

**APPENDIX G4:
CULTURAL/HERITAGE RESOURCES REPORT**

**Heritage impact survey report for the
PROPOSED MIXED USE DEVELOPMENT,
JABULANI, SOWETO,
GAUTENG PROVINCE**

THE PROJECT:

Development of a mixed use development of a partly vacant piece of land.

THIS REPORT:

HERITAGE IMPACT SURVEY REPORT FOR THE PROPOSED MIXED USE DEVELOPMENT, JABULANI, SOWETO, GAUTENG PROVINCE

Report No: 2008/JvS/104
Status: Final
Revision No: 0
Date: November 2008

Prepared for:

Bohlweki SSI

Representative: Ms. T Motsoene

Postal Address: PO Box 867, Gallo Manor, 2052
Tel: 011 798 6001
E-mail: gracem@bohlweki.co.za

Prepared by:

J van Schalkwyk (D Litt et Phil), Heritage Consultant

ASAPA Registration No.: 168

Principal Investigator: Iron Age, Colonial Period, Industrial Heritage

Postal Address: 62 Coetzer Avenue, Monument Park, 0181
Mobile: 076 790 6777
Fax: 012 347 7270
E-mail: jvschalkwyk@mweb.co.za

EXECUTIVE SUMMARY

HERITAGE IMPACT SURVEY REPORT FOR THE PROPOSED MIXED USE DEVELOPMENT, JABULANI, SOWETO, GAUTENG PROVINCE

Mixed use development is planned for a section of land in Jabulani, a suburb of the larger Soweto, located south of Johannesburg. A survey to locate, identify, evaluate and document sites, objects and structures of cultural importance found within the boundaries of the area where the development is to take place was conducted.

One feature, a sports stadium, was identified on the site. As it was the venue for many past community actions, ranging from political gatherings to sport, religious and cultural activities, it judged to have a high significance on a local level. As it is at present uncertain what the developers' intention is with this feature, the following is recommended:

- The community should be consulted to determine what emotional and historical significance this venue has for them, if any. If they agree that it can be demolished, it is recommended that the site is commemorated by erecting a small memorial capturing its history.
- If construction takes place and archaeological sites are exposed, it should immediately be reported to a museum, preferably one at which an archaeologist is available, so that an investigation and evaluation of the finds can be made.



J A van Schalkwyk
Heritage Consultant

TECHNICAL SUMMARY

Property details						
Province	Gauteng					
Magisterial district	Johannesburg					
Topo-cadastral map	2627BB, 2627BD					
Closest town	Johannesburg					
Suburbs	Jabulani					
Portions/Holdings						
Coordinates	Polygon					
	No	Latitude	Longitude	No	Latitude	Longitude
	1	S 26.24741	E 27.86186	2	S 26.24866	S 27.85912
	3	S 26.25164	E 27.85939	4	S 26.25190	S 27.85626
	5	S 26.25368	E 27.85648	6	S 26.25352	S 27.86067
	7	S 26.24877	E 27.86406			

Development criteria in terms of Section 38(1) of the NHR Act	Yes/No
Construction of road, wall, power line, pipeline, canal or other linear form of development or barrier exceeding 300m in length	
Construction of bridge or similar structure exceeding 50m in length	
Development exceeding 5000 sq m	Yes
Development involving three or more existing erven or subdivisions	Yes
Development involving three or more erven or divisions that have been consolidated within past five years	
Rezoning of site exceeding 10 000 sq m	Yes
Any other development category, public open space, squares, parks, recreation grounds	

Development	
Description	Development of a mixed use development
Project name	Jabulani CBD

Land use	
Previous land use	Vacant
Current land use	Urban

Heritage sites assessment		
<i>Site type</i>	<i>Site significance</i>	<i>Site grading (Section 7 of NHRA)</i>
Buildings/stadium	High on a local level	III
Impact assessment		
<i>Impact</i>	<i>Mitigation</i>	<i>Permits required</i>
Possible	Community opinion	None

TABLE OF CONTENTS

	Page
EXECUTIVE SUMMARY	II
TECHNICAL SUMMARY	III
TABLE OF CONTENTS	IV
LIST OF FIGURES.....	IV
GLOSSARY OF TERMS AND ABBREVIATIONS.....	V
1. INTRODUCTION.....	1
2. TERMS OF REFERENCE	1
3. DEFINITIONS AND ASSUMPTIONS	1
4. STUDY APPROACH AND METHODOLOGY	2
5. DESCRIPTION OF THE AFFECTED ENVIRONMENT	3
6. SITE SIGNIFICANCE AND ASSESSMENT	4
7. IDENTIFICATION OF RISK SOURCES	5
8. RECOMMENDED MANAGEMENT MEASURES.....	5
9. RECOMMENDATIONS.....	6
10. REFERENCES.....	8
APPENDIX 1: CONVENTIONS USED TO ASSESS THE IMPACT OF PROJECTS ON HERITAGE RESOURCES.....	9
APPENDIX 2. RELEVANT LEGISLATION	11
APPENDIX 3: SURVEY RESULTS	13
APPENDIX 4: ILLUSTRATIONS.....	14

LIST OF FIGURES

	Page
Fig. 1. Location of the study area in regional context.	3
Fig. 2. The location of the study areas.....	13
Fig. 3. Aerial view of the study area.....	14
Fig. 3. The Jabulani stadium.....	15
Fig. 4. A view across the open section of the study area.	15

GLOSSARY OF TERMS AND ABBREVIATIONS**STONE AGE**

Early Stone Age	2 000 000 - 150 000 Before Present (BP)
Middle Stone Age	150 000 - 30 000 BP
Late Stone Age	30 000 - until c. AD 200

IRON AGE

Early Iron Age	AD 200 - AD 900
Middle Iron Age	AD 900 - AD 1300
Late Iron Age	AD 1300 - AD 1830

HISTORIC PERIOD

Since the arrival of the white settlers - c. AD 1840 in this part of the country

ASAPA	Association of Southern African Professional Archaeologists
EIA	Early Iron Age
ESA	Early Stone Age
LIA	Late Iron Age
LSA	Late Stone Age
MSA	Middle Stone Age
NHRA	National Heritage Resources Act
PHRA	Provincial Heritage Resources Agency
SAHRA	South African Heritage Resources Agency

HERITAGE IMPACT SURVEY REPORT FOR THE PROPOSED MIXED USE DEVELOPMENT, JABULANI, SOWETO, GAUTENG PROVINCE

1. INTRODUCTION

Mixed use development is planned for a section of land in Jabulani, a suburb of the larger Soweto, located south of Johannesburg.

An independent heritage consultant was appointed by **Bohlweki SSI** to conduct a survey to locate, identify, evaluate and document sites, objects and structures of cultural importance found within the boundaries of the area where the development is to take place.

This HIA report forms part of the Environmental Impact Assessment (EIA) as required by the EIA Regulations in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998) and was done in accordance with Section 38 of the National Heritage Resources Act, No. 25 of 1999 and is intended for submission to the South African Heritage Resources Agency (SAHRA).

2. TERMS OF REFERENCE

The scope of work consisted of conducting a Phase 1 archaeological survey of the site in accordance with the requirements of Section 38(3) of the National Heritage Resources Act (Act 25 of 1999).

This include:

- Conducting a desk-top investigation of the area
- A visit to the proposed development site

The objectives were to

- Identify possible archaeological, cultural and historic sites within the proposed development areas;
- Evaluate the potential impacts of construction, operation and maintenance of the proposed development on archaeological, cultural and historical resources;
- Recommend mitigation measures to ameliorate any negative impacts on areas of archaeological, cultural or historical importance.

3. DEFINITIONS AND ASSUMPTIONS

The following aspects have a direct bearing on the survey and the resulting report:

- *Cultural resources* are all non-physical and physical human-made occurrences, as well as natural occurrences that are associated with human activity. These include all sites, structures and artefacts of importance, either individually or in groups, in the history, architecture and archaeology of human (cultural) development.
- The *significance* of the sites and artefacts are determined by means of their historical, social, aesthetic, technological and scientific value in relation to their uniqueness, condition of preservation and research potential. It must be kept in mind that the

various aspects are not mutually exclusive, and that the evaluation of any site is done with reference to any number of these.

- Sites regarded as having low significance have already been recorded in full and require no further mitigation. Sites with medium to high significance require further mitigation.
- The latitude and longitude of archaeological sites are to be treated as sensitive information by the developer and should not be disclosed to members of the public.

4. STUDY APPROACH AND METHODOLOGY

4.1 Extent of the Study

This survey and impact assessment covers the area as presented in Section 5 and as illustrated in Figure 1 - 3.

4.2 Methodology

4.2.1 Preliminary investigation

4.2.1.1 Survey of the literature

A survey of the relevant literature was conducted with the aim of reviewing the previous research done and determining the potential of the area. In this regard, various anthropological, archaeological and historical sources were consulted - see the list of references below.

4.2.1.2 Data bases

The *Heritage Atlas Database*, the *Environmental Potential Atlas* and the *National Archives of South Africa* were consulted.

4.2.1.3 Other sources

Aerial photographs and topocadastral and other maps were also studied - see the list of references below.

4.2.2 Field survey

The field survey was done according to generally accepted archaeological practices, and was aimed at locating all possible sites, objects and structures. The area that had to be investigated, was identified by members of **Bohlweki** by means of maps. The area was investigated by walking across it in a number of transects.

4.2.3 Documentation

All sites, objects and structures that are identified are documented according to the general minimum standards accepted by the archaeological profession. Coordinates of individual localities are determined by means of the *Global Positioning System (GPS)*¹ and plotted on a

¹ According to the manufacturer a certain deviation may be expected for each reading. Care was, however, taken to obtain as accurate a reading as possible, and then to correlate it with reference to the physical environment before plotting it on the map.

map. This information is added to the description in order to facilitate the identification of each locality.

Map datum used: Hartebeeshoek 94 (WGS84).

4.3 Limitations

In some sections the vegetation cover was very high, limiting the archaeological visibility.

5. DESCRIPTION OF THE AFFECTED ENVIRONMENT

5.1 Site location

The study area is located west of the railway line to Johannesburg and east of the M72, also known as Koma Street in the larger Soweto (see Fig. 1). For more detail, see the Technical Summary presented above.

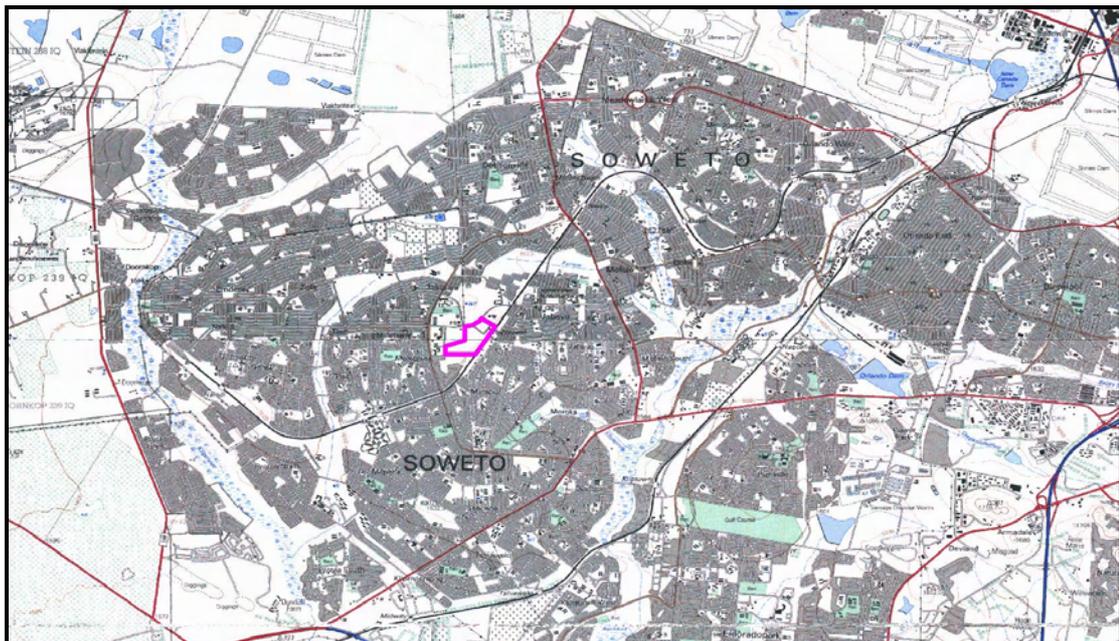


Fig. 1. Location of the study area in regional context.
(Map 2627BB, 2627BD: Chief Directorate Survey and Mapping.)

5.2 Site description

The area has been subjected to urban development for a number of decades, e.g. the Jabavu section (east of the study area) was established in 1948 and the Moroka section (to the south) was established in 1946. Although the largest part of the study area is currently vacant, it has

been impacted on by rubble that was dumped in areas. A sport stadium was built on a section of the site.

5.3 Regional overview

Nothing is known about the area in the period predating the development of larger Soweto. In fact, no sites have ever been reported for the region. Most of the heritage features date from the period of the development of the township, with the Oppenheimer Tower probably the oldest feature. Later developments are the Hector Petersen Memorial and the Mandela Family Museum, both located to the north of the study area.

5.4 Identified sites

5.4.1 Stone Age

No sites, features or objects of cultural significance dating to the Stone Age were identified in the study areas.

5.4.2 Iron Age

No sites, features or objects of cultural significance dating to the Iron Age were identified in the study areas.

5.4.3 Historic period

A sport stadium, known as the Jabulani Stadium, occurs on a section of the site. The date of its construction could not be determined, but it probably dates to the late 1950s, early 1960s, as most of the different suburbs surrounding it was developed during the late 1940s, early 1950s. Although the stadium is somewhat run down at present, it has played an important role in the life of the local community. Mass meetings, organised by the UDF, was the order of the day during the 1980s and Nelson Mandela's daughter Zinzi addressed huge crowds here in 1985. Even before that, Chief Mangosutu Buthelezi address crowds of up to 16000 people here in 1976. It is still being used for political gatherings, as recently as this year by Jacob Zuma. Apart from this, church groups use it regularly as venue and it is also used to host concerts.

6. SITE SIGNIFICANCE AND ASSESSMENT

6.1 Statement of significance

According to the NHR Act, Section 2(vi), the **significance** of heritage sites and artefacts is determined by its aesthetic, architectural, historical, scientific, social, spiritual, linguistic or technical value in relation to the uniqueness, condition of preservation and research potential. It must be kept in mind that the various aspects are not mutually exclusive, and that the evaluation of any site is done with reference to any number of these.

Sites regarded as having low significance are viewed as been recorded in full after identification and would require no further mitigation. Sites with a medium to high significance would require mitigation. Mitigation, in most cases the excavation of a site, is in essence destructive and therefore the impact can be viewed as high and as permanent.

- A sports stadium occurs on the site. It is judged to have a high significance on a local level (see Appendix 1 for the method used to evaluate this feature).

6.2 Impact assessment

Impact analysis of cultural heritage resources under threat of the proposed development, are based on the present understanding of the development.

- At present it is not clear what the developers' intension is with the stadium, i.e. if it is to be retained and upgraded, or if it would be demolished.

7. IDENTIFICATION OF RISK SOURCES

A Heritage Impact Assessment is focused on two phases of a proposed development: **the construction and operation phases**. The following project actions may impact negatively on archaeological sites and other features of cultural importance. The actions are most likely to occur during the construction phase of a project.

Construction phase:

Possible Risks	Source of the risk
Actually identified risks	
- damage to sites	Construction work
Anticipated risks	
- looting of sites	Curious workers

Operation phase:

Possible Risks	Source of the risk
Actually identified risks	
- damage to sites	Not keeping to management plans
Anticipated risks	
- damage to sites - looting of sites	Unscheduled construction/developments Visitors removing objects as keepsakes

8. RECOMMENDED MANAGEMENT MEASURES

Heritage sites are fixed features in the environment, occurring within specific spatial confines. Any impact upon them is permanent and non-reversible. Those resources that cannot be avoided and that are directly impacted by the development can be excavated/recorded and a management plan can be developed for future action. Those sites that are not impacted on can be written into the management plan, whence they can be avoided or cared for in the future.

8.1 Objectives

- Protection of archaeological, historical and any other site or land considered being of cultural value within the project boundary against vandalism, destruction and theft.

- The preservation and appropriate management of new discoveries in accordance with the National Heritage Resources Act (Act No. 25 of 1999), should these be discovered during construction.

8.2.1 Construction phase

General management objectives and commitments:

- To avoid disturbing sites of heritage importance; and
- To avoid disturbing burial sites.

The following shall apply:

- Known sites should be clearly marked in order that they can be avoided during construction activities.
- The contractors and workers should be notified that archaeological sites might be exposed during the construction work.
- Should any heritage artefacts be exposed during excavation, work on the area where the artefacts were discovered, shall cease immediately and the Environmental Control Officer shall be notified as soon as possible;
- All discoveries shall be reported immediately to a museum, preferably one at which an archaeologist is available, so that an investigation and evaluation of the finds can be made. Acting upon advice from these specialists, the Environmental Control Officer will advise the necessary actions to be taken;
- Under no circumstances shall any artefacts be removed, destroyed or interfered with by anyone on the site; and
- Contractors and workers shall be advised of the penalties associated with the unlawful removal of cultural, historical, archaeological or palaeontological artefacts, as set out in the National Heritage Resources Act (Act No. 25 of 1999), Section 51. (1).

9. RECOMMENDATIONS

Mixed use development is planned for a section of land in Jabulani, a suburb of the larger Soweto, located south of Johannesburg. A survey to locate, identify, evaluate and document sites, objects and structures of cultural importance found within the boundaries of the area where the development is to take place was conducted.

One feature, a sports stadium, was identified on the site. As it was the venue for many past community actions, ranging from political gatherings to sport, religious and cultural activities, it judged to have a high significance on a local level. As it is at present uncertain what the developers' intention is with this feature, the following is recommended:

- The community should be consulted to determine what emotional and historical significance this venue has for them, if any. If they agree that it can be demolished, it is recommended that the site is commemorated by erecting a small memorial capturing its history.
- If construction takes place and archaeological sites are exposed, it should immediately be reported to a museum, preferably one at which an archaeologist is available, so that an investigation and evaluation of the finds can be made.

10. REFERENCES

10.1 Data bases

Chief Surveyor General

Environmental Potential Atlas, Department of Environmental Affairs and Tourism.

Heritage Atlas Database, Pretoria.

National Archives of South Africa

10.2 Literature

Acocks, J.P.H. 1975. *Veld Types of South Africa*. Memoirs of the Botanical Survey of South Africa, No. 40. Pretoria: Botanical Research Institute.

Holm, S.E. 1966. *Bibliography of South African Pre- and Protohistoric archaeology*. Pretoria: J.L. van Schaik.

Meer, F. 1988. *Higher than Hope*. Johannesburg: Skotaville Publishers.

Richardson, D. 2001. *Historic sites of South Africa*. Cape Town: Struik Publishers.

10.3 Maps

1: 50 000 Topocadastral maps – 2627BB, 2627BD

APPENDIX 1: CONVENTIONS USED TO ASSESS THE IMPACT OF PROJECTS ON HERITAGE RESOURCES

Significance

According to the NHRA, Section 2(vi) the **significance** of a heritage sites and artefacts is determined by it aesthetic, architectural, historical, scientific, social, spiritual, linguistic or technical value in relation to the uniqueness, condition of preservation and research potential. It must be kept in mind that the various aspects are not mutually exclusive, and that the evaluation of any site is done with reference to any number of these.

Matrix used for assessing the significance of each identified site/feature

1. Historic value				
Is it important in the community, or pattern of history				
Does it have strong or special association with the life or work of a person, group or organisation of importance in history				
Does it have significance relating to the history of slavery				
2. Aesthetic value				
It is important in exhibiting particular aesthetic characteristics valued by a community or cultural group				
3. Scientific value				
Does it have potential to yield information that will contribute to an understanding of natural or cultural heritage				
Is it important in demonstrating a high degree of creative or technical achievement at a particular period				
4. Social value				
Does it have strong or special association with a particular community or cultural group for social, cultural or spiritual reasons				
5. Rarity				
Does it possess uncommon, rare or endangered aspects of natural or cultural heritage				
6. Representivity				
Is it important in demonstrating the principal characteristics of a particular class of natural or cultural places or objects				
Importance in demonstrating the principal characteristics of a range of landscapes or environments, the attributes of which identify it as being characteristic of its class				
Importance in demonstrating the principal characteristics of human activities (including way of life, philosophy, custom, process, land-use, function, design or technique) in the environment of the nation, province, region or locality.				
7. Sphere of Significance		High	Medium	Low
International				
National				
Provincial				
Regional				
Local				
Specific community				
8. Significance rating of feature				
1.	Low			
2.	Medium			
3.	High			

Significance of impact:

- low where the impact will not have an influence on or require to be significantly accommodated in the project design
- medium where the impact could have an influence which will require modification of the project design or alternative mitigation
- high where it would have a “no-go” implication on the project regardless of any mitigation

Certainty of prediction:

- Definite: More than 90% sure of a particular fact. Substantial supportive data to verify assessment
- Probable: More than 70% sure of a particular fact, or of the likelihood of that impact occurring
- Possible: Only more than 40% 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

Recommended management action:

For each impact, the recommended practically attainable mitigation actions which would result in a measurable reduction of the impact, must be identified. This is expressed according to the following:

- 1 = no further investigation/action necessary
- 2 = controlled sampling and/or mapping of the site necessary
- 3 = preserve site if possible, otherwise extensive salvage excavation and/or mapping necessary
- 4 = preserve site at all costs

Legal requirements:

Identify and list the specific legislation and permit requirements which potentially could be infringed upon by the proposed project, if mitigation is necessary.

APPENDIX 2. RELEVANT LEGISLATION

All archaeological and palaeontological sites, and meteorites are protected by the National Heritage Resources Act (Act no 25 of 1999) as stated in Section 35:

(1) Subject to the provisions of section 8, the protection of archaeological and palaeontological sites and material and meteorites is the responsibility of a provincial heritage resources authority: Provided that the protection of any wreck in the territorial waters and the maritime cultural zone shall be the responsibility of SAHRA.

(2) Subject to the provisions of subsection (8)(a), all archaeological objects, palaeontological material and meteorites are the property of the State. The responsible heritage authority must, on behalf of the State, at its discretion ensure that such objects are lodged with a museum or other public institution that has a collection policy acceptable to the heritage resources authority and may in so doing establish such terms and conditions as it sees fit for the conservation of such objects.

(3) Any person who discovers archaeological or palaeontological objects or material or a meteorite in the course of development or agricultural activity must immediately report the find to the responsible heritage resources authority, or to the nearest local authority offices or museum, which must immediately notify such heritage resources authority.

(4) No person may, without a permit issued by the responsible heritage resources authority-

- (a) destroy, damage, excavate, alter, deface or otherwise disturb any archaeological or palaeontological site or any meteorite;
- (b) destroy, damage, excavate, remove from its original position, collect or own any archaeological or palaeontological material or object or any meteorite;
- (c) trade in, sell for private gain, export or attempt to export from the Republic any category of archaeological or palaeontological material or object, or any meteorite; or
- (d) bring onto or use at an archaeological or palaeontological site any excavation equipment or any equipment which assist in the detection or recovery of metals or archaeological and palaeontological material or objects, or use such equipment for the recovery of meteorites.

In terms of cemeteries and graves the following (Section 36):

(1) Where it is not the responsibility of any other authority, SAHRA must conserve and generally care for burial grounds and graves protected in terms of this section, and it may make such arrangements for their conservation as it sees fit.

(2) SAHRA must identify and record the graves of victims of conflict and any other graves which it deems to be of cultural significance and may erect memorials associated with the grave referred to in subsection (1), and must maintain such memorials.

(3) No person may, without a permit issued by SAHRA or a provincial heritage resources authority-

- (a) destroy, damage, alter, exhume or remove from its original position or otherwise disturb the grave of a victim of conflict, or any burial ground or part thereof which contains such graves;
- (b) destroy, damage, alter, exhume, remove from its original position or otherwise disturb any grave or burial ground older than 60 years which is situated outside a formal cemetery administered by a local authority; or
- (c) bring onto or use at a burial ground or grave referred to in paragraph (a) or (b) any excavation equipment, or any equipment which assists in the detection or recovery of metals.

(4) SAHRA or a provincial heritage resources authority may not issue a permit for the destruction or damage of any burial ground or grave referred to in subsection (3)(a) unless it is satisfied that the applicant has made satisfactory arrangements for the exhumation and re-interment of the contents of such graves, at the cost of the applicant and in accordance with any regulations made by the responsible heritage resources authority.

The National Heritage Resources Act (Act no 25 of 1999) stipulates the assessment criteria and grading of archaeological sites. The following categories are distinguished in Section 7 of the Act:

- **Grade I:** Heritage resources with qualities so exceptional that they are of special national significance;
- **Grade II:** Heritage resources which, although forming part of the national estate, can be considered to have special qualities which make them significant within the context of a province or a region; and
- **Grade III:** Other heritage resources worthy of conservation, and which prescribes heritage resources assessment criteria, consistent with the criteria set out in section 3(3), which must be used by a heritage resources authority or a local authority to assess the intrinsic, comparative and contextual significance of a heritage resource and the relative benefits and costs of its protection, so that the appropriate level of grading of the resource and the consequent responsibility for its management may be allocated in terms of section 8.

Presenting archaeological sites as part of tourism attraction requires, in terms 44 of the Act, a Conservation Management Plan as well as a permit from SAHRA.

(1) Heritage resources authorities and local authorities must, wherever appropriate, co-ordinate and promote the presentation and use of places of cultural significance and heritage resources which form part of the national estate and for which they are responsible in terms of section 5 for public enjoyment, education, research and tourism, including-

- (a) the erection of explanatory plaques and interpretive facilities, including interpretive centres and visitor facilities;
- (b) the training and provision of guides;
- (c) the mounting of exhibitions;
- (d) the erection of memorials; and
- (e) any other means necessary for the effective presentation of the national estate.

(2) Where a heritage resource which is formally protected in terms of Part I of this Chapter is to be presented, the person wishing to undertake such presentation must, at least 60 days prior to the institution of interpretive measures or manufacture of associated material, consult with the heritage resources authority which is responsible for the protection of such heritage resource regarding the contents of interpretive material or programmes.

(3) A person may only erect a plaque or other permanent display or structure associated with such presentation in the vicinity of a place protected in terms of this Act in consultation with the heritage resources authority responsible for the protection of the place.

APPENDIX 3: SURVEY RESULTS

See Appendix 1 for an explanation of the conventions used in assessing the cultural remains.

Map datum used: Hartebeeshoek 94 (WGS84).

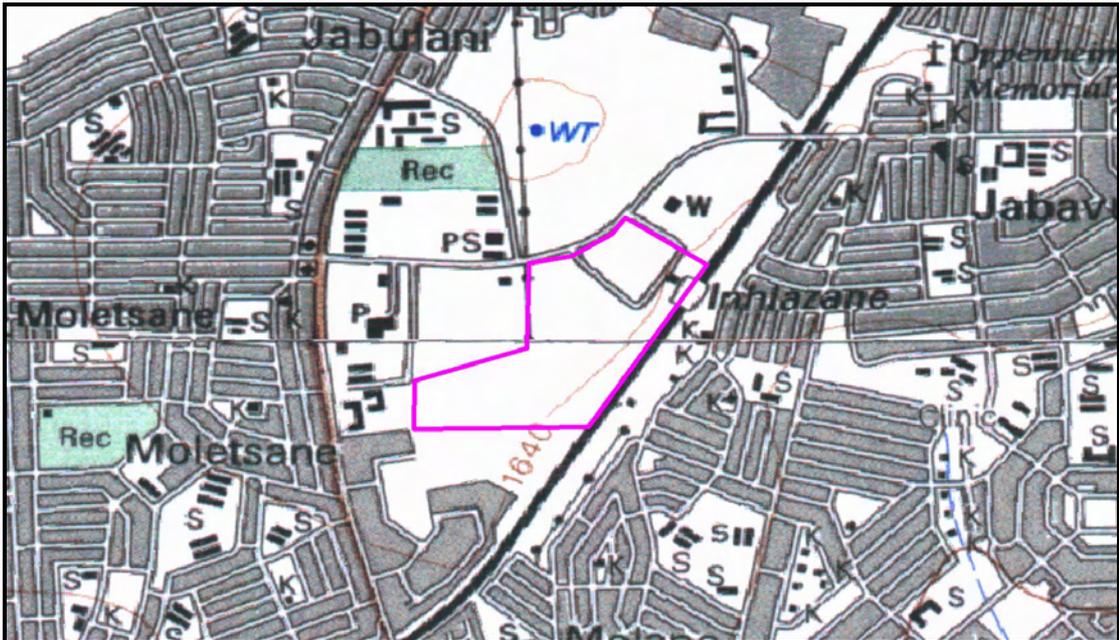


Fig. 2. The location of the study areas.
(Map 2627BB, 2627BD: Chief Directorate Survey and Mapping.)

Sites identified: Nil.

APPENDIX 4: ILLUSTRATIONS



Fig. 3. Aerial view of the study area.
(Photo: Courtesy of Google Earth)



Fig. 3. The Jabulani stadium.



Fig. 4. A view across the open section of the study area.