Phase 2 Cultural Heritage Documentation:

THE PROPOSED DEMOLISHING OF THE OLD CROWNWOOD ROAD BRIDGE, LOCATED IN THETA, JOHANNESBURG SOUTH, CITY OF JOHANNESBURG METROPOLITAN MUNICIPALITY, GAUTENG PROVINCE

Prepared for:

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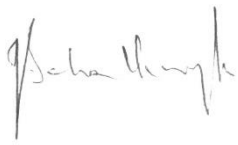
- Status: Final
- Date: February 2020
- Revision No: -
- Date: -

Specialist competency:

Johan 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 Province, Northern Cape Province, 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.



J A van Schalkwyk
Heritage Consultant
January 2020







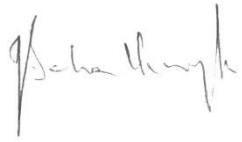
The Old Crownwood Road Bridge, seen from the air (2018)
(Image: Google Earth)

SPECIALIST DECLARATION

I, J A van Schalkwyk, as the appointed independent specialist, in terms of the 2014 EIA Regulations (as amended), hereby declare that I:

- I act as the independent specialist in this application;
- I perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant;
- regard the information contained in this report as it relates to my specialist input/study to be true and correct, and do not have and will not have any financial interest in the undertaking of the activity, other than remuneration for work performed in terms of the NEMA, the Environmental Impact Assessment Regulations, 2014 (as amended) and any specific environmental management Act;
- I declare that there are no circumstances that may compromise my objectivity in performing such work;
- I have expertise in conducting the specialist report relevant to this application, including knowledge of the Act, Regulations and any guidelines that have relevance to the proposed activity;
- I will comply with the Act, Regulations and all other applicable legislation;
- I have no, and will not engage in, conflicting interests in the undertaking of the activity;
- I have no vested interest in the proposed activity proceeding;
- I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing - any decision to be taken with respect to the application by the competent authority; and the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority;
- I have ensured that information containing all relevant facts in respect of the specialist input/study was distributed or made available to interested and affected parties and the public and that participation by interested and affected parties was facilitated in such a manner that all interested and affected parties were provided with a reasonable opportunity to participate and to provide comments on the specialist input/study;
- I have ensured that the comments of all interested and affected parties on the specialist input/study were considered, recorded and submitted to the competent authority in respect of the application;
- all the particulars furnished by me in this specialist input/study are true and correct; and
- I realise that a false declaration is an offence in terms of regulation 48 and is punishable in terms of section 24F of the Act.

Signature of the specialist



J A van Schalkwyk
February 2020

EXECUTIVE SUMMARY

Phase 1 Cultural Heritage Impact Assessment:
THE PROPOSED DEMOLISHING OF THE OLD CROWNWOOD ROAD BRIDGE, LOCATED IN THETA, JOHANNESBURG SOUTH, CITY OF JOHANNESBURG METROPOLITAN MUNICIPALITY, GAUTENG PROVINCE

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.

The old Crownwood Road Bridge located to the north of Theta in southern Johannesburg is part of a road that functions as an important link between the Johannesburg CBD and southern suburbs such as Booyens, Theta, Robertham, etc. The bridge was originally constructed c. prior to 1950s, but since then urban development expanded rapidly, resulting in a huge increase in traffic volumes. As indicated in the introduction, this caused serious problems and it was decided to construct a new bridge

The bridge currently acts as a barrier, catching driftwood and rubbish, impeding the flow of the river. It was therefore decided to demolish the structure, remove the remains and thereby normalise the flow of the river.

Based on what is known about the bridge and what remains of it currently, the following can be said:

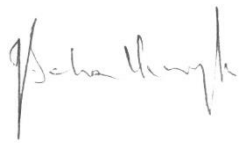
- It might be older than 60 years;
- Due to neglect, the deliberately removal of constituent elements, or as a result of vandalism, the integrity of the bridge has been totally compromised;
- It shows no unique features, either in its design or construction; and
- No important person or event can be associated with it.

The bridge is therefore rated to be:

- Local/Grade 4B: Low significance and should be recorded before destruction.

Basic documentation (photographic and descriptive) of the main features of this structure was done and is contained in this report.

It has also been shown in this report that bridges of similar construction and age are to be found in a number of places all over the South African countryside. Fortunately, most of them are in good condition due to continued use.



J A van Schalkwyk
Heritage Consultant
February 2020

TECHNICAL SUMMARY

Heritage Resource	
Crownwood Road Bridge	
Structures older than 60 years (Section 34)	Places, buildings, structures and equipment of cultural interest

Property owner	Gauteng Department of Roads and Transport

Location	
Farm name	Boundary of Mooifontein 225IQ & Langlaagte 224IQ
Magisterial district	Johannesburg
District municipality	City of Johannesburg
Topocadastral map	2628AA
Central coordinate	S 26,22762; E 28,00248
Size of development footprint	Confined to current bridge structure

Significance of site/feature			
Provincial Significance	Grade 4B	Medium significance	Should be recorded before destruction

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GLOSSARY OF TERMS AND ABBREVIATIONS

TERMS

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.

Historic Period: Since the arrival of the white settlers - c. AD 1830 - in this part of the country.

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

National Estate: The collective heritage assets of the Nation.

ACRONYMS and ABBREVIATIONS

ASAPA	Association of Southern African Professional Archaeologists
HIA	Heritage Impact Assessment
I & AP's	Interested and Affected Parties
NASA	National Archives of South Africa
NHRA	National Heritage Resources Act
PHRA	Provincial Heritage Resources Agency
SAHRA	South African Heritage Resources Agency
SAHRIS	South African Heritage Resources Information System

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1. INTRODUCTION

1.1 Background

The old Crownwood Road bridge is located in Theta, Johannesburg South (Fig. 1). The bridge became obsolete with the opening of a new one located 55 m upstream (i.e. to the east) in 2019. The replacement of the bridge became a requirement due to a number of reasons:

- It was old and not maintained up to standard;
- It was unsafe for pedestrians to cross due to the narrowness of the bridge itself and the large volume of vehicle traffic it carried;
- Due to its layout it presented a sharp turn that had to be negotiated before a vehicle could cross the bridge;
- As it was a single lane bridge (Fig. 2), it became a traffic bottleneck, causing endless delays and frustrations, eventually also becoming a crime hotspot – a few examples are:
    - Local journalist Sibonelo Mtshali wrote on 20 March 2019 in the "Southern Courier", warning citizens to be vigilant on Crownwood Road at the bridge as smash-and-grab incidents took regularly place while motorists were waiting to cross the bridge.
    - Members of the public also took to social media, e.g. **facebook**, to register their concern and frustration when trying to cross the bridge: on 19 August 2019 a local person posted a complaint that "Unruly drivers blocking intersections, driving on onoming (*sic*) traffic lane, cutting queues by crossing solid line."

The bridge currently acts as a barrier, catching driftwood and rubbish, impeding the flow of the river. It was therefore decided to demolish the structure, remove the remains and thereby normalise the flow of the river.

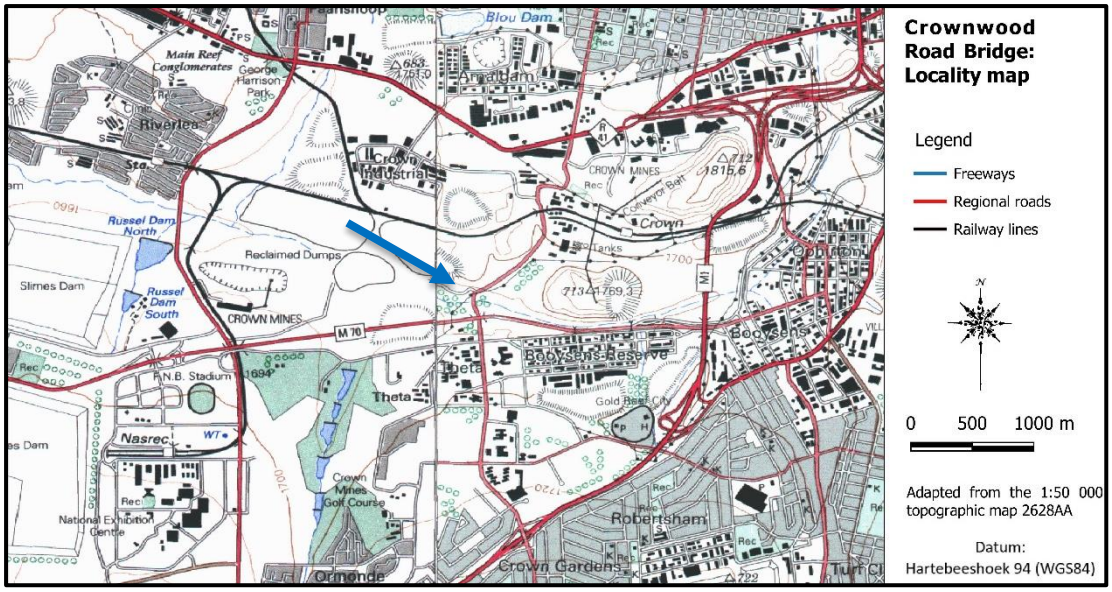

Figure 1. Location of the old Crownwood Bridge

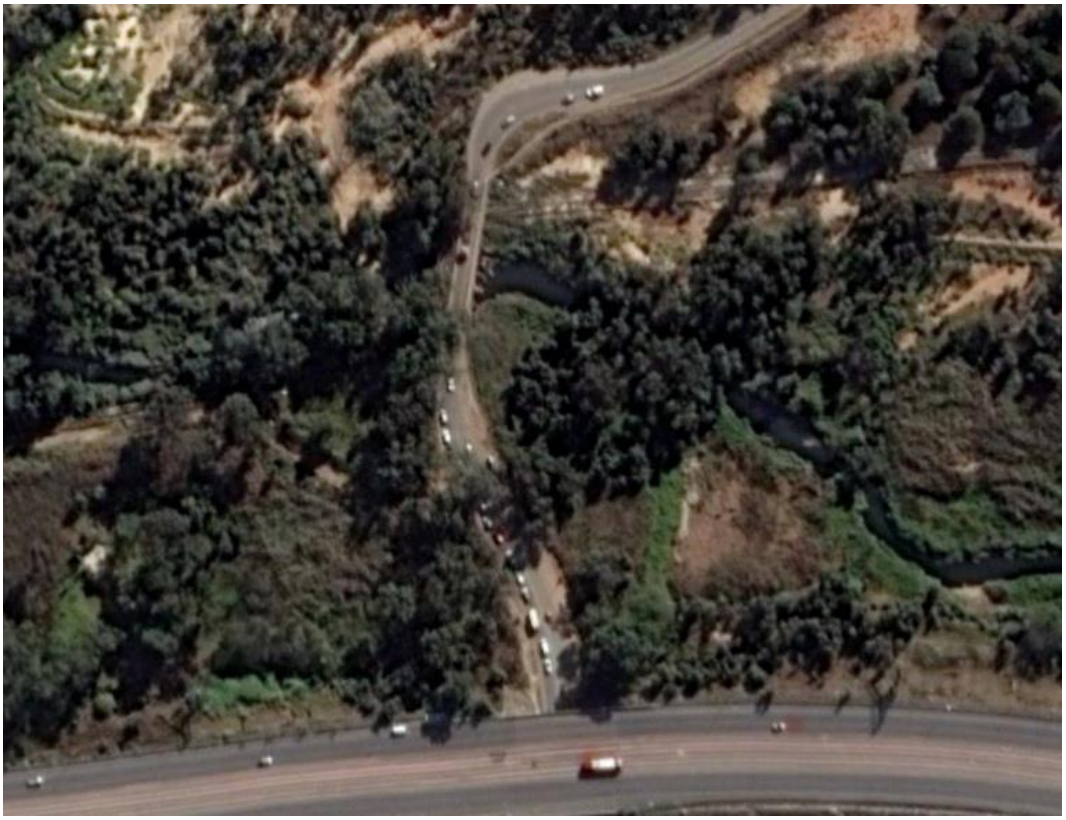

Figure 2. Traffic congestion caused by the single lane bridge
(Image: Google Earth)

At present the date of the construction of the old Crownwood Road bridge is uncertain, but it is estimated that it is probably older than 60 years and therefore enjoys general protection under the National Heritage Act, No. 25 of 1999. Accordingly, it was decided to request a Phase II documentation project. Subsequently, an independent heritage consultant was appointed to undertake this task.

1.2 Public participation

Apart from the usual Notification of Intent to Develop (NID) that was submitted to SAHRA/PHRA and site notices that were put up, the project was also announced on the website "The Heritage Portal" (Fig. 3 below).

- Up until the completion of this report, no comments were registered on this portal.

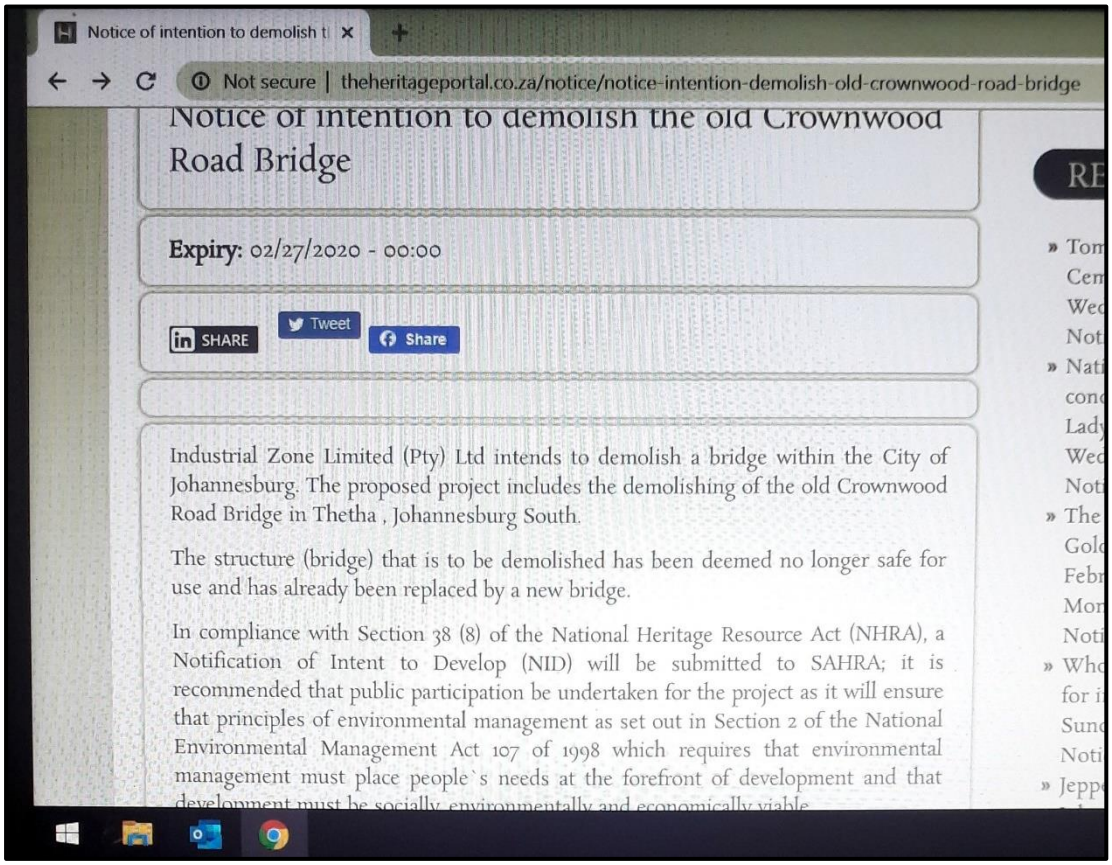

Figure 3. Partial screenshot of the notification done on the website “The Heritage Portal”

2. STUDY APPROACH AND METHODOLOGY

2.1 **Methodology**

2.1.1 Previous experience

A number of different types of bridges were documented in full – see list of references in Section 10 below. This is in addition to more than 400 structures that been documented at a basic level, all of which have been incorporated into a digital database.

2.1.2 Literature

Available literature, especially that of the US National Parks Services regarding documentation and conservation of bridges and other structures were studied.

2.1.3 *Field survey*

Physical documentation of the bridge took place on 2 February 2020 and 27 February 2020. Due to the high level of the water, as well as the large amount of rubbish and driftwood, and plant growth on the bridge and embankments, it was very difficult to get access to the underside of the bridge to obtain the required measurements as well as taking usable photographs. Subsequently, measurements were taken by using a Bosch PLR30 digital laser range finder. All features were extensively photographed by means of a Canon 550D digital camera (but were reduced in size for the purpose of inclusion in this report).

2.1.4 *Additional information*

Since the completion of the new bridge in 2019, various elements of the bridge were removed, either deliberately, or as a result of vandalism, and therefore could not be recorded since the request for a Phase 2 documentation was only issued in November 2019. Fortunately, by using Google Earth's historic imagery, it was possible to gain some understanding of what it was that was demolished/destroyed – see the various Figures below.

3. HISTORY OF THE BRIDGE

By studying the various available maps and aerial photographs, it was possible to determine an approximate date for the construction of the bridge, between c. 1927 – 1938. However, this date should also be subjected to some qualification, as there seems to have been older structures on the site as well. This will be addressed below.

Troye's Map of the Witwatersrandt (sic) Gold Fields (1890) (Fig. 4) indicated that no development, mining or urban, exists in the region at that time. This seems to remain the same as the official road map issued by the Johannesburg City Council (Fig. 5) also shows no roadworks in the area. However, it does show urban areas in the region that predates Troy's map, e.g. Booyens and Booyens Reserve.

The 1939 version of the official 1:50 000 topographic map (Fig. 6) clearly shows a road that passes across the river at the point where the (old) Crownwood Road Bridge is located today. However, this structure seems to be much longer and narrower than the current (old) bridge when seen on the official aerial photograph dating to 1938 (Fig. 7). This deduction is supported by the presence of a number of structures that does not relate to the current (old) bridge (see Fig. 9 below). Unfortunately, the later aerial photograph dating to 1952 (Fig. 8) are not clear enough to distinguish any detail.

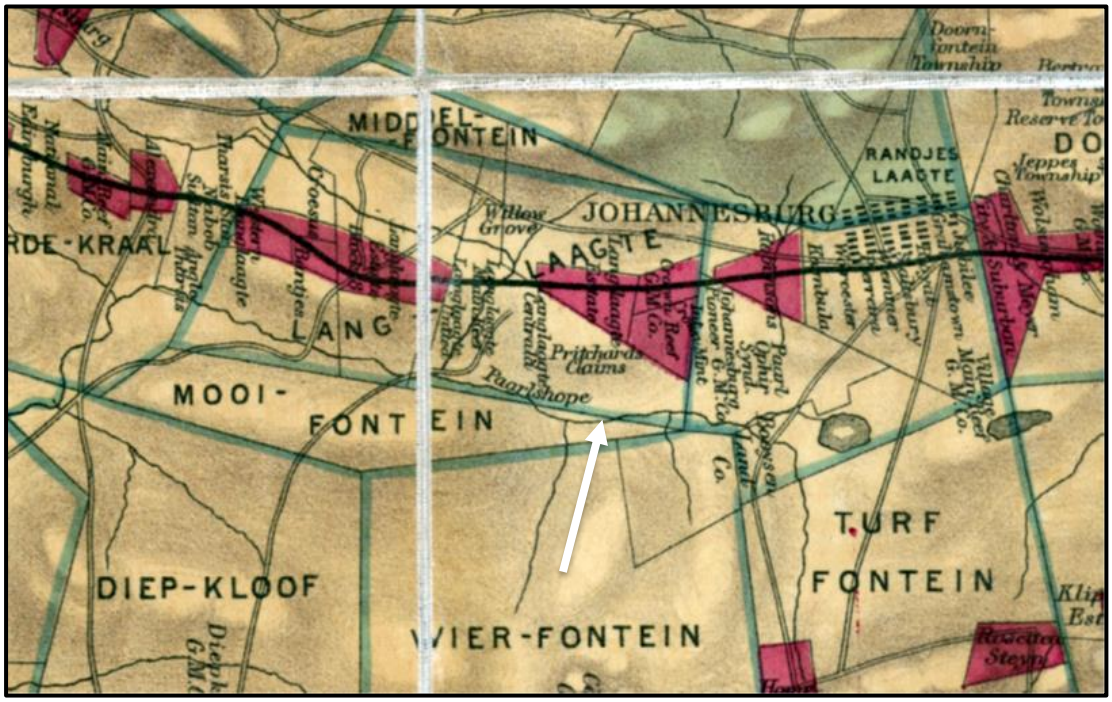

Figure 4. The study area on "Troye's Map of the Witwatersrandt Gold Fields" (1890)

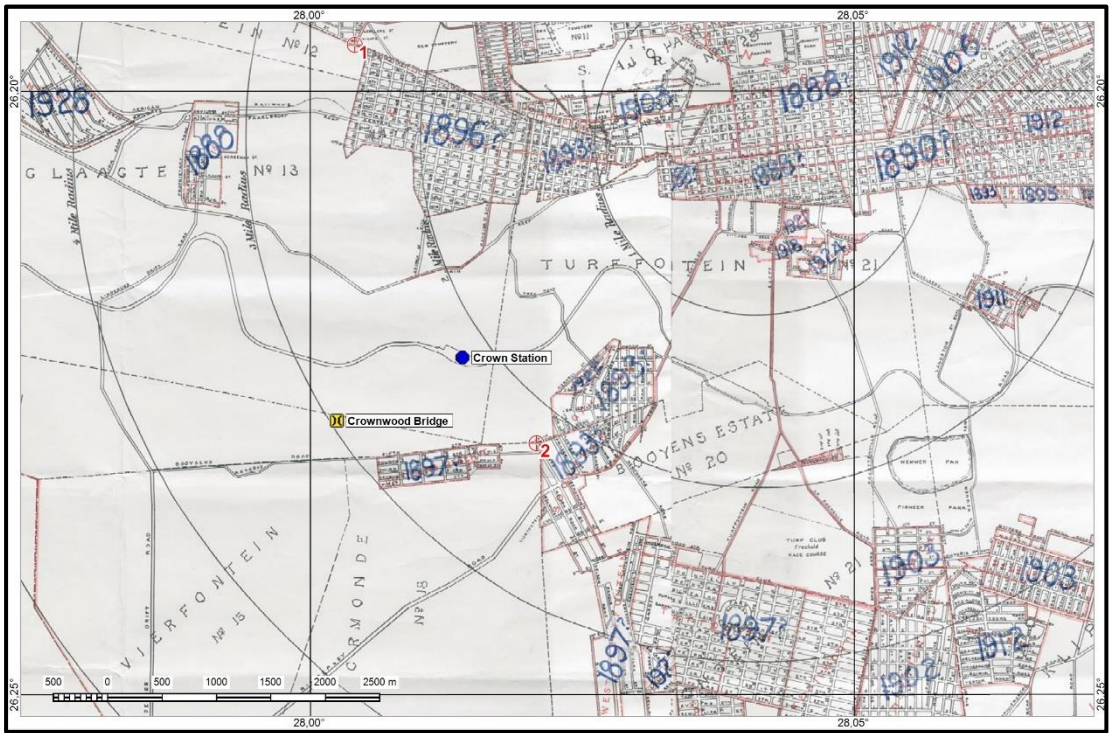

Figure 5. Location of the (future) Crownwood bridge in 1927
(Road Map issued by the Johannesburg Town Council) (Numbered wheel-crosses = calibration points)

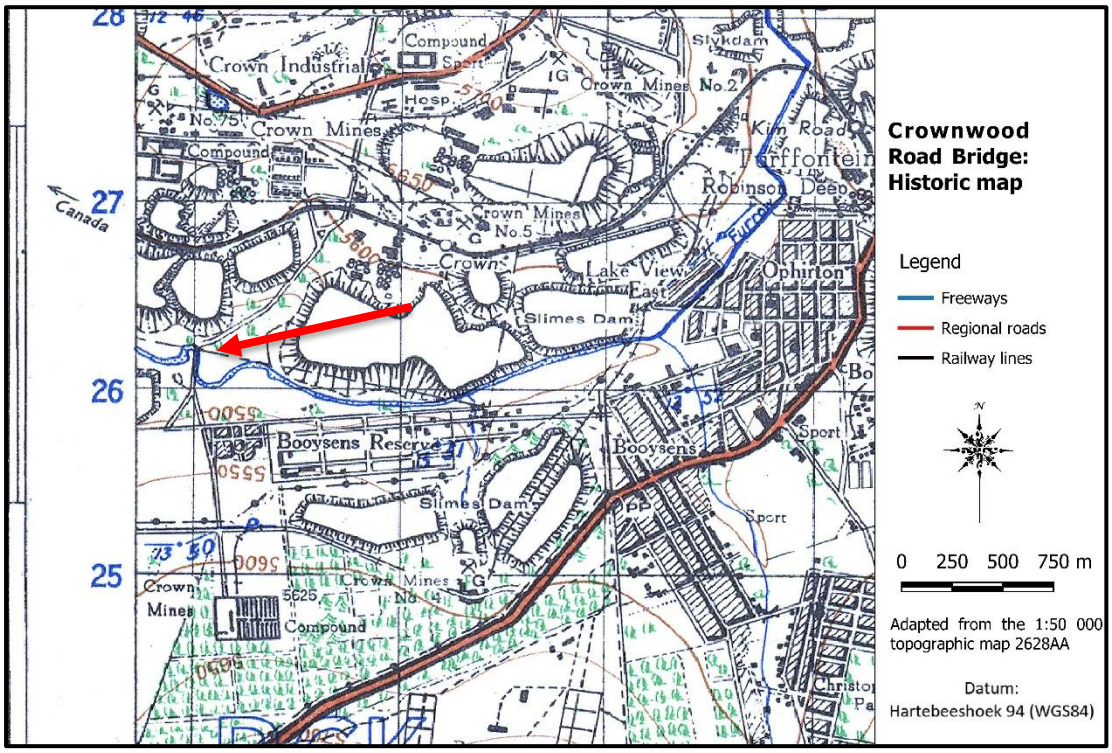

Figure 6. The location of the bridge on the 1939 version of the official 1:50 000 topographic map

Figure 7. The location of the bridge seen on the 1938 version of the official aerial photograph (Photograph: 133_013_06151)

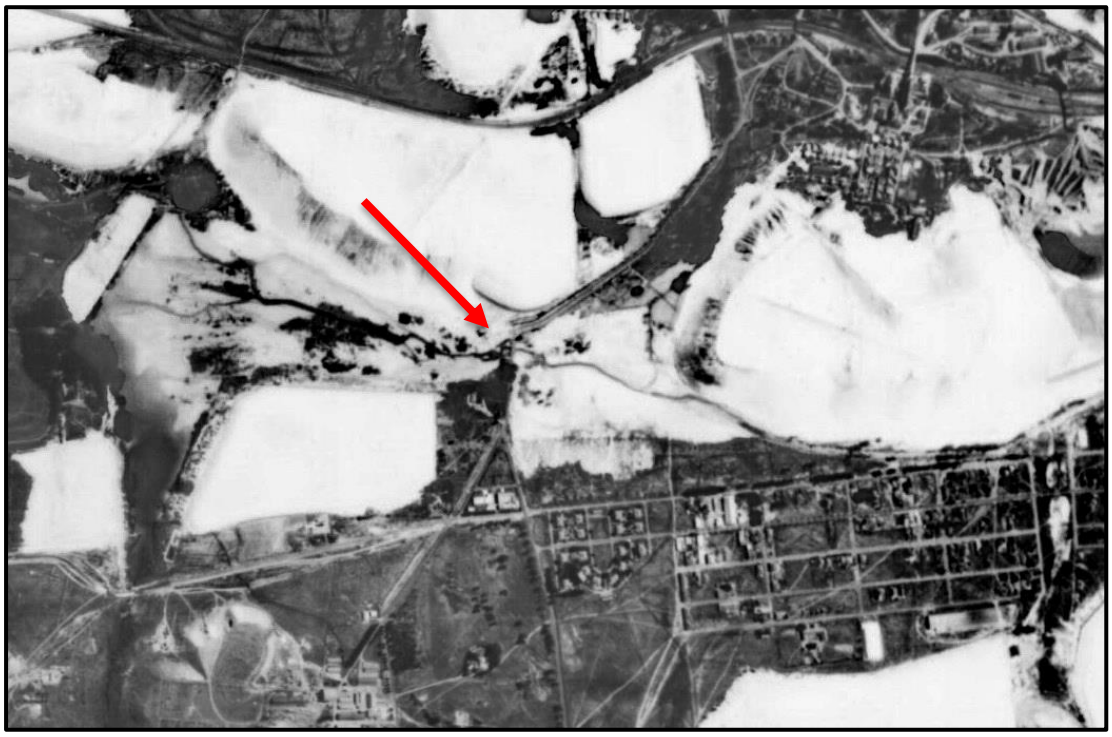

Figure 8. The location of the bridge seen on the 1952 version of the official aerial photograph (Photograph: 314_006_43618)

Figure 9. The older features in relation the (old) bridge

Details of the various features are indicated below in Fig. 10. Some (Fig. 10.1) seems to be retaining walls abutting to an older stone-built wall, which might have been an old dam wall (Fig. 10.2. The two larger segments of these structures (Fig. 10.3) seems to have housed some kind of sluice-gate. This is confirmed by their location close to each other, as well as some vertical grooves on the inside and the location of various bolts and ringbolts in strategic positions (Fig. 10.4 – 10.6).

It is postulated that this structure originally consisted of a small dam retaining wall. As (sludge) pipes had to be installed between the various slimes-dams (see aerial photographs in Fig. 7 & 8 above, these larger structures were built to accommodate it and the whole system was incorporated into the older, then existing dam.

10.1

10.2

10.3

10.4

10.5

10.6

Figure 10. Details of the older features next to the bridge

Eventually, in 2019, the old bridge was replaced by the new one located a short distance to the east (Fig. 11).

Figure 11. The old bridge on the left and new one on the right
(Image: Google Earth)

4. EVALUATION

A matrix was developed whereby the criteria as set out in Sections 3(3) and 7 of the NHRA, No. 25 of 1999, were applied for the structure. This allowed some form of control over the application of similar values for similar sites. Three categories of significance are recognized: low, medium and high. In terms of Section 7 of the NHRA, the structure is evaluated to have a grading as identified in the table below.

1. Historic value			
Is it important in the community, or pattern of history			No
Does it have strong or special association with the life or work of a person, group or organisation of importance in history			No
Does it have significance relating to the history of slavery			No
2. Aesthetic value			
It is important in exhibiting particular aesthetic characteristics valued by a community or cultural group			No
3. Scientific value			
Does it have potential to yield information that will contribute to an understanding of natural or cultural heritage			No
Is it important in demonstrating a high degree of creative or technical achievement at a particular period			No
4. Social value			
Does it have strong or special association with a particular community or cultural group for social, cultural or spiritual reasons			No
5. Rarity			
Does it possess uncommon, rare or endangered aspects of natural or cultural heritage			No
6. Representivity			
Is it important in demonstrating the principal characteristics of a particular class of natural or cultural places or objects			Yes
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			No
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.			No
7. Sphere of Significance	High	Medium	Low
International			
National			
Provincial			
Regional			
Local			Yes
Specific community			
8. Significance rating of feature			
1.	Low		Yes
2.	Medium		
3.	High		
9. 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 4A: High/medium significance - Should be mitigated before destruction		
6.	Generally protected 4B: Medium significance - Should be recorded before destruction		Yes
7.	Generally protected 4C: Low significance - Requires no further recording before destruction		

5. TECHNICAL DETAIL

The Crownwood Road Bridge is a single lane cast concrete bridge with a reinforced concrete deck. The superstructure is supported by seven cast concrete columns. The total bridge width is 5,6 m and the total length is approximately 45m and has a height of 3 meters above the current water level.

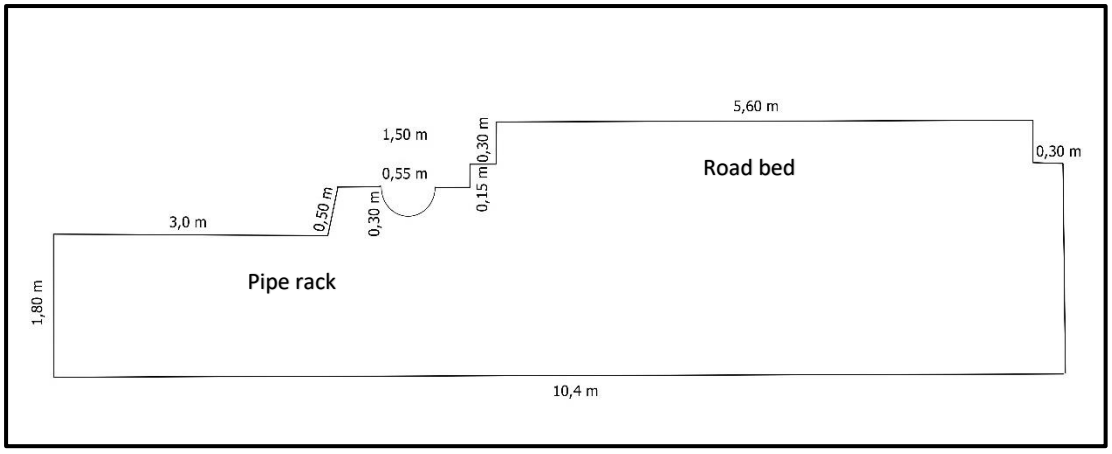

Figure 12. Profile sketch of the bridge structure showing the more important measurements
(It should be remembered that when the bridge was originally built, the measurements would have been according to the Imperial Standards of Measurements)

Figure 13. Side view of the old bridge, looking downstream

This is probably the most common type of bridge built in the country – see Fig. 14 below.


Eastern Cape


KwaZulu-Natal


Limpopo


Limpopo


Gauteng


Gauteng


Mpumalanga

North-West

Free State

Figure 14. Examples of bridges of similar material and construction across the country

6. DESCRIPTION OF THE BRIDGE

6.1 *Materials*

The material used in the construction of the bridge is largely 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.

Liebenberg *et al* (1984) describes the history of the development of concrete bridges. The local history does not differ much from that of concrete development in other parts of the world. With the development of pre-stressed and reinforced concrete it became easy to construct large numbers of shorter span bridges much cheaper than it would have been the case with iron or steel.

The abutment walls were constructed by means of cementing in sandstone blocks up to the required dimensions. Although many quarries, in the old days run by farm owners, were quite adept in producing blocks of required size and uniform shape, local conditions had to be taken into account at a project such as the building of a bridge. This usually required the presence of stonemasons on the site to trim the final few blocks to fit into place (oral information collected from farmers in the Bethal/Ermelo area).

6.2 *Bridge elements*

The various elements making up the bridge will be discussed and illustrated in alphabetic order by first defining it, then describing it and lastly by illustrating it. For measurements, refer to the technical drawing in Fig. 12 above.

Abutment Wall:

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

This was constructed from cast concrete. It probably rests on a foundation, currently below water level, which goes down to bedrock.

At its foundation is a layer of sandstone blocks of various sizes that are held in place with cement. This forms part of an older spillway located at the old dam wall located adjacent to the bridge.

Abutment wingwall:

- Extensions of a retaining wall as part of an abutment; used to contain the fill of an approach embankment.

Due to excessive plant growth and erosion, it is difficult to get a clear picture of this. It is probably soil that was banked down and supported in placed with concrete plinths.

Approach road:

- The road leading up to the bridge on both sides.

This is currently a tarmac road, carrying vehicular traffic in a south to north direction.

	

Bridge deck:

- The roadway portion of a bridge that supports the traffic.

The bridge deck consists of concrete, which is also part of the construction of the bridge and is then covered with a layer of tarmac. The total length of the bridge deck is just over 45 m.

	

Columns:

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

Seven columns support the bridge deck. It is from cast concrete and is set at a slight angle to the bridge deck in order to be parallel to the stream bed. They vary in height according to their location in relation to the riverbanks, becoming longer towards the centre of the river.


Angled view


Top view

Deck floor:

- The top layer on which the traffic crosses.

This consists of a layer of tarmac laid directly on the concrete bridge deck.

Embankment:

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

Done by packing down soil until the necessary height was achieved, diminishing in height the further one proceed away from the river. Due to excessive plant growth and erosion, it is difficult to get a clear picture of this. However, as this is a very low-level bridge, the embankment is very shallow.

Guide rail:

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

Not present

Pipe rack:

- Structure added to the columns which is used to house pipes crossing the river.

This is constructed from cast concrete and, as it forms a continuous part of the bridge columns, it probably was included as part of the original design. It carried one large pipe as well as 4 smaller ones. The latter number is determined from the number of (sawn-off) bolts that remains on the top of the rack. These pipes can be seen on old photographs coming from the east, on the right-hand bank of the river, crossing below the road, turning south to cross he river at the bridge (see frontispiece).


Side view


Vertical view

Railings:

- Consists of steel structure made up of a number of upright sections or stanchions, on which horizontal railings are suspended.

Unfortunately, all of this has been removed (see below). However, by using historic images (Google Earth) it is possible to get an idea of hat it used to be. On the upstream side of the river it used to be metal stanchions with some form of cross members. On the downstream side, at the pipe packs, it was cast concrete, which probably replaced the original metal structure and the remains of the stanchions can still be seen on that side. There were at least 15 upright stanchions to a side.


Image: Google Earth

Revetment:

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

This could only be determined on the upstream, left-hand bank of the bridge.

	

7. CONCLUSIONS

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.

The old Crownwood Road Bridge located to the north of Theta in southern Johannesburg is part of a road that functions as an important link between the Johannesburg CBD and southern suburbs such as Booyens, Theta, Robertham, etc. The bridge was originally constructed c. prior to 1950s, but since then urban development expanded rapidly, resulting in a huge increase in traffic volumes. As indicated in the introduction, this caused serious problems and it was decided to construct a new bridge

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Basic documentation (photographic and descriptive) of the main features of this structure was done and is contained in this report.

It has also been shown in this report that bridges of similar construction and age are to be found in a number of places all over the South African countryside. Fortunately, most of them are in good condition due to continued use.

- It is therefore our viewpoint that the proposed demolishing of the old Crownwood Road bridge should continue on condition of the Provincial Heritage Resource Agency issuing a permit to this effect.

8. REFERENCES

8.1 Data bases

Chief Surveyor General
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SAHRIS Database

8.2 Literature

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8.3 Maps and aerial photographs

1: 50 000 Topocadastral maps
Google Earth
Aerial photographs