



PGS

**HERITAGE & GRAVE
RELOCATION CONSULTANTS**

RAND WATER

**GL21009-RW-B19- B19 PIPELINE – LETHABO PUMP STATION IN THE
FREESTATE PROVINCE TO VEREENIGING PUMP STATION IN THE
GAUTNEG PROVINCE**

Heritage Impact Assessment

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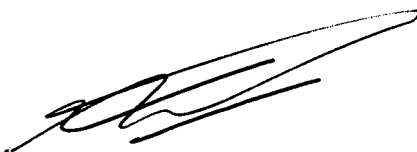
Declaration of Independence

The report has been compiled by PGS Heritage & Grave Relocation Consultants an appointed Heritage Specialist for Greenline Environmental Consulting (Pty) Ltd. The views stipulated in this report are purely objective and no other interests are displayed during the decision making processes discussed in the Heritage Impact Assessment Process that includes the Scoping as well as this final report

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EXECUTIVE SUMMARY

PGS Heritage & Grave Relocation Consultants was appointed by Greenline Environmental Consulting (Pty) Ltd to undertake a Heritage Impact Report that forms part of the Environmental Impact Assessment (EIA) and Environmental Management Plan (EMP) for the GL21009-RW-B19- B19 Pipeline – Lethabo Pump Station to Vereeniging Pump Station, Vereeniging, Gauteng Province.

During the field work two sites of heritage significance were identified.

RW1 – Stone bridge foundation at the entrance to the Maccauvlei Golf Course. The site is situated just outside the servitude alignment and should not be impacted by the construction activities.

RW3 – Unknown brick and concrete structure. . The site is situated just outside the servitude alignment and should not be impacted by the construction activities.

It is possible that the two sites could be damaged during construction, it is thus recommended that the sites be demarcated during construction and a buffer be fenced.

Destruction or alterations to any of the sites will require permits from the Gauteng Provincial Heritage Authority.

- a. A monitoring plan must be agreed upon by all the stakeholders for the different phases of the project focussing on the areas where earthmoving will occur.
- b. If during construction any possible finds are made, the operations must be stopped and the qualified archaeologist be contacted for an assessment of the find.
- c. A management plan must be developed for managing the heritage resources in the surface area impacted by operations during construction and operation of the development. This includes basic training for construction staff on possible finds, action steps for mitigation measures, surface collections, excavations, and communication routes to follow in the case of a discovery.

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1 INTRODUCTION

PGS Heritage & Grave Relocation Consultants was appointed by Greenline Environmental Consulting (Pty) Ltd to undertake a Heritage Impact Report that forms part of the Environmental Impact Assessment (EIA) and Environmental Management Plan (EMP) for the GL21009-RW-B19- B19 Pipeline – Lethabo Pump Station to Vereeniging Pump Station, Vereeniging, Gauteng Province.

1.1 Scope of the Study

The aim of the study is to identify possible heritage sites and finds that may occur in the proposed development area. The Heritage Impact Assessment aims to inform the Environmental Impact Assessment in the development of a comprehensive Environmental Management Plan to assist the developer in managing the discovered heritage resources in a responsible manner, in order to protect, preserve, and develop them within the framework provided by the National Heritage Resources Act of 1999 (Act 25 of 1999) (NHRA).

1.2 Specialist Qualifications

The Heritage Impact Report was compiled by PGS Heritage & Grave Relocation Consultants (PGS).

The staff at PGS has a combined experience of nearly 40 years in the heritage consulting industry. PGS and its staff have extensive experience in managing HIA processes. PGS will only undertake heritage assessment work where they have the relevant expertise and experience to undertake that work competently.

Wouter Fourie, Principal Archaeologist for this project, and the two field archaeologist, Henk Steyn and Marko Hutton are registered with the Association of Southern African Professional Archaeologists (ASAPA) and has CRM accreditation within the said organisation.

1.3 Assumptions and Limitations

Not subtracting in any way from the comprehensiveness of the fieldwork undertaken, it is necessary to realise that the heritage resources located during the fieldwork do not necessarily represent all the possible heritage resources present within the area. Various factors account for this, including the subterranean nature of some archaeological sites and the current dense vegetation cover. As such, should any heritage features and/or objects not included in the present inventory be located or observed, a heritage specialist must immediately be contacted.

Such observed or located heritage features and/or objects may not be disturbed or removed in any way until such time that the heritage specialist had been able to make an assessment as to the significance of the site (or material) in question. This applies to graves and cemeteries as well. In the event that any graves or burial places are located during the development the procedures and requirements pertaining to graves and burials will apply as set out below.

1.4 Legislative Context

The identification, evaluation and assessment of any cultural heritage site, artefact or find in the South African context is required and governed by the following legislation:

- i. National Environmental Management Act (NEMA) Act 107 of 1998
- ii. National Heritage Resources Act (NHRA) Act 25 of 1999
- iii. Minerals and Petroleum Resources Development Act (MPRDA) Act 28 of 2002
- iv. Development Facilitation Act (DFA) Act 67 of 1995

The following sections in each Act refer directly to the identification, evaluation and assessment of cultural heritage resources.

- i. National Environmental Management Act (NEMA) Act 107 of 1998
 - a. Basic Environmental Assessment (BEA) – Section (23)(2)(d)
 - b. Environmental Scoping Report (ESR) – Section (29)(1)(d)
 - c. Environmental Impacts Assessment (EIA) – Section (32)(2)(d)
 - d. Environmental Management Plan (EMP) – Section (34)(b)
- ii. National Heritage Resources Act (NHRA) Act 25 of 1999

- a. Protection of Heritage resources – Sections 34 to 36; and
- b. Heritage Resources Management – Section 38
- iii. Minerals and Petroleum Resources Development Act (MPRDA) Act 28 of 2002
 - a. Section 39(3)
- iv. Development Facilitation Act (DFA) Act 67 of 1995
 - a. The GNR.1 of 7 January 2000: Regulations and rules in terms of the Development Facilitation Act, 1995. Section 31.

The NHRA stipulates that cultural heritage resources may not be disturbed without authorization from the relevant heritage authority. Section 34 (1) of the NHRA states that “no person may alter or demolish any structure or part of a structure which is older than 60 years without a permit issued by the relevant provincial heritage resources authority...”. The NEMA (No 107 of 1998) states that an integrated environmental management plan should (23:2 (b)) “...identify, predict and evaluate the actual and potential impact on the environment, socio-economic conditions and cultural heritage”. In accordance with legislative requirements and EIA rating criteria, the regulations of SAHRA and Association of Southern African Professional Archaeologists (ASAPA) have also been incorporated to ensure that a comprehensive legally compatible AIA report is compiled.

Terminology

Abbreviations	Description
AIA	Archaeological Impact Assessment
ASAPA	Association of South African Professional Archaeologists
CRM	Cultural Resource Management
DEA	Department of Environmental Affairs
DWA	Department of Water Affairs
EIA practitioner	Environmental Impact Assessment Practitioner
EIA	Environmental Impact Assessment
ESA	Early Stone Age
GPS	Global Positioning System
HIA	Heritage Impact Assessment
I&AP	Interested & Affected Party
LSA	Late Stone Age
LIA	Late Iron Age

MSA	Middle Stone Age
MIA	Middle Iron Age
NEMA	National Environmental Management Act
NHRA	National Heritage Resources Act
PHRA	Provincial Heritage Resources Agency
PSSA	Palaeontological Society of South Africa
ROD	Record of Decision
SADC	Southern African Development Community
SAHRA	South African Heritage Resources Agency

Archaeological resources

This includes:

- i. material remains resulting from human activity which are in a state of disuse and are in or on land and which are older than 100 years including artefacts, human and hominid remains and artificial features and structures;
- ii. rock art, being any form of painting, engraving or other graphic representation on a fixed rock surface or loose rock or stone, which was executed by human agency and which is older than 100 years, including any area within 10m of such representation;
- iii. wrecks, being any vessel or aircraft, or any part thereof which was wrecked in South Africa, whether on land, in the internal waters, the territorial waters or in the maritime culture zone of the republic as defined in the Maritimes Zones Act, and any cargo, debris or artefacts found or associated therewith, which is older than 60 years or which SAHRA considers to be worthy of conservation;
- iv. features, structures and artefacts associated with military history which are older than 75 years and the site on which they are found.

Cultural significance

This means aesthetic, architectural, historical, scientific, social, spiritual, linguistic or technological value or significance

Development

This means any physical intervention, excavation, or action, other than those caused by natural forces, which may in the opinion of the heritage authority in any way result in the change to the nature, appearance or physical nature of a place or influence its stability and future well-being, including:

- i. construction, alteration, demolition, removal or change in use of a place or a structure at a place;
- ii. carrying out any works on or over or under a place;
- iii. subdivision or consolidation of land comprising a place, including the structures or airspace of a place;
- iv. constructing or putting up for display signs or boards;
- v. any change to the natural or existing condition or topography of land; and
- vi. any removal or destruction of trees, or removal of vegetation or topsoil

Early Stone Age

The archaeology of the Stone Age between 700 000 and 2500 000 years ago.

Fossil

Mineralised bones of animals, shellfish, plants and marine animals. A trace fossil is the track or footprint of a fossil animal that is preserved in stone or consolidated sediment.

Heritage

That which is inherited and forms part of the National Estate (Historical places, objects, fossils as defined by the National Heritage Resources Act 25 of 1999).

Heritage resources

This means any place or object of cultural significance

Holocene

The most recent geological time period which commenced 10 000 years ago.

Late Stone Age

The archaeology of the last 20 000 years associated with fully modern people.

Late Iron Age (Early Farming Communities)

The archaeology of the last 1000 years up to the 1800's, associated with iron working and farming activities such as herding and agriculture.

Middle Stone Age

The archaeology of the Stone Age between 20-300 000 years ago associated with early modern humans.

Palaeontology

Any fossilised remains or fossil trace of animals or plants which lived in the geological past, other than fossil fuels or fossiliferous rock intended for industrial use, and any site which contains such fossilised remains or trace.

Refer to **Appendix A** for further discussions on heritage management and legislative frameworks

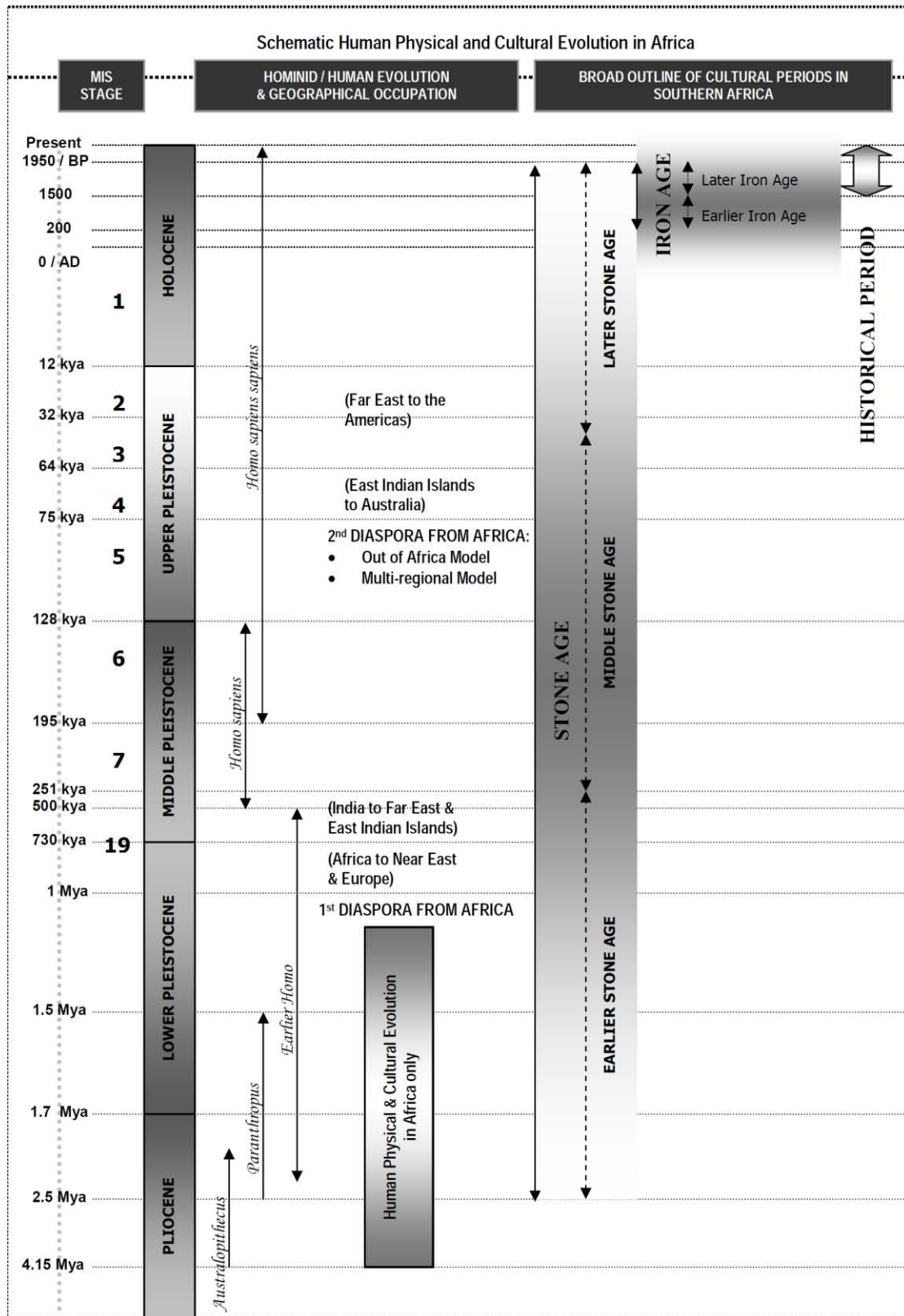


Figure 1 – Human and Cultural Time line in Africa (Morris, 2008)

2 TECHNICAL DETAILS OF THE PROJECT

2.1 Site Location and Description

Location	(S26 40 58.3 E27 56 13.0), The alignment follows the Vaal river flood line on the Free State province side from the Lethoba Pump station up to a point where it crosses in to the Gauteng Province in the vicinity of the Maccuvlei Golf Course and follows the northern flood line of the Vaal river on the Gauteng province side and carries on towards the Vereeniging Pump station.
Land	10km of alignment
Land Description	The land is brown fields with large areas disturbed by mining overburden and previous constructed pipeline servitudes.

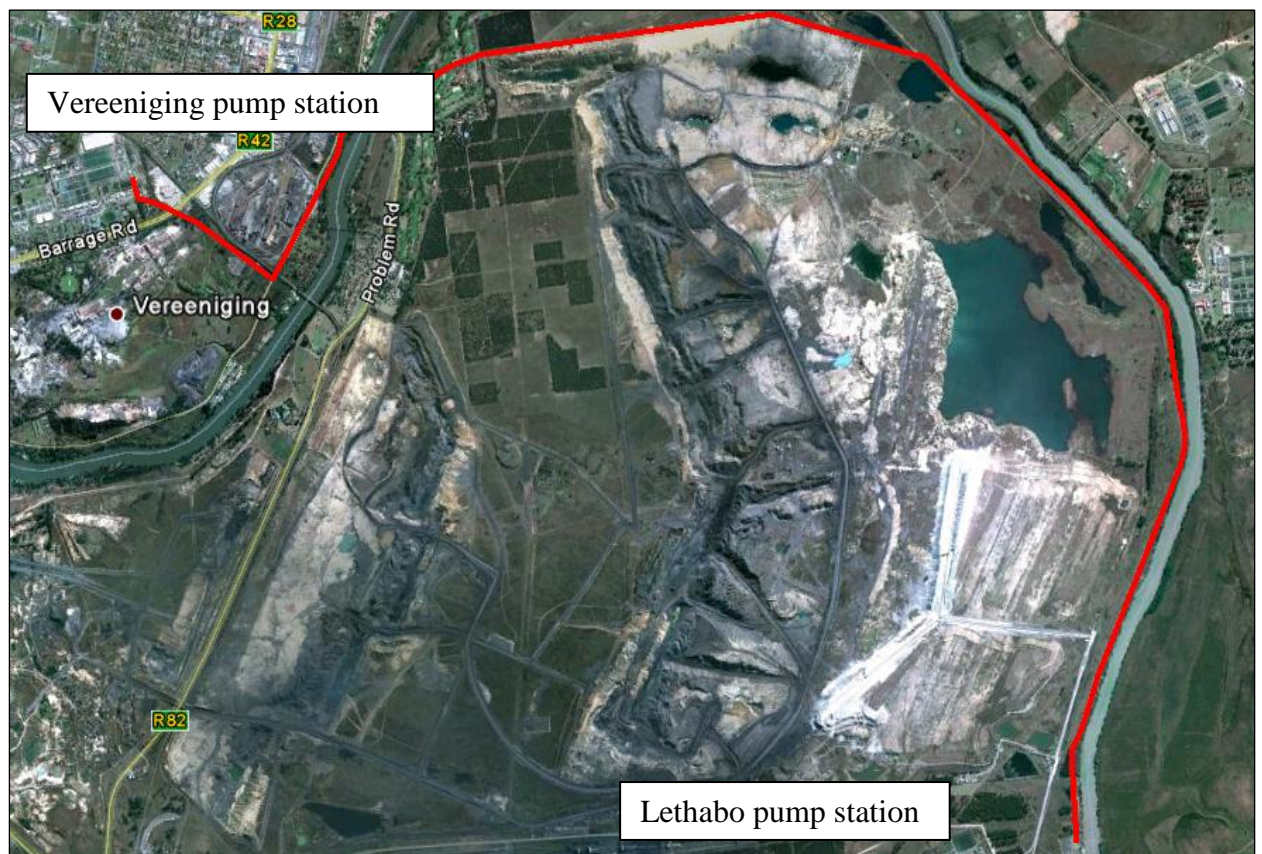


Figure 2 – Locality Map (google earth, 2011)

3 CURRENT STATUS QUO

3.1 Site Description

The servitude (



Figure 3) starts at the Lethabo power station close to Viljoensdrift in the Free State province (**Figure 4**), and aligns just to the south of the existing flood line of the Vaal river where it runs through an area covered by overburden, from previous mining activities (**Figure 5**).

The proposed alignment then traverses the Maccauvlei Gold Course before it crosses the Vaal River through an existing pipe bridge towards the Gauteng Province (**Figure 6**).



Figure 3 – View of servitude toward Lethabo pump station



Figure 4 – View of to the R385 towards Postmasburg (Study area on the left)



Figure 5 – Disturbed areas from previous mining activities



Figure 6 – Old bridge foundation close to where proposed crossing to the Gauteng Province over the Vaal is (Site RW1)

The alignment then follows Mario Milani drive until it turns north through disturbed field towards the Vereeniging Pumping Station (**Figure 7**).



Figure 7 – Broken and disturbed terrain toward Vereeniging Pump Station

3.1.1 Archival findings

Early History of the Rand Water Board (1903 – 1954)

The very first step in the provision of water to the residents of Johannesburg as well as towards the establishment of the Rand Water Board can be found in the appointment of the Sivewright Concession by the government of the Zuid-Afrikaan Republiek during December 1887. The concessionaire was tasked with registering a company whose aim it was to supply water to the residents of Johannesburg.

The concession was subsequently acquired by the Johannesburg Waterworks Estate and Exploration Company, and although the company was stated to have an available supply of 862,000 gallons of water within four years of its establishment, many of the town's residents still depended on rainwater tanks and wells for water.

The rapid growth in the population of Johannesburg coupled with the high potential for profits in the sale of water resulted in the establishment of a number of smaller companies and syndicates as suppliers of water during the 1890s,

Although the establishment of these smaller companies would have assisted in increasing the supply of water to the residents of Johannesburg, the population growth of the town seemed to increase so rapidly that the year 1895 saw Johannesburg experiencing a very serious shortage of water. Not only did the town's residents start to complain about the lack of water but also about the quality of the water they were able to obtain.

As a result the government of the Zuid-Afrikaan Republiek appointed a commission of enquiry in 1895 to find a solution for both these issues. One of the commission's recommendations was that both the construction and operation of infrastructure with which the residents of Johannesburg were to be supplied with water had to be undertaken by public institutions rather than private enterprise.

Although the outbreak of the South African War in 1899 meant that little was done at the time with regard to the recommendations of the commission, one historically significant event from this period was the securing of a stable source of water from the farm Zuurbekom by the Johannesburg Waterworks Estate and Exploration Company in 1898. The farm was situated on the edge of a large catchment area and had watersheds to the north and south and dykes along the east and west which created an extensive underground reservoir.

In September 1901 the Johannesburg Municipal Council was established. Representatives of the Council approached the Governor of the Transvaal through the Transvaal Civil Administration and argued for the appointment of a new commission to evaluate various sources of water in the surroundings of Johannesburg and investigate whether a public body could be established which would be responsible for the provision of sufficient, clean and affordable water to the town's residents and mines.

The Witwatersrand Water Supply Commission was appointed on 4 November 1901. It conducted a public enquiry over a period of three months and recommended the establishment of a public water supply body named the Rand Water Board. The body was to be responsible for the provision of water to the residents and mines of the Witwatersrand, from Springs in the east to Randfontein in the west.

The Rand Water Board Incorporation Ordinance was No. 32 of 1903 was subsequently passed in the Legislative Council on 7 May 1903 and the first meeting of the Board took place a week later. As a time saving measure its members were appointed directly by the Lieutenant-Governor of the Transvaal. The abovementioned ordinance stipulated that the Board was to be comprised of 11 members, including five representatives of the Chamber of Mines, three representatives of the Johannesburg City Council, one representative for the Krugersdorp and Roodepoort-Maraisburg area and one member to represent the areas of Germiston, Boksburg and Springs. The eleventh member of the Board was its chairman. Incidentally, in 1904 the membership of the Board was increased to 21 and by 1944 it had 34 members.

The Rand Water Board was tasked with taking over the operations of a number of the companies and syndicates which had been involved with the provision of water to the residents of Johannesburg before the war. These included the Braamfontein Company, the Johannesburg Waterworks and Exploration Company and the Vierfontein Syndicate. The Board was also tasked with paying half the compensation required to extinguish the Wonderfontein Concession, which resulted in a cost of £2,228,614 to the newly established institution. The acquisition of the operations of these companies meant that the Board was now able to control 2.5 million gallons of water per day. However, due to the rapid increase in the population of Johannesburg in the years after the war, it soon became evident to the members of the Board that they needed to expand their operations with immediate effect.

The first attempt of the Board to increase their water supply was to develop the rights they acquired from the Vierfontein Syndicate along the Klip River Valley south of Johannesburg. A number of boreholes were sunk into the dolomite underlying Zwartkopjes and adjacent farms. The water raised through these boreholes was collected in tanks at a pumping station on the farm Zwartkopjes from where it was pumped to a reservoir on Turffontein Nek. From here the water gravitated to a reservoir at Simmer and Jack (for supplying the East Rand) as well as a central pumping station at Village Main for distribution to the Yeoville reservoir and for the supply of the central area. At the time the supply of water was augmented by boreholes in Johannesburg at Doornfontein and Natal Spruit, Braamfontein (Sans Succi) and Springs on the East Rand.

During 1910 it was reported that the Zwartkopjes borehole system could supply some 8 million gallons of water per day while a further 2 million gallons per day could be obtained through the Zuurbekom system. However, by 1914 the borehole system at Zwartkopjes started to fail and with time was only able to provide 2 million gallons per day. As the requirements of the Witwatersrand

already stood at 9 million gallons per day in 1911, the failure of the Zwartkopjes system led to a serious shortage in water. The Board decided to establish a borehole system at Zuurbekom, and managed to increase the water obtained from here to 7.5 million gallons per day. The water supply was further augmented by water obtained from developing gold mines along the East Rand, as well as from a dam which had been constructed at Roodepoort. While all these operations assisted in meeting the requirements of the residents and mines along the Witwatersrand for the time being, the Board was well aware that these were for the most part only temporary solutions. As a result they started investigating other alternatives for obtaining more permanent supplies of water. As a result the Board investigated 21 different potential schemes in the areas surrounding Johannesburg, and during September 1913 made the decision to proceed with the Lindeques Scheme on the Vaal River. The scheme comprised the construction of a Barrage some 25 miles south of Vereeniging. The Barrage was to result in the creation of a reservoir on both sides of Vereeniging some 40 miles in length. This reservoir was to be of sufficient capacity to impound 13,633 million gallons of water and for the first year of operation was estimated to supply some 20 million gallons of water per day.

Statutory approval for the Vaal River Scheme (as it became known) was obtained in 1914 by means of a private act known as the Rand Water Board Supplementary Water Supply (Private) Act. In addition to the Barrage, the scheme also comprised the construction of a river intake station, the establishment of a main pumping station at Vereeniging (which comprised sedimentation tanks, filters, a pumping plant and a clear water reservoir), a reservoir and additions to the pumping plant at Zwartkopjes, service reservoirs on the Witwatersrand as well as all the required pipelines.

The cost of obtaining a daily supply of 10 million gallons of water through the Vaal River Scheme was estimated to be £1,250,000 and the Board immediately took steps to obtain a loan through which the scheme could be implemented. However, the outbreak of the First World War in 1914 temporarily halted these plans. This said, the impact of a severe drought which the country suffered from at the time meant that the demand for water increased rapidly. As a result the Board decided in 1916 to implement a scheme with which 5 million gallons of water could be obtained on a daily basis. Although construction started soon after, the war (which lasted till 1918) had a severe impact on the availability of building material. Although the scheme was finally completed in 1923 it cost some £250,000 more than the original estimate for the implementation of the 10 million gallons per day scheme. The Vaal River Scheme was officially opened on 27 July 1923 by the Governor-General of the Union of South Africa.

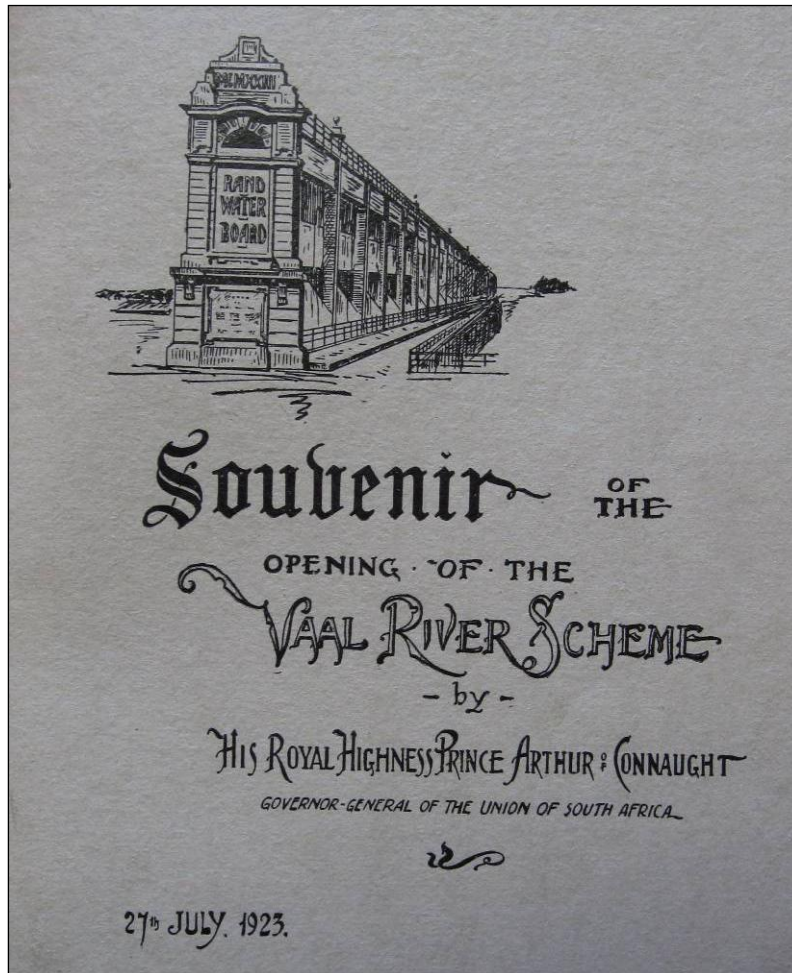


Figure 8

This image shows the cover page of the commemorative document associated with the official opening of the Vaal River Scheme on 27 July 1923. The illustration depicts one of the scheme's significant components, namely the Barrage (Rand Water Board, Library).

In 1923 the residents of the Witwatersrand to whom the Board was providing water was estimated to stand at 575 000 individuals whose daily demand for water averaged 11.5 million gallons per day.

However, evidence submitted to a select committee of Parliament during this time estimated that by 1950 the population of the Witwatersrand could stand at one million individuals. This led the Board to approve in 1924 an additional water supply scheme with which a further 5 million gallons of water per day could be obtained through the existing Vaal River Scheme. The scheme was completed in 1926.

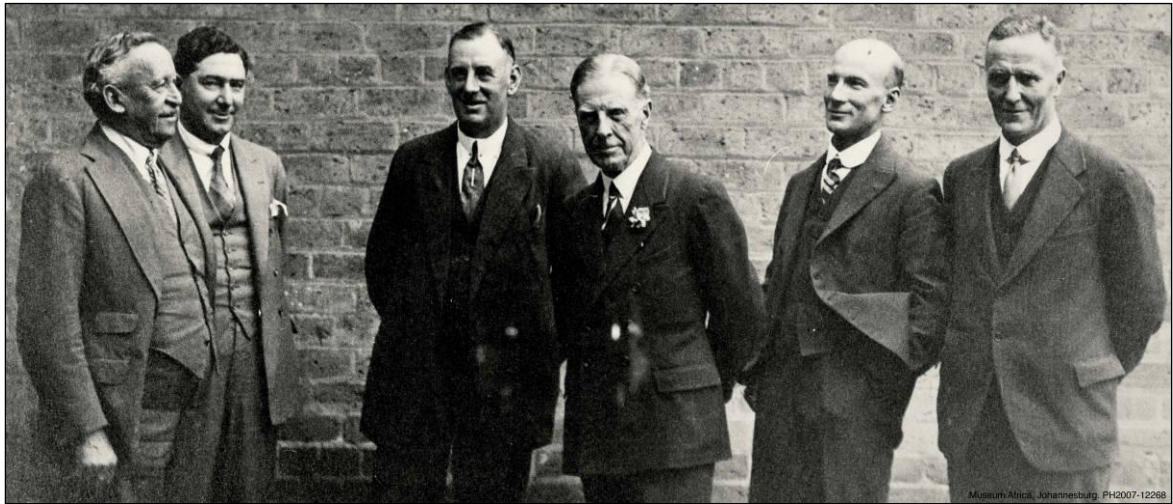


Figure 9 - Historic photograph taken in 1924 depicting senior members of the Rand Water Board. From left to right are Sir Julius Jeppé, M. Udwin, C.E. Mason, T.A.R. Purchase, A.H. John and J.H. Stevenson (Museum Africa, Images Collection, PH2007-14419).

By 1931 the demand for water of the Witwatersrand had increased to 17 million gallons per day. At the same time, it was calculated that the demand for water would increase to about 21 million gallons per day by 1940. As a result the Board decided to implement another additional water supply scheme in 1931 through which an additional 5 million gallons of water could be obtained on a daily basis as part of the Vaal River Scheme. However, the Board could not foresee the massive turnaround which the Witwatersrand gold mines were to experience in the following years. Shortly after the agreement for the implementation of the 1931 water supply scheme was signed, the Union Government decided to depart from the gold standard. This resulted in an immediate growth spurt in the gold mining industry which in turn resulted in increasing numbers of people settling in the Witwatersrand which in turn resulted in a rapid increase in the demand for water.

Another water supply scheme was implemented in 1933 which resulted in the fourth and final increase of five million gallons of water per day to be obtained from the Vaal River Scheme. However, the growth of the gold mines and population of the Witwatersrand increased steadily. During 1934 the Board was informed that the Government of the Union of South Africa was planning the construction of a dam on the Vaal River some 11 miles upstream from its existing storage area associated with the Vaal River Scheme. In the same year an agreement was reached according to which the Rand Water Board would contribute to the construction of the Vaal Dam (as the proposed dam was to be called) for the rights to store a certain volume of water and to abstract 60 million gallons of water per day from the flow. These abstraction rights were increased in 1937 by 70 million gallons per day and in 1944 by 65 million gallons of water per day.

The construction of the Vaal Dam and the rights obtained to a section of its water meant that the Rand Water Board had now secured a reliable and sustainable source of water.

In terms of the 1935 water supply scheme the water available for distribution to the Board's consumers was increased by 11 million gallons per day. The scheme was completed during the end of 1936 and this resulted in a total supply of 38 million gallons of water per day being distributed to the Board's consumers. However, rapid growth of the population and mines of the Witwatersrand meant that even higher volumes of water were required. By 1936 the Witwatersrand's daily consumption of water increased to 27 million gallons of water while the population had increased to more than a million.

The Rand Water Board reacted to the increasing demands for water with the 1937 water supply scheme which resulted in an additional 10 million gallons of water per day. In the following year a further 20 million gallons of water was provided as part of the 1938 water supply scheme. With the completion of these two schemes the Rand Water Board could now supply some 70 million gallons of water per day to its customers. This volume was considered enough for the period leading up to the year 1943.

When the Second World War broke out in 1939 it was hoped that it would have a limiting impact on the increasing demand for water on the Witwatersrand. However, this limiting impact only came into place after 1941. To meet the increasing demand for water experienced during the early parts of the war, the 1941 water supply scheme was implemented. This scheme entailed increasing the daily supply of water from 70 million gallons to 90 million gallons. The scheme was completed in 1947.

A very important event in the history of the Rand Water Board occurred during the war years. In 1943 agreements were reached for the Board to supply the municipalities of Pretoria and Vereeniging with water as well. The Pretoria scheme was commenced at the end of the war in 1945, and the first water was supplied to Pretoria when a pipeline from Germiston to that town was completed on 30 May 1947.

At the end of the war the demand for water increased again. The 1946 water supply scheme was implemented as a result and entailed increasing the supply of water by 20 million gallons per day thereby increasing the volume of water distributed per day to 110 million gallons. This volume comprised 103 million gallons from the Vaal River and seven million gallons from Zuurbekom. The

scheme resulted in the decision being made to construct a new purification works on the Vaal River to augment the one at the Vereeniging Pumping Station.

Although a site was acquired in 1946, it was only with the implementation of the 1949 water supply scheme that the new purification works was constructed. The scheme entailed the provision of an additional 40 million gallons of water per day by the year 1954 and comprised the construction of the Zuikerbosch Pumping Station. The scheme also comprised the construction of a pipeline between the new Zuikerbosch Pumping Station and the Zwartkopjes Pumping Station as well as the construction of a new pumping station at Zwartkopjes which was to deliver the water to service reservoirs all along the Witwatersrand (Rand Water Board, 1953).

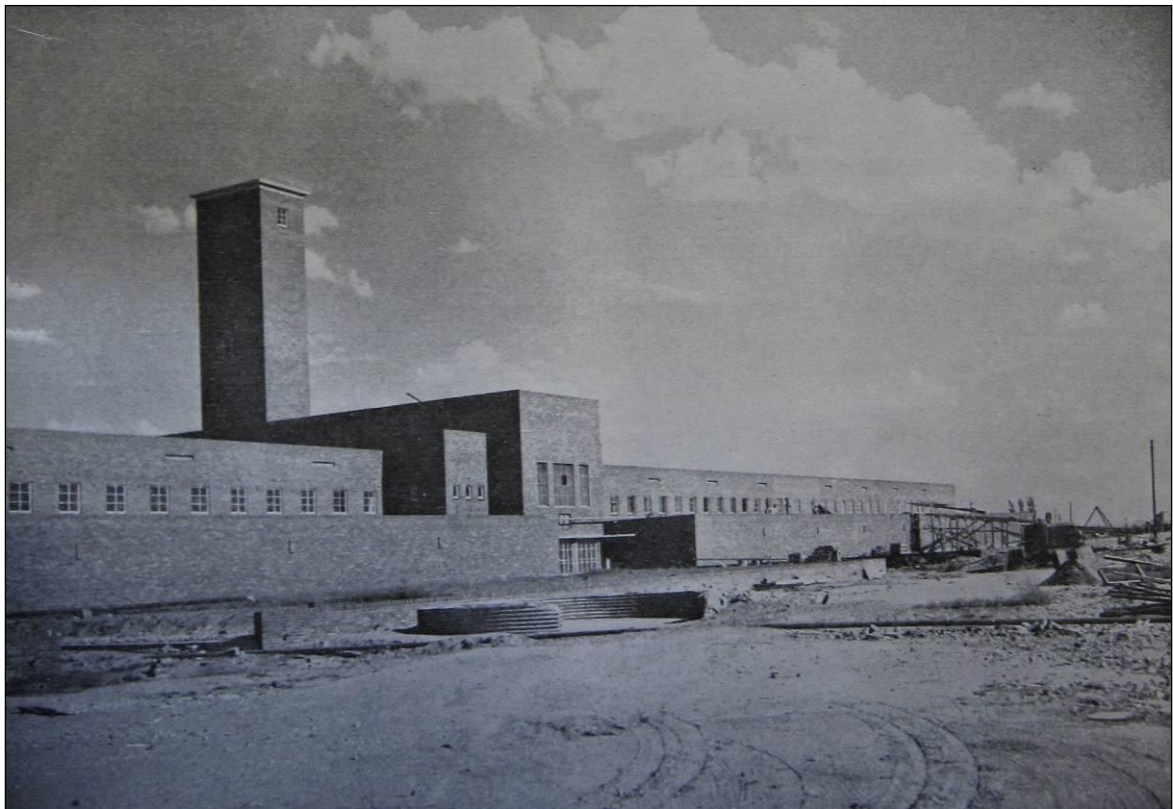


Figure 10 - Photograph depicting the construction of the filtration building at the Zuikerbosch Pumping Station. Although undated, the image was likely taken during or just before 1954 (Rand Water Board, 1953:35)

Early History of the Vereeniging Pumping Station

As mentioned before the Vereeniging Pumping Station was constructed as part of the Vaal River Scheme. The scheme received statutory approval in 1914 and construction activities commenced during 1916. The Vaal River Scheme as a whole was completed in 1923 and officially opened on 27 July 1923 by the Governor-General of the Union of South Africa, Prince Arthur of Connaught.

The land on which the Vereeniging Pumping Station was to be developed was obtained from the Vereeniging Estates Limited. Although the exact date of this acquisition is not known, it is believed to have been during 1916.

During April 1917, the well-known Vereeniging pioneer Dr. Thomas Nicolas Leslie submitted a report to the Rand Water Board which outlined a proposed scheme for the planting of trees at the Vereeniging Pumping Station. His recommendations included the planting of a row of cypress trees along all the boundary lines which could be trimmed to create a hedge as well as the planting of 18 rows of trees (nine rows of eucalyptus trees on the outside and nine rows of pine trees on the inside) along the northern boundary of the pumping station as a barrier against the wind and dust. The recommendations made in the Leslie report, barring some changes and exclusions, were subsequently accepted by the Board.

During the next couple of years a number of activities were undertaken as part of the construction of the Vereeniging Pumping Station. Apart from the planting of trees and fencing of the site, the earliest developments at the pumping station appear to have taken place in 1918 and comprised the construction of a pair of semi-detached cottages, a workshop as well as a railway siding.

Less than three years later, during April 1921 work commenced on four sedimentation tanks. The construction work at the sedimentation tanks was soon accompanied by the construction of further staff quarters. These included the construction of the Superintendent's House, one pair of Semi-Detached Cottages as well as Single Quarters.

During May 1921 the compound for black employees of the pumping station was completed. The compound was located in the north-eastern corner of the pumping station, directly north of the four sedimentation tanks which were under construction at the time. The fencing of the entire pumping station was also completed during this time.



Figure 11 - Historic photograph depicting the construction of the Offices, Laboratory and first Filter Block. The image was taken during 1922 or 1923 (Museum Africa, Images Collection, PH2007-14428).



Figure 12 - Historic photograph depicting the front entrance gates of the Vereeniging Pumping Station which were completed during August 1923. The Engine Room (centre) and Offices (right) can be seen behind the gates and fence (Museum Africa, Images Collection, PH2007-14433).

On 15 June 1921 excavation work started on the 5 million gallon reservoir. The reservoir was to be located south-east of the Engine Room and Boiler House, both of which were only completed later.

The three quarters for European staff members which had been under construction since April 1921, were finally completed in February 1922. During the period March to April 1922 construction work started on the No. 1 Engine Room and No. 1 Boiler House. The entire pumping station must have been a hive of activity at the time. Apart from the massive construction activities associated with the engine room and boiler house, the four sedimentation tanks as well as the five million gallon reservoir were also under construction and were completed during June 1922.

During August 1922 work commenced on features such as Turbo Pumps and Alternators, Station Piping, Station Water Supply, Coal Conveyor Plant and Station Lighting. One month later, during September 1922, work also commenced on the Filer House, Offices and Concrete Filter Tanks. On 2 December 1922 the pipeline between the pumping station and the Vaal River was completed.

Work progressed rapidly during the following months and during June 1923 the concrete piers of the pumping station's entrance gate were erected and its plastering taken in hand. The three boilers for installation in the Boiler House were also completed during this time as were the turbo pumps and turbo generator plant completed. One month later the ironwork at entrance gates was fixed.

Although the Vaal River Scheme became operational during July 1924, work continued on the Vereeniging Pumping Station. During August 1923 the entrance gates were completed, while the filter plant was almost completed. The boiler plant, generating set, switchboard and pumping units had also been erected by this time and were operating in a satisfactory manner.

While the exact dates are not available, it seems that both the engine room and boiler house were finally completed during the beginning of 1924.

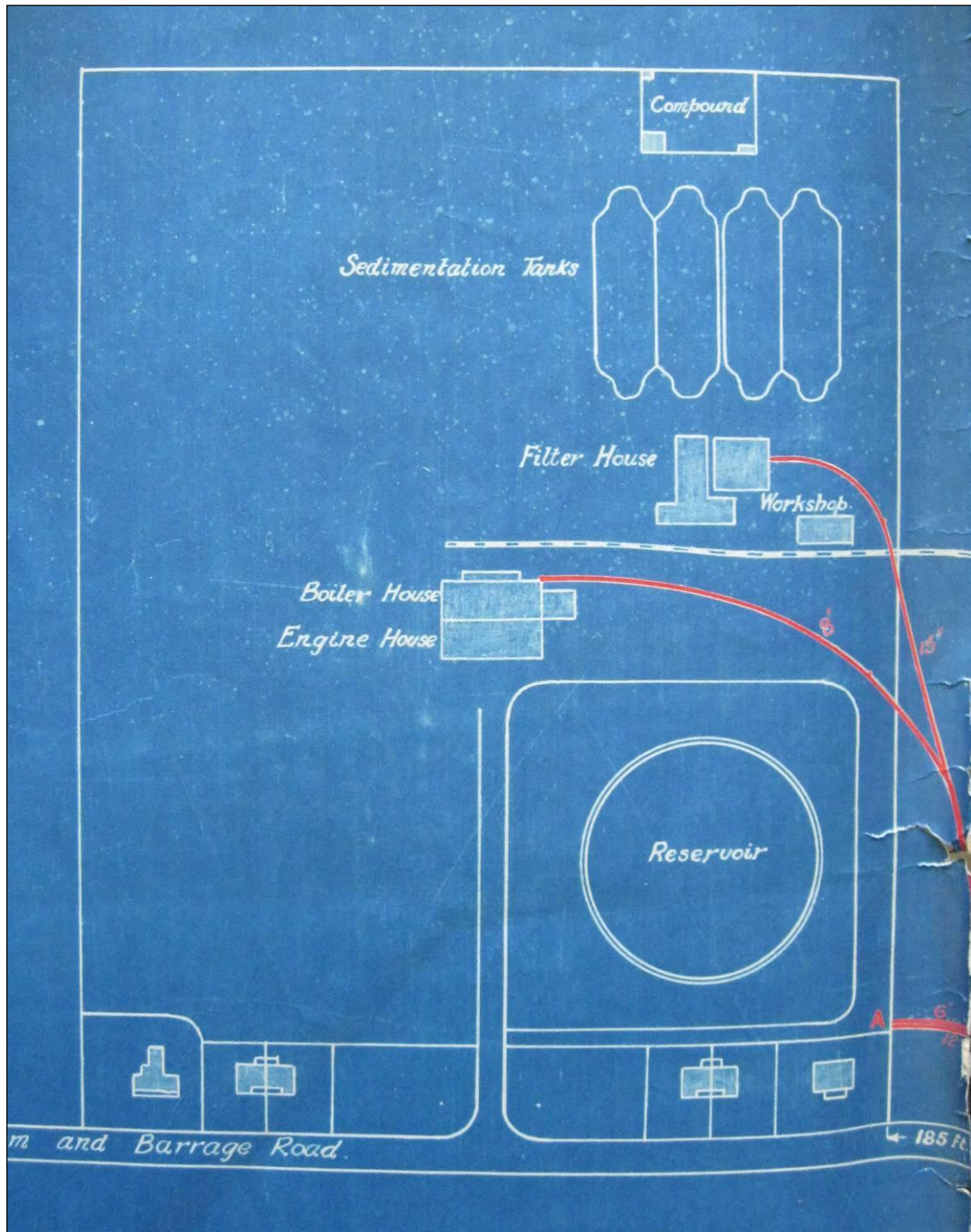


Figure 13 - This archival plan dates from the early to mid 1920s and provides the viewer with a good idea as to the general layout of the Vereeniging Pumping Station at the time (Rand Water Board, Technical Drawings, Plan F510). The components that can be identified on the map include the Engine Room, Boiler House, Filter House, Workshop, Reservoir, Sedimentation Tanks, Compound, Railway Siding and Staff Housing (including two pairs of semi-detached cottages, a superintendant's dwelling as well as single men's quarters).

3.1.2 Findings of the Heritage Impact Assessment

The findings can be compiled as follow and is combined to produce a heritage sensitivity map for the project: Refer to Appendix B for heritage map.

RW1

GPS: S26 40 57.5 E27 56 21.7

Old bridge foundation (RW1) close to the pipe bridge crossing at the Maccauvlei Golf Course.



Figure 14 – Stone bridge foundation of RW1

The site is situated just outside the servitude alignment and should not be impacted by the construction activities.

RW3

GPS: 26°41'1.68"S 27°56'10.75"E



Figure 15 – Brick and concrete structure

Unknown structure just of alignment, possible associated with early Rand Water pumping activities and thus older than 60 years.

The site is situated just outside the servitude alignment and should not be impacted by the construction activities.

3.2 Environmental Issues and Potential Impacts

ISSUE	Impact on historical sites
DISCUSSION	Two historical structures have been identified close to the alignment of the B19 alignment. <ol style="list-style-type: none">1. Old bridge foundation (RW1) close to the pipe bridge crossing at the Maccauveli Golf Course.2. Structure (RW3) to the east of servitude alignment close to the Mario Milani Drive and the R82.

EXISTING IMPACT	None known
PREDICTED IMPACT	<p>It is possible that the two sites could be damaged during construction, it is thus recommended that the sites be demarcated during construction and a buffer be fenced.</p> <p>Destruction or alterations to any of the sites will require permits from the Gauteng Provincial Heritage Authority.</p>

4 CONCLUSIONS AND RECOMMENDATIONS

Heritage resources are unique and non-renewable and as such any impact on such resources must be seen as significant.

During the field work two sites of heritage significance were identified.

RW1 – Stone bridge foundation at the entrance to the Maccauvlei Golf Course. The site is situated just outside the servitude alignment and should not be impacted by the construction activities.

RW3 – Unknown brick and concrete structure. . The site is situated just outside the servitude alignment and should not be impacted by the construction activities.

It is possible that the two sites could be damaged during construction, it is thus recommended that the sites be demarcated during construction and a buffer be fenced.

Destruction or alterations to any of the sites will require permits from the Gauteng Provincial Heritage Authority.

- a. A monitoring plan must be agreed upon by all the stakeholders for the different phases of the project focussing on the areas where earthmoving will occur.
- b. If during construction any possible finds are made, the operations must be stopped and the qualified archaeologist be contacted for an assessment of the find.
- c. A management plan must be developed for managing the heritage resources in the surface area impacted by operations during construction and operation of the development. This includes basic training for construction staff on possible finds, action steps for mitigation measures, surface collections, excavations, and communication routes to follow in the case of a discovery.

5 REFERENCES

Unpublished Reports

RAND WATER BOARD. 1923. Souvenir of the Opening of the Vaal River Scheme by his Royal Highness Prince Arthur of Connaught (Governor-General of the Union of South Africa). Unpublished Document.

RAND WATER BOARD. 1953. Rand Water Board: 1903-1953. Unpublished Report.

Rand Water Board. 1972. Annual Report. Unpublished Report.

TEMPELHOFF, J.W.N. 2003. The substance of ubiquity: Rand Water 1903-2003. A report on the centenary history of the Rand Water Board. Preliminary version submitted for scrutiny, evaluation and commented. Submitted 6 January 2003.

Unpublished Data from Rand Water Board Head Office

Chief Engineer Reports to the Finance and Executive Committee, 1919 – 1934.

Contract Files containing all data associated with the tenders issued by the Rand Water Board.

Technical Drawings and building plans housed at the Survey Department.

Museum Africa Photographs

PH2007-14419 Group photograph of senior staff as well as members of the Rand Water Board.

PH2007 – 14428 Vereeniging Office and Laboratory. 1st Filter Block.

PH2007 – 14429 Vereeniging P.S. No. 1 Engine Room.

PH2007 – 14433 Vereeniging P.S. 1st Scheme. Sedimentation Tanks. 1922/1923

LEGISLATIVE REQUIREMENTS – TERMINOLOGY AND ASSESSMENT CRITERIA

3.1 General principles

In areas where there has not yet been a systematic survey to identify conservation worthy places, a permit is required to alter or demolish any structure older than 60 years. This will apply until a survey has been done and identified heritage resources are formally protected.

Archaeological and palaeontological sites, materials, and meteorites are the source of our understanding of the evolution of the earth, life on earth and the history of people. In the new legislation, permits are required to damage, destroy, alter, or disturb them. People who already possess material are required to register it. The management of heritage resources are integrated with environmental resources and this means that before development takes place heritage resources are assessed and, if necessary, rescued.

In addition to the formal protection of culturally significant graves, all graves, which are older than 60 years and are not in a cemetery (such as ancestral graves in rural areas), are protected. The legislation protects the interests of communities that have interest in the graves: they may be consulted before any disturbance takes place. The graves of victims of conflict and those associated with the liberation struggle will be identified, cared for, protected and memorials erected in their honour.

Anyone who intends to undertake a development must notify the heritage resource authority and if there is reason to believe that heritage resources will be affected, an impact assessment report must be compiled at the construction company's cost. Thus, the construction company will be able to proceed without uncertainty about whether work will have to be stopped if an archaeological or heritage resource is discovered.

According to the National Heritage Act (Act 25 of 1999 section 32) it is stated that:

An object or collection of objects, or a type of object or a list of objects, whether specific or generic, that is part of the national estate and the export of which SAHRA deems it necessary to control, may be declared a heritage object, including –

- objects recovered from the soil or waters of South Africa, including archaeological and palaeontological objects, meteorites and rare geological specimens;
- visual art objects;
- military objects;
- numismatic objects;
- objects of cultural and historical significance;
- objects to which oral traditions are attached and which are associated with living heritage;
- objects of scientific or technological interest;
- books, records, documents, photographic positives and negatives, graphic material, film or video 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), or in a provincial law pertaining to records or archives; and
- any other prescribed category.

Under the National Heritage Resources Act (Act No. 25 of 1999), provisions are made that deal with, and offer protection, to all historic and pre-historic cultural remains, including graves and human remains.

3.2 Graves and cemeteries

Graves younger than 60 years fall under Section 2(1) of the Removal of Graves and Dead Bodies Ordinance (Ordinance no. 7 of 1925) as well as the Human Tissues Act (Act 65 of 1983) and are the jurisdiction of the National Department of Health and the relevant Provincial Department of Health and must be submitted for final approval to the Office of the relevant Provincial Premier. This function is usually delegated to the Provincial MEC for Local Government and Planning, or in some cases the MEC for Housing and Welfare. Authorisation for exhumation and reinterment must also be obtained from the relevant local or regional council where the grave is situated, as well as the relevant local or regional council to where the grave is being relocated. All local and

regional provisions, laws and by-laws must also be adhered to. In order to handle and transport human remains the institution conducting the relocation should be authorised under Section 24 of Act 65 of 1983 (Human Tissues Act).

Graves older than 60 years, but younger than 100 years fall under Section 36 of Act 25 of 1999 (National Heritage Resources Act) as well as the Human Tissues Act (Act 65 of 1983) and are the jurisdiction of the South African Heritage Resource Agency (SAHRA). The procedure for Consultation Regarding Burial Grounds and Graves (Section 36(5) of Act 25 of 1999) is applicable to graves older than 60 years that are situated outside a formal cemetery administered by a local authority. Graves in the category located inside a formal cemetery administered by a local authority will also require the same authorisation as set out for graves younger than 60 years over and above SAHRA authorisation.

If the grave is not situated inside a formal cemetery but is to be relocated to one, permission from the local authority is required and all regulations, laws and by-laws set by the cemetery authority must be adhered to.

**Appendix B
Heritage Map**

