

NGT INFRACO
PLANNING | CONSTRUCTION | MAINTENANCE

PROJECT TITLE:

PROPOSED INTERPRETATION CENTRE, PARKING AND STAFF QUARTERS FOR
KLOOFENDAL NATURE RESERVE IN ROODEPOORT, WITHIN THE CITY OF
JOHANNESBURG METROPOLITAN MUNICIPALITY, GAUTENG PROVINCE, SOUTH
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Heritage Impact Assessment for the Proposed Interpretation Centre,
Parking and Staff Quarters for Kloofendal Nature Reserve, Roodepoort,
City Johannesburg Metropolitan Municipality, Gauteng Province, South
Africa.

ACKNOWLEDGEMENT OF RECEIPT

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DECLARATION OF INDEPENDENCE

Nkosinathi Tomose for NGT Infraco has compiled this report. The views expressed in this report are entirely those of the author; no other interest was displayed during the decision-making process for the project.

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CLIENT APPROVAL/SIGN OFF:

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DESIGNATION	
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EXECUTIVE SUMMARY

Ikamva appointed NGT Infraco to conduct an HIA for the proposed construction of an interpretation centre, parking lots and staff quarters at Kloofendal Nature Reserve in Constatiakloof within the CoJMM Gauteng Province, South Africa. This report forms part of the environmental impact assessment (EIA) process for the proposed development. Accordingly, the study is conducted independently in Section 38 (1) and Section 34 of the National Heritage Resources Act (NHRA), No. 25 of 1999.

The standard NGT Infraco HIA study entails: conducting a detailed background information search of the receiving environment. Among other forms of data, the investigation assesses previous studies conducted in and around the proposed development study area and the broader receiving environment. It also includes conducting an onsite investigation (survey) to identify and map heritage resources and sites. This step is followed by an assessment of the impacts of the proposed development on the identified heritage resources and sites. A heritage Public Participation Process (PPP) is conducted as part of the HIA study to allow Interested and Affected Parties to give inputs on the heritage study and the conservation of heritage resources. Then conclusions are made about the nature of impacts of the project on the heritage resources or site or the heritage fabric of a place or landscape. Finally, recommendations are made on how to best use heritage as the base for the development or incorporate heritage resources and sites as an integral component of the project for their sustainable conservation. In cases where it is inevitable not to impact heritage resources or the site or the cultural landscape, heritage memorialisation strategies are devised to memorialise the heritage fabric of the place or the landscape through modern and contemporary means. Because heritage also has an intangible aspect to it, which often ignored, even in projects that neither negatively impact heritage resources or site – memorialisation is encouraged to developers to evoke the cultural significance or a place or landscape (its cultural heritage fabric). Furthermore, recommendations are made on how the positive project benefits can be enhanced to ensure a long-term strategy for the conservation and promotion of heritage resources, if any, are found mainly in urban gentrification programmes with heritage forming part of urbanism strategy.

The survey of the project area was conducted on:

- January 2020 by Nkosinathi Tomose (ED and Principal Consultant)

The survey was conducted on foot. A vehicle was also used to access the site. The survey yielded a number of cultural heritage resources. These included: a historic stone enclosure on the south hilltop with lots of material culture found in and around it, the historic Kloofendal monuments by the Confidence Reef Mineshaft, the Struben Stamp Mill and engine. No burial grounds and graves were identified during the survey. The monument is dated 1983, the Stamp Mill and the engine date to the 18800s and the historic stone enclosure on the southern hilltop is relatively dated to the 1930s based on the associated material culture. These heritage resources were documented, photographed and mapped. Based on the results of the literature review, field survey, project impact assessment on the heritage fabric, the sensitivity of the heritage sensitivity, the following conclusions and recommendations are made about the proposed programme:

Conclusions:

- It is concluded that Kloofendal Nature Reserve is an important cultural and natural heritage site if one assesses the site and its associated resources in totality in terms of Section 3(3) of the NHRA, No. 25 of 1999. The site meets approximately 95% of all elements contributing to the significance of a place or site or cultural landscape. The only aspect not met is its aesthetic appeal from a cultural heritage perspective, but the reserve provides a scenic natural landscape feature from a natural environment.
- In terms of the impact of the proposed development on both cultural landscape and natural heritage, it is concluded that the proposed development will not adversely impact these resources due to the fact it is planned in an area that is devoid of essential heritage resources (between the primary gate and the gate leading to the reserve and the associated infrastructure).
- The proposed development activities have the potential to enhance both the cultural heritage and biodiversity of Kloofendal Nature Reserve. This is based on the fact that for any interpretation centre to thrive and become self-sustainable, it has to push for research and research development as one of its key objectives of thrust. The interpretation centre will also raise awareness about the history and heritage of the study area, its associated industrial and natural heritage, and its role and place in shaping modern-day South African legacy. For example, the discovery of gold in 1884 propelled further exploration activities of the Witwatersrand, consequently discovering the main reef in 1886 by George Harrison on Farm Langlaagte. These activities or events resulted in 1st modern industrial revolution in South Africa and the establishment of cities such as Johannesburg, which later became an economic hub of Africa.
- Based on the impact assessment undertaken as part of the study, the number of positive impacts associated with the project far exceeds the number of adverse effects. Therefore, the project will yield the best conservation results due to the proposed development, stimulating research and part of content development and curation for the exhibitions and installations at the proposed interpretation centre. The interpretation also has the potential to increase awareness about both the cultural and natural heritage of the site. The benefits associated with this include increasing visitor numbers and generating revenue from tourists, which could be channelled back to conservation efforts at the reserve.
- The survey yield Middle Stone Age, industrial/historic archaeological resources - no burial grounds and graves were identified during the survey. However, their existence is not entirely ruled out since graves (unmarked graves) and other archaeological resources such as artefacts tend to be subterranean and can only be exposed and brought to the surface through excavation activities associated with developmental activities.
- In terms of the SAHRA Palaeontological Sensitivity Layer, the project area is located in a low Sensitivity Area. Therefore, there is no need to conduct a Palaeontological Impact Assessment (PIA) or dolomitic study as part of the study.
- It is concluded that when one accesses the heritage significance of the site and the role that it played in shaping the history of South Africa, the site is significant enough to be re-nominated and declared either as a provincial or national heritage site in terms of the new Act. The national significance will be a Grade higher than its current status of provincial

significance (by default) or local importance if we translate the Johannesburg Heritage Blue Plaque as an indication of the recent grading of the site. The national or provincial significance will be befitting due to the site significance in the pattern of South Africa mining heritage legacy, which played a pivotal role in shaping South Africa's modern economy. Furthermore, due to it being a site associated with the group of persons whose activities may have directly and indirectly resulted in the discovery of fossil sites in Sterkfontein and Swartkrans, which form part of the Cradle of Humankind World Heritage Site and the establishment of the South African Chamber of Mines, i.e. the Mineral Council. There is strong evidence that suggests that mining in the Witwatersrand contributed to the exploration of lime which forms part of the chemical components used to extract gold – thus, the linkages created between the site and the Cradle of Humankind and the fact that the two brothers are known to have explored Sterkfontein and Swartkrans. However, such relations will still need to be explored and investigated in detail. There is strong evidence that suggests that mining in the Witwatersrand contributed to the exploration of lime which forms part of the chemical components used to extract gold – thus, the linkages created between the site and the Cradle of Humankind and the fact that the two brothers are known to have explored Sterkfontein and Swartkrans. However, such relations will still need to be explored and investigated in detail.

Recommendations:

- It is recommended that, with the approval of the current BAR and EMPr, a Phase II HIA study should be conducted on site, which should include amongst other research objectives:
 - Detailed archaeological investigation of the material culture in and around the stonewall enclosure and the mining area. This investigation will assist in identifying the material culture found on site, its association and dating of the site in terms of different occupation and the activities that took place on site. For example, a scatter of glass stoneware and china already glimpse the people who explored the site. Furthermore, we know that the people who occupied and worked the 1940s consumed beer based on the South African Breweries beer bottle dated to 1945, which shows that the site was occupied during the 1940s.
 - Investigation of spatial patterns between sites, material culture and objects is required on site.
 - It is also recommended that further research is required to investigate and determine the types of relations between the site and the Cradle; this will increase the cultural heritage significance of Kloofendal.
- It is recommended that the design team (architectural, landscape and engineering) on the project should explore ways to incorporate heritage in their designs and use it as a base for the design process. Elements of heritage should be integrated into the building fabric and the landscape.
- There is some level of confusion on the site's status. It is not clear whether it's a provincial heritage site or a local heritage site – this is based on memorial plaques found on site, the National Monument Council, and the City of Johannesburg Heritage Blue Plaque. Joburg City Parks and I&APs should determine what heritage grade or status they want to achieve on site. Should it be provincial or national, then a nomination dossier for the regarding and declaration of the site should be developed and submitted to the relevant authority for consideration.

- As part of the current development, future development or re-nomination and grading of the site, a detailed integrated conservation management plan (ICMP) is proposed for the Kloofendal Nature Reserve and its heritage resources. The ICMP will work as a guideline for protecting, conserving, and promoting cultural and natural heritage resources in the reserve. As part of the ICMP, detailed Heritage Public Participation (H-PP) should be undertaken as part of the exercise to get inputs from interested and affected parties (I&APs) such as the City of Johannesburg Department of Arts and Culture: Directorate Immovable Heritage, whose blue plaque is found at the Struben Mill Stamp, the Gauteng Department of Arts and Culture and Friends of Kloofendal Nature Reserve.
- In terms of the current development, heritage resources will not be negatively impacted. On the contrary, the proposed project is more likely to enhance the heritage and conservation and promote conservation than to destroy. Therefore, it is recommended that both the SAHRA and the PHRA-G grant the project a **Positive Review Comment** and allow the proposed project to proceed as planned. It will positively enhance the sense of the place and its heritage fabric.

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LIST OF ABBREVIATIONS

ACRONYMS	DESCRIPTION
AUTHORITIES	
ASAPA	Association of South African Professional Archaeologists
CoJMM	City of Johannesburg Metropolitan Municipality
NGT	Nurture, Grow, Treasure
PHRA-G	Provincial Heritage Resources Agency Gauteng
SAHRA	South African Heritage Resources Agency
GDARD	Gauteng Department of Agriculture and Rural Development
DISCIPLINE	
BGG	Burial grounds and graves
CMP	Conservation Management Plan
ICMP	Integrated Conservation Management Plan
HIA	Heritage Impact Assessment
H-PP	Heritage Public Participation
I&APs	Interested and Affected Parties
PIA	Palaeontological Impact Assessment
PSL	Palaeontological Sensitivity Layer
RQC	Review and Quality Control
LEGAL	
NHRA	National Heritage Resources Act, No. 25 of 1999
NEMA	National Environmental Management Act, No. 108 of 1998

TERMS AND DEFINITIONS

Archaeological resources

These include:

- Material remains resulting from human activities 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;
- 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;
- 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 the maritime culture zone of the republic as defined in the Maritimes Zones Act, and any cargo, debris or artefacts found or associated in addition to that, which is older than 60 years or which SAHRA considers being worthy of conservation;
- Features, structures and artefacts associated with military history are older than 75 years and the site on which they are found.

Palaeontological

This means 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.

Cultural significance

- Cultural significance means aesthetic, architectural, historical, scientific, social, spiritual, linguistic or technological value or importance.

Development

Development 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 influences its stability and future well-being, including:

- Construction, alteration, demolition, removal or change in use of a place or a structure at a place;
- Carrying out any works on or over or under a place;
- Subdivision or consolidation of land comprising a place, including the structures or airspace of a place;
- Constructing or putting up for display signs or boards; any change to the natural or existing condition or topography of land;
- And any removal or destruction of trees or removal of vegetation or topsoil.

Heritage resources: This means any place or object of cultural significance

Living heritage

- Living heritage means the intangible aspects of inherited culture and may include cultural tradition; oral history; performance; ritual; popular memory; skills and techniques; indigenous knowledge systems; and the holistic approach to nature, society and social relationship

1. INTRODUCTION

1.1. Background Information of Proposed Programme

The Joburg City has appointed Ikamva to manage the EIA process for the proposed development of an interpretation centre, parking area and staff quarters at Kloofendal Nature Reserve in Roodepoort, CoJMM Gauteng Province. In Roodepoort, the nature reserve is situated in the suburb of Kloofendal near Constatiakloof.

According to the Programme Background Information Document (BID) about the proposed development:

- Stage 1 – is the current EIA process in the form of a Basic Assessment Report (BAR) and Environmental Management Programme (EMPr). Round 2 is assumed to refer to Stage 2: will involve a feasibility study and design process by an architectural and engineering team resulting in the production of associated infrastructure drawings.

This HIA forms part of the various specialist studies aimed at informing the BAR and the EMPr about the environmental and heritage status of the receiving environment. NGT Infraco has been appointed to manage the HIA. The study investigates the potential impacts of the proposed project on the identified heritage resources in the receiving environment and the impact on the intangible heritage fabric of the receiving environment. The objective of the HIA is to advise on the management of the heritage resources (both the tangible and the intangible) in the study area in terms of known heritage resources management measures in line with the NHRA, No. 25 of 1999.

1.2. Proposed Work Scope

- BAR and EMPr conducted by Ikamva and acquisition of environmental permits
- Specialist inputs to inform the BAR and EMPr

In addition to compliance requirements for an HIA's as part of the BAR and EMPr, this HIA intends to give inputs on what should be done to enhance further the receiving environment's cultural fabric in the second stage of the project.

1.3. Location of the study area

The study area is situated in the north-western suburbs of Johannesburg Central Business District (CBD) in Roodepoort in the suburbs of Kloofendal. It is ensconced between Wilgerood Road (Robert Broom Street) in the north, Ondekker Road in the south, C.R Swart Road in the west and Christian de Wet Road in the east



Figure 1: Map showing the locality of the project area.

1.4. Condition Description, History and Developmental Context of the Affected Area

1.4.1. Spatial Planning and Land Use

The site is zoned a Nature Reserve and is open to the public for recreational activities and events (Figure 2 and 3). Its primary land use is conservation. Amenities on site include, amongst others:

- The Ecological Centre (Figure 5)
- An amphitheatre with several small lapa's with chairs that surround the amphitheatre and one big Lapa, i.e. the Executive Lapa and stage (Figure 6 – 8)
- Other infrastructure includes: ablution facilities, braai area and small pavilions (e.g. Figure 9)
- Historical objects such as the Struben Stamp Mill and the associated engine (Figure 10)
- Several paved and unpaved pathways for walking and exploration of the reserve (Figure 11)
- An unpaved parking area where the proposed interpretation centre is proposed to be constructed (Figure 12)
- A dam (Figure 13)
- The spruit (Figure 14)

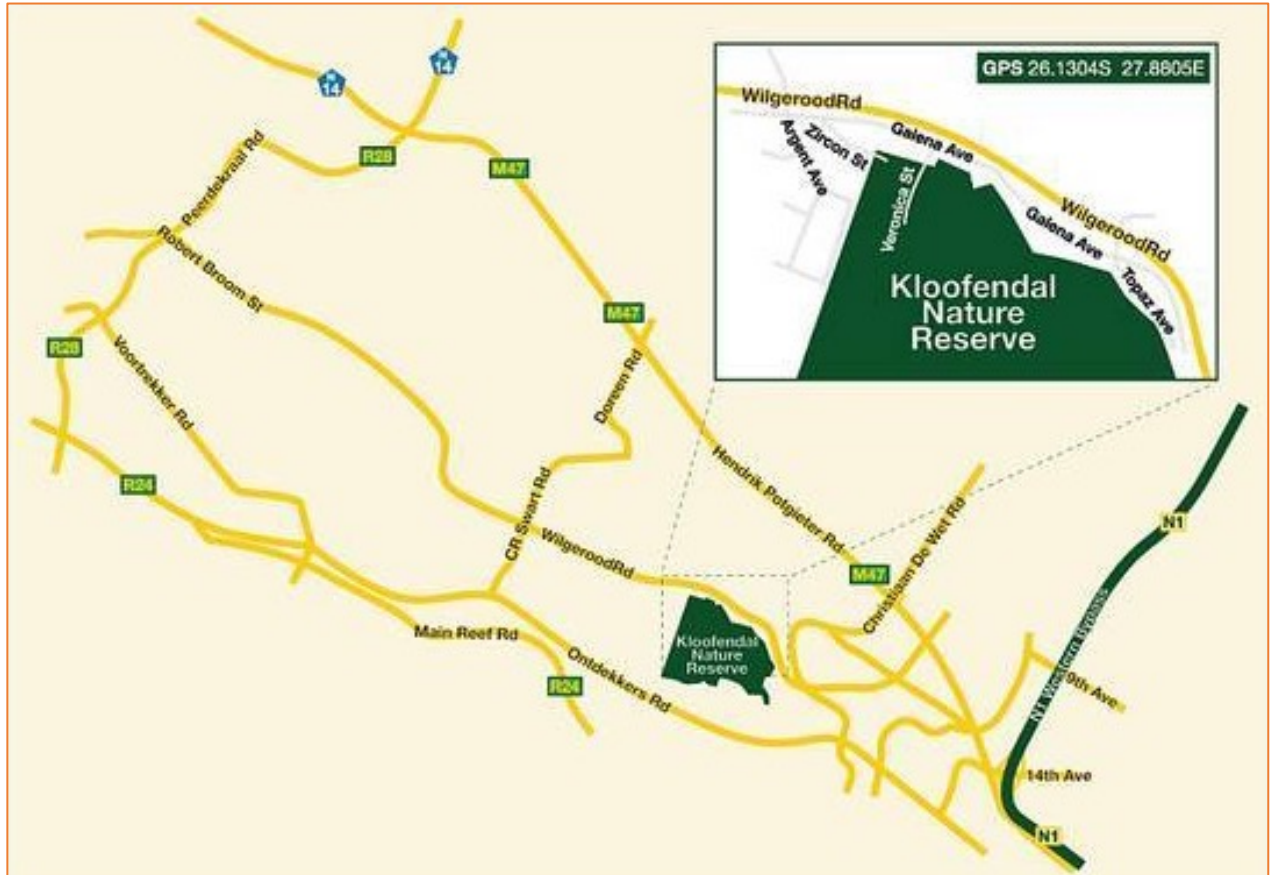


Figure 2- Boundary of the study area (Map @ Friends of Kloofendal, January 2020)

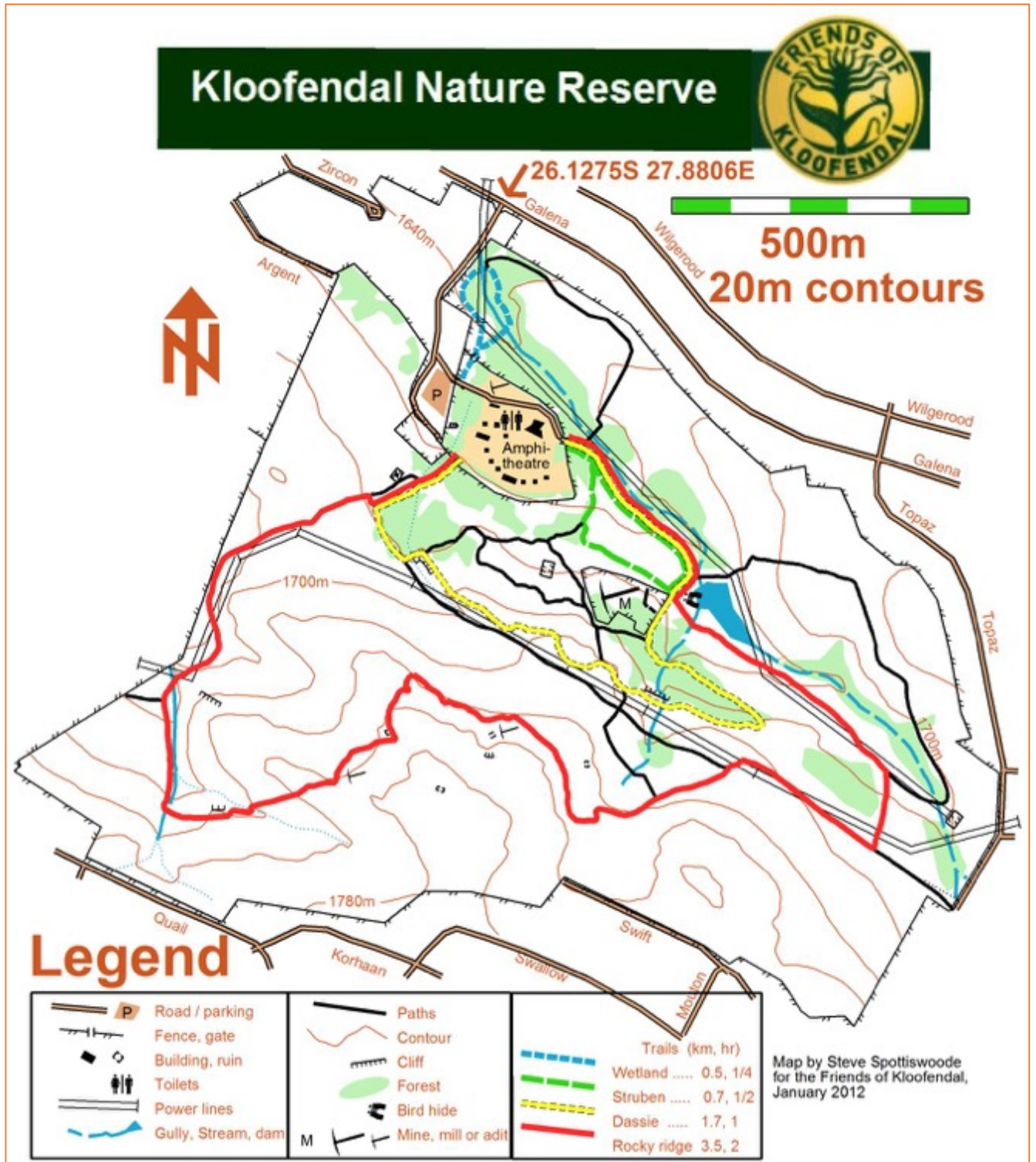
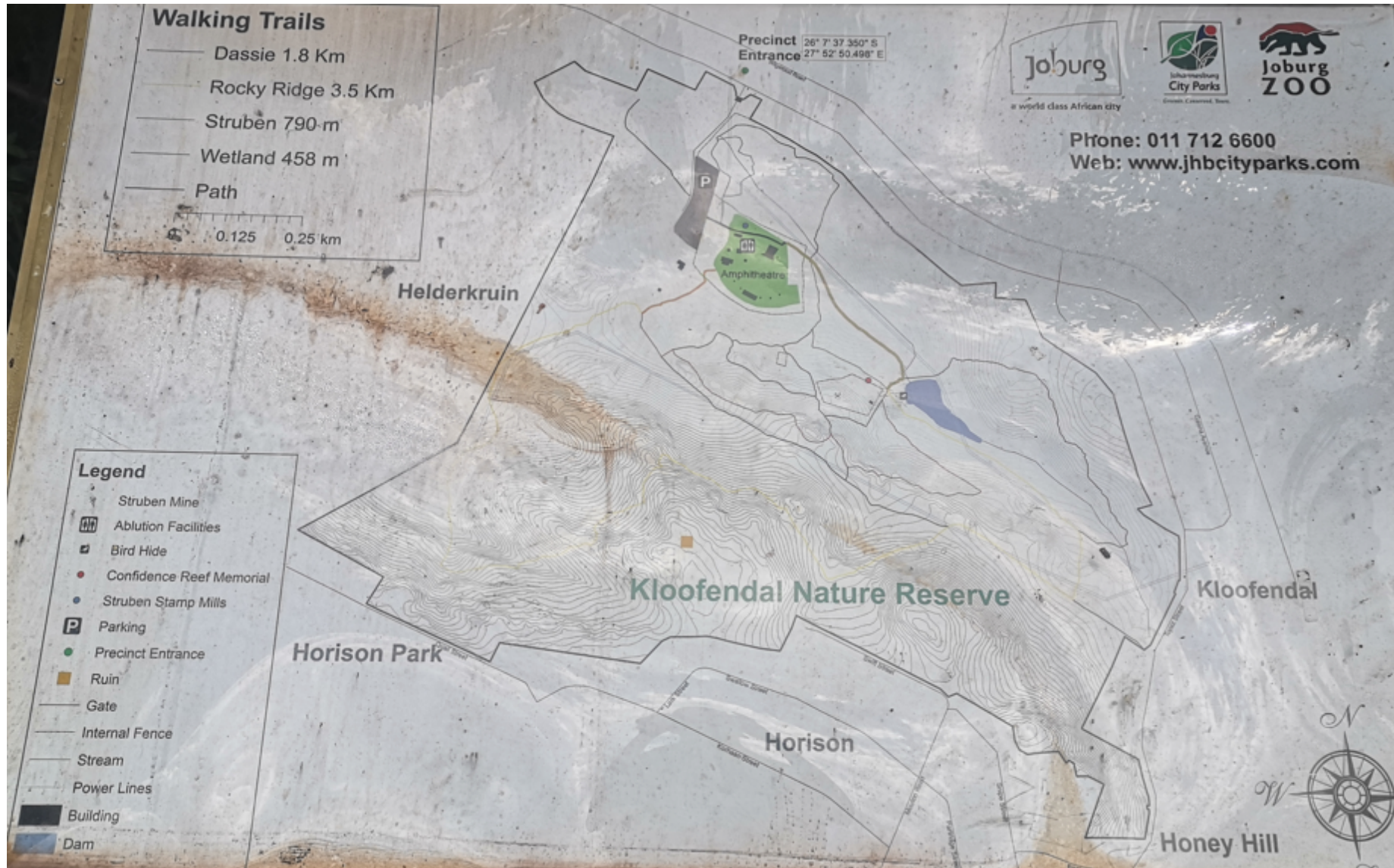


Figure 3- Boundaries and facilities within Kloofendal Nature Reserve (Map @ Friends of Kloofendal, January 2020)



The HIA was developed by NGT Infraco on behalf of Ikamva for Joburg City parks – Kloofendal Nature Reserve



Figure 4- Site boundary and existing infrastructure including the dam and heritage resources (Map @ Joburg City Parks and Zoo)



Figure 5- Entrance to the ecological centre



Figure 6-Stage which forms part of the amphitheatre



Figure 7--Small Lapa's



Figure 8-Exacutive lapa



Figure 9- pavilion



Figure 10- Struben Stamp Mill



Figure 11- Example of paved and unpaved pathways



Figure 12- Existing unpaved parking



Figure 13- Picture showing the location of the dam



Figure 14- Wilgespruit north of the dam

1.4.2. Accessibility of the Area

The study site is ensconced between Wilgerood Road (Robert Broom Street) in the north, Ondekker Road in the south, C.R Swart Road in the west and Christian de Wet Road in the east. It can be accessed from these significant roads (Figure 15):

- From Johannesburg (south-east) via Ondekker Road, joining Christian De Wet and Dr Robert Broom Street, which passes north of the site
- From Hendrik Potgieter in the north either through Christian De Wet or Golf Club Terrace joining Dr Robert Broom which, passes north of the site
- From the west, the site is accessed via Ondekker Road in the south, joining C.R Swart Road, which leads to Dr Robert Broom eastwards.

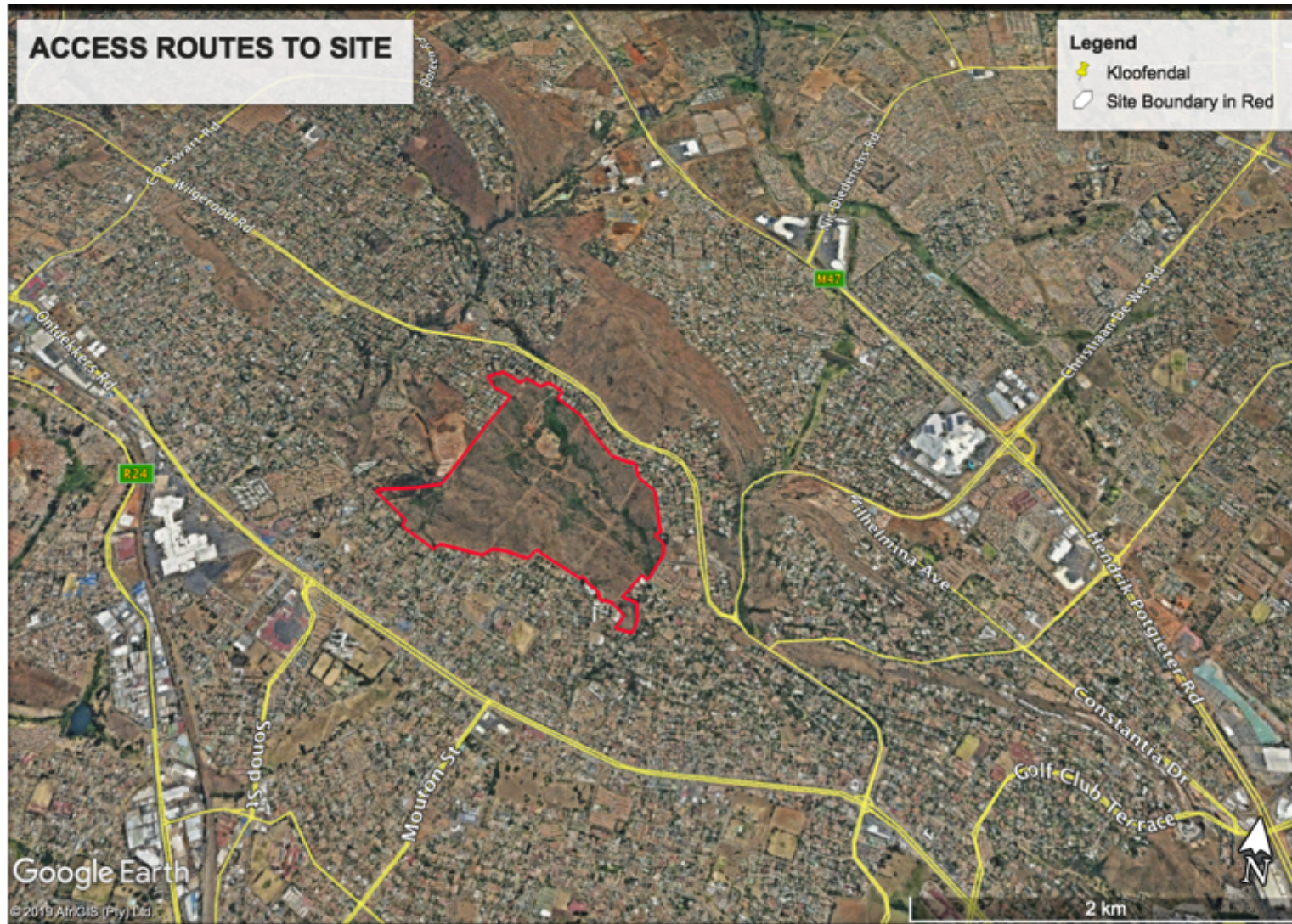


Figure 15-Access routes to the site

1.4.3. Development Context and History of the Area

In terms of cultural heritage, the study area is associated with industrial heritage and history, i.e. the discovery of gold in the Witwatersrand. The first gold-bearing reef was discovered on the eastern section of the Farm Wilgespruit on the 18th of September 1884. The discovery was made by the Struben brothers, Fredrick Pine Theophilus Struben and Hendrik Wilhelm Struben (*Figure 16*), who owned the Sterkfontein Junction Mining Syndicate. Fredrick (Fred) and Hendrik (Harry) were sons of Johan H.M. Struben (from Holland), who was an official of the South African Republic, and his wife, Frances S. Beattie (of Scottish origin), who migrated to South Africa in 1850 settling in Pietermaritzburg and 1885 moved to Pretoria. The Struben brothers mine became known as the Confidence Reef Mine. This discovery followed several entrepreneurial and business ventures by the Struben brothers. For example, below is the summary of significant events or activities associated with Harry (i.e. born on the 9th of October 1840 on a yacht trip in Lower Rhine, German and died on the 18th of October 1915 in Rosebank, Cape Town, South Africa) started (*Table 1*):

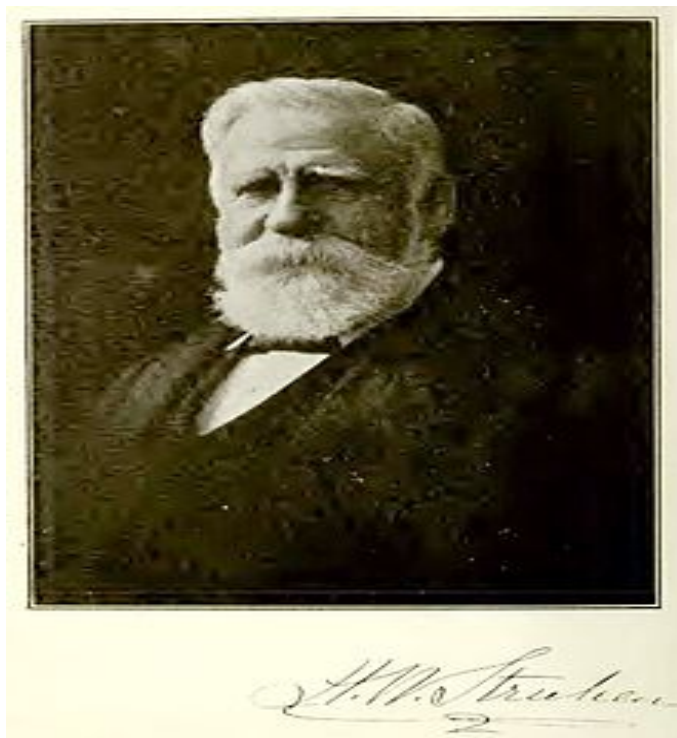


Figure 16- Hendrik Wilhelm Struben

Table 1- Significant events by years associated with Harry Struben

Year	Event or Activity
1855	Owner of a transport rider company carrying goods between the Natal and the Transvaal
In 1862	By far 'The Willow's on the outskirts of Pretoria
January 1868	Marries Mary L. Cole, and they were blessed with a family of eight children in the later years
1872	Together with Piet Marais buys two farms in the Lydenburg District, Mpumalanga (then Eastern Transvaal)
October 1876	Elected to the Volksraad to represent the constituency of Pretoria East
1880-1881	Embarks on mining ventures with his younger brother, Fred Struben
December 1883	Together with his younger brother establish the Sterkfontein Junction Mining Syndicate. The company explores the farms Sterkfontein and Swartkrans in today west rand. Their focus is almost entirely on quartz reefs, little realising that gold on the Witwatersrand was confined primarily to conglomerate beds.
September 1884	He comes across a promising quartz outcrop on the farm Wilgespruit and, they name it, Confidence Reef.
1885	The Transvaal government assisted in financing its exploitation in 1885, but the yields proved to be disappointing.
1886	Their mining activities attracted other fortune-seekers to the area, and the rich Main Reef conglomerate was found on the farm Langlaagte in 1886. Together with his younger brother, Fred, they retire to Cape Town.
1875-6	He was elected as the first Director of the Delagoa Bay Railway.
March 1887	Harry is elected to the first Diggers' Committee in Johannesburg
Late 1887	Harry was elected the first president of the Chamber of Mines (the current Mineral Council of South Africa), which was founded to promote the mining industry in the Transvaal.
1889	Harry sold his mining rights on the farms Driefontein and Vogelstruisfontein and retired to Rosebank, Cape Town

His brother Fred (born on the 14th of June 1851 in Pietermaritzburg in South Africa and died on the 7th of September 1931 in Devonshire, England) worked alongside his older brother. Still, he often chased prospecting activities on his own (*Figure 17* and *Table 2*):



Figure 17- Fredrick Pine Theophilus Struben

Table 2- Significant events by year associated with Fred Struben

Year	Event or Activity
1855	Joins his older brother Harry on the farm The Willows, near Pretoria, assisting him in trading and prospecting ventures.
1870	Works a claim on the alluvial diamond diggings along the Vaal River
1872-1873	Involved with prospecting activities in Pilgrim's Rest, Mpumalanga (then Eastern Transvaal)
May – July 1876	Take part in a punitive expedition against the Bapedi under Paramount Chief Sekhukhune in the Lydenburg District
1879	Helps to organise transport during the Anglo-Zulu War
1880-1881	He travels to Europe during the First South African War (i.e. First Anglo-Boer War) following the British annexation of the Transvaal
December 1883	Tours the Witwatersrand looking for gold. He and Harry then formed the Sterkfontein Junction Mining Syndicate to prospect on, among others, the farms Sterkfontein and Swartkrans. At that time, like almost all other prospectors, they concentrated their efforts on quartz reefs, not suspecting that gold on the Witwatersrand occurred mainly in conglomerate beds.
1884	Started prospecting in Barberton following the discovery of gold at present-day Barberton in February 1884 by F.H. Barber and others, but without success
September 1884	Fred and his brother Harry discovered a good quartz reef on the farm Wilgespruit, south-east of Kromdraai, and they name it Confidence Reef.
1886	The Transvaal government promised state aid for its exploitation, but the results were disappointing. However, their activities helped attract other prospectors to the region, which led to discovering an extremely rich Main Reef conglomerate on the farm Langlaagte in 1886.

	A few years later, the Struben brothers sold their mining rights on the farms Driefontein and Vogelstruisfontein for a substantial sum and retired to Cape Town
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In the Witwatersrand, it is understood that the two brothers were working under the invitation of Mr Louw Geldenhuys and had learned and acquired their mining expertise from a Cornish miner by the name of George Arnold. The news of the discovery was made known to the President of the Transvaal Republic and the world on the 5th of January 1885. The Transvaal government promised state aid for its exploitation of gold, but the mine had low yields, and the two brothers eventually abandoned the mine, which remained idle for some three decades. Although not successful at Confidence Reef Mine, their discovery brought about several other gold prospectors such as George Harrison & George Walker in the Witwatersrand, consequently resulting in the discovery of the Main Reef in 1886 by George Harrison on Farm Langlaagte. The two George's had learned and acquired their mining skills from Mr Arthur Edgson based in Muldersdrift. In addition to the Confidence Reef Mine, the Struben's brothers also put claims on the Main Reef – east of the Farm Langlaagte where they dug numerous test-shafts with the aim and objective of quantifying the gold content. Hence, their claims were referred to as the Crown Reef. A few years later (1889), the Struben brothers sold their mining rights on the farms Driefontein and Vogelstruisfontein for a substantial sum and retired to Cape Town. But, it seems that Fred retained the property rights at Wilgespruit because the literature shows that the property was only sold by his wife, Mable, following his death in 1931 in Devonshire, England. She sold it to George Brown of Roodepoort, who also failed in his mining endeavours at Wilgespruit. Below is a letter to Mrs Struben from George Brown dated the 16th of September 1926 (*Figure 18*). Before the property was sold to him, the Confidence Reef mine was rented out and operated by a consortium led by Count Jacques de Waru. Count Jacques de Waru had also abandoned the mine because it did not prove consistently payable due to its low yields; eventually, interest in its operation was short-lived and it lay abandoned until the 1930s.

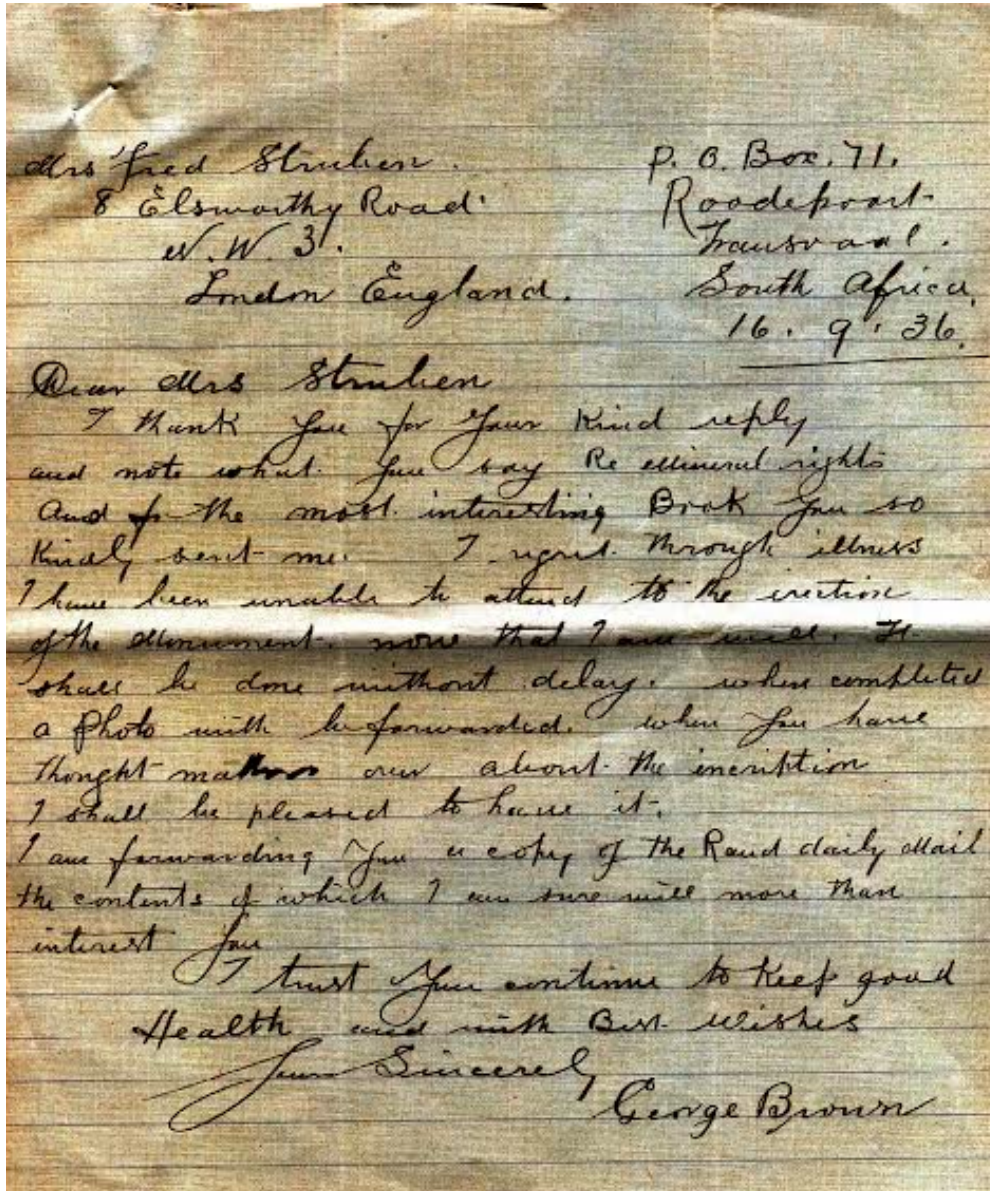


Figure 18-The first page of correspondence between Brown and Mabel Struben, whom Brown consulted about the wording on the plaque

In terms of the mining infrastructure at Confidence Reef Mine, George Walker is accredited with its set up or establishment; Walker was commissioned to help set up the new stamp mill in Kloofendal. He built a small cottage nearby to replace the Struben brothers tent (Figure 19). The stamp mill was imported from Sandycroft Foundry in England (Figure 19-20). The mill was powered with an eight horse-power steam engine which then had been imported from Ransom, Simms & Jefferies from England. In 1936 George Brown built a monument to honour the Struben's brother discovery of gold at Kloofendal, with his own money since the mine was not yielding the desired results (Figure 21). The monument commemorating the efforts of the Struben brothers in the discovery of gold was built using red bricks with a marble plaque narrating the story about what the Struben brothers had achieved in Kloofendal, the monument towered on the koppie overlooking the Magaliesberg. The marble inscription reads:

"To the memory of Fred and Harry Struben, who by their brotherly cooperation during a period of arduous work discovered and proved the gold-bearing conglomerate of the Witwatersrand, September 1884. The first public information of discovery was made to the President of the Transvaal Republic and the world, the 5th of January 1885 "Erected by Geo. Brown, November, 1836, Wilgespruit."

The monument stood overlooking the scenic Magaliesberg for some three decades until the mid-1960s when it was destroyed by a treasure hunter who destroyed it searching for the legendary 'Kruger Millions' he thought had been buried within it. Today, sadly, nothing remains of Brown's Struben monument.



Figure 19-Struben Brothers Stamp Mill 1885 - HF Gros Collection (@Heritage Portal)



Figure 20-Struben Stamp Mill



Figure 21-The Struben Monument via Rod Kruger (@Heritage Portal)

The Confidence Reef Mine is also a declared Provincial Heritage Site by the National Monuments Council in 1983 (Figure 13). In addition to this, perhaps it is time to revive the idea of a substantial memorial to the famous brothers? Rod Kruger sits where the monument once stood. The area is now

in the Kloofendal Nature Reserve, near Clearwater Mall and Strubens Valley.

Conclusions on Literature Review

In conclusion, the background information search has shown that the study area is a rich cultural landscape associated with a group of persons that played an integral part in the discovery of gold in the Witwatersrand and, consequently, Johannesburg's establishment of the Gauteng Province as it is known today. Furthermore, the Struben brother's discovery contributed to the shaping of the modern-day economy of South Africa. For example, the 1800s industrial revolution propelled by the discovery of diamonds in Kimberly in 1867 (the Eureka and many other discoveries that followed) on the Orange River banks near Hopetown in Northern Cape and later discovering gold in the Witwatersrand in the 1880s. The Struben brothers also played an integral part in establishing the Chamber of Mine, now known as the Mineral Council South Africa (e.g. Harry in 1887).

Based on this, it is concluded that the Confidence Reef is a site of cultural heritage significance and deserves a declaration as a National Heritage Site; it resulted in the discovery of gold and the formation of South African mining heritage. Furthermore, the prospecting endeavours by the two brothers before their discovery at confidence resulted in the discovery of fossil material in the Sterkfontein and Swartkrans area, which are now declared a World Heritage Site.

2. TERMS OF REFERENCE FOR THE APPOINTMENT OF HERITAGE SPECIALIST

The HIA is conducted in terms of Sections 38 and Section 34 of the NHRA, No. 25 of 1999. NGT Infraco is appointed as the lead cultural resources management (CRM) consultant to conduct and manage the HIA and the associated heritage public participation process (H-PPP). The appointment of NGT Infraco is based on NGT Infraco experience and expertise in the field of **conservation**, one of the three sectors NGT Infraco operates within. Other sectors where NGT Infraco has experience and expertise in include Infrastructure and **Built Environment**. Conservation of cultural heritage and environment resources are at the core of NGT Infraco business. NGT Infraco was also appointed based on its understanding of the socio-economic benefits associated with conservation efforts.

2.1. NGT Infraco and Its Experience

2.1.1. Who We Are

NGT Infraco was a through the line Planning, Construction and Maintenance company established in 2013 (www.ngtinfraco.co.za). We provide services in the infrastructure and property development and conservation sectors. We operate in all three South Africa regions, which include:

- Northern Regions: Gauteng Province, Limpopo, Mpumalanga and the North West Province
- Central Regions: Free State Province and KwaZulu-Natal
- Cape Regions: Eastern Cape Province, the Western Cape and the Northern Cape

2.1.2. How We Operate

NGT is a collaborative platform for specialists across the planning, construction, maintenance and conservation space. Our process objective is to offer a seamless, streamlined experience to our clients and stakeholders.

2.1.3. Our Management

The Company Executive Director and Principal Consultant has 13 years of experience in the following field:

- Infrastructure development - planning, permitting, design and management
- Built environment – feasibility, planning, permitting, design and build
- Conservation - feasibility, planning, permitting and conservation management plans for both cultural and natural heritage resources
- Project and programme management – from inception to handover

In addition to his vast South African experience, he has extensive international experience and expertise. International project experience in countries such as the Democratic Republic of Congo, scientific exchange programmes with countries such as the United States of America, the Peoples Republic of China and France

Together with his creative mind and entrepreneurial zeal, the above gives NGT Infraco a competitive edge over its competitors and the work it delivers on. With each project and programme uniquely conceptualised, structured and delivered to exceed client expectations. At NGT Infraco, we continuously challenge ourselves to supersede conventional thinking in providing on projects and programmes.

2.2. Legal Requirements for Completion of the Study

The NHRA, No. 25 of 1999, sets norms and standards for managing heritage resources in South Africa. Section 35 and 38 (3) of the NHRA, No. 25 of 1999 informs the current HIA study. Table 4 below gives a summary of all the relevant legislation that informed the current study.

Table 3: Legislation and relevance to this HIA Study

LEGISLATION (INCL. POLICIES, BILLS AND FRAMEWORK)	
Heritage	<ul style="list-style-type: none"> • Heritage resources in South Africa are managed through the National Heritage Resources Act (NHRA), No. 25 of 1999. This Act sets guidelines and principles for the management of the <i>nation estate</i>. • Section 34 becomes relevant in terms of structures. • Section 35 becomes relevant in terms of archaeology and palaeontology. • Section 36 becomes relevant for the management of burial grounds and graves. • Section 38 of the Act becomes relevant to this development based on the nature and character of the programme
Environmental	<ul style="list-style-type: none"> • The NEMA, No. 107 of 1998. • The cultural environment in South Africa is managed through Section 24 of the NEMA, No. 107 of 1998.

3. METHODOLOGY

3.1. Approach to the study

Nkosinathi Tomose is responsible for compiling the HIA report and the H-PPP, including its Review and Quality Control (RQC) process. The RQC involves reviewing First Draft HIA (Revision 01) and revising the Second Draft (Revision 02). The RQC is a standard process at NGT Infraco and forms part of its quality management systems. This process considers if:

- The study addresses project objectives in line with the project work scope
- The study follows the necessary steps in conducting and completing the work in terms of the required legislation
- The quality of the content of the study
- The work was conducted, concluded and delivered to the client and the project proponent within the prescribed timeframes and schedule of works:
 - Keeping to delivery timeframes is an essential aspect of project management because it can result in significant project risks such as financial escalations, unrests due to delayed service delivery, especially in public projects.
 - Reputation risks to the appointed Principal Agent
- That document management system includes compliance to non-disclosures and document pathway between the consultant, the principal-agent, stakeholders and authorities.

3.1.1. Step I – Literature Review (Desktop Phase)

Background information search for the proposed development occurred following the receipt of an appointment letter from the client. Sources used included, but not limited to, published HIA studies, academic books, academic journal articles and the internet about the site and the broader area in which it is located. Interpretation of legislation (the NHRA, No. 25 of 1999) and local by-law forms form the backbone for the study.

3.1.2. Step II – Physical Survey

- The survey of the project area was conducted on:
- Nkosinathi Tomose conducted the survey of the proposed development area in January 2020; the survey was conducted on foot, and the site was accessed using a bakkie;
- The surveys aimed to identify archaeological, burial grounds and graves, and built environment heritage sites and features in and around the area proposed for development area;
- To record and document the sites using applicable tools and technology;
- The survey also paid attention to historically disturbed areas, such as the area south of the stonewall enclosure with dead matured trees (*Figure 22*), where some material culture was found similar to that found at the stonewall enclosure (*Figure 23*)

The following technological tools were used for documenting and recording identified resources on site:

- Garmin GPS (i.e. Garmin 62s) – to take Latitude and Longitude coordinates of the identified sites and to track the site
- Canon SLR – to take photos of the affected environment and the identified sites.



Figure 22- matured trees that have since died situated south of the stonewall enclosure



Figure 23-Stoneware found in the area with trees that shows signs of disturbances

3.1.3. Step III - Site Grading and Impact Significance Ratings

The following site significance classification minimum standards as prescribed by the SAHRA (2006) and approved by ASAPA for the Southern African Developing Community (SADC) region were used to grade the identified heritage resources or sites (*Table. 2*).

3.1.3.1. Site Grading

Table 4: Site significance classification standards as prescribed by SAHRA

FIELD RATING	GRADE	SIGNIFICANCE	RECOMMENDED MITIGATION
National Significance (NS)	Grade 1	High Significance	Conservation; National Site nomination
Provincial Significance (PS)	Grade 2	High Significance	Conservation; Provincial Site nomination
Local Significance (LS)	Grade 3A	High Significance	Conservation; Mitigation not advised
Local Significance (LS)	Grade 3B	High Significance	Mitigation (Part of the site should be retained)
Generally Protected A (GP. A)	-	High / Medium Significance	Mitigation before destruction
Generally Protected B (GP. B)	-	Medium Significance	Recording before destruction
Generally Protected C (GP. A)	-	Low Significance	Destruction

3.1.3.2. Ratings in terms of Section 3 (3) of the NHRA, No. 25 of 1999

Cultural and natural landscape rating including architectural and archaeological resources in terms of the importance

Table 5: Significance criteria in terms of Section 3(3) of the National Heritage Resources Act.

No	Criteria Used
1	The importance of the cultural heritage in the community or pattern of South African history (Historical and political significance)
2	Possession of uncommon, rare or endangered aspect of South African natural and cultural heritage significance
3	Potential to yield information that will contribute to an understanding of South African natural or cultural heritage (Research/scientific significance)
4	Importance in exhibiting particular aesthetic characteristics valued by a community or cultural group (Aesthetic significance)
5	What is the state of the architectural and structural integrity of the street and streetscape?
6	Importance in demonstrating a high degree of creative or technical achievement at a particular period (Scientific significance)
7	Solid and unique association with a particular community or cultural group for social, cultural or spiritual reasons (Social significance)
8	Strong or unique association with the life and work of a person, group or organisation of importance in the history of South Africa (Historic significance)
9	The significance of the site relating to the history of slavery in South Africa.

3.1.3.3. Historical Significance Rating

Table 6- Rating in terms of the history of the area

No	Criteria Used
1	Is the street or streetscape associated with a historical person or group?
2	Is the street or streetscape associated with a historical event?
3	Is the street or streetscape associated with a religious, economic, social, political or educational activity?
4	Is the street or streetscape of archaeological significance? Are any of the buildings on the site older than 60 years?

3.1.3.4. Landscape Architectural Significance Rating (artefactual significance)

Table 7- Landscape and landscape features a rating

No	Criteria Used
1	Are the street and streetscape an essential example of a Johannesburg streetscape precinct?
2	Is the street or streetscape an outstanding example of a particular style or period?
3	Does the street or streetscape contain fine landscaping details and reflect exceptional craftsmanship?
4	Is the street or streetscape an example of an exceptional industrial, engineering or technological development?
5	What is the state of the architectural and structural integrity of the street and streetscape?
6	Are the streetscape current and future use sympathy with its original usage for which they were designed)?
7	Were the alterations to the street or streetscape was done in sympathy with the original design?

3.1.3.5. Spatial Significance Rating

Table 8- Spatial Rating

No	Criteria Used
1	Can the street be considered a landmark in the city?
2	Does the street or any of the adjacent buildings contribute to the character of the neighbourhood?
3	Do any of the buildings contribute to the character of the streetscape?
4	Does the street relate to the urban network of adjacent streets and streetscapes?

3.2. Limitations and Assumptions

Although a comprehensive physical survey was undertaken, it should be noted that some of the archaeological material, including artefacts and graves, can be buried underground or hidden underneath thick vegetation. Therefore, some of these resources may not have been identified during the initial survey and site visit. If the proposed development activities bring these materials to the surface, they should be treated as Chance Finds. Should such resources be unearthed, it is recommended that development activities are stopped immediately; an archaeologist be contacted to conduct a site visit and make recommendations on the mitigation of the finds. SAHRA and PHRA-G should also be informed immediately of such discoveries. In this case, no archaeological material of graves should be moved from the site, until the heritage specialist has assessed the significance of the site and archaeological material, which is also subject to SAHRA approval. Furthermore, the survey

was conducted in the absence of architectural and engineering drawings to show the type of proposed infrastructure.

The surveyor and the principal consultant did not visit the shafts due to health and safety reasons (*Figure 24*). However, this limitation will be mitigated by arranging a site visit of the mine shaft as part of the guided tours during the H-PP, which will form part of the EIA public participation process.

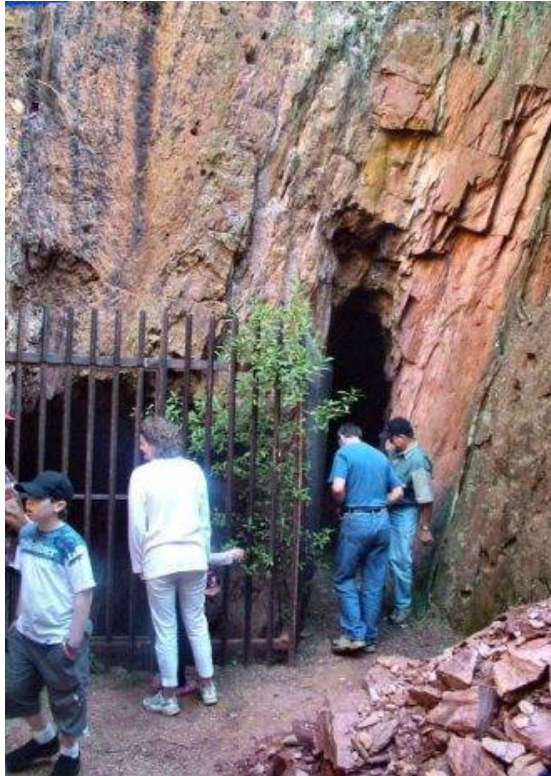


Figure 24- example of the mine shaft on site

4. RESULTS

The background information yielded information about the history and heritage of the study area. The survey confirmed some of the known heritage resources and other forms such as the material culture associated with the stone enclosure were discovered. Below is the list of heritage resources found on site:

4.1. Struben Stamp Mill and Associated Engine

The Struben Stamp Mill and engine (*Figure 25-26*). The stamp mill is situated at the second entrance to the reserve by the fence once, which separates the parking area, the recreational space with a fence demarcates it from the rest of the infrastructure. Figure 27 is the Johannesburg Heritage blue plaque, a plaque given to the City of Johannesburg outstanding and significant heritage resources.



Figure 25- Struben Stamp Mill and the associated engine. Note the CoJMM heritage blue plaque



Figure 26- Struben Stamp Mill - picture taken from the north facing south. Note the engine associated with the stamp mill



Figure 27-City of Johannesburg Blue Plaque narrating the history of the Struben Stamp Mill

4.2. Confidence Reef Memorial by the National Monuments Council

A picture of Confidence Main Reef memorial erected on site in 1983 by the National Monuments Council. The memorial is made of sandstone and has a brass plaque of the National Monuments Council and a brass inscription of the history and significance of the site (*Figure 28*). Before, 1999 site adorned with such plaques by the National Monuments Council were sites of national heritage significance. Figure 29 shows the memorial's location from the eastern koppie facing west – near the memorial is a shed.



Figure 28- Confidence Reef Mine National Monuments Council memorial dated 1



Figure 29-Position of the memorial

4.3. Historic Stonewalled Enclosure and Material Culture Found Around it

They are situated on the southern hilltop rectangle stonewall structures, possibly associated with the 1930 to 1940 or 1960s occupation of the site and the related industrial activities (*Figure 30*). Several artefacts were found around the one enclosure, and an Ohlsson South African Breweries beer bottle was located north of the enclosure (*Figure 31 and 32*). Also identified nearby the stonewall enclosure is a Middle Stone Age flake (*Figure 33*) and several stonewares, chinaware and glass (*Figure 34*). The glass and stoneware dated the 1900s and 1800s. This type of stoneware is often found in mid-1900s industrial archaeological sites



Figure 30-Historic rectangle stonewall enclosure found on the southern hilltop at Nature Reserve



Figure 31- Talana base of a bottle dated 1945 found immediately north of the stonewall enclosure



Figure 32- Example of full-sized South Africa full-sized dated 1940s with Ohlsson Cap the Breweries embossment on the side and underneath is Talana as is with the bottle based found on site.



Figure 33- Middle Stone Age Flake made from quartz



Figure 34-stoneware (blue arrows), china (blue and green –red arrow)) and glass found around the stone enclosure

4.1. Significance of the site and associated heritage resources in terms of Section 3 (3)

This section of the Act states that without limiting the generality of subsections (subsection (1) and (2) of the NHRA, No. 25 of 1999 a place or object is to be considered part of the national estate if it has cultural significance or other exceptional value because of:

- (a) its importance in the community, or pattern South African history;
- (b) its possession of uncommon, rare or endangered aspects of South African natural or cultural heritage;
- (c) it's potential to yield information that will contribute to an understanding South African natural or cultural heritage;
- (d) its importance in demonstrating the principal characteristics of a particular class of South African natural or cultural places or objects; 35
- (e) its importance in exhibiting particular aesthetic characteristics valued by a community or cultural group;
- (f) its importance in demonstrating a high degree of creative or technical achievement at a particular period;
- (g) its strong or unique association with a particular community or cultural group 40 for social, cultural or spiritual reasons;
- (h) its strong or unique association with the life or work of a person, group or organisation of importance in the history of South Africa; and
- (i) sites of significance relating to the history of slavery in South Africa.

The assessment of the site (Kloofendal Nature Reserve with all its heritage resources) heavily relied on this section of the Act since the evaluation did not only look at heritage features and objects in isolation but as a collective forming part of the broader cultural landscape (*Table 9*).

Table 9: Significance criteria in terms of Section 3(3) of the National Heritage Resources Act.

No	Criteria Used	Site Grading	Site Significance Rating	Definition of Site Significance	Impact Significance from Activities (negative or positive impact)	Nature of Impact (Direct vs Indirect effect)	Mitigation Measures to be Considered
1	The importance of the cultural heritage in the community or pattern of South African historical and political significance)	2	High	Kloofendal Nature Reserve is a rich cultural landscape associated with the history and heritage of the mining industry in South Africa. The industry played a significant role in the development of South African modern economy and still plays a pivotal role in the economy in the modern day South Africa.	<p>Negative Impacts:</p> <ul style="list-style-type: none"> The proposed development will not negatively impact cultural heritage fabric of Kloofendal Nature Reserve and the associated cultural heritage resources. <p>Positive Impacts:</p> <ul style="list-style-type: none"> The proposed interpretation centre is viewed as an effort to contribute to research and interpretation of the site and will result to its cultural and natural heritage fabric being enhance – a positive impact. 	<p>Nature of Negative Impacts:</p> <ul style="list-style-type: none"> No direct impact – negative impact will result from the proposed development <p>Nature of Positive Impacts:</p> <ul style="list-style-type: none"> The indirect positive impacts will result in research, interpretation and raising awareness about both cultural and natural heritage of Kloofendal Nature Reserve 	<ul style="list-style-type: none"> The proposed development should be limited into the area outside the reserve as planned. No activities should take place inside the reserve as these may result to direct negative impacts on the cultural heritage resources.
2	Possession of uncommon, rare or endangered aspect of South African natural and cultural heritage significance	2	High	The site contains the early history of the South Africa mining industry, and played a significant role in the development of Johannesburg, the modern day modern-day province and in shaping the South African economy.	<p>Negative Impacts:</p> <ul style="list-style-type: none"> The proposed development will not negatively impact the cultural heritage fabric of Kloofendal Nature Reserve and the associated cultural heritage resources. <p>Positive Impacts:</p> <ul style="list-style-type: none"> The proposed interpretation centre is viewed as an effort to contribute to research and interpretation of the site and will result to positive benefits to both cultural and natural heritage resources and their conservation 	<p>Nature of Negative Impacts:</p> <ul style="list-style-type: none"> No direct impact – the negative impact will result from the proposed development <p>Nature of positive Impacts:</p> <ul style="list-style-type: none"> Research, interpretation and raising awareness about both cultural and natural heritage of Kloofendal Nature Reserve. This will result to long terms sustainable conservation efforts 	<ul style="list-style-type: none"> The proposed development should be limited in the area outside the reserve as planned. No activities should take place inside the reserve as these may result to direct negative impacts on the cultural heritage resources.

No	Criteria Used	Site Grading	Site Significance Rating	Definition of Site Significance	Impact Significance from Activities (negative or positive impact)	Nature of Impact (Direct vs Indirect impact)	Mitigation Measures to be Considered
3	Potential to yield information that will contribute to an understanding South African natural or cultural heritage (Research/scientific significance)	3A	High	The site has a potential for historical and industrial archaeological research. The area around the stonewall enclosure yielded lots of material culture in form of bottles, glass and stoneware. The area around the mine shaft also has a potential to yield archaeological material culture which would unshed more scientific information about the miners, their activities on site and the type of technology they used and food the consumed during mining.	<p>Negative Impacts:</p> <ul style="list-style-type: none"> No negative impacts will result from the proposed development activities – they are situated outside the reserve. <p>Positive Impacts:</p> <ul style="list-style-type: none"> The proposed interpretation centre is viewed as an effort to contribute to research and interpretation of the site and will result to its cultural and natural heritage fabric being enhance – a positive impact. 	<p>Nature of Negative Impacts:</p> <ul style="list-style-type: none"> No direct negative impacts will result from the proposed development <p>Nature of Positive Impacts:</p> <ul style="list-style-type: none"> Research, interpretation and raising awareness about both cultural and natural heritage of Kloofendal Nature Reserve. This will result to long terms sustainable conservation efforts 	<ul style="list-style-type: none"> It is proposed that the Nature Reserve partner with a university or museum or a heritage company and conduct as Phase II HIA. The HIA will conduct a detailed investigation of the stone wall enclosure and the areas around the mine shaft. It should include survey of archaeological material culture through archaeological excavation which will yield more information about the miners on site. At the southern hilltop a bottle with a date of 1930s was identified, China ware and some stoneware was also found. The excavation will also assist with relative dating of the site and yield more information of the activities that took place on site during the different occupation periods. during the survey.
4	Importance in exhibiting particular aesthetic characteristics valued by a community or cultural group (Aesthetic significance)	3A	High	The site rich in biodiversity and contains elements of the history of mining in South Africa. It is one of scenic areas in Johannesburg and the community where it is situated.	<p>Negative Impacts:</p> <ul style="list-style-type: none"> Depending on the type and nature of architectural design impacts may result i.e. for example, design and construction of visual intrusive infrastructure. <p>Positive Impacts:</p> <ul style="list-style-type: none"> The proposed development provides an opportunity to incorporate cultural heritage as the based for the development. Incorporating both cultural and natural heritage elements in the design and construction of the proposed infrastructure. 	<p>Nature of Negative Impacts:</p> <ul style="list-style-type: none"> The negative impacts will be visual and intrusive depending on the nature of architecture and infrastructure proposed. <p>Nature of Negative Impacts:</p> <ul style="list-style-type: none"> The positive benefits will result from incorporation of both natural and cultural heritage elements in the design and construction of the proposed infrastructure 	<ul style="list-style-type: none"> The appointed architects and engineering team should maximise the environmental and cultural heritage elements in their designs. Heritage should form the base of design and development process. No intrusive infrastructure should be proposed on site as this will take away from the current scenic beauty of the site and impact on the reserve aesthetic and scenic feel in the process compromising in heritage fabric (both natural and cultural fabric)
5	What is the state of the architectural and structural integrity of the street and streetscape?	3E	Low	The old streetscapes are not preserved	<p>Negative Impacts:</p> <ul style="list-style-type: none"> N/A. <p>Positive Impacts:</p> <ul style="list-style-type: none"> N/A. 	<p>Nature of Negative Impacts:</p> <ul style="list-style-type: none"> N/A <p>Nature of Negative Impacts:</p> <ul style="list-style-type: none"> N/A 	<ul style="list-style-type: none"> N/A

No	Criteria Used	Site Grading	Site Significance Rating	Definition of Site Significance	Impact Significance from Activities (negative or positive impact)	Nature of Impact (Direct vs Indirect impact)	Mitigation Measures to be Considered
6	Importance in demonstrating a high degree of creative or technical achievement at a particular period (Scientific significance)	3A	High	The Struben Stamp Mill and the associated engine show demonstrate technological advancement in the early mining of gold in the Witwatersrand and South Africa in the 1800s. It is a sign of scientific and engineering achievement.	Negative Impacts: <ul style="list-style-type: none"> The proposed development will not a negative impact on the cultural heritage fabric of Struben Stamp Mill and the associated engine 	Nature of Negative Impacts: <ul style="list-style-type: none"> No direct impact – negative impact will result from the proposed development 	<ul style="list-style-type: none"> It is proposed that no development activities should come close to the Struben Mill Stamp and the associated engine. An Integrated Conservation Management Plan (ICMP) should be developed and it should integrate these resources and spell out their short (associated with construction phase of the proposed development), medium and long term conservation strategy.
					Positive Impacts: <ul style="list-style-type: none"> This objective will be given more narrative in the proposed interpretation centre. This will assist people learn more about them, their manufacture, their journey to South Africa, people who assembled them and how they operated. 	Nature of Negative Impacts: <ul style="list-style-type: none"> Interpretation, awareness and better conservation of these heritage or historic objects. 	
7	Strong or special association with a particular community or cultural group for social, cultural or spiritual reasons (Social significance)	2	High	The Struben brothers form part of what is known as the Randlords a group mining pioneers whose work and mining activities resulted to the development of towns such as Johannesburg, Florida, Krugersdorp etc.	Negative Impacts: <ul style="list-style-type: none"> The proposed development will not negatively impact on the cultural heritage fabric of the site and its association with a particular community or cultural group 	Nature of Negative Impacts: <ul style="list-style-type: none"> No direct impact 	<ul style="list-style-type: none"> A professional heritage team will need to be involved in the design and development of the interpretation centre storyline to assist with content development and its professional curation. This will guarantee proper and professional interpretation and narration of the associated group of people or cultural groups.
					Positive Impacts: <ul style="list-style-type: none"> The proposed interpretation centre will further harness the status of the Randlords and contribute to awareness about the contribution the made in the development of Gauteng and the economy in South Africa. 	Nature of Negative Impacts: <ul style="list-style-type: none"> Direct The indirect positive impacts will result to research, interpretation and raising awareness of about the Randlords and their role and place in the making of South Africa, its industrial revolution and economy. 	

No	Criteria Used	Site Grading	Site Significance Rating	Definition of Site Significance	Impact Significance from Activities (negative or positive impact)	Nature of Impact (Direct vs Indirect impact)	Mitigation Measures to be Considered
8	Strong or special association with the life and work of a person, group or organisation of importance in the history of South Africa (Historic significance)	2	High	The Struben brothers were not only involved with the discovery of gold in Confidence Reef Mine, they also played an integral role in the development of the South African Chamber of Mines now known as the Mineral Council of South Africa. For example, Harry Struben was one of the founding members of the Chamber of Mines – an institution tasked with the responsibility of promoting mining activities in South Africa. Therefore, the site is integral to understanding and shaping South African mining heritage and economy. As a result of their mining endeavours, in the north-west of Kloofendal Nature Reserve lime mining took place as a component in the chemical process for extraction of gold. The lime mines that indirectly resulted from gold lead to the discovery of many fossil sites in the in Sterkfontein, Swartkrans and Kromdraai in the Cradle of Humankind World Heritage Site. Today South African boasts one of the largest fossil site in the world as a result of mining activities.	Negative Impacts: <ul style="list-style-type: none"> No negative impacts will result from the proposed activities 	Nature of Negative Impacts: <ul style="list-style-type: none"> No direct impact – negative impact will result from the proposed development 	<ul style="list-style-type: none"> Further research in proposed to determine areas where the Struben brothers worked in Swartkrans and Sterkfontein before their discovery of Confidence Reef. If it is found that they worked some of the fossil sites in the Cradle of Humankind – this could boost the heritage significance and status of Kloofendal Nature Reserve and allow I&APs to nominate the site for national significance and protection.
					Positive Impacts: The proposed development will result to more research and interpretation of the site. Linkages with other important sites in South Africa will be developed. This is the positive benefits to Kloofendal as its storyline can be linked to other important sites in the region stimulating more interest on the history of mining and mining heritage.	Nature of Negative Impacts: <ul style="list-style-type: none"> Profiling of the importance of mining and mining heritage as a layer in the South African heritage. 	
9	The significance of the site relating to the history of slavery in South Africa.	3E	Low	There is no direct association with history of slavery	Negative Impacts: N/A	Nature of Negative Impacts: N/A	N/A
					Positive Impacts: N/A	Nature of Negative Impacts: N/A	

4.2. Historical Significance Rating

Significance criteria in terms of historical, artefactual and spatial significance.

As the criteria set out in the National Heritage Resources Act tend to approach heritage from the level of national significance and few heritage sites and features fall within this category, a second set of criteria are used to determine the regional and local significance of heritage sites. Three sub-categories are used to determine this significance:

- Historical significance – this category determines the social context in which a heritage site and resource need to be assessed. These criteria focus on the history of the place in terms of its significance in time and the role they played in a particular community (human context).
- Architectural significance – The objective of this set of criteria is to assess the artefactual significance of the heritage resource, its physical condition and its meaning.
- Spatial significance – focuses on the physical context in which the object and place exists and how it contributed to the landscape, the region, the precinct and neighbourhood.

As the criteria set out in the National Heritage Resources Act tend to approach heritage from the level of national significance and few heritage sites and features fall within this category, a second set of criteria are used to determine the regional and local significance of heritage sites. Three sub-categories are used to determine this significance (*Table 10*):

Table 10-Assessment of impacts on the history of the area

No	Criteria Used	Site Grading	Significance Rating	Definition of Site Significance	Impact Significance from Proposed Activities (negative or positive impact)	Nature of Impact (Direct vs Indirect impact)	Mitigation Measures to be Considered
1	Is the site associated with a historical person or group?	Grade 2	High	The site is associated with Strubens brothers who played an important role in the discovery of gold in the Witwatersrand and in the formation of the Chamber of Mines i.e. the Mineral Council of South Africa e.g. Harry Struben	Negative Impacts: <ul style="list-style-type: none"> N/A 	Nature of Negative Impacts: <ul style="list-style-type: none"> N/A 	<ul style="list-style-type: none"> N/A
					Positive Impacts: <ul style="list-style-type: none"> The proposed development will promote the history and heritage of mining 	Nature of Positive Impacts: <ul style="list-style-type: none"> Indirect impact as the result of the proposed development activities 	
2	Is the site associated with a historical event?	Grade 2	High	Discovery of gold in the Witwatersrand in 1884 by the Struben brothers which culminated to more exploration of the Witwatersrand reef resulting to the 1886 discovery of the main reef by George Harrison	Negative Impacts: N/A	Nature of Negative Impacts: N/A	<ul style="list-style-type: none"> N/A
					Positive Impacts: <ul style="list-style-type: none"> The proposed development will promote the history and heritage of mining 	Nature of Positive Impacts: <ul style="list-style-type: none"> Indirect impact as the result of the proposed development activities 	
3	Is the site associated with a religious, economic, social, political or educational activity?	Grade 2	High	Site is associated with South African 19 th Century industrial revolution brought about the discovery of mineral resources in the late 1800s. It is an important site in terms of the economic and industrial history of South Africa	Negative Impacts: N/A	Nature of Negative Impacts: N/A	<ul style="list-style-type: none"> N/A
					Positive Impacts: N/A	Nature of Positive Impacts: N/A	
4	Is the site of archaeological significance? Are any of the buildings or built environment features on the site older than 60 years?	Grade 3C	Medium/High	The site is a good example of a historical and industrial archaeology site.	Negative Impacts: N/A	Nature of Negative Impacts: N/A	More archaeological research is proposed on site. A partnership with research institution or a museum will assist develop more archaeological database about the site
					Positive Impacts: <ul style="list-style-type: none"> Potential to stimulate interest in historic and industrial archaeology 	Nature of Positive Impacts: Indirect	

4.3. Landscape Architectural Significance Rating (artefactual significance)

This section assesses the impact significance on the receiving environment landscape and associated landscape feature such as streets and streetscapes (Table 11)

Table 11- Assessment of impact on the receiving environment landscape and landscape features such as streets and streetscapes

No	Criteria Used	Site Grading	Significance Rating	Definition of Site Significance	Impact Significance from Proposed Activities (negative or positive impact)	Nature of Impact (Direct vs Indirect impact)	Mitigation Measures to be Considered
1	Is the street and streetscape an important example of a CoJMM or Roodepoort streetscape or precinct?	N/A	N/A	N/A	Negative Impacts: • N/A	Nature of Negative Impacts: • N/A	N/A
					Positive Impacts: • N/A	Nature of Positive Impacts: • N/A	
2	Is the street or streetscape an outstanding example of a particular style or period?	N/A	N/A	N/A	Negative Impacts: N/A	Nature of Negative Impacts: N/A	
					Positive Impacts:	Nature of Positive Impacts:	
3	Does the street or streetscape contain fine landscaping details and reflect exceptional craftsmanship?	N/A	N/A	N/A	Negative Impacts: N/A	Nature of Negative Impacts: N/A	N/A
					Positive Impacts: N/A	Nature of Positive Impacts: N/A	
4	Is the street or streetscape an example of an exceptional industrial, engineering or technological development?	N/A	N/A	N/A	Negative Impacts: N/A	Nature of Negative Impacts: N/A	N/A
					Positive Impacts:	Nature of Positive Impacts:	
5	What is the state of the architectural and structural integrity of the street and streetscape?	N/A	N/A	N/A	Negative Impacts: N/A	Nature of Negative Impacts: N/A	N/A
					Positive Impacts:	Nature of Positive Impacts:	
6	Are the street or streetscapes current and future use in sympathy with its original use (for which they were designed)?	N/A	N/A	N/A	Negative Impacts: N/A	Nature of Negative Impacts: N/A	N/A
					Positive Impacts:	Nature of Positive Impacts:	

7	Were the alterations to the street or streetscape done in sympathy with the original design?	N/A	N/A	N/A	Negative Impacts: N/A	Nature of Negative Impacts: N/A	N/A
					Positive Impacts:	Nature of Positive Impacts:	

4.4. Spatial Significance Rating

In this selection of the impact assessment, the focus is not of heritage features such as buildings, monuments, memorials and other features as single units. The assessment focus of the evaluation of significance in terms of spatial pattern in the landscape, city, town, village, neighbourhood or precinct which forms part of the broader cultural landscape. The assessment is for the following features not as the single units in the landscape (*Table 12*):

Table 12- Assessment of spatial pattern of heritage resources in the landscape

No	Criteria Used	Site Grading	Significance Rating	Definition of Site Significance	Impact Significance from Proposed Activities (negative or positive impact)	Nature of Impact (Direct vs Indirect impact)	Mitigation Measures to be Considered
1	Can the site be considered a landmark in the local community, city and region (province)	Grade 2A	High	The site was declared a national monument in 1983, however lost its status with the promulgation of the NHRA, No. 25 of 1999 in 1999. It is a landmark for the local community and the province of Gauteng. It is associated with the Struben Stamp Mill and the associated engine. These two heritage objects have been given a CoJMM heritage blue plaque as this reduces their status to local significance in terms of the Act. The stonewall enclosure with a bottle dated to 1930s is presumable associated with the memorial and the mine in terms of spatial patterning of heritage features on site.	Negative Impacts: <ul style="list-style-type: none"> N/A Positive Impacts: <ul style="list-style-type: none"> The proposed development will allow an opportunity to assess relationships between sites and determine the spatial patterns of such relation as part of research aimed at strengthening content and storyline for the interpretation centre 	Nature of Negative Impacts: <ul style="list-style-type: none"> N/A Nature of Positive Impacts: <ul style="list-style-type: none"> This will be a positive spinoff from the project if properly managed and executed (indirect positive benefit) 	<ul style="list-style-type: none"> It is proposed that a more detailed Phase II HIA is required to map out all heritage resources and site within the reserve and map their spatial patterns in the landscape as part of research efforts aimed at strengthening the content about the site and its curation in the proposed interpretation centre.
2	Does the street or any of the adjacent buildings contribute to the	Grade 3E	Low	The site is linked to the Cradle of Humankind World Heritage Site by virtue of association of lime activities in	Negative Impacts: N/A	Nature of Negative Impacts: N/A	

	character of the neighbourhood?			the Cradle and based on the fact that the two brothers once worked in Sterkfontein and Swartkrans. The road north of the site has been renamed Dr Robert Broom Street – this has created an indirect linkage between the site and the neighbouring Cradle of Humankind World Heritage Site	Positive Impacts: Provides an opportunity to assess linkages with other important sites in the region.	Nature of Positive Impacts: This will be a positive enhance the status and significance of Kloofendal Nature Reserve cultural heritage significance and its contribution to character of the neighbourhood both locally and provincially	<ul style="list-style-type: none"> More research is required as part of content development and curation for the interpretation centre
No	Criteria Used	Site Grading	Significance Rating	Definition of Site Significance	Impact Significance from Proposed Activities (negative or positive impact)	Nature of Impact (Direct vs Indirect impact)	Mitigation Measures to be Considered
3	Do any of the buildings, features and objects contribute to the character of the landscape or streetscape?	N/A	N/A	N/A	Negative Impacts: N/A Positive Impacts: Provides an opportunity to assess linkages with other important sites in the region.	Nature of Negative Impacts: N/A Nature of Positive Impacts: This will be a positive enhance the status and significance of Kloofendal Nature Reserve cultural heritage significance and its contribution to character of the neighbourhood both locally and provincially	
4	Does the street relate to the urban network of adjacent streets and streetscapes?	N/A	N/A	N/A	Negative Impacts: N/A Positive Impacts: Provides an opportunity to assess linkages with other important sites in the region.	Nature of Negative Impacts: N/A Nature of Positive Impacts: This will be a positive enhance the status and significance of Kloofendal Nature Reserve cultural heritage significance and its contribution to character of the neighbourhood both locally and provincially	

5. DISCUSSION

When assessed in terms of Section 3 (3) of the NHRA, No. 25 of 1999 - Kloofendal Nature Reserve (with all its heritage resources) has proven to be a site of importance in the community or pattern South African history. It is associated with the discovery of gold in 1884, which propelled further prospecting in the Witwatersrand, resulting in the 1886 discovery of the main reef 1886 by George Harrison. The gold rush brought about the industrial revolution in the Witwatersrand in late 1800, culminating in establishing cities like Johannesburg, which worked as centres of trade and exchange of goods and resources. The gold in the Witwatersrand also shaped the South African economy and influenced political events such as the Second South African War (circa 1889 and 1902), commonly known as the Anglo Boer War. Cultural heritage resources such as the Struben Stamp Mill provide a rare example of the early mining technology in the Witwatersrand and South Africa in a good state of preservation. This rare South African mining heritage is adequately preserved, and the Nature Reserve provides better protection from potential vandalism.

Furthermore, the Struben Stamp Mill has one of Johannesburg Heritage blue plaques. The city prides itself on protecting its heritage resources, which guarantees that these heritage objects on site are not under any imminent danger of vandalism. Based on the significance of the 1884 discovery of gold and the fact that the site was once declared a National Heritage Site, it is argued that the site and associated heritage resources are befitting to be declared either a provincial or national heritage site. The site also has considerable potential to contribute to historic and industrial archaeological research in the region (Gauteng Province) and South Africa. There are few existing industrial archaeological sites in the country, and most mining heritage is continuously desecrated. The rarity and uniqueness of the site further strengthen its significance in the broader cultural landscape in terms of its tangible and intangible heritage fabric. The site showcases the technology associated with the mining industry in South Africa and acts as a torch to the under-explored economic and entrepreneurial legacy of South Africa. The South African entrepreneurial heritage, mainly if one accesses the Struben brothers experienced, i.e. a true entrepreneurial zeal of the Struben brothers who can be classified as part of the Randlords. Their storyline tells us about their perseverance and consistency in their quest for success.

The site, however, does not exhibit any particular aesthetic characteristics other than its significance in terms of mining and industrial heritage. Its natural environment offers a unique aesthetic feel. It provides a scenic space for the enjoyment and experience of biodiversity in Johannesburg, together with sites such as Klipriviersberg Nature Reserve and Melville Koppies others.

The Struben Stamp Mill and the associated engine undoubtedly demonstrate technical achievement in mining and mining engineering legacy in South Africa in the 1880s. Although gold was found in many parts of the world, few mines had advanced technology such as those found on site. Regarding its association with a particular community or cultural group for social, economic, cultural or spiritual reasons - the site has an association with the Randlords, the Mineral Council, which was called Chamber of Mines; Harry Struben was one of the founding fathers of Chamber of Commerce. An institution that lobbies and promote exploration, mining investment and associated activities in South Africa. This association makes the site unique to historians, archaeologists or heritage practitioners

and the Mineral Council of South Africa. There is no evidence to suggest the site associated with the history of slavery (or migrant labour practice) from the historical records and archives. However, there is less research devoted to addressing slavery in the early mining exploration and activities in South Africa during the late 1800s. Most literature focused on mining and mining compounds post-1902.

It is argued that the proposed interpretation centre has the potential to contribute more towards research and research development about the cultural heritage of the site, its association with other sites in the region; for example, its links to the Cradle of Humankind World Heritage site since the two brothers first explored for gold in Sterkfontein and Swartkrans. Furthermore, the discovery of gold propelled more mining activities targeted at extracting lime. Lime mining resulted in the discovery of fossil material in the Cradle, which in 1999 was declared a World Heritage Site. The site also can incorporate and use both cultural and natural heritage as the base for development. Cultural and natural heritage elements are included in the planning and design process for the proposed interpretation centre, for example, as part of landscape design or the actual building fabric and its dimensions.

6. CONCLUSIONS

- It is concluded that Kloofendal Nature Reserve is an important cultural and natural heritage site if one assesses the site and its associated resources in totality in terms of Section 3(3) of the NHRA, No. 25 of 1999. The site meets approximately 95% of all elements contributing to the significance of a place or site or cultural landscape. The only aspect not met is its aesthetic appeal from a cultural heritage perspective, but the reserve provides a scenic natural landscape feature from a natural environment.
- In terms of the impact of the proposed development on both cultural landscape and natural heritage, it is concluded that the proposed development will not adversely impact these resources due to the fact it is planned in an area that is devoid of essential heritage resources (between the primary gate and the gate leading to the reserve and the associated infrastructure).
- The proposed development activities have the potential to enhance both the cultural heritage and biodiversity of Kloofendal Nature Reserve. This is based on the fact that for any interpretation centre to thrive and become self-sustainable, it has to push for research and research development as one of its key objectives of thrust. The interpretation centre will also raise awareness about the history and heritage of the study area, its associated industrial and natural heritage, and its role and place in shaping modern-day South African legacy. For example, the discovery of gold in 1884 propelled further exploration activities of the Witwatersrand, consequently discovering the main reef in 1886 by George Harrison on Farm Langlaagte. These activities or events resulted in 1st modern industrial revolution in South Africa and the establishment of cities such as Johannesburg, which later became an economic hub of Africa.
- Based on the impact assessment undertaken as part of the study, the number of positive impacts associated with the project far exceeds the number of adverse effects. Therefore, the project will yield the best conservation results due to the proposed development, stimulating research and part of content development and curation for the exhibitions and installations at the proposed interpretation centre. The interpretation also has the potential to increase awareness about both the cultural and natural heritage of the site. The benefits associated with this include increasing visitor numbers and generating revenue from tourists, which could be channelled back to conservation efforts at the reserve.
- The survey yield Middle Stone Age, industrial/historic archaeological resources - no burial grounds and graves were identified during the survey. However, their existence is not entirely ruled out since graves (unmarked graves) and other archaeological resources such as artefacts tend to be subterranean and can only be exposed and brought to the surface through excavation activities associated with developmental activities.
- In terms of the SAHRA Palaeontological Sensitivity Layer, the project area is located in a low Sensitivity Area. Therefore, there is no need to conduct a Palaeontological Impact Assessment (PIA) or dolomitic study as part of the study.
- It is concluded that when one accesses the heritage significance of the site and the role that it played in shaping the history of South Africa, the site is significant enough to be re-nominated and declared either as a provincial or national heritage site in terms of the new Act. The national significance will be a Grade higher than its current status of provincial significance (by default) or local importance if we translate the Johannesburg Heritage Blue

Plaque as an indication of the recent grading of the site. The national or provincial significance will be befitting due to the site significance in the pattern of South Africa mining heritage legacy, which played a pivotal role in shaping South Africa's modern economy. Furthermore, due to it being a site associated with the group of persons whose activities may have directly and indirectly resulted in the discovery of fossil sites in Sterkfontein and Swartkrans, which form part of the Cradle of Humankind World Heritage Site and the establishment of the South African Chamber of Mines, i.e. the Mineral Council. There is strong evidence that suggests that mining in the Witwatersrand contributed to the exploration of lime which forms part of the chemical components used to extract gold – thus, the linkages created between the site and the Cradle of Humankind and the fact that the two brothers are known to have explored Sterkfontein and Swartkrans. However, such relations will still need to be explored and investigated in detail. There is strong evidence that suggests that mining in the Witwatersrand contributed to the exploration of lime which forms part of the chemical components used to extract gold – thus, the linkages created between the site and the Cradle of Humankind and the fact that the two brothers are known to have explored Sterkfontein and Swartkrans. However, such relations will still need to be explored and investigated in detail.

7. RECOMMENDATION

- It is recommended that, with the approval of the current BAR and EMPr, a Phase II HIA study should be conducted on site, which should include amongst other research objectives:
 - Detailed archaeological investigation of the material culture in and around the stonewall enclosure and the mining area. This investigation will assist in identifying the material culture found on site, its association and dating of the site in terms of different occupation and the activities that took place on site. For example, a scatter of glass stoneware and china already glimpse the people who explored the site. Furthermore, we know that the people who occupied and worked the 1940s consumed beer based on the South African Breweries beer bottle dated to 1945, which shows that the site was occupied during the 1940s.
 - Investigation of spatial patterns between sites, material culture and objects is required on site.
 - It is also recommended that further research is required to investigate and determine the types of relations between the site and the Cradle; this will increase the cultural heritage significance of Kloofendal.
- It is recommended that the design team (architectural, landscape and engineering) on the project should explore ways to incorporate heritage in their designs and use it as a base for the design process. Elements of heritage should be integrated into the building fabric and the landscape.
- There is some level of confusion on the site's status. It is not clear whether it's a provincial heritage site or a local heritage site – this is based on memorial plaques found on site, the National Monument Council, and the City of Johannesburg Heritage Blue Plaque. Joburg City Parks and I&APs should determine what heritage grade or status they want to achieve on site. Should it be provincial or national, then a nomination dossier for the regarding and declaration of the site should be developed and submitted to the relevant authority for consideration.
- As part of the current development, future development or re-nomination and grading of the site, a detailed integrated conservation management plan (ICMP) is proposed for the Kloofendal Nature Reserve and its heritage resources. The ICMP will work as a guideline for protecting, conserving, and promoting cultural and natural heritage resources in the reserve. As part of the ICMP, detailed Heritage Public Participation (H-PP) should be undertaken as part of the exercise to get inputs from interested and affected parties (I&APs) such as the City of Johannesburg Department of Arts and Culture: Directorate Immovable Heritage, whose blue plaque is found at the Struben Mill Stamp, the Gauteng Department of Arts and Culture and Friends of Kloofendal Nature Reserve.
- In terms of the current development, heritage resources will not be negatively impacted. On the contrary, the proposed project is more likely to enhance the heritage and conservation and promote conservation than to destroy. Therefore, it is recommended that both the SAHRA and the PHRA-G grant the project a **Positive Review Comment** and allow the proposed project to proceed as planned. It will positively enhance the sense of the place and its heritage fabric.

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