

Notification of Intent to Develop:

**REHABILITATION OF TWO BRIDGE STRUCTURES IN THE TSHWANE REGION
OF GAUTENG PROVINCE**

Prepared for:

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1. INTRODUCTION

The Gauteng department of roads and transport appointed KBK Engineers for consulting engineering services for the rehabilitation of eight structures in the Tshwane region within the Gauteng province. The contract commencement date was February 2016. The scope of the works includes the following: Detailed assessment and design report, tender documentation, site inspection, tender period and tender evaluation, administration and monitoring of the works contract, additional duties (if applicable), materials quality control for the construction and construction phase

During 2012 and 2013, bridges and culverts in the Gauteng Province were inspected as part of the SANRAL bridge network inspection project. A defects based system was used in these inspections, defects are rated using the DER (D= degree of defect, E=extent of defect and R=relevancy of defect) methodology rating system. All bridges and major culverts are inspected in detail every five to six years, and any repair works prioritised in terms of risk. The Bridge management system employs the overall condition index (OCI) to measure the soundness of bridge structures, and to identify the need for maintenance. GPDRT's management system aims to ensure the safety of the travelling public on bridges and major culverts. The bridges mentioned below was identify as structures needed rehabilitation.

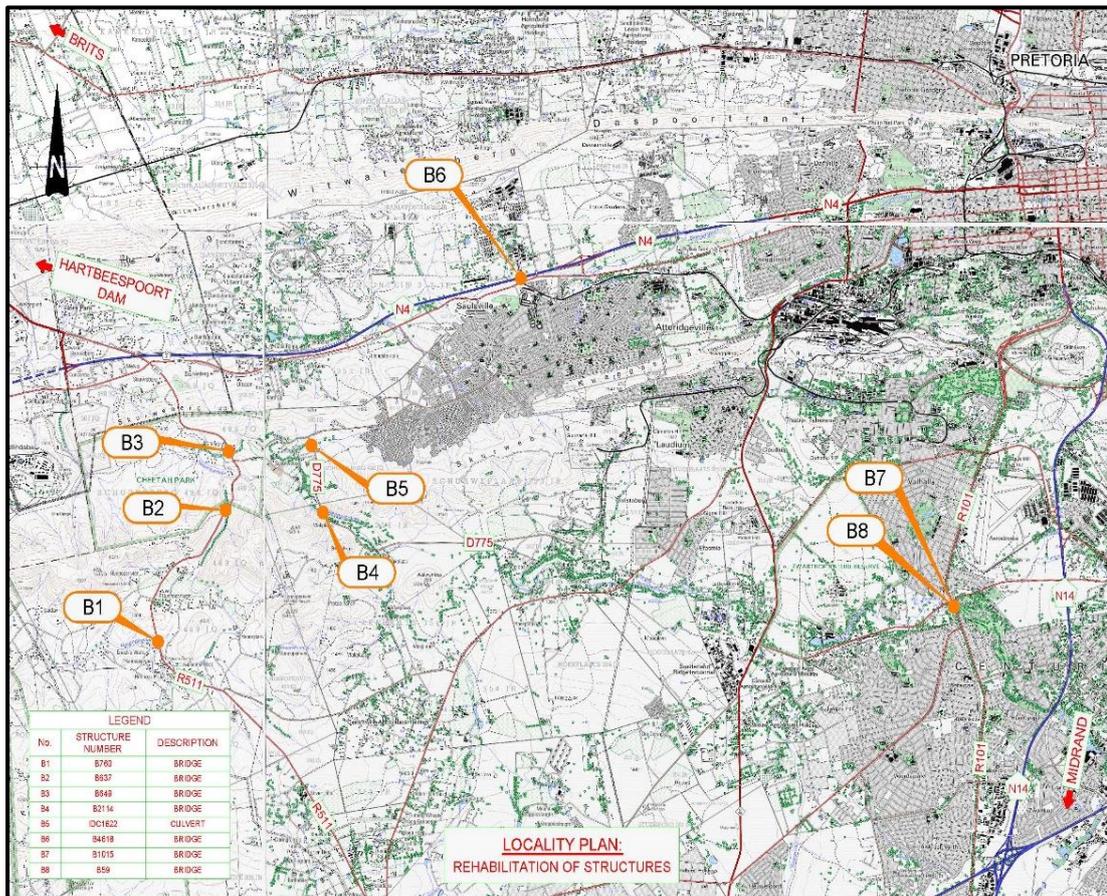


Figure 1. Location of the different bridges inspected for SANRAL.

The structures that require rehabilitation are scattered around the Tshwane regional district in the Gauteng province. Bridge 59 is found adjacent bridge 1015 along Road R101 (P1-2) passing through the Zwartkops residential suburb. Bridge 649 are found along provincial RoadR511 (P249), south-west of Atteridgeville Township.

2. LEGISLATIVE FRAMEWORK

The proposal is governed by national legislation and standards and International Best Practise. These include:

- South African Legislation
 - National Heritage Resources Act, 1999 (Act No. 25 of 1999) (NHRA).
- Standards and Regulations
 - South African Heritage Resources Agency (SAHRA) Minimum Standards.
- International Best Practise and Guidelines
 - ICOMOS Standards (Guidance on Heritage Impact Assessments for Cultural World Heritage Properties); and
 - The UNESCO Convention concerning the Protection of the World Cultural and Natural Heritage (1972).

3. HERITAGE RESOURCE AND IMPACTS THEREUPON

3.1 Bridge 59

Heritage Resource	
Bridge 59 (B8 on map in Fig. 1 above)	Wierda Bridge
Structures older than 60 years (Section 34)	Places, buildings, structures and equipment of cultural interest

Property owner	SANRAL
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Location	
Farm name	Zwartkop 356JS
Magisterial district	Pretoria
District municipality	City of Tshwane
Topocadastral map	2528CC
Central coordinate	-25.82686, 28.15723
Size of development footprint	Limited to the bridge feature

Significance of site/feature			
Provincial Significance	Grade II	High significance	Conservation by provincial heritage authority, provincial site nomination. No alteration whatsoever without permit from provincial heritage authority.

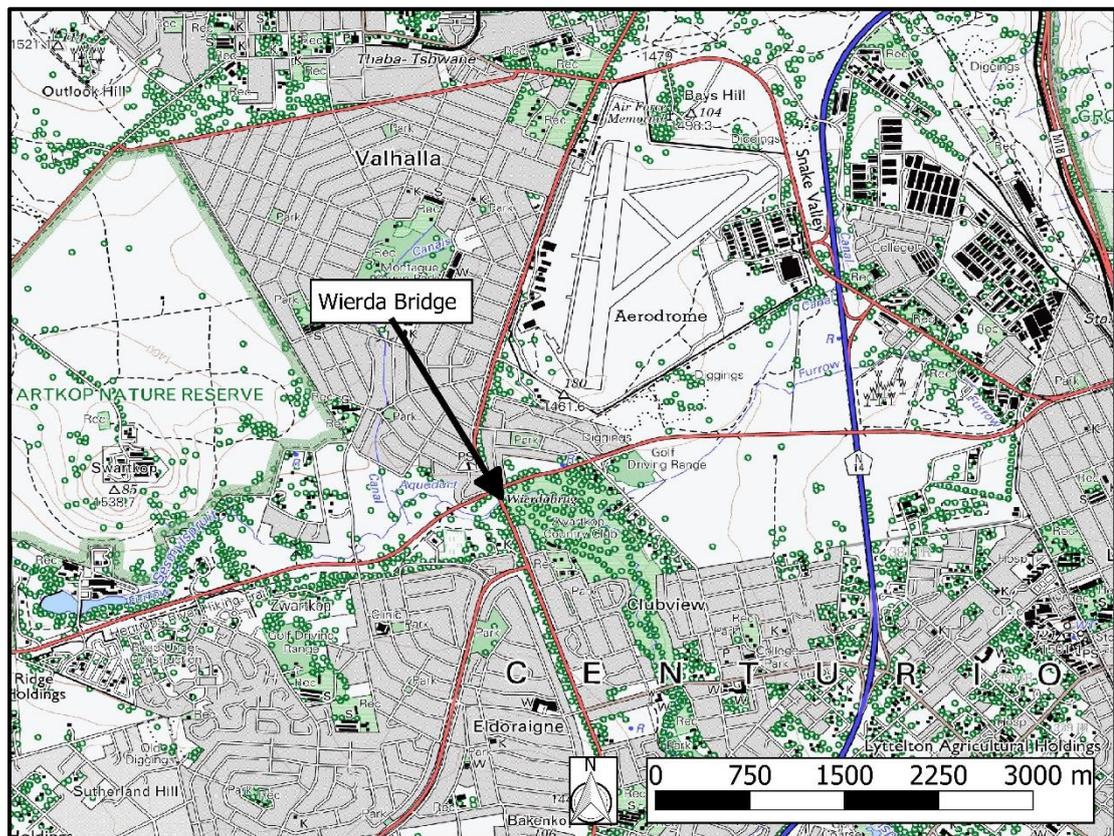


Figure 2. Location of Bridge 59.

Background history
This bridge over the Sesmyspruit is named for Sytze Wopkes Wierda, Chief of the

Department of Public Works of the South African Republic (ZAR). It is the second bridge that was built here, after the previous one was destroyed during a flash flood a few months earlier.

On 26 April 1891 the Executive Council of the ZAR took a decision to have a new bridge built. Only six months later it was opened to traffic by Gen. N.J. Smit, vice president and leader of the Republican attack at Amajuba in 1881.

The steel bridge consists of a single span of 21,3 m and rests on two abutments with foundations at a depth of 3,6 m below the river bed. The contractor was J.J. Kirkness and the total contract costs was £ 7 591-00-00.

The bridge was proclaimed a national heritage site in 1965, but since then has been re-evaluated as a provincial heritage resource.



Figure 3. Postal coach between Johannesburg and Pretoria fording the Sesmyspruit after the bridge was washed away (1890/1891).

Impact assessment

Due to its age and the heavy traffic volume this bridge carries, it is in urgent need of repair. Please see the detailed assessment presented by the consulting engineers – Appendix 4.

Mitigation

Please see the detailed analysis of work to be done as presented by the consulting engineers – Appendix 4.

Recommendation

As the remedial actions proposed by the consulting engineers does not necessitate structural changes to the bridge, it is proposed that the reparations can continue on condition of a permit being issued by the PHRA.

It is also recommended that a full “before and after” photographic record is made and that this is submitted to the PHRA on completion of the project.

3.2 Bridge 649

Heritage Resource	
Bridge 649 (B3 on map above)	Hennops River
Structures older than 60 years (Section 34)	Places, buildings, structures and equipment of cultural interest

Property owner	SANRAL
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Location	
Farm name	Schurveberg 488JQ
Magisterial district	Pretoria
District municipality	City of Tshwane
Topocadastral map	2527DD
Central coordinate	-25.79546, 27.99052
Size of development footprint	Limited to the bridge feature

Significance of site/feature			
Generally Protected B	Grade IV-B	Medium significance	Conservation by local authority. Site should be recorded before destruction. Destruction permit required from provincial heritage authority.

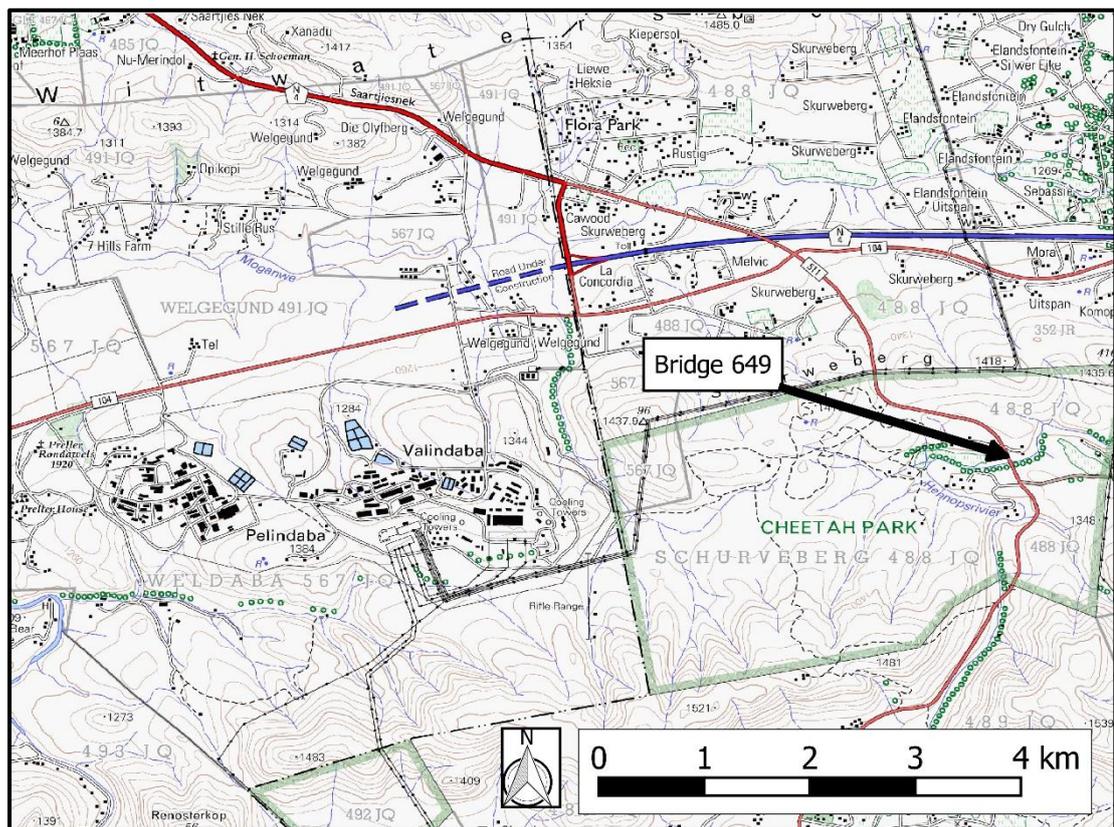


Figure 4. Location of Bridge 649.

Background history
Apart from the fact, according to local oral tradition, that this bridge was constructed in 1940, little is known about its history. It is an arch (filled) type single span bridge with an overall span length of 18,1 m. The

bridge has an arch span rise of 6 m, 2.5 m springing thickness and 0.33 m crown thickness. The original handrails were removed some time ago and replaced with precast concrete handrails.

This is the type of bridge and construction methods used on large numbers of road and railway bridges in the period between the two World Wars and shortly thereafter. The use of concrete came much in vogue as all metals were classified as strategic resources and consequently reserved for the war effort.

As-built drawings are available for this bridge.

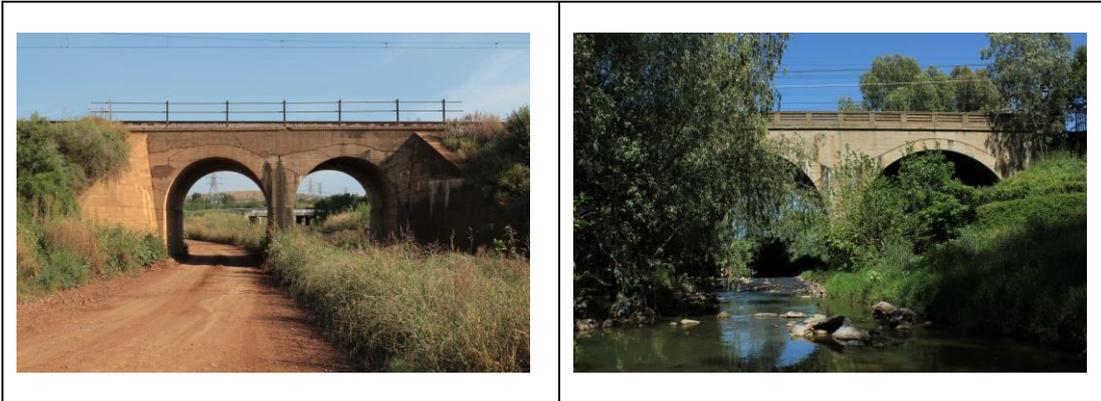


Figure 5. Bridges of similar material and construction - North-West Province and Gauteng.

Impact assessment

Due to its age and the heavy traffic volume this bridge carries, it is in urgent need of repair. Please see the detailed assessment presented by the consulting engineers – Appendix 4.

Mitigation

Please see the detailed analysis of work to be done as presented by the consulting engineers – Appendix 4.

Recommendation

The remedial actions proposed by the consulting engineers necessitate structural changes to the bridge. Fortunately, this is not a unique type of bridge and similar ones occur all over the country. It is therefore proposed that the reparations can continue on condition of a permit being issued by the PHRA.

It is also recommended that a full “before and after” photographic record is made and that this is submitted to the PHRA on completion of the project. To this must be added copies of the existing as-built drawing of this bridge.

4. RECOMMENDATIONS

Due to ever increasing population figures resulting in increased traffic volumes, especially in Gauteng Province, upgrading and maintenance of infrastructure is an unavoidable and continuous process.

- It is our viewpoint that the proposed maintenance on Bridge 59 can continue on condition of the Provincial Heritage Resource Agency issue a permit to this effect and that the recommended documentation of the process is completed by a heritage practitioner in consultation with the consulting engineers.
- It is our viewpoint that the proposed upgrade of Bridge 649 can continue on condition of the Provincial Heritage Resource Agency issue a permit to this effect and that the recommended documentation of the process is completed by a heritage practitioner in consultation with the consulting engineers.

5. REFERENCES

5.1 Data bases

Heritage Atlas Database, Pretoria
National Archives of South Africa
SAHRA Archaeology and Palaeontology Report Mapping Project (2009)
SAHRIS Database

5.2 Literature

Bakker, K.A., Clarke, N.J. & Fisher, R.C. 2014. *Eclectic ZA Wilhelmiens : A shared Dutch built heritage in South Africa*. Pretoria: Visual Books.

Oberholster, J.J. 1972. The historical monuments of South Africa. Cape Town: Rembrand van Rijn Foundation.

Van Schalkwyk, J.A. 2015. Bridging the Country: a brief history of bridge in South African. *South African Archaeological Bulletin* 70(202):193–200.

5.3 Maps and aerial photographs

1: 50 000 Topocadastral maps

Google Earth

5.4 Websites

pghbridges.com/basics
www.historicbridges.org
[www.pdfdrive.net/egce-406-bridge design](http://www.pdfdrive.net/egce-406-bridge-design)

APPENDIX 1. SPECIALIST COMPETENCYJohan (Johnny) van Schalkwyk

J A van Schalkwyk, D Litt et Phil, heritage consultant, has been working in the field of heritage management for more than 40 years. Originally based at the National Museum of Cultural History, Pretoria, he has actively done research in the fields of anthropology, archaeology, museology, tourism and impact assessment. This work was done in Limpopo Province, Gauteng, Mpumalanga, North West Province, Eastern Cape, Northern Cape, Botswana, Zimbabwe, Malawi, Lesotho and Swaziland. Based on this work, he has curated various exhibitions at different museums and has published more than 70 papers, most in scientifically accredited journals. During this period he has done more than 2000 impact assessments (archaeological, anthropological, historical and social) for various government departments and developers. Projects include environmental management frameworks, roads, pipeline-, and power line developments, dams, mining, water purification works, historical landscapes, refuse dumps and urban developments.

A complete *curriculum vitae* can be supplied on request.

APPENDIX 2. CONVENTIONS USED TO ASSESS THE SIGNIFICANCE OF HERITAGE RESOURCES

A system for site grading was established by the NHRA and further developed by the South African Heritage Resources Agency (SAHRA 2007) and has been approved by ASAPA for use in southern Africa and was utilised during this assessment.

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. SITE EVALUATION			
1.1 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			
1.2 Aesthetic value			
It is important in exhibiting particular aesthetic characteristics valued by a community or cultural group			
1.3 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			
1.4 Social value			
Does it have strong or special association with a particular community or cultural group for social, cultural or spiritual reasons			
1.5 Rarity			
Does it possess uncommon, rare or endangered aspects of natural or cultural heritage			
1.6 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.			
2. Sphere of Significance		High	Medium
International			
National			
Provincial			
Regional			
Local			
Specific community			
3. Field Register Rating			
1.	National/Grade 1: High significance - No alteration whatsoever without permit from SAHRA		
2.	Provincial/Grade 2: High significance - No alteration whatsoever without		

	permit from provincial heritage authority.	
3.	Local/Grade 3A: High significance - Mitigation as part of development process not advised.	
4.	Local/Grade 3B: High significance - Could be mitigated and (part) retained as heritage register site	
5.	Generally protected A: High/medium significance - Should be mitigated before destruction	
6.	Generally protected B: Medium significance - Should be recorded before destruction	
7.	Generally protected C: Low significance - Requires no further recording before destruction	

APPENDIX 3. 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 4. SUBMISSION BY KBK ENGINEERS (PTY) LTD

See separate document: Submission by KBK Engineers (Pty) Ltd.