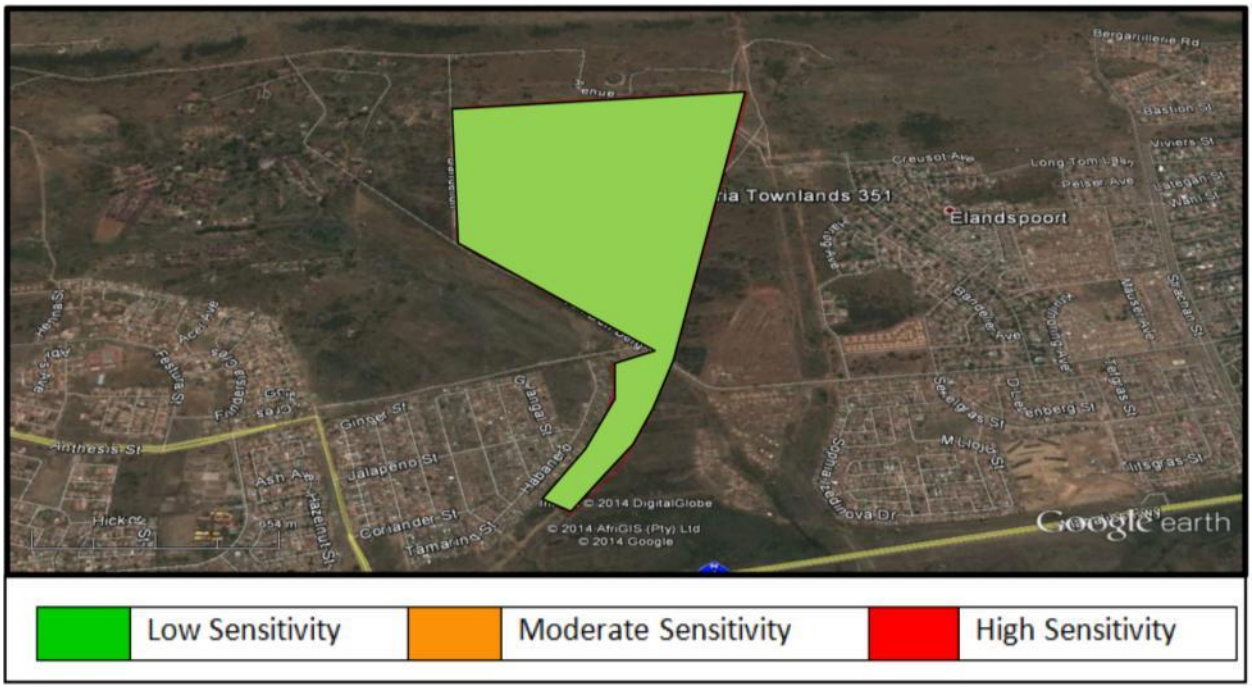

Figure 22 – The palaeontological desktop study has allocated a Low Palaeontological Sensitivity to the study area (Groenewald, 2014).

6 FIELDWORK FINDINGS

6.1 Introduction

A systematic walk-through survey of the northern section of the study area was undertaken over one day by a fieldwork team comprising an archaeologist and a field assistant. The archaeologist was equipped with a hand-held GPS, and his recorded track logs are depicted in blue below (Figure 24). The general area was documented by means of various photographs. Where sites of heritage significance were identified, a site recording using standard best practice techniques was made. This included the recording of the position of the site (descriptive and by way of using recorded GPS coordinates), site type (i.e. Stone Age, Late Iron Age), establishing the approximate extent of the site as well as the condition of the site. The significance of each site as well as possible mitigation measures that may be required are also recorded in the field.

Dense vegetation found across the southern end of the study area made it impossible to access large sections of this component of the site. The dense vegetation consisted primarily of *lantana* and *Tagetes minuta*.

Although access was attempted from numerous points, the vegetation found here proved too dense to provide enough accessibility or visibility for survey purposes. During a second visit it was found that the extreme southern end of the study area had burnt in a veld fire and could therefore be assessed in the field. A second attempt was made on this day to access the remainder of the southern section which could not be accessed during the previous success. However, this second attempt was also unsuccessful. Based on observations that could be made during these attempts to survey the southern section, it would appear that significant components of the overgrown sections are covered by building rubble and rubbish discard heaps.

The track log recorded during the survey is shown in Figures 24 and 25.

As a result of the fieldwork undertaken, two heritage sites were identified. These identified heritage sites will be discussed in more detail below.

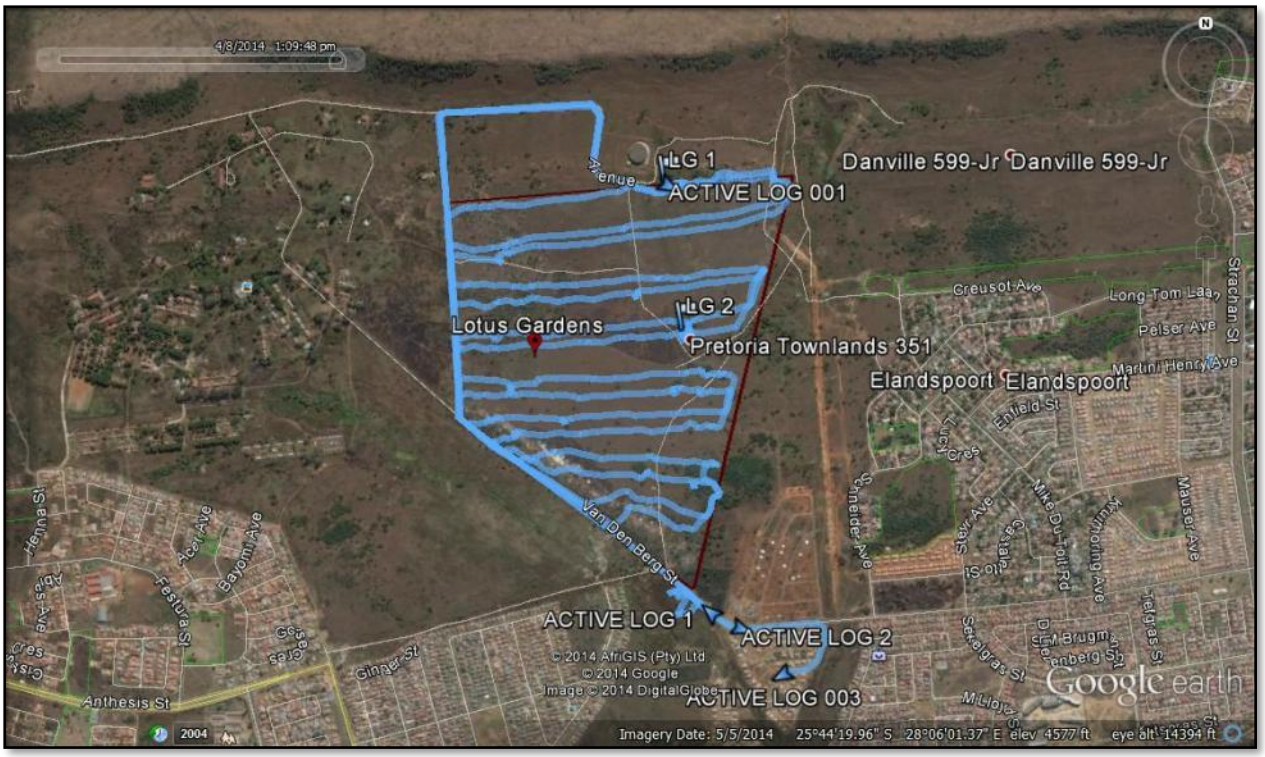

Figure 23 – Northern section of the study area, showing the track log (blue lines) and two identified heritage sites (LG 1 and LG 2)

Figure 24 - Southern section of the study area, showing the track log (blue lines). The south-western section of the study area covered with track log line is the only section on this entire southern component of the study area that could be walked in the field. This is due to the fact that this section had burnt during a recent veld fire at the time of the fieldwork. The remainder of the southern section was covered in dense lantana and Tagetes minuta vegetation and as a result was impenetrable.

6.2 Heritage sites identified within the study area

6.2.1 Site 1

Coordinates:

S 25° 44’ 03.0”
E 28° 06’ 05.1”

Site Description:

A short segment of a low stone wall was identified at this location. The stone wall is situated on a low rise on the northern section of the study area. The stone wall is approximately 15 m long and is approximately 0.3 m wide and 0.3 m high and the entire site is roughly 25 m in diameter.

The stone wall is situated next to a large municipal water reservoir. The reservoir is located a short distance from the northern boundary of the northern section of the study area. The stone wall had evidently been damaged and partially destroyed by the earth-moving work conducted during the construction of the water reservoir. It appears likely that the construction work had also completely destroyed other sections of stone walls which may have formed part of a stonewalled settlement.

The site was overgrown with grass and other vegetation, which made identification of the shape and extent problematic. However, since a number of Late Iron Age sites have been identified in the general area, it is more than likely for a Late Iron Age stonewalled settlement to originally have been located here.

Significance:

Since the stonewalling has been damaged and partially destroyed by the construction of the reservoir, the condition of the site is poor. As a result it has a **Low Significance** and is graded as **Generally Protected 4C**.

Figure 25 – General view of the site. Note the dense vegetation.

Figure 26 – View of stone wall at Site 1

6.2.2 Site 2

Coordinates:

S 25° 44’ 15.9”
E 28° 06’ 06.9”

Description of Site

The site comprises a number of stonewall sections situated amongst some trees with low branches and covered in grass and other vegetation. The dense vegetation made the accurate identification of the site difficult.

The identified stone walls measured approximately 0.3 m wide and 0.2 m high and although the dense vegetation made the assessment of the exact extent of the site difficult, the stonewalling appear to extent over an area of roughly 50 m by 50 m.

As indicated above, the high number of Late Iron Age sites identified in the general area makes it highly likely for a Late Iron Age stonewalled settlement to be located here.

No associated cultural material or middens were identified in association with the stone walls. However, this may be due to the dense vegetation found here.

Significance:

The preservation of the site is better than the one identified further to the north. The site can also be identified as a Late Iron Age site, and although its exact age or association would be impossible to accurately discern from the densely covered vegetation at present, an archaeological site formally protected by legislation is located here. As a result, the site is of **Medium Significance** and is graded as **Generally Protected B**.

Figure 27 – General view of a small section of walling from Site 2. Note the vegetation.

Figure 28 – Another view of a wall section from Site 2.

7 IMPACT OF PROPOSED DEVELOPMENT ON HERITAGE RESOURCES

In this section the impact of the proposed development on the two heritage sites identified in the study area will be calculated. The image below depicts the development layout plan with the identified heritage sites plotted on it.

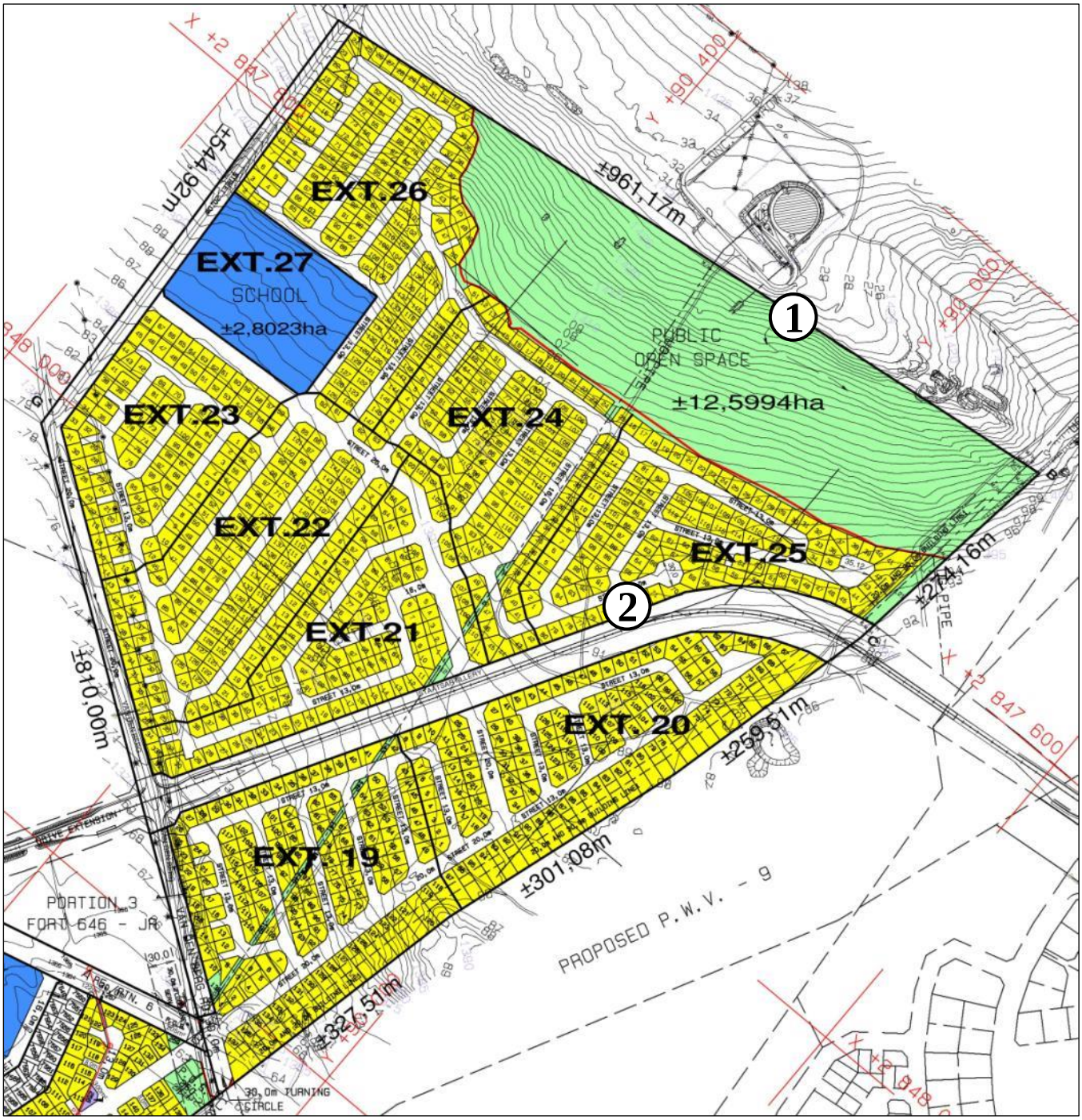

Figure 29 – Detail view of the northern section of the development layout plan showing the position of the two identified archaeological sites. The overall development layout plan was provided by the client and an overlay of the identified sites was made over the plan using Google Earth.

7.1 Risk Calculation for the Impact of the Proposed Development on Site 1

It is evident from the overlay of the identified archaeological sites on the development layout plan, that Site 1 is located in an area that will be used as a Public Open Space. As a result there will not be any direct negative impact on the site. In the section that follows the impact risk of the proposed development on Site 1 will be established.

$$\text{Impact Risk} = \frac{(\text{Significance} + \text{Spatial} + \text{Temporal})}{3} \times \frac{\text{Probability}}{5}$$

$$\text{Impact Risk} = \frac{(2 + 3 + 3)}{3} \times \frac{2}{5}$$

IMPACT RISK = 1.07

Table 10: Risk Calculation for Development Impact on Site 1

IMPACT	SIGNIFICANCE	SPATIAL SCALE	TEMPORAL SCALE	PROBABILITY	RATING
	Low	Local	Medium-Term	Could Happen	**Very Low**
Impact on Site 1	2	3	3	2	**1.07**

This calculation has revealed that the impact risk of the development on Site 1 falls within Impact Class 1, which represents a **Very Low Impact** Risk. As a result, no mitigation would be required.

7.2 Risk Calculation for the Impact of the Proposed Development on Site 2

It is evident from the overlay of the identified archaeological sites on the development layout plan, that Site 2 is located in an area earmarked for residential development as well as the construction of a road. As a result a permanent negative impact can be expected on the site. In the section that follows the impact risk of the proposed development on Site 2 will be established.

$$\text{Impact Risk} = \frac{(\text{Significance} + \text{Spatial} + \text{Temporal})}{3} \times \frac{\text{Probability}}{5}$$

$$\text{Impact Risk} = \frac{(3 + 3 + 5)}{3} \times \frac{5}{5}$$

IMPACT RISK = 3.33

Table 11: Risk Calculation for Development Impact on Site 2

IMPACT	SIGNIFICANCE	SPATIAL SCALE	TEMPORAL SCALE	PROBABILITY	RATING
	Moderate	Local	Permanent	Is going to happen	**High**
Impact on Site 2	3	3	5	5	**3.67**

This calculation has revealed that the impact risk of the proposed development on Site 2 falls within Impact Class 4, which represents a **High Impact Risk**. As a result, specific mitigation measures would be required to reduce the overall impact risk on the site. See below for details.

8 MITIGATION MEASURES AND GENERAL RECOMMENDATIONS

8.1 Mitigation Measures Required for the Archaeological Sites

Impact risk calculations were undertaken to establish the expected impact of the proposed development on the two archaeological sites, which indicated that the proposed development poses a Very Low Impact Risk to Site 1 but a High Impact Risk to Site 2. No mitigation measures would be required for Site 1. However, mitigation measures will be required for Site 2.

Site 1:

- Since the site is located in the Public Open Space area, no mitigation is required.
- However, as the site is more than likely part of an Iron Age settlement and as a result older than 100 years, it is protected under the National Heritage Resources Act from any damage or destruction without a permit from SAHRA.

Site 2:

- The first mitigation measure would be to clear the stonewalled site of vegetation. The reason for this is twofold: firstly to allow for the recording of the site layout plan (see next mitigation measure) and secondly to allow for a visual assessment of the surface of the site to confirm whether any associated cultural material such as middens are located here. It is important to note that vegetation clearing should only be undertaken by a team under the supervision of a professional and experienced archaeologist.

- Once the vegetation clearing is complete a site layout plan must be recorded using archaeological best practice techniques. At the same time photographic recording should also be undertaken.
- Depending on the findings of the assessment of the site after it had been cleared of vegetation, two parallel mitigation alternatives exist. If no associated cultural material are identified or if no potential for the presence of such cultural material is noted, no further archaeological mitigation would be required and only the last listed item comprising a destruction permit application would be required. However, if archaeological middens, concentrations of cultural material or the potential for such features are identified, further mitigation measures comprising Shovel Test Pits (STP's) and Archaeological Excavations may be required. These measures can only be undertaken after receipt of an archaeological excavation permit.
- A permit from SAHRA will also be required before the site can be destroyed.

8.2 Mitigation for the Palaeontology

The developer and the ECO of the project must be informed of the fact that stromatolites have been recorded from rock units in the Pretoria Group and that sedimentary structures that might resemble trace fossils have been described from quartzite formations in the group. If any fossils or fossil structures are recorded in the study area SAHRA need to be notified. No further action is needed in terms of the Palaeontological heritage of the development site.

9 CONCLUSIONS

PGS Heritage was appointed by Tambura 69 Trust to undertake a Heritage Impact Assessment (HIA) which forms part of the Environmental Impact Assessment (EIA) for the proposed construction of a new residential development, Lotus Gardens Extensions 18 to 27, located on two adjacent properties: Portion 523 of the farm Pretoria Town & Townlands No.351-JR; and Portion 540 of the farm Pretoria Town & Townlands No. 351-JR, in Pretoria West, Tshwane Metropolitan Municipality, Gauteng Province.

An archival and historical desktop study was undertaken which was used to compile a historical layering of the study area within its regional context. This component indicated that the landscape within which the project area is located has a rich and diverse history. However, the desktop study did not reveal any historic or heritage sites from within the study area.

The desktop study work was followed by fieldwork which comprised a walkthrough of the study area. A total of two heritage sites were identified within the northern section of the study area. The two identified sites are Late Iron Age stonewalled sites.

Impact risk calculations were undertaken on the expected impact of the proposed development on these two sites, which indicated that the proposed development poses a Very Low Impact Risk to Site 1 but a High Impact risk to Site 2. The following mitigation measures would be required:

Archaeological Sites

Site 1:

- Since the site is located in the Public Open Space area, no mitigation is required.
- However, as the site is more than likely part of an Iron Age settlement and as a result older than 100 years, it is protected under the National Heritage Resources Act from any damage or destruction without a permit from SAHRA.

Site 2:

- The first mitigation measure would be to clear the stonewalled site of vegetation. The reason for this is twofold: firstly to allow for the recording of the site layout plan (see next mitigation measure) and secondly to allow for a visual assessment of the surface of the site to confirm whether any associated cultural material such as middens are located here. It is important to note that vegetation clearing should only be undertaken by a team under the supervision of a professional and experienced archaeologist.
- Once the vegetation clearing is complete a site layout plan must be recorded using archaeological best practice techniques. At the same time photographic recording should also be undertaken.
- Depending on the findings of the assessment of the site after it had been cleared of vegetation, two parallel mitigation alternatives exist. If no associated cultural material are identified or if no potential for the presence of such cultural material is noted, no further archaeological mitigation would be required and only the last listed item comprising a destruction permit application would be required. However, if archaeological middens, concentrations of cultural material or the potential for such features are identified, further mitigation measures comprising Shovel Test Pits (STP's) and Archaeological Excavations may be required. These measures can only be

undertaken after receipt of an archaeological excavation permit.

- A permit from SAHRA will also be required before the site can be destroyed.

Palaeontology

A palaeontological impact study (desktop) was conducted by Dr. Gideon Groenewald. The findings of this report are that the study area is underlain by Vaalian aged shale of the Strubenkop Formation, volcanic rocks of the Hekpoort Formation and quartzite of the Boshoek Formation, Pretoria Group. No fossils have been recorded from these formations in the study area and a **Low Palaeontological Sensitivity** is allocated to the development footprint. In terms of the palaeontological assessment, the developer and the ECO of the project must be informed of the fact that stromatolites have been recorded from rock units in the Pretoria Group and that sedimentary structures that might resemble trace fossils have been described from quartzite formations in the group. If any fossils or fossil structures are recorded in the study area, SAHRA needs to be notified. No further action is needed in terms of the Palaeontological heritage of the development site.

General Recommendations

The desktop study has revealed the existence of a military camp known as Quagga Camp. The camp appears to have been associated with the South African War (1899-1902) as well as the years directly after the cessation of hostilities and was used as a training camp by the Prince of Wales's Leinster Regiment as well as the 2nd Norfolk Volunteer Active Service Company. While some references suggest that the camp was located at Phillip Nel Park (roughly 4.7 km east of the present study area) (archive-za.com/za/t/tekkieraces.co.za/Tekkieraces/), the published history of the Leinster Regiment describes the position of the camp as "...*bounded by a sewage farm, a leper hospital and a dump of condemned tin meat*." (Whitton, 2012). This latter description would place the position of the camp much closer to the present study area, and potentially within the study area. As a result, it is recommended that an archaeological watching brief is implemented during the construction phase.

On the condition that the recommendations above are adhered to, the development is not expected to have a severe negative impact on the identified heritage sites. From a heritage point of view the proposed development may be allowed to continue.

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10.3 Reports from SAHRIS Database

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Roodt, F. 2002. *Phase 1 Archaeological Impact Assessment: Proposed Township Development Lotus , Pretoria, Gauteng. Prepared for Bohlweki Environmental (Pty) Ltd.*

Van der Walt, J. 2008. *Phase 1 Archaeological Impact Assessment for the proposed Lotus Gardens Primary School, Lotus Gardens Extension 2, Gauteng Province*. Prepared for La Terra Earth Sciences (Pty) Ltd.

Van Schalkwyk, J. 2012*. Heritage Impact Assessment For The Proposed Fort West Phase 1 Development, Pretoria Magisterial District, Gauteng Province.* Prepared for Seedcracker Environmental Consulting.

10.4 Internet Resources

http://archive-za.com/za/t/tekkieraces.co.za/Tekkieraces/

http://en.wikipedia.org/wiki/Laudium
http://www.sahistory.org.za/topic/prehistory-pretoria
http://www.pretoria.co.za

10.5 Archival References

National Archives, Maps, 3/551

10.6 Historic Topographic Maps

The historic topographic maps used in this report were obtained from the Directorate: National Geo-spatial Information of the Department of Rural Development & Land Reform, Cape Town.

10.7 Google Earth

All the aerial depictions and overlays used in this report are from Google Earth.

Appendix A

PALAEONTOLOGICAL DESKTOP STUDY

PALAEONTOLOGICAL DESKTOP ASSESSMENT FOR THE PROPOSED HOUSING DEVELOPMENT OF LOTUS GARDENS EXTENSIONS 18 TO 27, PRETORIA WEST, GAUTENG PROVINCE.

For:

HIA CONSULTANTS

DATE: 02 April 2014

By

GIDEON GROENEWALD

EXECUTIVE SUMMARY

Gideon Groenewald was appointed by PGS Heritage to undertake a desktop survey, assessing the potential palaeontological impact of the proposed development of a residential housing complex located at Lotus Gardens, Pretoria West in the Gauteng Province.

This report forms part of the Environmental Impact Assessment and complies with the requirements of the South African National Heritage Resource Act No 25 of 1999. In accordance with Section 38 (Heritage Resources Management), a Heritage Impact Assessment (HIA) is required to assess any potential impacts to palaeontological heritage within the development footprint of the development.

The key assumption for this scoping study is that the existing geological maps and datasets used to assess site sensitivity are correct and reliable. However, the geological maps used were not intended for fine scale planning work and are largely based on aerial photographs alone, without ground-truthing. There is also an inadequate database for fossil heritage for much of the RSA, due to the small number of professional palaeontologists carrying out fieldwork in RSA. Most development study areas have never been surveyed by a palaeontologist.

The project entails the development of a housing complex at Lotus Gardens, Pretoria West, Gauteng Province.

The study area is underlain by Vaalian aged iron rich shales of the Strubenkop Formation, volcanic rocks of the Hekpoort Formation and quartzite of the Boshoek Formation, Pretoria Group, Transvaal Supergroup.

No fossils have been recorded from the shale units of the Strubenkop Formation or the volcanic rocks of the Hekpoort Formation. Stromatolite structures have however been reported from various formations in the Pretoria Group and might be present in the study area. Sedimentary structures that might resemble trace fossils have been described from quartzites of the Magaliesberg Formation, in this region, and it is therefore possible that similar structures might be present in the quartzites of the Boshoek Formation. To date, there is however no proof of trace fossils in these units.

Recommendation:
The developer and the ECO of the project must be informed of the fact that stromatolites have been recorded from rock units in the Pretoria Group and that sedimentary structures that might resemble trace fossils have been described from quartzite formations in the group. If any fossils or fossil structures are recorded in the study area SAHRA need to be notified. No further action is needed in terms of the Palaeontological heritage of the development site.

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1 INTRODUCTION

1.1 Background

Gideon Groenewald was appointed by PGS Heritage to undertake a desktop survey, assessing the potential palaeontological impact of the proposed development of a residential housing complex located at Lotus Gardens, Pretoria West in the Gauteng Province.

This report forms part of the Environmental Impact Assessment and complies with the requirements of theSouth African National Heritage Resource Act No 25 of 1999. In accordance with Section 38 (Heritage Resources Management), a Heritage Impact Assessment (HIA) is required to assess any potential impacts to palaeontological heritage within the development footprint of the development.

Categories of heritage resources recognised as part of the National Estate in Section 3 of the Heritage Resources Act, and which therefore fall under its protection, include:

- geological sites of scientific or cultural importance;
- objects recovered from the soil or waters of South Africa, including archaeological and palaeontological objects and material, meteorites and rare geological specimens;
- objects with the potential to yield information that will contribute to an understanding of South Africa's natural or cultural heritage.

1.2 Aims and Methodology

Following the "SAHRA APM Guidelines: Minimum Standards for the Archaeological & Palaeontological Components of Impact Assessment Reports" the aims of the palaeontological impact assessment are:

- to identify exposed and subsurface rock formations that are considered to be palaeontologically significant;
- to assess the level of palaeontological significance of these formations;
- to comment on the impact of the development on these exposed and/or potential fossil resources and
- to make recommendations as to how the developer should conserve or mitigate damage to these resources.

In preparing a palaeontological desktop study the potential fossiliferous rock units (groups, formations etc.) represented within the study area are determined from geological maps. The known fossil heritage within each rock unit is inventoried from the published scientific literature and previous palaeontological impact studies in the same region.

The likely impact of the proposed development on local fossil heritage is determined on the basis of the palaeontological sensitivity of the rock units concerned and the nature and scale of the development itself, most notably the extent of fresh bedrock excavation envisaged. The different sensitivity classes used are explained in Table 1.1 below.

*Table **Error! No text of specified style in document.**.1 Palaeontological Sensitivity Analysis Outcome Classification*

Sensitivity	Description
Low Sensitivity	Areas where a negligible impact on the fossil heritage is likely. This category is reserved largely for areas underlain by igneous rocks. However, development in fossil bearing strata with shallow excavations or with deep soils or weathered bedrock can also form part of this category.
Moderate Sensitivity	Areas where fossil bearing rock units are present but fossil finds are localised or within thin or scattered sub-units. Pending the nature and scale of the proposed development the chances of finding fossils are moderate. A field-based assessment by a professional palaeontologist is usually warranted.
High Sensitivity	Areas where fossil bearing rock units are present with a very high possibility of finding fossils of a specific assemblage zone. Fossils will most probably be present in all outcrops and the chances of finding fossils during a field-based assessment by a professional palaeontologist are very high. Palaeontological mitigation measures need to be incorporated into the Environmental Management Plan

1.3 Scope and Limitations of the Desktop Study

The study will include: i) an analysis of the area's stratigraphy, age and depositional setting of fossil-bearing units; ii) a review of all relevant palaeontological and geological literature, including geological maps, and previous palaeontological impact reports; iii) data on the proposed development provided by the developer (e.g. location of footprint, depth and volume of bedrock excavation envisaged) and iv) where feasible, location and examination of any fossil collections from the study area (e.g. museums).

The key assumption for this scoping study is that the existing geological maps and datasets used to assess site sensitivity are correct and reliable. However, the geological maps used were not intended for fine scale planning work and are largely based on aerial photographs alone, without ground-truthing. There is also an inadequate database for fossil heritage for much of the RSA, due to the small number of professional palaeontologists carrying out fieldwork in RSA. Most development study areas have never been surveyed by a palaeontologist.

These factors may have a major influence on the assessment of the fossil heritage significance of a given development and without supporting field assessments may lead to either:

- an underestimation of the palaeontological significance of a given study area due to ignorance of significant recorded or unrecorded fossils preserved there, or
- an overestimation of the palaeontological sensitivity of a study area, for example when originally rich fossil assemblages inferred from geological maps have in fact been destroyed by tectonism or weathering, or are buried beneath a thick mantle of unfossiliferous "drift" (soil, alluvium etc.).

2 DESCRIPTION OF THE PROPOSED DEVELOPMENT

The project entails the development of a housing complex at Lotus Gardens, Pretoria West, Gauteng Province (Figure 2.1).

*Figure **Error! No text of specified style in document.**.30 Image showing the locality of the site*

3 GEOLOGY

The study area is underlain by Vaalian aged iron rich shales of the Strubenkop Formation, Volcanic rocks of the Hekpoort Formation and quartzite of the Boshoek Formation, Pretoria Group, Transvaal Supergroup (Figure 3.1) (Johnson et al, 2006).

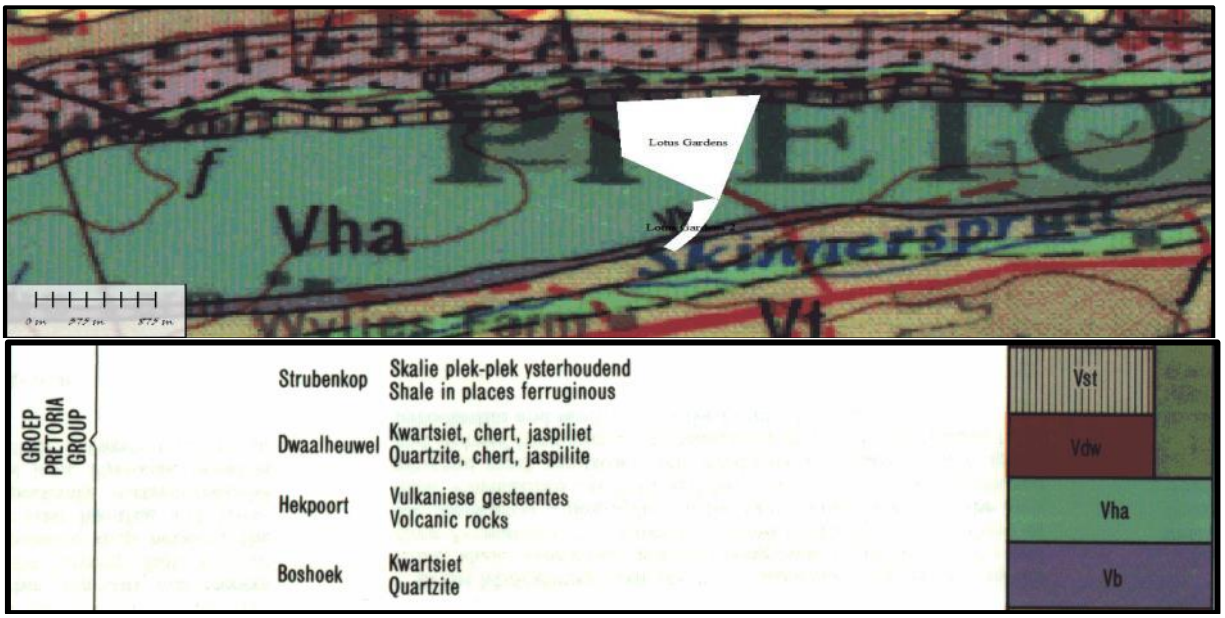

*Figure **Error! No text of specified style in document.**.31 Geology and Legend for study area*

4 PALAEONTOLOGY OF THE AREA

No fossils have been recorded from the shale units of the Strubenkop Formation or the volcanic rocks of the Hekpoort Formation. Stromatolite structures have however been reported from various formations in the Pretoria Group and might be present in the study area. Sedimentary structures that might resemble trace fossils have been described from quartzites of the Magaliesberg Formation, in this region, and it is therefore possible that similar structures might be present in the quartzites of the Boshoek Formation. To date, there is however no proof of trace fossils in these units.

5 PALAEONTOLOGICAL SENSITIVITY

Due to the absence of fossils in all three of the geological formations underlying the development area, a Low Palaeontological sensitivity rating is allocated to the study area.

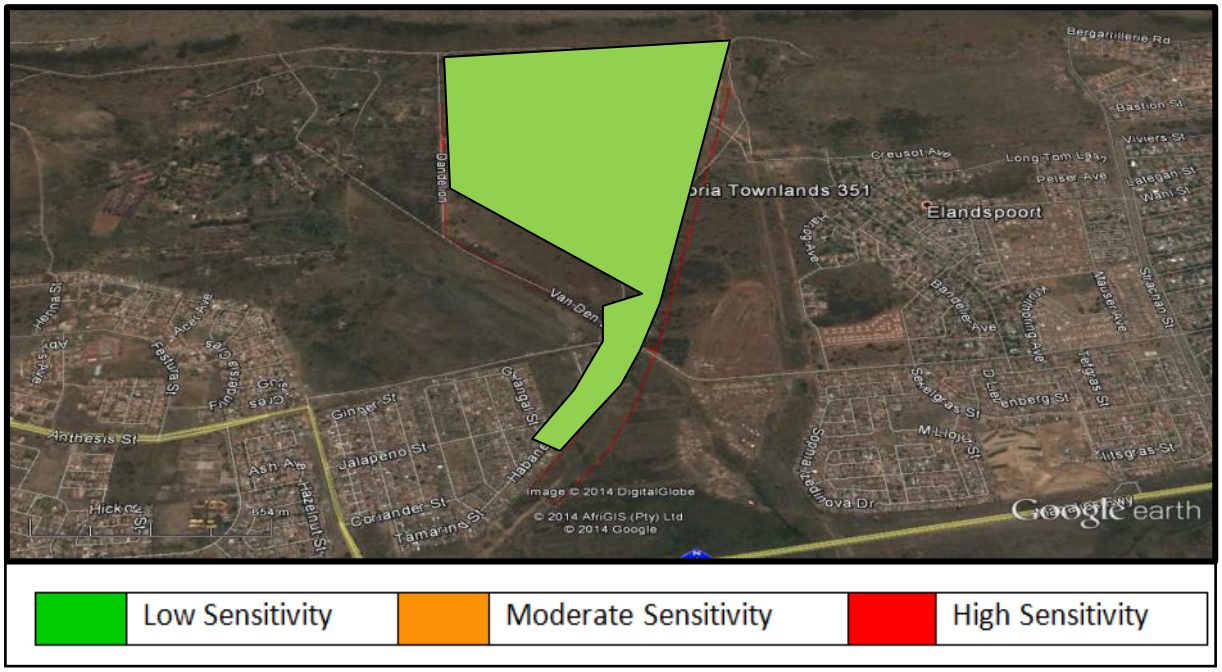

*Figure **Error! No text of specified style in document.**.32 A Low Palaeontological sensitivity is*

6 CONCLUSION AND RECOMMENDATIONS

The study area is underlain by Vaalian aged shale of the Strubenkop Formation, volcanic rocks of the Hekpoort Formation and quartzite of the Boshoek Formation, Pretoria Group. No fossils have been recorded from these formations in the study area and a Low Palaeontological sensitivity is allocated to the development footprint.

Recommendation:

The developer and the ECO of the project must be informed of the fact that stromatolites have been recorded from rock units in the Pretoria Group and that sedimentary structures that might resemble trace fossils have been described from quartzite formations in the group. If any fossils or fossil structures are

recorded in the study area SAHRA need to be notified. No further action is needed in terms of the Palaeontological heritage of the development site.

7 REFERENCES

Johnson MR, Anhausser CR and Thomas RJ. 2006. The Geology of South Africa. Geological Society of South Africa.

8 QUALIFICATIONS AND EXPERIENCE OF THE AUTHOR

Dr Gideon Groenewald has a PhD in Geology from the University of Port Elizabeth (Nelson Mandela Metropolitan University) (1996) and the National Diploma in Nature Conservation from Technicon RSA (the University of South Africa) (1989). He specialises in research on South African Permian and Triassic sedimentology and macrofossils with an interest in biostratigraphy, and palaeoecological aspects. He has extensive experience in the locating of fossil material in the Karoo Supergroup and has more than 20 years of experience in locating, collecting and curating fossils, including exploration field trips in search of new localities in the southern, western, eastern and north-eastern parts of the country. His publication record includes multiple articles in internationally recognized journals. Dr Groenewald is accredited by the Palaeontological Society of Southern Africa (society member for 25 years).

9 DECLARATION OF INDEPENDENCE

I, Gideon Groenewald, declare that I am an independent specialist consultant and have no financial, personal or other interest in the proposed development, nor the developers or any of their subsidiaries, apart from fair remuneration for work performed in the delivery of palaeontological heritage assessment services. There are no circumstances that compromise the objectivity of my performing such work.

Dr Gideon Groenewald
Geologist

Appendix B

LEGISLATIVE REQUIREMENTS – TERMINOLOGY AND ASSESSMENT CRITERIA

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 palaeontological 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 terms of the heritage legislation, permits are required to damage, destroy, alter, or disturb them. Furthermore, individuals who already possess heritage 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 located in a cemetery (such as ancestral graves in rural areas), are protected. The legislation also 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 resources 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 palaeontological 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 prehistoric cultural remains, including graves and human remains.

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 reinternment 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 Resources 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.