

**DOCUMENTATION OF THE RIETSPRUIT DAM, LOCATED SOUTH OF
VENTERSDORP IN NORTH WEST PROVINCE**

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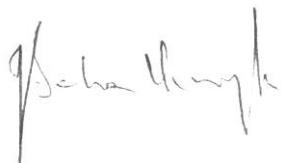
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Declaration:

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



J A van Schalkwyk (D Litt et Phil)
Heritage Consultant
October 2015

EXECUTIVE SUMMARY

DOCUMENTATION OF THE RIETSPRUIT DAM, LOCATED SOUTH OF VENTERSDORP IN NORTH WEST PROVINCE

The Department of Water and Sanitation is continuously monitoring the status of the large number of dams > 4800 in the country. Chief concern in this is the safety risk presented by each dam. If, on investigation, the risk seems too high, the particular dam is upgraded to counter this hazard. One such dam is the Rietspruit Dam located south of Ventersdorp in North West Province. As early as 2006 an investigation into the safety of this dam proposed various recommendations for remedial actions that are to be implemented.

However, as the dam was constructed prior to 1954, it is older than 60 years and consequently enjoys general protection under the Heritage Act, No. 25 of 1999. It was therefore recommended that the dam wall should be documented before it can be upgraded, in anticipation of SAHRA issuing a permit for the upgrade.

In accordance with the National Heritage Resource Act, No. 25 of 1999, an independent heritage consultant was appointed by **Royal HaskoningDHV** to document the identified dam wall.

In order to determine the significance of the feature, the following aspects were reviewed:

- A review of the technology and materials used in the construction of the dam was done.
 - In this report, the various elements making up the dam wall and its ancillary features were documented. This should be read in conjunction with the report of the consulting engineers (Royal HaskoningDHV 2015). From this it was determined that the Rietspruit Dam does not exhibit any remarkable construction techniques or features.
- The history of the development of the dam.
 - From the above research into the background history of the Rietspruit Dam it was determined that it cannot be linked to any historical event or significant person.
- The history of the larger region was reviewed to determine if any event of historical, cultural or political significance could be linked to the dam.
 - From the above research into the background history of the region it was determined that the Rietspruit Dam cannot be linked to any historical event or significant person
- A review was done of other dams in the larger region to determine how many “similar” ones are still in existence.
 - Similar earth dams are still to be found in the larger region, of which the following are but a few, all sharing the same construction principles and all dating to the period from the 1920s to the 1960s:
 - Klipdrift Dam, Enzel Spruit, Potchefstroom region;
 - Boskop Dam, Mooi River, Potchefstroom;
 - Bospoort Dam, Elands River, Rustenburg region;
 - Rust de Winter Dam, Elandsriver, Hammanskraal region;
 - Bon Accord Dam, Apies River, Pretoria region;
 - Rietvlei Dam, Rietvlei River, Pretoria region.

Further afield similar dams are for example:

- Glen Alpine Dam, Mogalakwena River, Pietersburg region;
- Grass Ridge Dam, Great Brak River, Eastern Cape;
- Tsojana Dam, Ncuncuzo River, Eastern Cape.

Based on the above, the Rietspruit Dam is judged to have low significance on a regional level. This information is deemed sufficient for presentation to SAHRA in order for the latter body to issue the required permit before the upgrading of the dam wall can take place.

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.

Conditions for inclusion in the environmental authorisation:

- Should any heritage features, archaeological sites or graves be exposed during construction work, it must immediately be reported to a heritage practitioner so that an investigation and evaluation of the finds can be made.



J A van Schalkwyk
Heritage Consultant
October 2015

TECHNICAL SUMMARY

Property details						
Province	North West					
Magisterial district	Ventersdorp					
District municipality	Dr Kenneth Kaunda					
Topo-cadastral map	2626BD					
Closest town	Ventersdorp					
Farm name	Klipplaatdrif					
Coordinates	Centre point (approximate)					
	No	Latitude	Longitude	No	Latitude	Longitude
	1	S 26.41356	E 26.79709			

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

Development	
Description	Upgrading of an existing storage dam
Project name	Rietspruit Dam Upgrade

Land use	
Previous land use	Vacant
Current land use	Urban

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GLOSSARY OF TERMS AND ABBREVIATIONS

TERMS

Study area: Refers to the entire study area as indicated by the client in the accompanying Fig. 1 and 2.

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
Late 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
Late Iron Age	AD 1300 - AD 1830

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

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

DOCUMENTATION OF THE RIETSPRUIT DAM, LOCATED SOUTH OF VENTERSDORP IN NORTH WEST PROVINCE

1. INTRODUCTION

The Department of Water and Sanitation is continuously monitoring the status of the large number of dams > 4800 in the country. Chief concern in this is the safety risk presented by each dam. If, on investigation, the risk seems too high, the particular dam is upgraded to counter this hazard. One such dam is the Rietspruit Dam located south of Ventersdorp in North West Province. As early as 2006 an investigation into the safety of this dam proposed various recommendations for remedial actions that are to be implemented.

Essentially, the activities will entail the infilling and deposition of about 10 000m³ of borrow material (sourced from a quarry nearby) to stabilise the base of the current earth embankment and widen the girth of the dam wall. Construction will occur in an area of approximately 5ha adjacent to the dam wall and result in the removal of about 1ha of vegetation. The work entails largely earthworks, reshaping and compaction with some work to upgrade the toe drain and possibly replace some mechanical elements referred to in the attached report (see Royal HaskoningDHV 2015).

However, as the dam was constructed prior to 1954, it is older than 60 years and consequently enjoys general protection under the Heritage Act, No. 25 of 1999. It was therefore recommended that the dam wall should be documented before it can be upgraded, in anticipation of SAHRA issuing a permit for the upgrade.

In accordance with the National Heritage Resource Act, No. 25 of 1999, an independent heritage consultant was appointed by **Royal HaskoningDHV** to document the identified dam wall.

2. SITE LOCATION AND DESCRIPTION

The Rietspruit Dam is located approximately 11 km south of the town of Ventersdorp. For more information, please see the Technical Summary presented above (p. iv).

The geology of the area is made up of sand, changing to granite in the south. The topography can be described as slightly undulating plains and the only significance change is brought about by the Rietspruit that passes through the study area. The original vegetation is classified as Dry Sandy Highveld Grassland. However, this vegetation has completely been changed on the site due to current farming activities as well as the development of holiday resorts that developed all around the dam.

The cultural landscape qualities of the region essentially consist of a rural setup. In this the human occupation is made up of a small-scale pre-colonial element consisting of Stone Age occupation and Late Iron Age occupation, as well as a much later colonial (farmer) component. The latter eventually gave rise to the development of a number of smaller towns.

Very little information regarding the occupation of the region during Stone Age times was obtained. Records indicated that rock engravings occur far to the south and west of the region. This absence of occupation can probably be attributed to this being a somewhat inhospitable region, with a lack of suitable places to live, e.g. rock shelters, as well as the fact that the area is quite open and with little open water.

Iron Age people started to settle in southern Africa c. AD 300, with one of the oldest known sites at Broederstroom south of Hartebeespoort Dam dating to AD 470. Having only had cereals (sorghum, millet) that need summer rainfall, Early Iron Age (EIA) people did not move outside this rainfall zone, and neither did they occupy the central interior highveld area.

The occupation of the larger geographical area (including the study area) did not start much before the 1500s. By the 16th century things changed, with the climate becoming warmer and wetter, creating condition that allowed Late Iron Age (LIA) farmers to occupy areas previously unsuitable, for example the Witwatersrand and the Magaliesberg (Horn 1996). However, no sites are known from this period in the larger region.

White settlers moved into the area during the first half of the 19th century. They were largely self-sufficient, basing their survival on cattle/sheep farming and hunting. This remained so up to the present day. The only alternative activity was some sporadic diamond mining that took place in the region. During the Anglo Boer War some fighting took place in the larger region. Many soldiers that died during these battles were later reburied in a cemetery on the western side of the town of Coligny.

The town of Ventersdorp was founded in 1866 on the farm Roodepoort and proclaimed a town in 1887. It is named after the former owner of the farm, Johannes Venter.

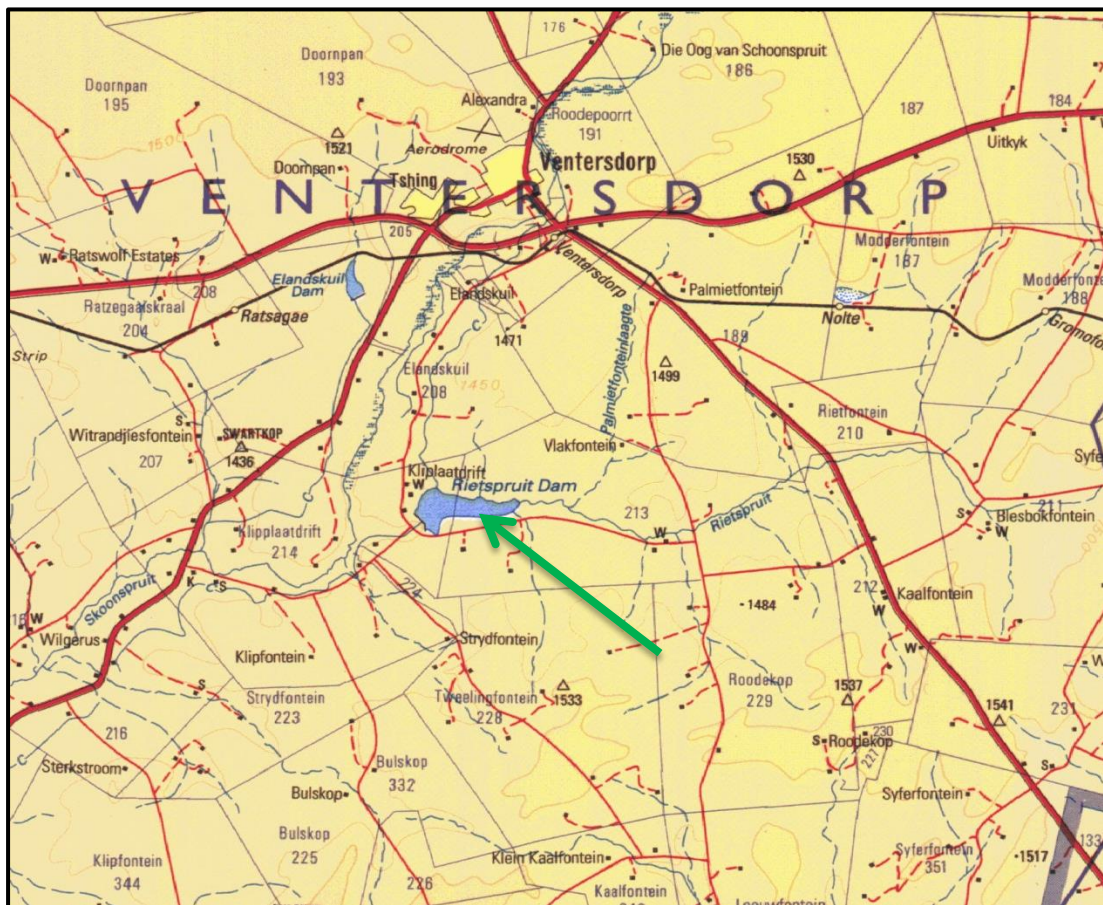


Fig. 1. Location of Rietspruit Dam in regional context.
(Map 2626: Chief Surveyor-General)

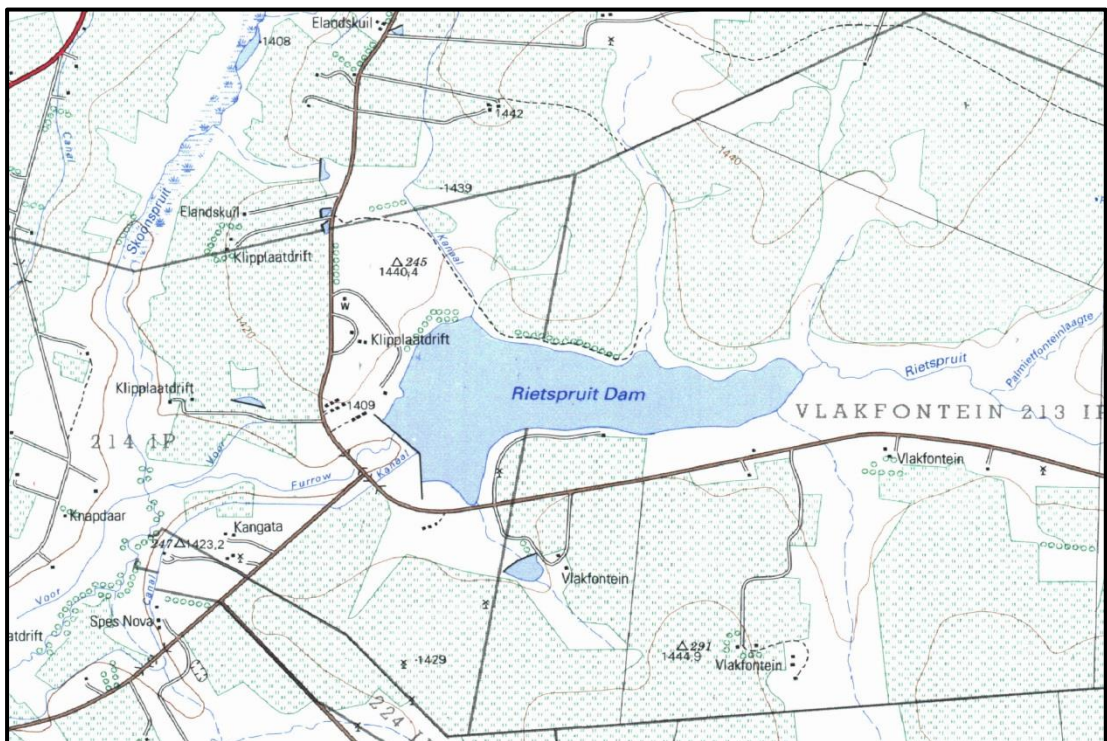
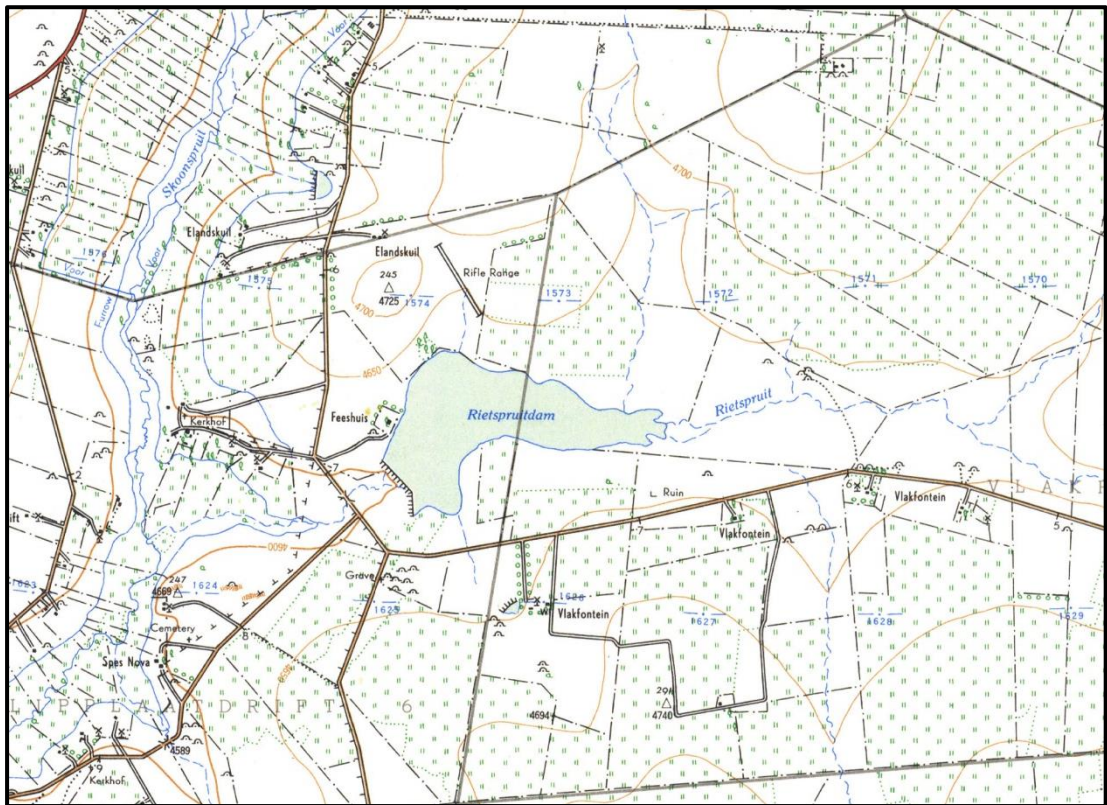


Fig. 2. The dam indicated on the 1954 and 1998 versions of the 1:50 000 cadastral maps. (Maps 2626BD: Chief Surveyor-General)

3. DESCRIPTION OF THE DAM

3.1 History of the Dam

The Rietspruit Dam is located on the Farm Klippaatdrift 214IP. Its purpose is for storage of water for irrigation, but as secondary purpose it has developed into a tourism attraction. It is located in the Rietspruit, one of the tributaries of the Schoonspruit.

According to information supplied by the Department of Water Affairs and Forestry, the dam was originally constructed in 1940, and raised to its current height by 1955.

3.2 Classification

The Rietspruit Dam is classified as an earth dam (also referred to as embankment dam). An earth dam is made of earth (or soil) built up by compacting successive layers of earth, using the most impervious materials to form a core and placing more permeable substances on the upstream and downstream sides. A facing of crushed stone prevents erosion by wind or rain, and an ample spillway, usually of concrete, protects against catastrophic washout should the water overtop the dam. Earth dam resists the forces exerted upon it mainly due to shear strength of the soil. Earth dams are usually built in wide valleys having flat slopes at flanks (abutments). They can be built on all types of foundations.

According to an inspection report by the Council for Geoscience for the Department of Water Affairs and Forestry, dated 12 October 2005, site investigations were not done prior to construction in 1940 “and ‘as built’ founding conditions were not recorded.” In other words, no information regarding the site, its geology and the inner construction of the dam is available.



Fig. 3. Aerial view of the development area.

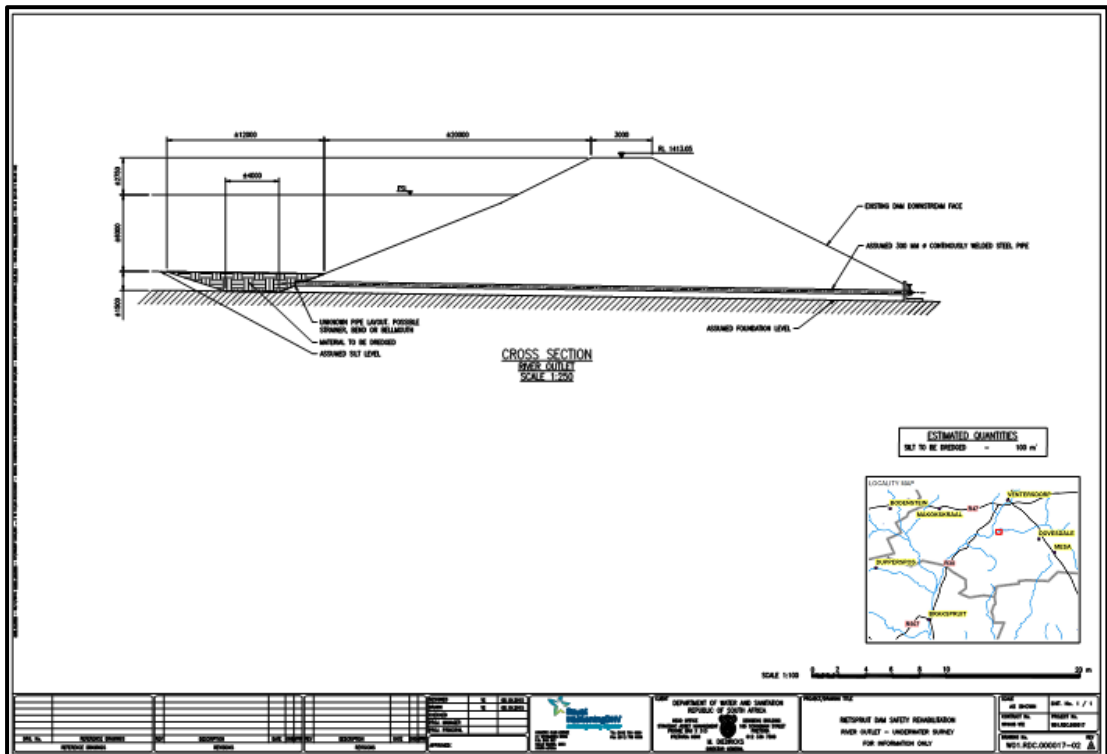
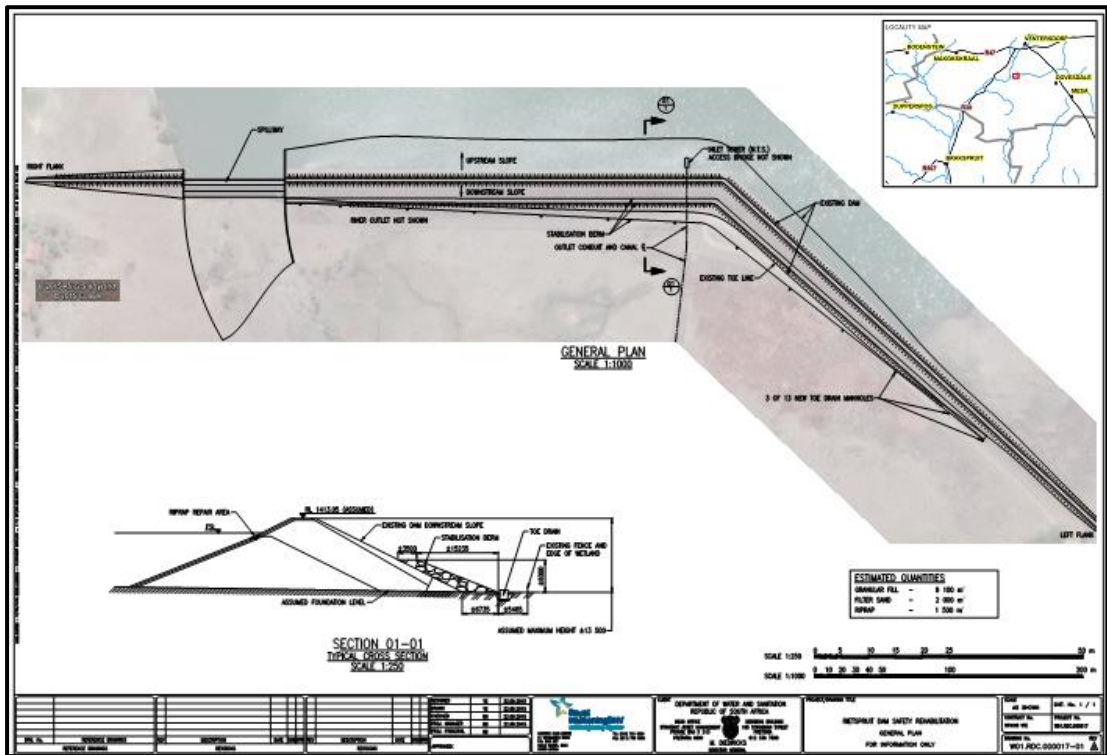


Fig. 4. Section drawings of the dam wall.

3.3 Dam elements

The various elements making up the dam wall will be discussed and illustrated in alphabetic order by first defining it, then describing it and lastly by illustrating it. The technical information used is based on documents supplied by Royal HaskoningDHV, as well as documents obtained from the U.S. Army Corps of Engineers, 2004.

Dam wall

- The structure employed in or across a waterway for the purpose of impounding or diverting water.

The crest of the dam wall is c. 920 metres (or c. 3018 ft in 1954 terms) in length and is a total of 13 metres high.



The dam wall (Photo: Google Earth)



Frontal view



Front



Western section (top)



Eastern section (top)

Dam drain valve:

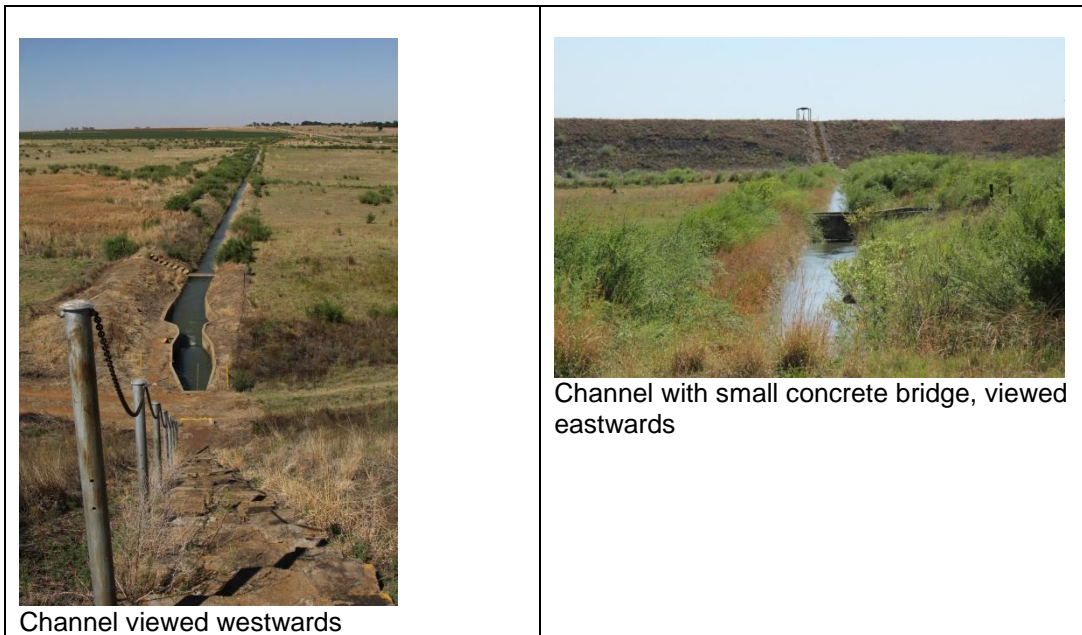
- A valve installed on the outside of the dam that can be used to drain the dam. The dam drain valve is installed towards the bottom of the dam wall in close proximity to the spillway.

The valve is linked to a conduit, usually a pipe constructed of steel or concrete, to convey the discharge through or under the dam. In this particular case the valve has rusted and is leaking and is in urgent need of repair.

*Channel outlet:*

- An opening through which water can freely be discharged for a particular purpose from a reservoir.

The Rietspruit Dam channel is made of concrete and extends over a number of kilometres southwards supplying water to different farms.



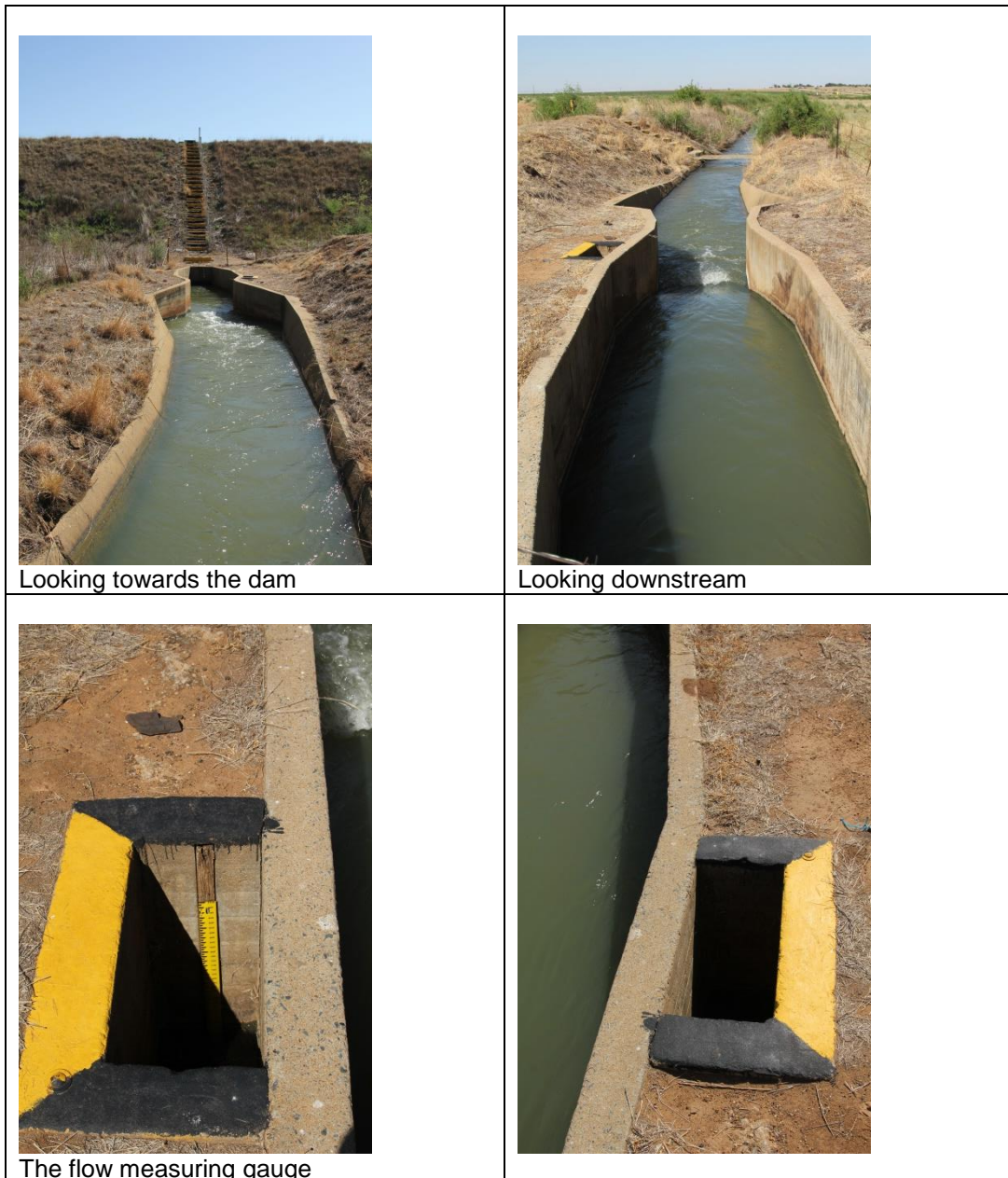
Channel viewed westwards

Channel with small concrete bridge, viewed eastwards

Flow measuring flume at the channel outlet:

- A measuring gauge inserted in the flow channel to determine the amount of water flowing out of the dam.

The measuring gauge is inserted on the left side of the channel at the point where the channel is slightly constricted.



Outlet tower.

- A structure that houses the equipment for regulating the outflow of water from the dam.

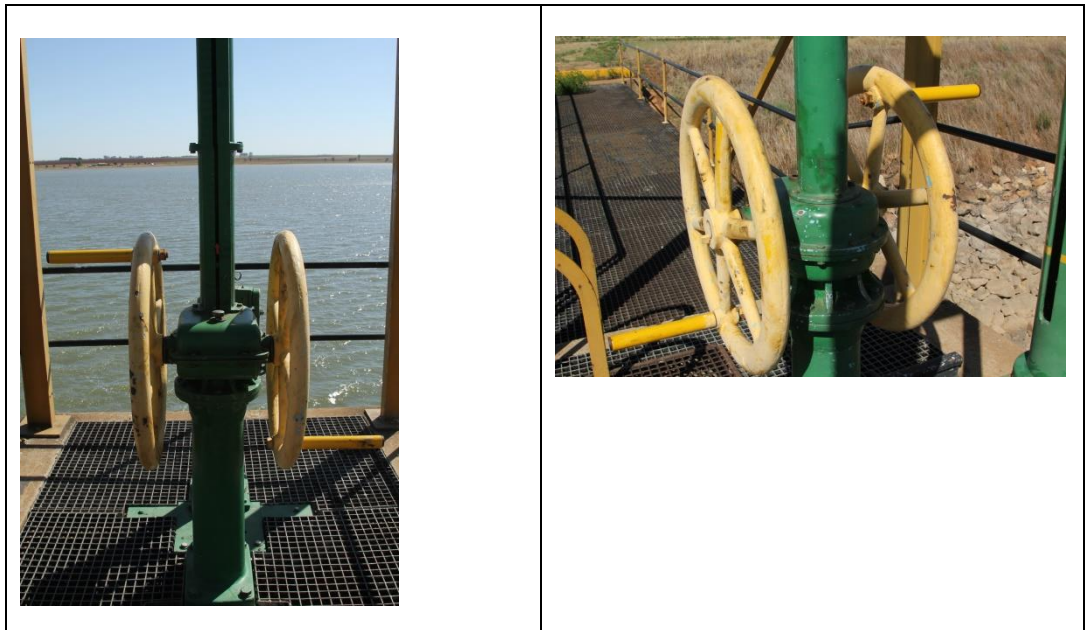
Apparently, the current outlet tower was constructed at the old spillway point prior to when the dam wall was raised. It is constructed from concrete and house the radial gate system and the outlet works isolation penstock. It is accessed by means of a steel truss bridge.



Radial gate

- Allows for the control of volume of water let out of the dam.

The radial gate system comprises of the radial gate, the lifting shaft and headstock mounted at the bottom of, within and on top of the tower respectively. The radial gate system also includes the outlet works isolation penstock.



Spillway:

- A structure over or through which flood flows are discharged. If the flow is controlled by gates, it is considered a controlled spillway; if the elevation of the spillway crest is the only control, it is considered an uncontrolled spillway

The spillway seen in cross section of the crest, the downstream slope, and bucket have an 'S' or ogee form of curve. The purpose of the bucket is to slow the water down as it cascades over the spillway. The spillway is 76 metres (or 250 ft in 1954 terms) in length. Due to the height of the water level, the height of this feature could not be ascertained.

*Spillway channel:*

- A channel conveying water from the spillway to the river downstream.

In the case of the Rietspruit Dam the left side of the spillway channel is defined by means of a concrete wall. The whole channel has been scoured clean of surface soil due to previous floods.

*Staircase:*

- For accessing the crest of the dam at the inlet tower.

According to Mr T Ackerman, this staircase is rather unique as it is not found at other dams and also the fact that it is built with hand dressed stones.



Upstream side protection:

- For protecting the upstream slope from deterioration and damage from wave action, the slope is covered with different protective material.

In this particular case use was made of riprap, a layer of large un-coursed stones, broken rock, placed on the upstream slope of an embankment dam, protection against wave action.



Rock toe drain system manholes

Six manholes are connected by gravity pipes which ties into the canal. Their function is to drain any excessive leakage from the zoned embankment into receptor manholes.



Manhole no. 6

The row of manholes

4. SITE SIGNIFICANCE AND ASSESSMENT

In order to determine the significance of the feature, the following aspects were reviewed:

- A review of the technology and materials used in the construction of the dam was done.
 - In this report, the various elements making up the dam wall and its ancillary features were documented. This should be read in conjunction with the report of the consulting engineers (Royal HaskoningDHV 2015). From this it was determined that the Rietspruit Dam does not exhibit any remarkable construction techniques or features.
- The history of the development of the dam.
 - From the above research into the background history of the Rietspruit Dam it was determined that it cannot be linked to any historical event or significant person.
- The history of the larger region was reviewed to determine if any event of historical, cultural or political significance could be linked to the dam.
 - From the above research into the background history of the region it was determined that the Rietspruit Dam cannot be linked to any historical event or significant person
- A review was done of other dams in the larger region to determine how many “similar” ones are still in existence.
 - Similar earth dams are still to be found in the larger region, of which the following are but a few, all sharing the same construction principles and all dating to the period from the 1920s to the 1960s:
 - Klipdrift Dam, Enzel Spruit, Potchefstroom region;
 - Boskop Dam, Mooi River, Potchefstroom;
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Based on the above, the Rietspruit Dam is judged to have low significance on a regional level. This information is deemed sufficient for presentation to SAHRA in order for the latter body to issue the required permit before the upgrading of the dam wall can take place.

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.

Conditions for inclusion in the environmental authorisation:

- Should any heritage features, archaeological sites or graves be exposed during construction work, it must immediately be reported to a heritage practitioner so that an investigation and evaluation of the finds can be made.

5. REFERENCES

5.1 Data bases

Chief Surveyor General
Environmental Potential Atlas, Department of Environmental Affairs and Tourism.
Heritage Atlas Database, Pretoria.
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5.2 Literature

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5.3 Interviews

Mr T Ackerman, from the Department of Water and Sanitation who is responsible for the Rietspruit Dam.

5.4 Maps and aerial photographs

1: 50 000 Topocadastral maps: 2626BD
Google Earth

APPENDIX 1: CONVENTIONS USED TO ASSESS THE SIGNIFICANCE OF HERITAGE RESOURCES

Significance

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

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

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

APPENDIX 2. RELEVANT LEGISLATION

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

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

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

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

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

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

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

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

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

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

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

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

APPENDIX 3. 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 30 years. 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 60 papers, many 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, road-, pipeline-, and power line developments, dams, mining, water purification works, historical landscapes, refuse dumps and urban developments.