

Phase 1 Cultural Heritage Impact Assessment:

**THE PROPOSED UPGRADE OF THE AVENUE ROAD BRIDGE IN NORWOOD,
CITY OF JOHANNESBURG METROPOLITAN MUNICIPALITY,
GAUTENG PROVINCE**

Prepared for:

Envirolution (Mr T Sekele)

- Postal Address: P O Box 1898, Sunninghill, 2157; Tel: 0861 444 499, E-mail: thabang@envirolution.co.za

Prepared by:

J A van Schalkwyk (D Litt et Phil),

- Heritage Consultant: ASAPA Registration No.: 164 - Principal Investigator: Iron Age, Colonial Period, Industrial Heritage.
- Postal Address: 62 Coetzer Avenue, Monument Park, 0181; Tel: 076 790 6777; E-mail: jvschalkwyk@mweb.co.za

Report No: 2017/JvS/061

- Status: Final
- Date: November 2017
- Revision No: -
- Date: -



Copy Right:

This report is confidential and intended solely for the use of the individual or entity to whom it is addressed or to whom it was meant to be addressed. It is provided solely for the purposes set out in it and may not, in whole or in part, be used for any other purpose or by a third party, without the author's prior written consent.

Declaration:

I, J.A. van Schalkwyk, declare that:

- I am suitably qualified and accredited to act as independent specialist in this application.
- I do not have any financial or personal interest in the proposed development, nor its developers or any of their subsidiaries, apart from the provision of heritage assessment and management services, for which a fair numeration is charged.
- The work was conducted in an objective manner and any circumstances that might have compromised this have been reported.



J A van Schalkwyk
Heritage Consultant
November 2017



EXECUTIVE SUMMARY**Phase 1 Cultural Heritage Impact Assessment:
THE PROPOSED UPGRADE OF THE AVENUE ROAD BRIDGE IN NORWOOD,
CITY OF JOHANNESBURG METROPOLITAN MUNICIPALITY,
GAUTENG PROVINCE**

It is the intention of the Johannesburg Roads Agency (JRA) to upgrade the Avenue Bridge in The Gardens suburb of the City of Johannesburg, following severe flood damage sustained during heavy rainfall in February 2017.

As has been shown above, the bridge does not exhibit any particular interesting or unique features, nor can it be linked to any particular incident of important person. In addition, its integrity has also been compromised due to structural changes and neglect. However, what remains of the structure is older than 60 years and therefore enjoy general protection under the National Heritage Resources Act, 1999 (Act No. 25 of 1999)

Secondly, it does form part of the built fabric and historic layering of the surrounding suburbs, and all effort should be made to retain as much of the original bridge structure as possible.

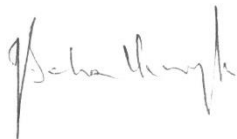
Thirdly, it is the stated aim of the Johannesburg Roads Agency to rehabilitate the bridge in sympathy with the old, remaining structures. To this end, the JRA should be commended for and receive the support from SAHRA to achieve the required rehabilitation goals.

Reasoned opinion as to whether the proposed activity should be authorised:

- From a heritage point of view, it is recommended that the proposed development be allowed to continue on acceptance of the proposed mitigation measures.

Conditions for inclusion in the environmental authorisation:

- As access to the bridge was restricted during the current survey, detailed documentation should be done of the structure "as is" before development takes place, especially of the substructure.
- Detailed descriptions and plans of the proposed alterations to the existing structure should be submitted to SAHRA for their approval prior to any work been done on the bridge.
- Apart from the reports submitted to SAHRA, copies of all documents should be retained by the JRA for possible future research projects.



J A van Schalkwyk
Heritage Consultant
November 2017

TECHNICAL SUMMARY

Project description	
Description	Upgrade of an existing road bridge
Project name	Avenue Road Bridge

Applicant
Johannesburg Roads Agency

Environmental assessors
Envirolution Consulting
Mr T Sekele

Property details						
Province	Gauteng					
Magisterial district	Johannesburg					
District municipality	City of Johannesburg					
Topo-cadastral map	2628AA					
Farm name	Klipfontein 58IR					
Closest town	Johannesburg					
Coordinates	Centre point (approximate)					
	No	Latitude	Longitude	No	Latitude	Longitude
	1	-26.14791	28.07743			

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	Yes
Construction of bridge or similar structure exceeding 50m in length	No
Development exceeding 5000 sq m	No
Development involving three or more existing erven or subdivisions	No
Development involving three or more erven or divisions that have been consolidated within past five years	No
Rezoning of site exceeding 10 000 sq m	No
Any other development category, public open space, squares, parks, recreation grounds	No

Land use	
Previous land use	Farming
Current land use	Eco Estate

TABLE OF CONTENTS

	Page
LIST OF FIGURES.....	IV
GLOSSARY OF TERMS AND ABBREVIATIONS.....	V
1. INTRODUCTION.....	1
2. TERMS OF REFERENCE	1
3. LEGISLATIVE FRAMEWORK.....	2
4. HERITAGE RESOURCES.....	3
5. STUDY APPROACH AND METHODOLOGY	4
6. SITE SIGNIFICANCE AND ASSESSMENT	5
7. DESCRIPTION OF THE AFFECTED ENVIRONMENT	6
3. DESCRIPTION OF THE BRIDGE	8
4. MANAGEMENT MEASURES.....	15
5. CONCLUSIONS.....	17
11. REFERENCES.....	18
APPENDIX 1. INDEMNITY AND TERMS OF USE OF THIS REPORT	19
APPENDIX 2. SPECIALIST COMPETENCY.....	20
APPENDIX 3. CONVENTIONS USED TO ASSESS THE SIGNIFICANCE OF HERITAGE RESOURCES	21
APPENDIX 4. RELEVANT LEGISLATION.....	23

LIST OF FIGURES

	Page
Fig. 1. Access restrictions to the site.	2
Fig. 2. Location of the bridge in the larger region.	7
Fig. 3. Town Council of Johannesburg Road Map, 1927.....	9
Fig. 4. 1939 version of Map 2628AA: Chief Surveyor-General)	9
Fig. 5. 1998 version of Map 2628AA: Chief Surveyor-General.	10

GLOSSARY OF TERMS AND ABBREVIATIONS

TERMS

Stone Age: The first and longest part of human history is the Stone Age, which began with the appearance of early humans between 3-2 million years ago. Stone Age people were hunters, gatherers and scavengers who did not live in permanently settled communities. Their stone tools preserve well and are found in most places in South Africa and elsewhere.

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

Iron Age: Period covering the last 1800 years, when new people brought a new way of life to southern Africa. They established settled villages, cultivated domestic crops such as sorghum, millet and beans, and they herded cattle as well as sheep and goats. As they produced their own iron tools, archaeologists call this the Iron Age.

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

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

Cumulative impacts: "Cumulative Impact", in relation to an activity, means the past, current and reasonably foreseeable future impact of an activity, considered together with the impact of activities associated with that activity, that in itself may not be significant, but may become significant when added to existing and reasonably foreseeable impacts eventuating from similar or diverse activities.

Mitigation, means to anticipate and prevent negative impacts and risks, then to minimise them, rehabilitate or repair impacts to the extent feasible.

ABBREVIATIONS

ADRC	Archaeological Data Recording Centre
ASAPA	Association of Southern African Professional Archaeologists
CS-G	Chief Surveyor-General
EIA	Early Iron Age
ESA	Early Stone Age
LIA	Late Iron Age
LSA	Later Stone Age
HIA	Heritage Impact Assessment
MSA	Middle Stone Age
NASA	National Archives of South Africa
NHRA	National Heritage Resources Act
PHRA	Provincial Heritage Resources Agency
SAHRA	South African Heritage Resources Agency

**Phase 1 Cultural Heritage Impact Assessment:
THE PROPOSED UPGRADE OF THE AVENUE ROAD BRIDGE IN NORWOOD,
CITY OF JOHANNESBURG METROPOLITAN MUNICIPALITY,
GAUTENG PROVINCE**

1. INTRODUCTION

It is the intention of the Johannesburg Roads Agency (JRA) to upgrade the Avenue Bridge in The Gardens suburb of the City of Johannesburg, following severe flood damage sustained during heavy rainfall in February 2017.

The following information was obtained from the City of Johannesburg's Road Agency Media Release dated 5 April 2017 (<http://www.jra.org.za>):

- An investigation into the existing storm water structure revealed that the pipes have broken and are dislocated from the trench. The failing support structures have put additional pressure on the storm water drainage system. Kerb inlets on the roadway are blocked, the parapet wall, bridge abutments and water channel have collapsed. Soil erosion has also resulted in a 5m deep trench a meter away from the sidewalk, which poses a risk to pedestrians.
- The project will include demolition of the current damaged stormwater drainage system and the construction of a new structure. Repairs will also be undertaken to the existing bridge and stream crossing, main sewer line and to other important services. The river banks will undergo reshaping and re-vegetation along with the installation of gabion walls to prevent soil erosion. The rehabilitation of Avenue Road Bridge will eliminate future flooding risks. Until the rehabilitation commences, the public are advised to exercise caution in the area during heavy rainfall.

South Africa's heritage resources, also described as the 'national estate', comprise a wide range of sites, features, objects and beliefs. According to Section 27(18) of the National Heritage Resources Act (NHRA), Act 25 of 1999, no person may destroy, damage, deface, excavate, alter, remove from its original position, subdivide or change the planning status of any heritage site without a permit issued by the heritage resources authority responsible for the protection of such site.

As the structure is older than 60 years, and therefore enjoy general protection in accordance of the National Heritage Resource Act, No. 25 of 1999, an independent heritage consultant was appointed by *Envirovolution Consulting* to evaluate and document the identified bridge in anticipation of SAHRA giving permission for its upgrading.

This 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) as amended and is intended for submission to the South African Heritage Resources Agency (SAHRA).

2. TERMS OF REFERENCE

2.1 Scope of work

The aim of this study is to determine the significance of the Hilson Bridge, Avenue Road, The Gardens, City of Johannesburg. This includes:

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

The objectives were to:

- Evaluate the potential impacts of construction, operation and maintenance of the proposed development on the identified bridge;
- Recommend mitigation measures to ameliorate any negative impacts on the identified bridge.

2.2 Limitations and assumptions

The investigation has been influenced by the following factors:

- It is assumed that the description of the proposed project, provided by the client, is accurate.
- No subsurface investigation (i.e. excavations or sampling) were undertaken, since a permit from SAHRA is required for such activities.
- It is assumed that the public consultation process undertaken as part of the Environmental Impact Assessment (EIA) is sufficient and that it does not have to be repeated as part of the heritage impact assessment.
- Access to the site was severely limited (see Fig. 1 below).



Fig. 1. Access restrictions to the site.

3. LEGISLATIVE FRAMEWORK

The HIA 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) – see Appendix 4 for more detail on this Act
 - Mineral and Petroleum Resources Development Act, 2002 (Act No. 22 of 2002) (MPRDA);
 - National Environmental Management Act 1998 (Act No. 107 of 1998) (NEMA); and
 - National Water Act, 1998 (Act No. 36 of 1998) (NWA).

- Standards and Regulations
 - South African Heritage Resources Agency (SAHRA) Minimum Standards;
 - Association of Southern African Professional Archaeologists (ASAPA) Constitution and Code of Ethics;
 - Anthropological Association of Southern Africa Constitution and Code of Ethics.
- 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).

4. HERITAGE RESOURCES

4.1 The National Estate

The NHRA (No. 25 of 1999) defines the heritage resources of South Africa which are of cultural significance or other special value for the present community and for future generations that must be considered part of the national estate to include:

- places, buildings, structures and equipment of cultural significance;
- places to which oral traditions are attached or which are associated with living heritage;
- historical settlements and townscapes;
- landscapes and natural features of cultural significance;
- geological sites of scientific or cultural importance;
- archaeological and palaeontological sites;
- graves and burial grounds, including-
 - ancestral graves;
 - royal graves and graves of traditional leaders;
 - graves of victims of conflict;
 - graves of individuals designated by the Minister by notice in the Gazette;
 - historical graves and cemeteries; and
 - other human remains which are not covered in terms of the Human Tissue Act, 1983 (Act No. 65 of 1983);
- sites of significance relating to the history of slavery in South Africa;
- movable objects, including-
 - objects recovered from the soil or waters of South Africa, including archaeological and palaeontological objects and material, meteorites and rare geological specimens;
 - objects to which oral traditions are attached or which are associated with living heritage;
 - ethnographic art and objects;
 - military objects;
 - objects of decorative or fine art;
 - objects of scientific or technological interest; and
 - books, records, documents, photographic positives and negatives, graphic, film or video material 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).

4.2 Cultural significance

In the NHRA, Section 2 (vi), it is stated that “cultural significance” means aesthetic, architectural, historical, scientific, social, spiritual, linguistic or technological value or

significance. This is determined in relation to a site or feature's uniqueness, condition of preservation and research potential.

According to Section 3(3) of the NHRA, a place or object is to be considered part of the national estate if it has cultural significance or other special value because of

- its importance in the community, or pattern of South Africa's history;
- its possession of uncommon, rare or endangered aspects of South Africa's natural or cultural heritage;
- its potential to yield information that will contribute to an understanding of South Africa's natural or cultural heritage;
- its importance in demonstrating the principal characteristics of a particular class of South Africa's natural or cultural places or objects;
- its importance in exhibiting particular aesthetic characteristics valued by a community or cultural group;
- its importance in demonstrating a high degree of creative or technical achievement at a particular period;
- its strong or special association with a particular community or cultural group for social, cultural or spiritual reasons;
- its strong or special association with the life or work of a person, group or organisation of importance in the history of South Africa; and
- sites of significance relating to the history of slavery in South Africa.

A matrix was developed whereby the above criteria were applied for the determination of the significance of each identified site (see Appendix 3). This allowed some form of control over the application of similar values for similar identified sites.

5. STUDY APPROACH AND METHODOLOGY

5.1 Methodology

5.1.1 Previous experience

A number of bridges in the Steelpoort River (Limpopo Province) were documented as part of a larger project for the Dept. of Water Affairs and Forestry (Van Schalkwyk 2010) as well as the documentation of bridges on the R104 (Van Schalkwyk 2011), N10 (Van Schalkwyk 2015) and a sandstone bridge in KwaZulu-Natal (Van Schalkwyk 2009). Experience and terminology obtained during this project was applied during the current project.

5.1.2 Literature

Available literature, such as that of the US National Parks Services regarding documentation and conservation of bridges and other structures, were used as guideline in the documentation process.

An extensive archival search has revealed no information on the construction of the bridges under discussion.

5.1.3 Field survey

The various structures were visited on 8 November and again on 15 November 2017. Basic drawings were made of each structure and they were photographically recorded by means of a Canon 550D camera. Measurements were taken by means of a Bosch PLR 30 Laser-instrument.

6. SITE SIGNIFICANCE AND ASSESSMENT

6.1 Heritage assessment criteria and grading

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

Table 2: Site Grading System.

SAHRA Cultural Heritage Site Significance			
Field Rating	Grade	Significance	Recommended Mitigation
National Significance	Grade I	High significance	Conservation by SAHRA, national site nomination, mention any relevant international ranking. No alteration whatsoever without permit from SAHRA
Provincial Significance	Grade II	High significance	Conservation by provincial heritage authority, provincial site nomination. No alteration whatsoever without permit from provincial heritage authority.
Local Significance	Grade III-A	High significance	Conservation by local authority, no alteration whatsoever without permit from provincial heritage authority. Mitigation as part of development process not advised.
Local Significance	Grade III-B	High significance	Conservation by local authority, no external alteration without permit from provincial heritage authority. Could be mitigated and (part) retained as heritage register site.
Generally Protected A	Grade IV-A	High/medium significance	Conservation by local authority. Site should be mitigated before destruction. Destruction permit required from provincial heritage authority.
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.
Generally Protected C	Grade IV-C	Low significance	Conservation by local authority. Site has been sufficiently recorded in the Phase 1 HIA. It requires no further recording before destruction. Destruction permit required from provincial heritage authority.

The occurrence of sites with a Grade I significance will demand that the development activities be drastically altered in order to retain these sites in their original state. For Grade II, III and IV sites, the applicable of mitigation measures would allow the development activities to continue.

6.2 Methodology for the assessment of potential impacts

All impacts identified during the EIA stage of the study will be classified in terms of their significance. Issues were assessed in terms of the following criteria:

- The **nature**, a description of what causes the effect, what will be affected and how it will be affected;
- The physical **extent**, wherein it is indicated whether:
 - 1 - the impact will be limited to the site;
 - 2 - the impact will be limited to the local area;
 - 3 - the impact will be limited to the region;
 - 4 - the impact will be national; or
 - 5 - the impact will be international;
- The **duration**, wherein it is indicated whether the lifetime of the impact will be:
 - 1 - of a very short duration (0–1 years);
 - 2 - of a short duration (2-5 years);
 - 3 - medium-term (5–15 years);

- 4 - long term (> 15 years); or
- 5 - permanent;
- The **magnitude** of impact, quantified on a scale from 0-10, where a score is assigned:
 - 0 - small and will have no effect;
 - 2 - minor and will not result in an impact;
 - 4 - low and will cause a slight impact;
 - 6 - moderate and will result in processes continuing but in a modified way;
 - 8 - high, (processes are altered to the extent that they temporarily cease); or
 - 10 - very high and results in complete destruction of patterns and permanent cessation of processes;
- The **probability** of occurrence, which describes the likelihood of the impact actually occurring and is estimated on a scale where:
 - 1 - very improbable (probably will not happen);
 - 2 - improbable (some possibility, but low likelihood);
 - 3 - probable (distinct possibility);
 - 4 - highly probable (most likely); or
 - 5 - definite (impact will occur regardless of any prevention measures);
- The **significance**, which is determined through a synthesis of the characteristics described above (refer formula below) and can be assessed as low, medium or high;
- The **status**, which is described as either positive, negative or neutral;
- The degree to which the impact can be reversed;
- The degree to which the impact may cause irreplaceable loss of resources; and
- The degree to which the impact can be mitigated.

The **significance** is determined by combining the criteria in the following formula:

$S = (E+D+M) \times P$; where
 S = Significance weighting
 E = Extent
 D = Duration
 M = Magnitude
 P = Probability

The **significance weightings** for each potential impact are calculated as follows:

Table 1: Significance Ranking

Significance of impact		
Points	Significant Weighting	Discussion
< 30 points	Low	Where this impact would not have a direct influence on the decision to develop in the area.
31-60 points	Medium	Where the impact could influence the decision to develop in the area unless it is effectively mitigated.
> 60 points	High	Where the impact must have an influence on the decision process to develop in the area.

7. DESCRIPTION OF THE AFFECTED ENVIRONMENT

7.1 Site location

The structure under investigation is known as the Hilson Bridge. It used to be located at the junction of Hamlin Street and The Avenue on the border of the suburbs The Gardens and Highlands (Fig. 1).

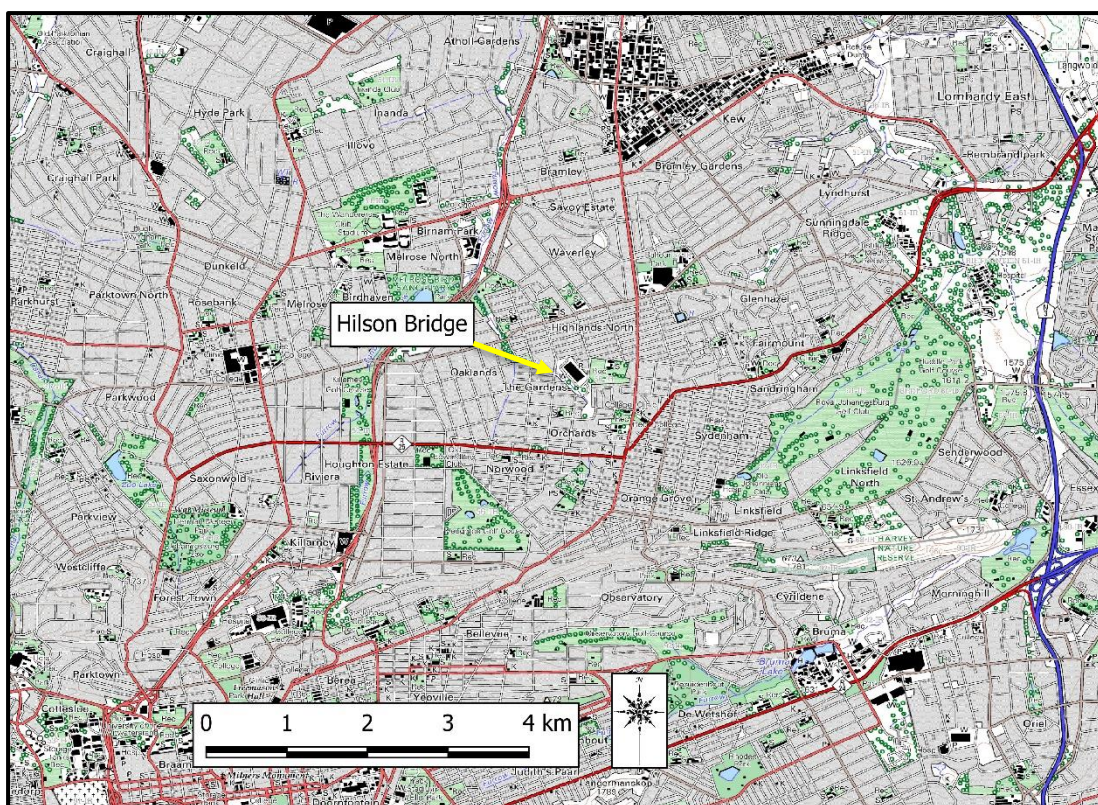


Fig. 2. Location of the bridge in the larger region.

7.2 Overview of the region

The area in which the bridge is located has been subjected to intensive urbanisation over the past 100 years. As a result, little information regarding the period prior to this process of urbanisation is available.

The study area falls within that zone usually located on the front edge of (city) urban-sprawl where the land previously used for agricultural use (only) have become subdivided into small holdings. What used to be a large single agricultural unit or farm now consists of tens of small properties. These units do not have their economic base in traditional agriculture but are sustained by a variety of land uses and economic activities with strong urban associations. This phenomenon happened in the past forty years. Therefore, most of the built fabric, date from this period. The result was that any historic farmsteads that may have existed have either disappeared or have been 'upgraded'.

Highland North:

Part of the farm Klipfontein 58-IR. The land originally belonged to Julius Rosen, who, in 1903, rented the land out to the Highlands North Estate Co. Extensions dates as follows: Ext. 1 in 1925 and Ext. 2 in 1939.

Norwood:

Part of the farm Klipfontein 58-IR. Land belonged to A Osborn, J Tucker and C Schulz who bought it in July 1902. Development of the suburb only started after 1910.

Oaklands:

Located on part of the farm Klipfontein 58-IR. The land was bought by Marthinus Andreas Begeman in December 1895. The suburb was laid out in the same year and by 1896 many of the stands were already sold. The name probably derives from an oak lane the led up to Begeman's house.

Orchards:

Located on a section of the farm Klipfontein 58-IR, it was laid out in February 1903. The property originally belonged to Jacobus Petrus Roux. The name of the suburb probably derives from the orchards that were located on the farm as well as the region.

Sydenham:

Located on a section of the farm Klipfontein 58-IR. The suburb was developed in 1905 by Richard Smeddon who bought to land in the same year.

The Gardens:

A portion of the farm Klipfontein 58-IR. The land was originally bought by John de Lacy in October 1903 for the Roman Catholic Church. The name probably refers to some orchards and gardens that used to exist on the property.

3. DESCRIPTION OF THE BRIDGE

3.1 Identified structure

The structure under investigation is known as the Hilson Bridge. It is located at the junction of Hamlin Street and The Avenue on the border of the suburbs The Gardens and Highlands.

3.1.1 Classification

According to available information, the Hilson Bridge can be classified as a simple span bridge as the effective length of the span is the same as the length of the spanning structure. The spanning superstructure extends from one vertical support, called abutment, to another, without crossing over an intermediate support. It can also be described as a rigid frame bridge, as the abutment and deck girders are fastened to form a single unit. The deck does not rest on bearings atop the abutment.

3.1.2 Materials

The material used in the construction of the bridge is cast concrete. The latter technique, although used to some extent prior to that, came into 'fashion' only during the Second World War as iron and for that matter all metals was declared a strategic resource. The use of iron was limited to the minimum and was only used for guide rails and other railings, as well as for reinforcing the concrete.

3.2 History of the bridge

According to the inscription on the 'memorial' stone, the bridge was constructed in 1926. However, the current bridge only forms part of the original bridge. Unfortunately, it was not possible to access the underside of the bridge to determine the structural changes that were done to the bridge and we are therefore limited to what can be deduced from the outside as well as from various maps.

- Based on the maps dating between 1927 and 1939, Avenue Road only went up to the stream (Sandspruit). From there it turned sharply north-east, and became Avenue Street Extension (Fig. 3 & 4 below).
- This conflicts with the current road alignment, as is indicated on all later maps, which carries on in a straight line across the river (Fig. 5), with no road branching off to the north-east.

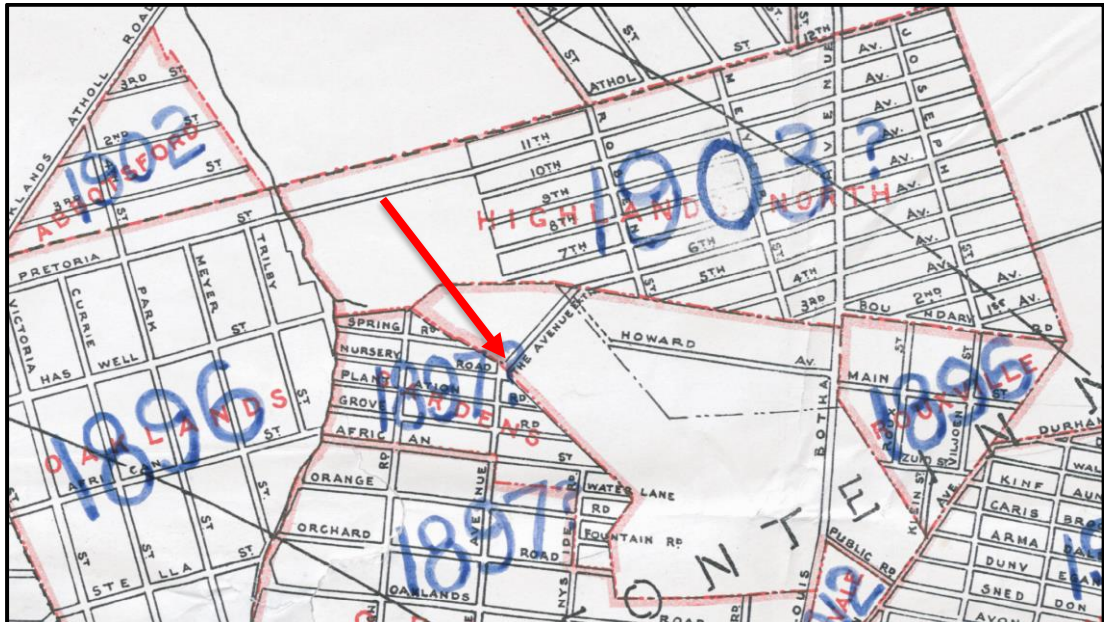


Fig. 3. Town Council of Johannesburg Road Map, 1927.

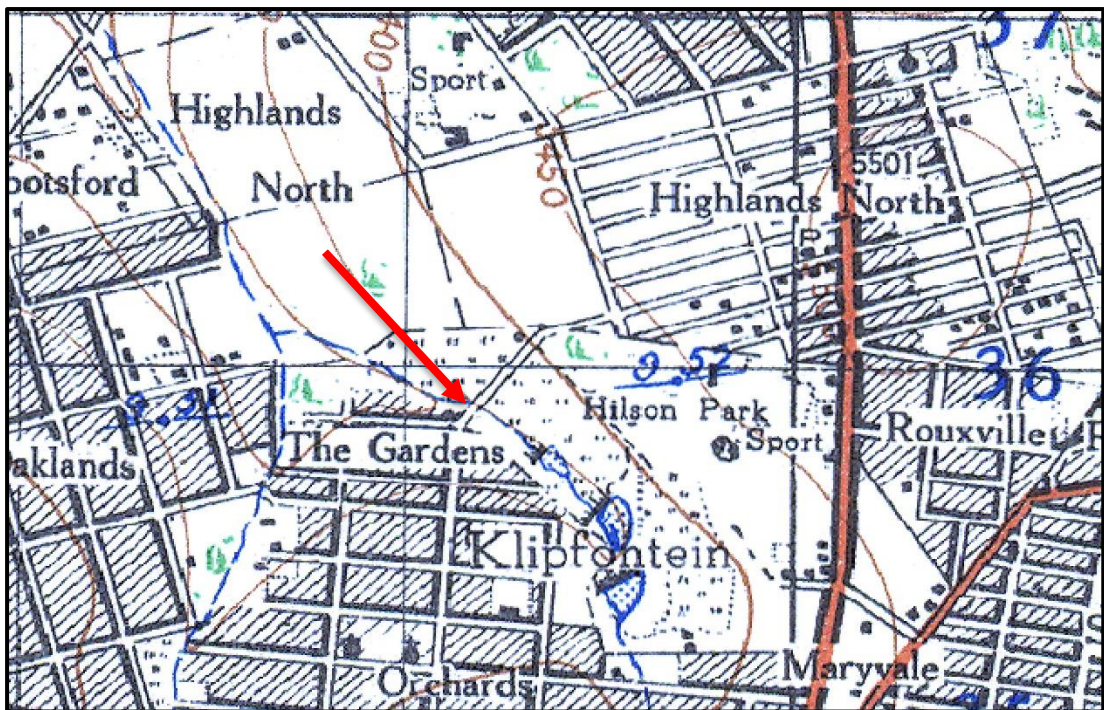


Fig. 4. 1939 version of Map 2628AA: Chief Surveyor-General)

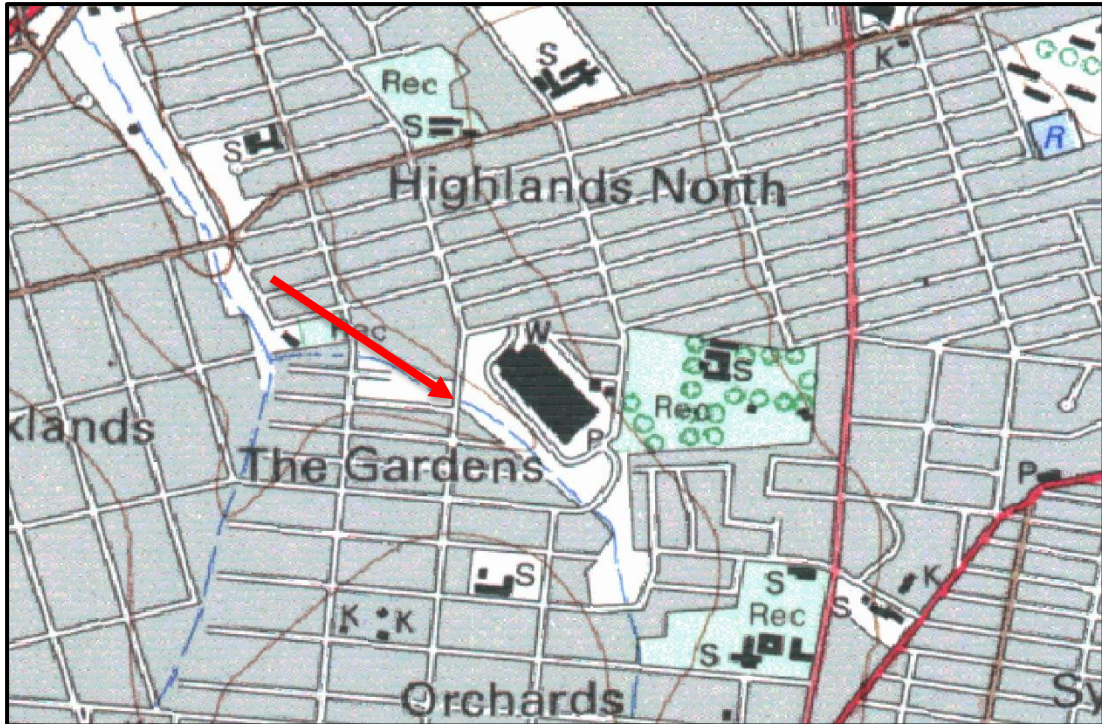


Fig. 5. 1998 version of Map 2628AA: Chief Surveyor-General.

From this it is deduced that at some point in time the road was straightened and that a section of the bridge became redundant. This argument is supported by the fact that the up-stream bridge railing (wall) is approximately 20 metres from the current road alignment.

However, both bridge railings (walls) are constructed in the same style and with the same material. As there was no reason as to why such a wide bridge would have been required at this particular junction, it can only be assumed that the downstream railing was reconstructed in its current position.

Significantly, the section downstream of the bridge has also been channelled with concrete, whereas the same is not applicable to the upstream section.

Based on the above discussion, the following conclusion is made:

- The integrity of the 1926 structure has been compromised when the road was straightened after 1939 (the last map that was identified with the road branching off to the northeast).

3.3 Bridge elements

The various elements making up the bridge will be discussed and illustrated in alphabetic order.

Abutment Wall:

Part of a structure which supports the end of a span or accepts the thrust of the arch; it often supports and retains the approach embankment.

- The walls could not be verified due to restricted access to the area.

Approach Road:

The road leading up to the bridge on both sides.

- The approach road runs between the suburbs of Highlands North and Orchards, through The Gardens. It currently consists of tarmac.



Current approach road

Bridge Deck:

The roadway portion of the bridge that carries the traffic.

- The bridge deck seems to be concrete slab, probably reinforced by girders and is then covered with a layer of tarmac – this does not exist anymore for the upstream section of the bridge.

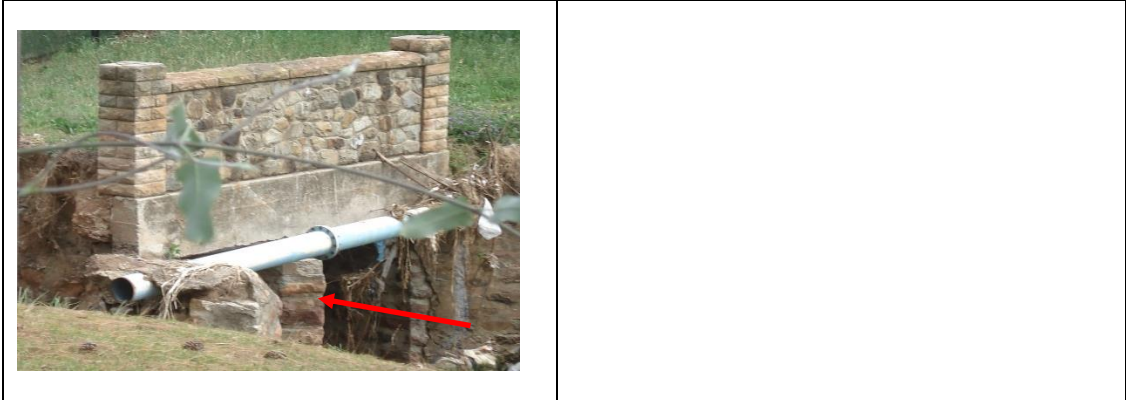


Concrete bridge deck

Columns:

Vertical structure member used to support the load of the bridge deck.

- It seems as if there were a single column supporting the bridge deck. It is from cemented dressed stone and is set at a right angle to the bridge deck in order to be parallel to the stream bed.



Commemoration/dedication:

Any form of naming or honouring a person or event, usually a local politician or celebrity.

- A square stone inlaid on the upstream railing with the words: City of Johannesburg, Hilston Bridge – Brug, 1926.
 - This is an interesting statement as Johannesburg only achieved city status in 1928 (Raper 2004). The implication is that this stone was added at a later point in time and therefore did not form part of the original bridge, again questioning the integrity of the original structure.



Embankment:

Angled grading of the ground, leading up to the bridge.

- The could not be verified due to restricted access to the area.

Guide rail:

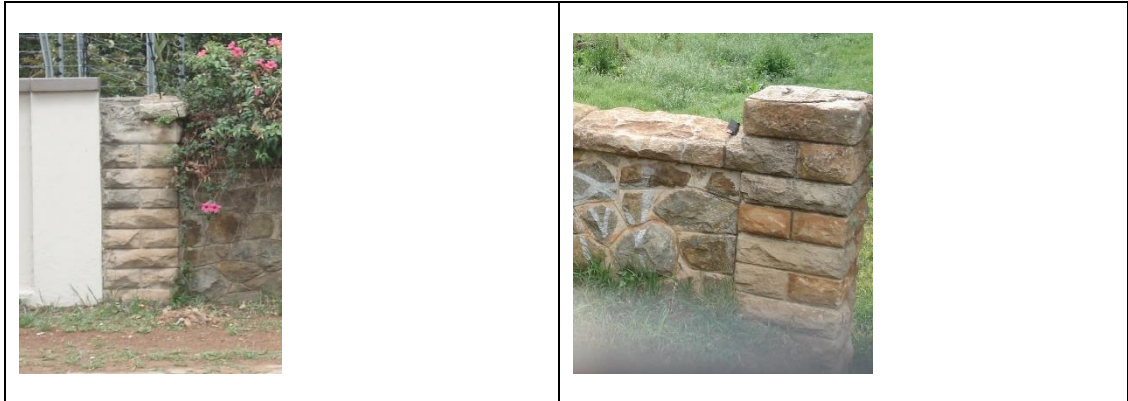
A low railing alongside the outer edge of a bridge deck used to protect vehicles and pedestrians from going too close to the edge.

- The could not be verified due to restricted access to the area. On the main section of the bridge these are now replaced by formal pavements for pedestrian crossings.

Pylon:

A monumental vertical structure marking the entrance to a bridge or forming part of a gateway.

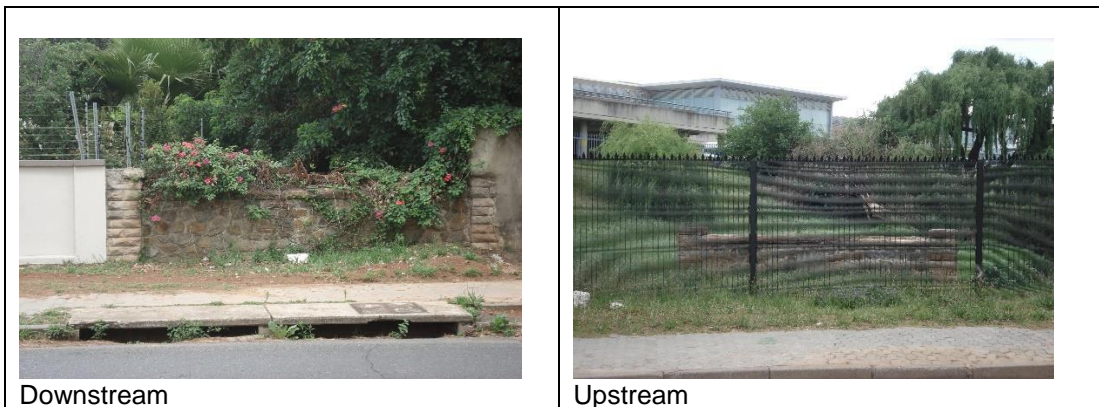
- Small columns of dress stone (probably sandstone) are located at each of the corners of the bridge.



Railing:

Barriers defining the outer edge of the bridge deck. Can consist of a steel/concrete structure made up of a number of upright sections or stanchions, on which horizontal railings are suspended; or walling in some or other format.

- The railings are of roughly dressed stone fixed with concrete.



Revetment:

A facing of masonry or stones to protect an embankment from erosion.

- The revetment walls are constructed from cemented stone. It usually goes down to bedrock. Due to erosion the base of the wings has eroded away.



Inside of revetment wall

3.4 Significance assessment

3.4.1 Historical Significance

- *Is the structure (bridge) associated with a historic person or group?*

It is unknown whether the bridge is associated with a particular historic person or group.

- *Is the structure associated with a historic event or activity?*

As yet it could not be determined whether the bridge is associated with an outstanding historic event of national or regional significance.

- *Is the structure associated with a historic religious, social, economic or political activity?*

These structures are usually not associated with particular religious, social, economic or political activity, but do play a facilitating role, i.e. access to institutions that represents these activities, e.g. churches, schools or places of work.

- *Does the structure illustrate a historical period?*

The bridge represents the type of infrastructure development that took place in the period between the two World Wars when urbanisation increased at a rapid rate.

- *Is the structure older than 60 years?*

According to the memorial stone the bridge was completed in 1926.

3.4.2 Architectural significance

- *Is the structure an example of a particular bridge type?*

Due to the limited access to the bridge, the substructure could not be investigated. However, from what was seen and what is known about similar bridges in the larger region, it seems to conform to the bridge type that was constructed for similar sized crossings in the same environment.

- *Is the structure an example of a particular style or period?*

Due to the rapid expansion of the surrounding suburbs in the region at the early part of the 20th century, these bridges all seem to conform to a particular type, but it is not possible to link them to an architectural style *per sé*.

- *Do the structure contain fine details and or workmanship?*

Apart from the dressed sandstone used for the pylons and capping of the stone railings, the bridge does not exhibit any fine details.

- *What is the state of the integrity of the structure?*

As indicated above, the integrity of the bridge has been compromised when the original alignment of the road was changed. Secondly, recent neglect and flood damaged contributed to more damage.

- *Is the structure still utilized?*

A section of the bridge is still utilized.

- *Was the structure extended and altered?*

It is believed that when the original alignment of the road was changed, the bridge was expanded side-ways. However, it is not possible to determine the extent of these changes, due to difficulties in getting access to the site.

3.4.3 Environmental and spatial significance

- *Is the structure a landmark in the town or city?*

The site is unobtrusive and even difficult to observe in its totality.

- *Does the structure or any of the features contribute to the character of the neighbourhood?*

As the site is very unobtrusive, overgrown and behind security fencing, it contributes little visually to the character of the neighbourhood.

- *Does the structure or any of the features contribute to the character of the street or square?*

As the site is very unobtrusive, overgrown and behind security fencing, it contributes little visually to the character of the neighbourhood.

- *Is it an important group of buildings?*

It is difficult to determine whether it is an exceptionally important group of buildings. This would only be possible after a complete study on similar settlements in the region has been done.

4. 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 proposed 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.

Sources of risk were considered with regards to development activities defined in Section 2(viii) of the NHRA that may be triggered and are summarised in Table 2A and 2B below. These issues formed the basis of the impact assessment described. The potential risks are discussed according to the various phases of the project below.

4.1 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 NHRA, should these be discovered during construction activities.

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 activities.
- 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 heritage practitioner 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).

4.2 Control

In order to achieve this, the following should be in place:

- A person or entity, e.g. the Environmental Control Officer, should be tasked to take responsibility for the heritage sites and should be held accountable for any damage.
- Known sites should be located and isolated, e.g. by fencing them off. All construction workers should be informed that these are no-go areas, unless accompanied by the individual or persons representing the Environmental Control Officer as identified above.
- In areas where the vegetation is threatening the heritage sites, e.g. growing trees pushing walls over, it should be removed, but only after permission for the methods proposed has been granted by SAHRA. A heritage official should be part of the team executing these measures.

Table 2A: Construction Phase: Environmental Management Programme for the project

Action required	Protection of heritage sites, features and objects		
Potential Impact	The identified risk is damage or changes to resources that are generally protected in terms of Sections 27, 28, 31, 32, 34, 35, 36 and 37 of the NHRA that may occur in the proposed project area.		
Risk if impact is not mitigated	Loss or damage to sites, features or objects of cultural heritage significance		
Activity / issue	Mitigation: Action/control	Responsibility	Timeframe
1. Removal of Vegetation 2. Construction of required infrastructure, e.g. access roads, water pipelines	See discussion in Section 9.1 above	Environmental Control Officer	During construction only
Monitoring	See discussion in Section 9.2 above		

Table 2B: Operation Phase: Environmental Management Programme for the project

Action required	Protection of heritage sites, features and objects
Potential Impact	It is unlikely that the negative impacts identified for pre-mitigation will occur if the recommendations are followed.
Risk if impact is	Loss or damage to sites, features or objects of cultural heritage

not mitigated	significance		
Activity / issue	Mitigation: Action/control	Responsibility	Timeframe
1. Removal of Vegetation 2. Construction of required infrastructure, e.g. access roads, water pipelines	See discussion in Section 9.1 above	Environmental Control Officer	During construction only
Monitoring	See discussion in Section 9.2 above		

5. CONCLUSIONS

It is the intention of the Johannesburg Roads Agency (JRA) to upgrade the Avenue Bridge in The Gardens suburb of the City of Johannesburg, following severe flood damage sustained during heavy rainfall in February 2017.

As has been shown above, the bridge does not exhibit any particular interesting or unique features, nor can it be linked to any particular incident of important person. In addition, its integrity has also been compromised due to structural changes and neglect. However, what remains of the structure is older than 60 years and therefore enjoy general protection under the National Heritage Resources Act, 1999 (Act No. 25 of 1999)

Secondly, it does form part of the built fabric and historic layering of the surrounding suburbs, and all effort should be made to retain as much of the original bridge structure as possible.

Thirdly, it is the stated aim of the Johannesburg Roads Agency to rehabilitate the bridge in sympathy with the old, remaining structures. To this end, the JRA should be commended for and receive the support from SAHRA to achieve the required rehabilitation goals.

Reasoned opinion as to whether the proposed activity should be authorised:

- From a heritage point of view, it is recommended that the proposed development be allowed to continue on acceptance of the proposed mitigation measures.

Conditions for inclusion in the environmental authorisation:

- As access to the bridge was restricted during the current survey, detailed documentation should be done of the structure "as is" before development takes place, especially of the substructure.
- Detailed descriptions and plans of the proposed alterations to the existing structure should be submitted to SAHRA for their approval prior to any work been done on the bridge.
- Apart from the reports submitted to SAHRA, copies of all documents should be retained by the JRA for possible future research projects.

11. REFERENCES

11.1 Data bases

Chief Surveyor General
Environmental Potential Atlas, Department of Environmental Affairs and Tourism.
Heritage Atlas Database, Pretoria
National Archives of South Africa
SAHRA Archaeology and Palaeontology Report Mapping Project (2009)
SAHRIS Database

11.2 Literature

Joubert, E. 1955. *Road transport in South Africa during the 19th century*. School of Librarianship. Cape Town: University of Cape Town.

Raper, P.E. 2004. *South African place names*. Johannesburg: Jonathan Ball Publishers.

Van der Waal, G-M. 1979. *Projek: Opname Historiese Geboue in Johannesburg. Vierde verslag: Buitewyke*. Volume 1. Johannesburg: Randse Afrikaanse Universiteit.

Van Schalkwyk, J.A. 2009. *Documentation of an old sandstone bridge across the Flagstone Spruit, N11 national route, southwest of Ladysmith, kwaZulu-Natal Province*. Unpublished report 2009/JvS/0044.

Van Schalkwyk, J.A. 2010. *Documentation of heritage resources in the Steelpoort River valley, Mpumalanga and Limpopo Provinces*. Unpublished report for Dept. Water Affairs and Forestry.

Van Schalkwyk, J.A. 2011. *Documentation of four bridges on road R104 between Pretoria and Bronkhorstspuit, Gauteng Province*. Unpublished report 2011/JvS/049. Pretoria.

Van Schalkwyk, J.A. 2012a. *Documentation of four bridges on the N10 national road between Upington and Groblershoop, Northern Cape Province*. Unpublished report: 2012/JvS/018.

Van Schalkwyk, J.A. 2012b. *Heritage documentation of four bridges on a section of the N11 national route north of Mokopane, Limpopo Province*. Unpublished report 2012JvS/036.

Van Schalkwyk, J.A. 2014. *Documentation of the Keeromspruit Bridge located between Middleburg and Loskop Dam, Mpumalanga Province*. Unpublished report: 2012/JvS/018.

Van Schalkwyk, J.A. 2015. *Documentation of a number of bridge and culvert structures on the N10 national road between Upington and Groblershoop, Northern Cape Province*. Unpublished report: 2015/JvS/032.

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

11.3 Maps and aerial photographs

Google Earth
1: 50 000 Topocadastral maps
Norwood/Orchards Residents Association: <http://www.nora.org.za>

APPENDIX 1. INDEMNITY AND TERMS OF USE OF THIS REPORT

The findings, results, conclusions and recommendations given in this report are based on the author's best scientific and professional knowledge as well as available information. The report is based on survey and assessment techniques which are limited by time and budgetary constraints relevant to the type and level of investigation undertaken and the author reserve the right to modify aspects of the report including the recommendations if and when new information may become available from ongoing research or further work in this field, or pertaining to this investigation.

Although all possible care is taken to identify all sites of cultural importance during the investigation of study areas, it is always possible that hidden or sub-surface sites could be overlooked during the study. The author of this report will not be held liable for such oversights or for costs incurred as a result of such oversights.

Although the author exercises due care and diligence in rendering services and preparing documents, he accepts no liability and the client, by receiving this document, indemnifies the author against all actions, claims, demands, losses, liabilities, costs, damages and expenses arising from or in connection with services rendered, directly or indirectly by the author and by the use of the information contained in this document.

This report must not be altered or added to without the prior written consent of the author. This also refers to electronic copies of this report which are supplied for the purposes of inclusion as part of other reports, including main reports. Similarly, any recommendations, statements or conclusions drawn from or based on this report must make reference to this report. If these form part of a main report relating to this investigation or report, this report must be included in its entirety as an appendix or separate section to the main report.

APPENDIX 2. 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 3. 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	Low
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 4. 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.