



CES (COASTAL & ENVIRONMENTAL SERVICES): PROPOSED ESKOM LESOKWANA SUBSTATION AND POWERLINES PROJECT IN THE EKURHULENI METROPOLITAN MUNICIPALITY, THE NKANGALA DISTRICT MUNICIPALITY & THE SEDIBENG DISTRICT MUNICIPALITY, GAUTENG & MPUMALANGA PROVINCES

Archaeological Impact Assessment



Prepared for: **CES (Coastal & Environmental Services)**
Prepared by: **Exigo Sustainability (Pty) Ltd**

ARCHAEOLOGICAL IMPACT ASSESSMENT (AIA) FOR THE PROPOSED ESKOM LESOKWANA SUBSTATION AND POWERLINES PROJECT IN THE EKURHULENI METROPOLITAN MUNICIPALITY, THE NKANGALA DISTRICT MUNICIPALITY & THE SEDIBENG DISTRICT MUNICIPALITY, GAUTENG & MPUMALANGA PROVINCES

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DECLARATION

I, Nelius Le Roux Kruger, declare that –

- I act as the independent specialist;
- I am conducting any work and activity relating to the proposed Eskom Lesokwana Substation and Powerlines Project in an objective manner, even if this results in views and findings that are not favourable to the client;
- I declare that there are no circumstances that may compromise my objectivity in performing such work;
- I have the required expertise in conducting the specialist report and I will comply with legislation, including the relevant Heritage Legislation (National Heritage Resources Act no. 25 of 1999, Human Tissue Act 65 of 1983 as amended, Removal of Graves and Dead Bodies Ordinance no. 7 of 1925, Excavations Ordinance no. 12 of 1980), the Minimum Standards: Archaeological and Palaeontological Components of Impact Assessment (SAHRA and the CRM section of ASAPA), regulations and any guidelines that have relevance to the proposed activity;
- I have not, and will not engage in, conflicting interests in the undertaking of the activity;
- I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing - any decision to be taken with respect to the application by the competent authority; and - the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority;
- All the particulars furnished by me in this declaration are true and correct.



Signature of specialist
Company: Exigo Sustainability
Date: 4 September 2021

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EXECUTIVE SUMMARY

This report details the results of an Archaeological Impact Assessment (AIA) study subject to an Environmental Impact Assessment (EIA) process for the proposed ESKOM Lesokwana Substation and Powerlines Project in the the Nigel, Heidelberg, Delmas and Suikerbosrand areas of the the Ekurhuleni Metropolitan Municipality, Sedibeng District Municipality, Nkangala District Municipality , Gauteng and Mpumalanga Provinces. The project entails the proposed construction of a new substation and a new power line, each for which 4 alternative sites and alignments have been assessed. The report includes background information on the area’s archaeology, its representation in Southern Africa, and the history of the larger area under investigation, survey methodology and results as well as heritage legislation and conservation policies. A copy of the report will be supplied to the Gauteng Provincial Heritage Resources Authority (Gauteng-PHRA) and the Mpumalanga Provincial Heritage Resources Authority (M-PHRA) and recommendations contained in this document will be reviewed.

Project Title	ESKOM Lesokwana Substation and Powerlines Project
Project Location	S26.43597° E28.26309° (General Locale)
1:250 000 Map Sheet	2628
Farm Portion / Parcel	Various / Municipal
Magisterial District / Municipal Area	Ekurhuleni Metropolitan Municipality, Sedibeng District Municipality, Nkangala District Municipality
Province	Gauteng and Mpumalanga Provinces

The history of the Southern Highveld is reflected in a rich archaeological landscape. Sites, documenting Earlier, Middle and Later Stone Age habitation occur throughout, mostly in open air locales or in sediments alongside rivers or pans. Bantu-speaking tribes moved into this area during the last millennia and these presumably Sotho-Tswana groups occupied the landscape during the Late Iron Age times at around AD 1500-1800. Settlement by Iron Age communities occurred near rivers and close to rocky outcrops. European farmers, settling in the area since the middle of the 19th century, divided up the landscape into a number of farms. Regionally, the archaeology of the Southern Highveld depicts the interaction between the first humans and their adaptation and utilization to the environment, the migration of people, technological advances, warfare, contact and conflict. Contained in its archaeology are traces of conquests by Bantu-speakers, Europeans and British imperialism encompassing the struggle for land, resources and political power. Specifically, the Witwatersrand holds sites dating to the Colonial Period, primarily related to the Gold Mining industry of the past century and resulting urbanization and industrialization. The proposed ESKOM Lesokwana Substation and Powerlines Project areas have, in places, been altered and transformed as a result of urbanisation and mining development which might have removed or obscured signs of archaeological material which is normally subterranean. A large number of heritage resources were nonetheless encountered and the following recommendations are made based on observations in project locales:

The Substation Alternatives

- A farmstead with associated outbuildings dating to the Historical Period (**Site Exigo-LSS-HP01**) occurs on the farm Tamboekiesfontein 2km west of substation alternative 2 and within the buffer zone of the proposed Brenner – Snowden Powerline alignment. The site is generally protected under the National Heritage Resource Act (NHRA 1999) and the site should be avoided by means of the implementation of a 20m conservation buffer. Should impact on the building prove inevitable, the structure should be adequately documented by means of a Phase 2 Specialist Study. Such a study should minimally include

the mapping, documentation, and possible sampling of the feature in order to conserve the historical fabric of the heritage resources. The necessary alteration and destruction permits should be obtained from the relevant Heritage Resources Authorities prior to site sampling and destruction. Generally, the site should be monitored by an informed ECO in order to avoid the destruction of previously undetected heritage remains.

- The remains of a farmstead, outbuildings and structures associated with livestock farming as well as the stone foundation remains of dwellings or enclosures (**Site Exigo-LSS-HP02**, **Site Exigo-LSS-HP03**) were noted on the farm Tamboekiesfontein along the northwestern periphery of the substation alternative 2 site. The larger compound is in a ruined state of preservation any potential heritage value attached to the site has probably been lost but it would be advisable to monitor the site during construction in order to avoid the destruction of previously undetected heritage remains.
- The remains of a farmstead, outbuildings and structures associated with livestock farming as well as the stone foundation remains of dwellings or enclosures (**Site Exigo-LSS-HP04**) were noted on the farm Uitkyk within the substation alternative 4 site. The larger compound is in a ruined state of preservation, any potential heritage value attached to the site has probably been lost but it would be advisable to monitor the site during construction in order to avoid the destruction of previously undetected heritage remains.
- A large community cemetery (**Site Exigo-LSS-BP01**), associated with the nearby Magagula Heights occurs on the farm Tamboekiesfontein 800m west of substation alternative 2 and within the buffer zone of the proposed Brenner – Snowden Powerline alignment Heights and impact could occur. The site should be avoided by means of a 100m conservation buffer or, alternatively legally compliant gravel reaction should be executed if impact is inevitable.
- A newly established municipal cemetery (**Site Exigo-LSS-BP02**) occurs on the farm Tamboekiesfontein 400m west of substation alternative 1 and within the buffer zone of the proposed Brenner – Snowden Powerline alignment. It seems as though no human remains have been interred at the cemetery but the site holds intrinsic value as it will contain human burials in future. The site should be avoided by means of a 100m conservation buffer.

The Proposed Brenner - Snowdon Power Line alignment

- The remains of presumably an old station building, adjacent foundations, a stone railway culvert as well as a large square stone enclosure (**Site Exigo-LBS-HP01**) dating to the Historical Period occurs on the farm Roodekraal 133IR directly south of the existing Transnet railway line in the Brenner-Snowdon Line buffer area. The site and structures are older than 60 years and generally protected under the National Heritage Resource Act (NHRA 1999) and the site should be avoided by means of a 20m conservation buffer. Should impact on the buildings prove inevitable, the structure should be adequately documented by means of Phase 2 Specialist Study. Such a study should minimally include the mapping, documentation and possible sampling of the feature in order to conserve the historical fabric of the heritage resources. The necessary alteration and destruction permits should be obtained from the relevant Heritage Resources Authorities prior to site sampling and destruction. Generally, the site should be monitored by an informed ECO in order to avoid the destruction of previously undetected heritage remains.
- A number of square stone foundation remains of dwellings or enclosures (**Site Exigo-LBS-HP02**) as well as the remains of one of the Rooikraal farmsteads (**Site Exigo-LBS-HP03**) were noted on the farm Roodekraal 133IR in the Brenner-Snowdon Line buffer area. Even though the sites are older than 60 years and generally protected under the National Heritage Resource Act (NHRA 1999), no special cultural or social association for the structures could be established, they are poorly preserved and it is recommended that the sites be monitored the site during construction in order to avoid the destruction of previously undetected heritage remains.

- The remains of another Rooikraal farmstead occur on the farm Roodekraal 133IR in the buffer area of the alternative deviation for the Brenner-Snowdon Line (**Site Exigo-LBS-HP04**). The site and structures are older than 60 years and generally protected under the National Heritage Resource Act (NHRA 1999) and it might afford a better understanding of architectural and industrial developments in the larger Nigel. The site should be avoided by means of a 20m conservation buffer. Should impact on the building prove inevitable, the structures should be adequately documented by means of Phase 2 Specialist Study. Such a study should minimally include the mapping, documentation and possible sampling of the feature in order to conserve the historical fabric of the heritage resources. The necessary alteration and destruction permits should be obtained from the relevant Heritage Resources Authorities prior to site sampling and destruction. Generally, the site should be monitored by an informed ECO in order to avoid the destruction of previously undetected heritage remains.
- A community cemetery (**Site Exigo-LBS-BP01**) on the farm Tamboekiesfontein, two Historical Period cemeteries (**Site Exigo-LBS-BP02**, **Site Exigo-LBS-BP04**) and an informal cemetery (**Site Exigo-LBS-BP03**) on the farm Roodekraal occur in close proximity of the proposed Brenner-Snowdon line alignment. The cemeteries, which are highly significant in terms of heritage value, contain graves which are to be older than 60 years and thus protected by the National Heritage Resource Act (NHRA 1999). It is crucial that the sites be avoided by means of a 100m conservation buffer or, alternatively legally compliant grave relocation should be conducted if impact is proven to be inevitable.

The Proposed Nevis - Snowdon Power Line alignment

- A later Iron Age Farmer Period stone walled site (**Site Exigo-LNS-IA01**) occurs on the farm Spaarwater 171 within the buffer of the proposed Nevis-Snowdon line alignment. The site probably dates to the late 18th early 19th century and might be regarded as part of the Suikerbosrand Iron Age landscape. As such, the site is of scientific value in terms of its regional representation in the Iron Age farmer period landscape of the area and it should be avoided by means of a 20m conservation buffer. Should impact on the site prove inevitable, the structure should be adequately documented by means of Phase 2 Specialist Study. Such a study should minimally include the mapping, documentation and possible sampling of the feature in order to conserve the historical fabric of the heritage resources. The necessary alteration and destruction permits should be obtained from the relevant Heritage Resources Authorities prior to site sampling and destruction. Generally, the site should be monitored by an informed ECO in order to avoid the destruction of previously undetected heritage remains.
- The remains of a mine of pit the East Daggafontein Mine **Site Exigo-LNS-HP01** occur on the farm Rietfontein 276IR within the buffer area of the Nevis-Snowdon Line. The mine, as well as old ruins or "murasies" are indicated on historical topographic maps but the site could not be inspected during the site assessment due to access constraints. The site and indicated structures are older than 60 years and generally protected under the National Heritage Resource Act (NHRA 1999) and an assessment of possible significant building ruins and Historical period remains should be conducted prior to alteration of the site.
- The remains of the farmstead of the farm Rietfontein 276IR (**Site Exigo-LNS-HP02**) as well a compound consisting out of a dwelling and a free-standing building dating to the Historical Period on the farm Spaarwater 171IR (**Site Exigo-LNS-HP03**) occur within the buffer area of the Nevis-Snowdon. The sites and associated structures are older than 60 years and generally protected under the National Heritage Resource Act (NHRA 1999). The resources might afford a better understanding of architectural and industrial developments in the larger Nigel area and the sites should be avoided by means of a 20m conservation buffer. Should impact on the buildings prove inevitable, the structure should be adequately documented by means of Phase 2 Specialist Study. Such a study should minimally include the mapping, documentation and possible sampling of the features in order to conserve the historical fabric of the heritage resources. The necessary alteration and destruction permits should be obtained

from the relevant Heritage Resources Authorities prior to site sampling and destruction. Generally, the site should be monitored by an informed ECO in order to avoid the destruction of previously undetected heritage remains.

- The poorly preserved foundation remains of a dwelling (**Site Exigo-LNS-HP03**) occur within the buffer area of the Nevis-Snowdon Line. The site and structures are older than 60 years but it is poorly preserved even though protected under the National Heritage Resource Act (NHRA 1999). It would be advisable to monitor the site during construction in order to avoid the destruction of previously undetected heritage remains.
- The ruined remains of a drive-in theatre (**Site Exigo-LNS-HP04**) occurs north of the town of Nigel within the buffer area of the Nevis-Snowdon Line. The site is not older than 60 years (which implies that it is not protected under the NHRA) and it therefore carries no heritage value. No further actions in terms of heritage management is recommended for the site.
- A community cemetery (**Site Exigo-LNS-BP01**) and a small family cemetery belonging to the Pistorius family Site (**Exigo-LNS-BP03**) occurs on the farm Spaarwater 1711R within the buffer of the proposed Nevis-Snowdon line alignment. In both instances, the cemeteries which are highly significant in terms of its heritage value, contain graves which seem to be older than 60 years and thus protected by the National Heritage Resource Act (NHRA 1999). The sites should be avoided by means of a 100m conservation buffer or, alternatively legally compliant grave relocation should be executed if impact is inevitable.
- The Nigel Municipal Cemetery (**Site Exigo-LNS-BP02**) containing a large number of burials occurs in along the western outskirts of Nigel and east of the proposed Nevis-Snowden line alignment. The cemetery, which is highly significant in terms of its heritage and social value, contains graves which seem to be older than 60 years and thus protected by the National Heritage Resource Act (NHRA 1999). The site is situated approximately 1.5km east of the Nevis-Snowden power line buffer and impact is unlikely but cognizance should be taken of the presence of the site within the larger landscape.

The Kendal – Hera Power Line alignment

- A number of Middle Stone Age tools (**Exigo-LKH-SA01**) occur scattered across the project landscape but specifically around the Blesbokspruit on the farm Maraisdrift 1901R within the buffer of the proposed Kendal-Hera line alignment. These lithics were found in areas previously cultivated and their primary context has in all probability been lost compromising their scientific value. The occurrences are not unique to this area and they seem to occur in low frequencies on exposed surfaces. No further actions in terms of heritage management is recommended for the site
- A large number of densely overgrown clusters of large later Iron Age Farmer Period stone walled sites, consisting out of collapsed stone walling arranged in large scalloping circular enclosures (**Site Exigo-LKH-IA01 Site Exigo-LKH-IA04**) are situated around the southern, western and norther sections of the Suikerbosrand Nature Reserve within the buffer area for the Kendal-Hera line alignment. These sites date to the late 18th early 19th centuries as part of the large Suikerbosrand Iron Age capitals and the resources are of scientific value in terms of their regional representation in the Iron Age farmer period landscape of the area and it is rated as of high significance. Cognizant of the fact that the Iron Age stone walled sites of Suikerbosrand and its surroundings are currently the subject of significant and ongoing research projects, it is recommended that impact to these sites be avoided at all cost by the implementation of conservation buffers in all instances. It would be advisable to monitor all sites during construction in order to avoid the destruction of previously undetected heritage remains.
- In addition, smaller satellite later Iron Age Farmer Period stone walled site (**Site Exigo-LKH-IA05- Site Exigo-LKH-IA07**) occur in a number of locations north and east of the town of Heidelberg within the buffer of the proposed Kendal-Hera line alignment. The sites, dating to the late 18th early 19th centuries are of scientific value in terms of the larger Suikerbosrand Iron Age farmer period landscape and the

sites should be avoided by means of the implementation of a 20m conservation buffer zone. Should impact on the sites prove inevitable, the structure should be adequately documented by means of Phase 2 Specialist Study. Such a study should minimally include the mapping, documentation and possible sampling of the features in order to conserve the historical fabric of the heritage resources. The necessary alteration and destruction permits should be obtained from the relevant Heritage Resources Authorities prior to site sampling and destruction. Generally, the site should be monitored by an informed ECO in order to avoid the destruction of previously undetected heritage remains.

- The poorly preserved foundation remains of a Historical Period dwelling (**Site Exigo-LKH-HP01**) as well as the structural remains of another farmstead (**Site Exigo-LKH-HP02**) occur on the farm Klippoort 1871R in the buffer area of the Kendal-Hera line. In both cases, the sites are older than 60 years and generally protected under the National Heritage Resource Act (NHRA 1999). Notwithstanding the preservation condition of the structures, the sites might afford a better understanding of architectural and industrial developments in the larger Nigel area and they sites should be avoided by means of the implementation of a 20m conservation buffer. Should impact on the buildings prove inevitable, the structure should be adequately documented by means of Phase 2 Specialist Study. Such a study should minimally include the mapping, documentation and possible sampling of the features in order to conserve the historical fabric of the heritage resources. The necessary alteration and destruction permits should be obtained from the relevant Heritage Resources Authorities prior to site sampling and destruction. Generally, the site should be monitored by an informed ECO in order to avoid the destruction of previously undetected heritage remains.
- An old railway line traverses a large drainage line over a Historical Period two-arch concrete bridge on the farm Klippoort 1871R (**Site Exigo-LKH-HP03**). In addition, a number of Historical Period buildings and dwellings occur at the site of the Kaydale Railway Station (**Site Exigo-LKH-HP04**) east of the bridge. In both cases, the features are situated outside of the Kendal-Hera power line buffer and impact is unlikely but cognizance should be taken of the presence of the site within the larger landscape.
- The currently occupied Rietpoort farmstead (**Site Exigo-LKH-HP05**) occurs on the farm Rietpoort 1931R in the buffer area of the Kendal-Hera Line. The site and structures are older than 60 years and generally protected under the National Heritage Resource Act (NHRA 1999). The site might afford a better understanding of architectural and industrial developments in the larger Nigel area and it should be avoided by the implementation of a 20m conservation buffer. As the site is currently occupied, alteration of the farmstead is not advisable. However, should impact on the buildings prove inevitable, the structure should be adequately documented by means of Phase 2 Specialist Study. Such a study should minimally include the mapping, documentation and possible sampling of the features in order to conserve the historical fabric of the heritage resources. The necessary alteration and destruction permits should be obtained from the relevant Heritage Resources Authorities prior to site sampling and destruction. Generally, the site should be monitored by an informed ECO in order to avoid the destruction of previously undetected heritage remains.
- An apparent informal cemetery (**Site Exigo-LKH-BP01**) occurs along the northern border of the Suikerbosrand Nature Reserve in a pocket of Black Wattle trees. The site could not be located during the site assessment but the cemetery is highly significant in terms of its heritage and social value and it is protected by the National Heritage Resource Act (NHRA 1999). The site is situated approximately 3km south of the Kendal-Hera power line buffer and impact is unlikely but cognizance should be taken of the presence of the site within the larger landscape.
- Four informal cemeteries (**Site Exigo-LKH-BP02 - Site Exigo-LKH-BP05**) occur within and around crop fields on the farm Eendracht 1851R in close proximity of the Kendal-Hera line buffer. The cemetery is densely overgrown and two burials could be identified indicated by rectangular stone cairns. The cemeteries, which are highly significant in terms of its heritage value, contain graves which might to be older than 60 years and thus protected by the National Heritage Resource Act (NHRA 1999). In all

instances, the sites should be avoided by means of 100m conservation buffers or, alternatively legally compliant grave relocation should be executed if impact on the sites prove inevitable.

- A burial site (**Site Exigo-LKH-BP06**) is indicated on historical topographic maps of the farm Klippoortjie 1871R within a pocket of Poplar trees. These burials could not be located during the site assessment but presumed cemetery is highly significant in terms of its heritage and social value and it is protected by the National Heritage Resource Act (NHRA 1999). The site should be avoided by means of a 100m conservation buffer or, alternatively legally compliant grave relocation should be executed if impact on the sites prove inevitable.
- A large informal cemetery on the farm Maraisdrift 1901R (**Site Exigo-LKH-BP07**) and another cemetery on the farm Nooitgedacht 2861R (**Site Exigo-LKH-BP09**) are situated in close proximity of the proposed Kendal-Hera line alignment. The cemeteries, which are highly significant in terms of heritage value, contain graves which seem to be older than 60 years and thus protected by the National Heritage Resource Act (NHRA 1999). The sites should be avoided by means of the implementation of a 100m conservation buffer or, alternatively legally compliant grave relocation should be executed if impact is inevitable.
- A family cemetery belonging to the Jacobs family (**Site Exigo-LKH-BP08**) on the farm Rietpoort 1931R is situated approximately 100m north of the Kendal-Hera power line buffer and impact is unlikely but cognizance should be taken of the presence of the site within the larger landscape. It would be advisable to monitor the site for any impact emanating from the development.
- A burial site is indicated on historical topographic maps of the farm Nooitgedacht 2861R in close proximity of the Kendal-Hera line (**Site Exigo-LKH-BP10**). The burial site could not be located during the site assessment and it is not clear if the grave remains in existence but the site is nonetheless of heritage and social value and it is protected by the National Heritage Resource Act (NHRA 1999). The site should be avoided by means of the implementation of a 100m conservation buffer or, alternatively legally compliant grave relocation should be executed if impact is inevitable.

The Proposed Lesokwana MTS Line Strengthening

- The poorly preserved remains of a farmstead (**Site Exigo-MTS-HP01**) were noted on the farm Zonnestraal in the proposed Lilo Power Lines corridor. Even though the sites are older than 60 years and generally protected under the National Heritage Resource Act (NHRA 1999), no special cultural or social association for the structures could be established, they are poorly preserved and it is recommended that the sites be monitored the site during construction in order to avoid the destruction of previously undetected heritage remains.
- A compound of Historical Period buildings occur on the farm Withok in the proposed Lilo Power Lines corridor (**Site Exigo-MTS-HP02**). The site and structures are older than 60 years and generally protected under the National Heritage Resource Act (NHRA 1999) and it might afford a better understanding of architectural and industrial developments in the larger Nigel. The site should be avoided by means of a 20m conservation buffer. Should impact on the building prove inevitable, the structures should be adequately documented by means of Phase 2 Specialist Study. Such a study should minimally include the mapping, documentation and possible sampling of the feature in order to conserve the historical fabric of the heritage resources. The necessary alteration and destruction permits should be obtained from the relevant Heritage Resources Authorities prior to site sampling and destruction. Generally, the site should be monitored by an informed ECO in order to avoid the destruction of previously undetected heritage remains
- A Historical Period cemetery (**Site Exigo-MTS-BP01**) on the farm Witpoort occur in the general proximity of the proposed Lilo Power Lines corridor. The cemetery, which are highly significant in terms of heritage value, contain graves which are to be older than 60 years and thus protected by the National Heritage Resource Act (NHRA 1999). It is crucial that the sites be avoided by means of a 100m

conservation buffer or, alternatively legally compliant grave relocation should be conducted if impact is proven to be inevitable.

The following general recommendations should be observed for all project components:

- It is advised that all burial grounds should be fenced off and access control should be applied. Here, wire fences of at least 1.5 m in height should be erected within the conservation buffers around the burial sites. The fences should have access gates which should be locked and clear signage on the fences should indicate the significance and protection status of the sites and it should provide contact details for site access. In all instances, the fences should not be erected closer than 5m from graves along the outer periphery of the burial grounds. In addition, Site Management Plans (SMP) should be compiled outlining required and continued mitigation and conservation requirements and measures for the burials. The contents of the SMP should be communicated to all consultants, contractors and workers entering and moving around on project sites. **Should impact on any human burial occur, development should be suspended and the heritage specialist should be consulted. The conservation of burial sites should be ensured and full grave relocations are recommended should impact be unavoidable. This measure should be undertaken by a qualified archaeologist, and in accordance with relevant legislation, permitting, statutory permissions and subject to any local and regional provisions and laws and by-laws pertaining to human remains. A full social consultation process should occur in conjunction with the mitigation of cemeteries and burials (see Addendum B).**
- Considering the localised nature of heritage remains, the general monitoring of the development progress by an ECO is recommended during the planning and construction phases of the project. Should any subsurface palaeontological, archaeological or historical material, or burials be exposed during construction activities, all activities should be suspended and the archaeological specialist should be notified immediately.
- It is essential that cognisance be taken of the larger archaeological landscape of the area in order to avoid the destruction of previously undetected heritage sites. It should be stated that the possibility of undetected archaeological remains occurring elsewhere in the project area should not be excluded. Burials and historically significant structures dating to the Colonial Period occur on farms in the area and these resources should be avoided during all phases of construction and development, including the operational phases of the development

It has been established that, for the proposed Substation, Alternative 3 is the preferred alternative and likely to have the least impact on Heritage resources. Power Line Alternative 1 is the preferred alternative in terms of impact on Heritage resources. It should be noted that all of the alternatives can be considered as long as the required heritage mitigation measures to minimize and avoid these impacts are applied.

ESKOM Lesokwana Substation and Powerlines Project Heritage Sites Locations

Site Code	Coordinate S E	Short Description
EXIGO-LSS-HP01	S26.409105° E28.211948°	Historical Period Site
EXIGO-LSS-HP02	S26.410240° E28.231714°	
EXIGO-LSS-HP03	S26.413697° E28.231163°	
EXIGO-LSS-HP04	S26.402149° E28.267249°	
EXIGO-LSS-BP01	S26.409786° E28.221900°	Burial Site / Grave
EXIGO-LSS-BP02	S26.389659° E28.228313°	
EXIGO-LBS-HP01	S26.35342° E28.26901°	Historical Period Site

Site Code	Coordinate S E	Short Description
EXIGO-LBS-HP02	S26.325044° E28.273907°	
EXIGO-LBS-HP03	S26.324295° E28.286919°	
EXIGO-LBS-HP04	S26.308847° E28.288572°	
EXIGO-LBS-BP01	S26.42803° E28.19738°	Burial Site / Grave
EXIGO-LBS-BP02	S26.35379° E28.27434°	
EXIGO-LBS-BP03	S26.33048° E28.27011°	
EXIGO-LBS-BP04	S26.353313° E28.269771°	
EXIGO-LNS-IA01	S26.43860° E28.38606°	Iron Age Farmer Period Site
EXIGO-LNS-HP01	S26.284425° E28.536048°	Historical Period Site
EXIGO-LNS-HP02	S26.306949° E28.545632°	
EXIGO-LNS-HP03	S26.377742° E28.481716°	
EXIGO-LNS-HP04	S26.38576° E28.46453°	
EXIGO-LNS-HP05	S26.394633° E28.437932°	
EXIGO-LNS-BP01	S26.39712° E28.43488°	Burial Site / Grave
EXIGO-LNS-BP02	S26.406156° E28.443653°	
EXIGO-LNS-BP03	S26.42682° E28.39493°	
EXIGO-LKH-SA01	S26.476376° E28.428657°	Stone Age Site
EXIGO-LKH-IA01	S26.49266° E28.15575°	Iron Age Farmer Period Site
EXIGO-LKH-IA02	S26.46044° E28.17161°	
EXIGO-LKH-IA03	S26.44332° E28.18431°	
EXIGO-LKH-IA04	S26.44686° E28.21006°	
EXIGO-LKH-IA05	S26.458244° E28.373481°	
EXIGO-LKH-IA06	S26.479445° E28.419048°	
EXIGO-LKH-IA07	S26.476118° E28.429135°	
EXIGO-LKH-HP01	S26.460620° E28.382718°	Historical Period Site
EXIGO-LKH-HP02	S26.461271° E28.386364°	
EXIGO-LKH-HP03	S26.464112° E28.395893°	
EXIGO-LKH-HP04	S26.471770° E28.399877°	
EXIGO-LKH-HP05	S26.476825° E28.485860°	
EXIGO-LKH-BP01	S26.459895° E28.250025°	Burial Site / Grave
EXIGO-LKH-BP02	S26.44904° E28.33450°	
EXIGO-LKH-BP03	S26.44418° E28.34132°	
EXIGO-LKH-BP04	S26.44183° E28.34363°	
EXIGO-LKH-BP05	S26.44673° E28.34242°	
EXIGO-LKH-BP06	S26.461787° E28.381912°	
EXIGO-LKH-BP07	S26.477870° E28.429807°	
EXIGO-LKH-BP08	S26.46976° E28.49059°	
EXIGO-LKH-BP09	S26.34440° E28.64307°	
EXIGO-LKH-BP10	S26.31314° E28.65456°	
EXIGO-MTS-HP01	S26.398418° E28.271265°	Historical Period Site
EXIGO-MTS-HP02	S26.350319° E28.343587°	
EXIGO-MTS-BP01	S26.292807° E28.349062°	Burial Site / Grave

This report details the methodology, limitations and recommendations relevant to these heritage areas, as well as areas of proposed development. It should be noted that recommendations and possible mitigation measures are valid for the duration of the development process, and mitigation measures might have to be implemented on additional features of heritage importance not detected during this Phase 1 assessment (e.g. uncovered during the construction process).

NOTATIONS AND TERMS/TERMINOLOGY

Absolute dating: Absolute dating provides specific dates or range of dates expressed in years.

Archaeological record: The archaeological record minimally includes all the material remains documented by archaeologists. More comprehensive definitions also include the record of culture history and everything written about the past by archaeologists.

Artefact: Entities whose characteristics result or partially result from human activity. The shape and other characteristics of the artefact are not altered by removal of the surroundings in which they are discovered. In the Southern African context examples of artefacts include potsherds, iron objects, stone tools, beads and hut remains.

Assemblage: A group of artefacts recurring together at a particular time and place, and representing the sum of human activities.

Context: An artefact's context usually consists of its immediate *matrix*, its *provenience* and its *association* with other artefacts. When found in *primary context*, the original artefact or structure was undisturbed by natural or human factors until excavation and if in *secondary context*, disturbance or displacement by later ecological action or human activities occurred.

Cultural Heritage Resource: The broad generic term *Cultural Heritage Resources* refers to any physical and spiritual property associated with past and present human use or occupation of the environment, cultural activities and history. The term includes sites, structures, places, natural features and material of palaeontological, archaeological, historical, aesthetic, scientific, architectural, religious, symbolic or traditional importance to specific individuals or groups, traditional systems of cultural practice, belief or social interaction.

Cultural landscape: A cultural landscape refers to a distinctive geographic area with cultural significance.

Cultural Resource Management (CRM): A system of measures for safeguarding the archaeological heritage of a given area, generally applied within the framework of legislation designed to safeguard the past.

Feature: Non-portable artefacts, in other words artefacts that cannot be removed from their surroundings without destroying or altering their original form. Hearths, roads, and storage pits are examples of archaeological features

Lithic: Stone tools or waste from stone tool manufacturing found on archaeological sites.

Matrix: The material in which an artefact is situated (sediments such as sand, ashy soil, mud, water, etcetera). The matrix may be of natural origin or human-made.

Midden: Refuse that accumulates in a concentrated heap.

Microlith: A small stone tool, typically knapped of flint or chert, usually about three centimetres long or less.

Monolith: A geological feature such as a large rock, consisting of a single massive stone or rock, or a single piece of rock placed as, or within, a monument or site.

Phase 1 CRM Assessment: An Impact Assessment which identifies archaeological and heritage sites, assesses their significance and comments on the impact of a given development on the sites. Recommendations for site mitigation or conservation are also made during this phase.

Phase 2 CRM Study: In-depth studies which could include major archaeological excavations, detailed site surveys and mapping / plans of sites, including historical / architectural structures and features. Alternatively, the sampling of sites by collecting material, small test pit excavations or auger sampling is required. Mitigation / Rescue involves planning the protection of significant sites or sampling through excavation or collection (in terms of a permit) at sites that may be lost as a result of a given development.

Phase 3 CRM Measure: A Heritage Site Management Plan (for heritage conservation), is required in rare cases where the site is so important that development will not be allowed and sometimes developers are encouraged to enhance the value of the sites retained on their properties with appropriate interpretive material or displays.

Provenience: Provenience is the three-dimensional (horizontal and vertical) position in which artefacts are found. Fundamental to ascertaining the provenience of an artefact is *association*, the co-occurrence of an artefact with other archaeological remains; and *superposition*, the principle whereby artefacts in lower levels of a matrix were deposited before the artefacts found in the layers above them, and are therefore older.

Random Sampling: A probabilistic sampling strategy whereby randomly selected sample blocks in an area are surveyed. These are fixed by drawing coordinates of the sample blocks from a table of random numbers.

Site (Archaeological): A distinct spatial clustering of artefacts, features, structures, and organic and environmental remains, as the residue of human activity. These include surface sites, caves and rock shelters, larger open-air sites, sealed sites (deposits) and river deposits. Common functions of archaeological sites include living or habitation sites, kill sites, ceremonial sites, burial sites, trading, quarry, and art sites,

Stratigraphy: This principle examines and describes the observable layers of sediments and the arrangement of strata in deposits

Systematic Sampling: A probabilistic sampling strategy whereby a grid of sample blocks is set up over the survey area and each of these blocks is equally spaced and searched.

LIST OF ABBREVIATIONS

Abbreviation	Description
ASAPA	Association for South African Professional Archaeologists
AIA	Archaeological Impact Assessment
BP	Before Present
BCE	Before Common Era
BGG	Burial Grounds and Graves
CRM	Culture Resources Management
ECO	Environmental Control Officer
EIA	Early Iron Age (also Early Farmer Period)
EIA	Environmental Impact Assessment
EFP	Early Farmer Period (also Early Iron Age)
ESA	Earlier Stone Age
GIS	Geographic Information Systems
HIA	Heritage Impact Assessment
ICOMOS	International Council on Monuments and Sites
K2/Map	K2/Mapungubwe Period
LFP	Later Farmer Period (also Later Iron Age)
LIA	Later Iron Age (also Later Farmer Period)
LSA	Later Stone Age
MIA	Middle Iron Age (also Early later Farmer Period)
MSA	Middle Stone Age
NHRA	National Heritage Resources Act No.25 of 1999, Section 35
PFS	Pre-Feasibility Study
PHRA	Provincial Heritage Resources Authority
SAHRA	South African Heritage Resources Association
YCE	Years before Common Era (Present)

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1 BACKGROUND

1.1 Scope and Motivation

Exigo Sustainability (Pty) Ltd (Exigo) was commissioned by CES (Coastal & Environmental Services) to conduct an Archaeological Impact Assessment (AIA) study subject to an Environmental Basic Assessment (BA) process for the ESKOM Lesokwana Substation and Powerlines Project which extend across the; Ekurhuleni Metropolitan Municipality, Sedibeng District Municipality and the Nkangala District Municipality, which fall under the Gauteng and Mpumalanga Provinces. The rationale of this AIA is to determine the presence of heritage resources such as archaeological and historical sites and features, graves and places of religious and cultural significance in previously unstudied areas; to consider the impact of the proposed project on such heritage resources; and to submit appropriate recommendations with regard to the cultural resources management measures that may be required at affected sites / features.

1.2 Project Direction

Exigo's expertise ensures that all projects are conducted to the highest international ethical and professional standards. As archaeological specialist for Exigo, Mr Nelius Kruger acted as field director for the project; responsible for the assimilation of all information, the compilation of the final consolidated AIA report and recommendations in terms of heritage resources on the demarcated project areas. Mr Kruger is an accredited archaeologist and Culture Resources Management (CRM) practitioner with the Association of South African Professional Archaeologists (ASAPA), a member of the Society for Africanist Archaeologists (SAFA) and the Pan African Archaeological Association (PAA) as well as a Master's Degree candidate in archaeology at the University of Pretoria.

1.3 Project Brief

The initial scope of the proposed ESKOM Lesokwana Substation and Powerlines Project included the following (refer to Figures 1-1, 1-2, and 1-3 and 1-4 below as well as **Section 2.3**):

- The establishment of Lesokwana substation south of existing Brenner substation, including the establishment of 8x 88kV feeder bays for distribution, and 6x 275kV transformer bays for transmission where the *following alternatives will be considered*:
 - o Substation alternative site 1: Purple square area
 - o Substation alternative site 2: Green square area
 - o Substation alternative site 3: Orange square area
- The loop In and Out of 1x Matla-Jupiter B 400kV lines into Lesokwana, the loop In and Out of Snowdon-Brenner 275kV line into Lesokwana;
- Build a double circuit Tern line from the new MTS to Vosloorus South substation (2.5km), a double circuit Tern line from the new MTS to SAR Plaats substation (1.5km), a double circuit Tern line from the new MTS to the 88kV line close to Gravett substation (3.5km) and a double circuit Tern line from the new MTS to the 88kV line close to Mapleton substation (4.5km).
- An additional power line is planned and three route alternatives for this powerline are proposed:
 - o Brenner-Snowdon with a possible route alternative deviation, totaling a distance of approximately 16.3km.
 - o Nevis-Snowdon totaling a distance of approximately 43.7km.
 - o Kendal-Hera totaling a distance of approximately 60.8km.

In 2021, the Scope of the project was changed to include the following components (see Figure 1-4):

- Phase 1 entails the establishment of a loop in/out of the new proposed Matla – Jupiter B 275kV line, which is built at 400kV, into the existing Brenner substation.
- Phase 2 entails the establishment of loop in/out of the 2 x Matla – Jupiter B 400kV lines into the new Lesokwana substation (2 x Double circuit Tx lines) over a distance of 25km.
- Phase 2 also includes a loop in/out of the existing Brenner-Snowdon 275kV Line into Lesokwana substation (1 x double circuit Tx line) over a distance of 5km.

In addition, a new project footprint for the proposed Lesokwana was proposed. For the purposes of this assessment, the additional project scope is referred to as the Lesokwana MTS Line Strengthening and Substation.

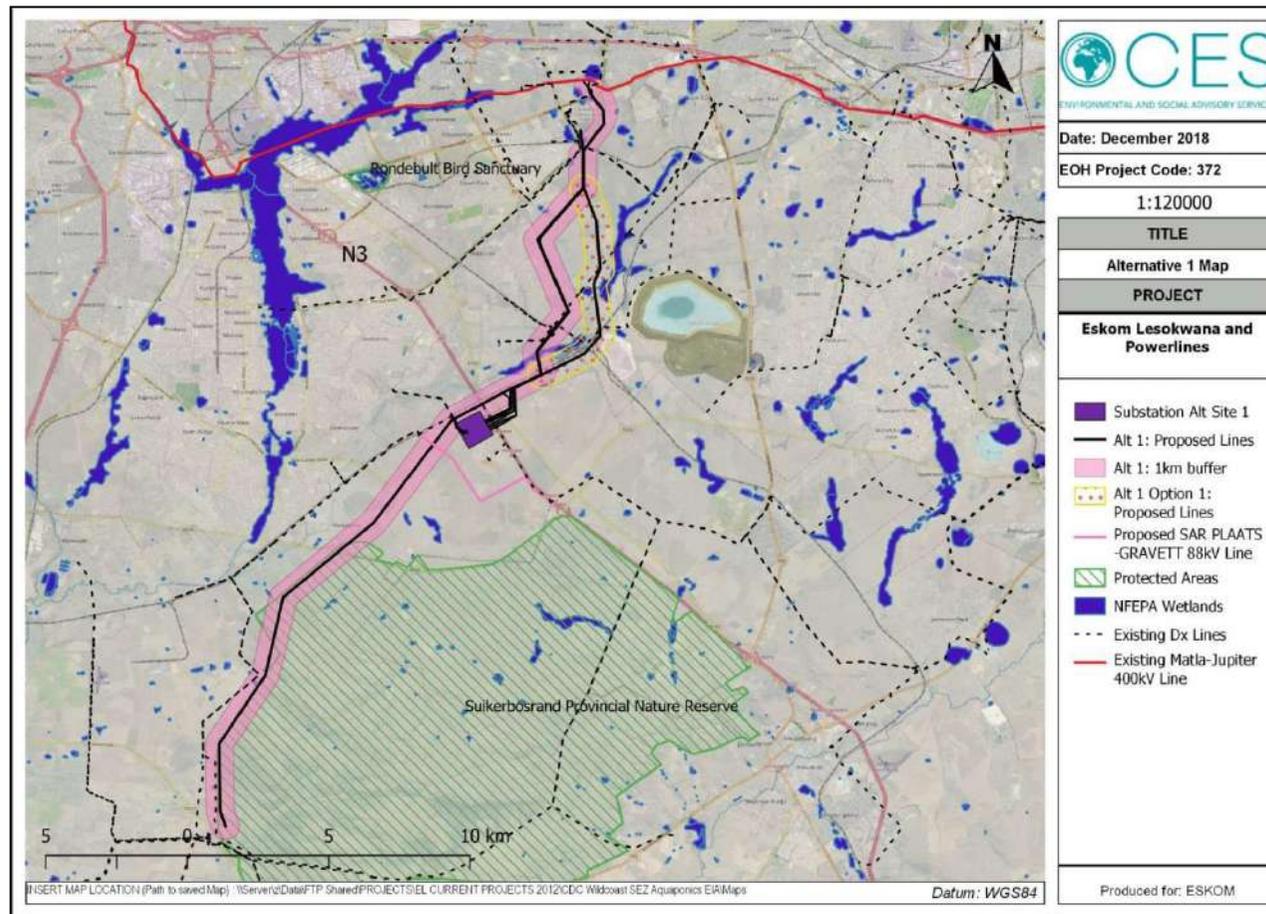


Figure 1-1: Project map indicating the location of the preferred substation site as well as the Brenner-Snowden power line alignment.

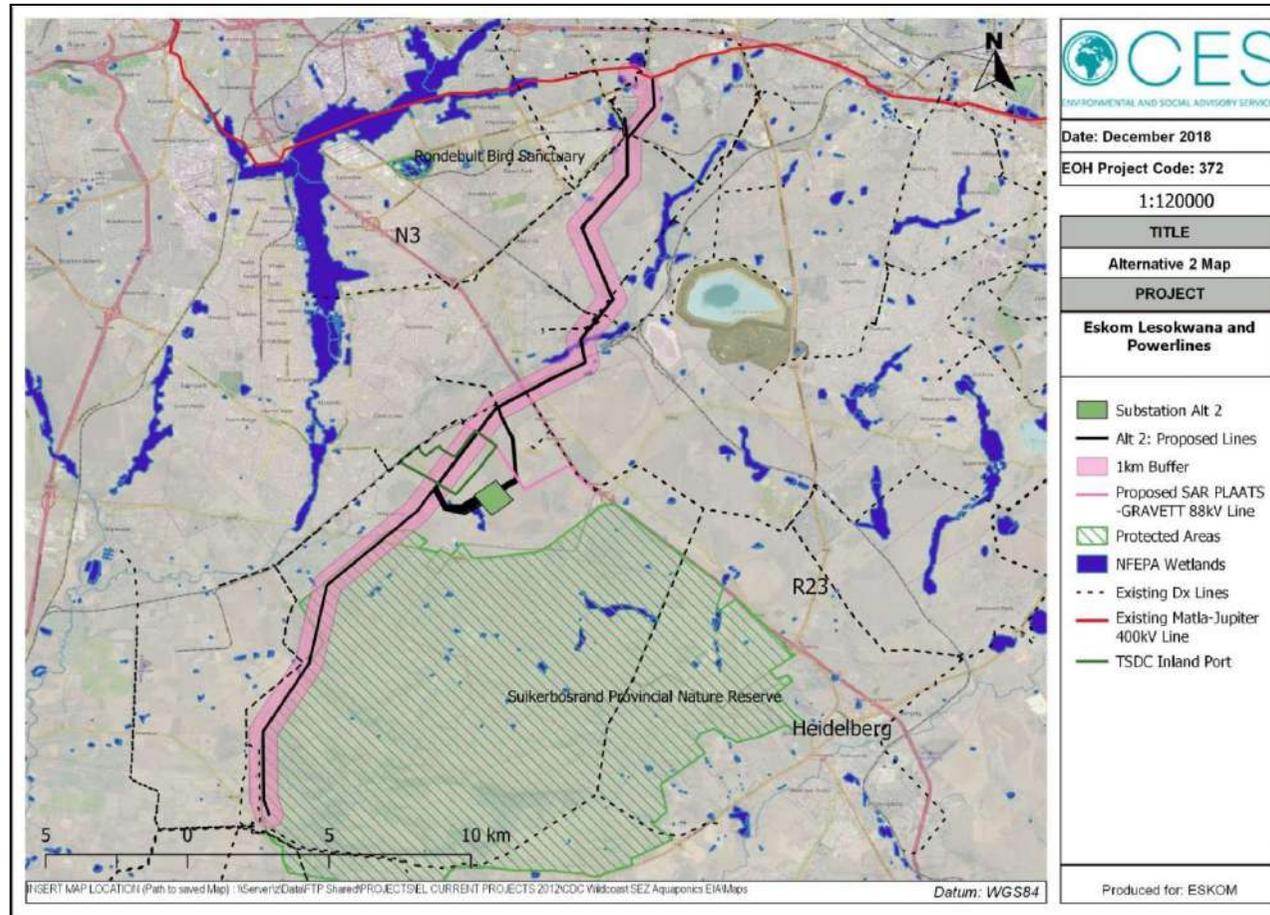


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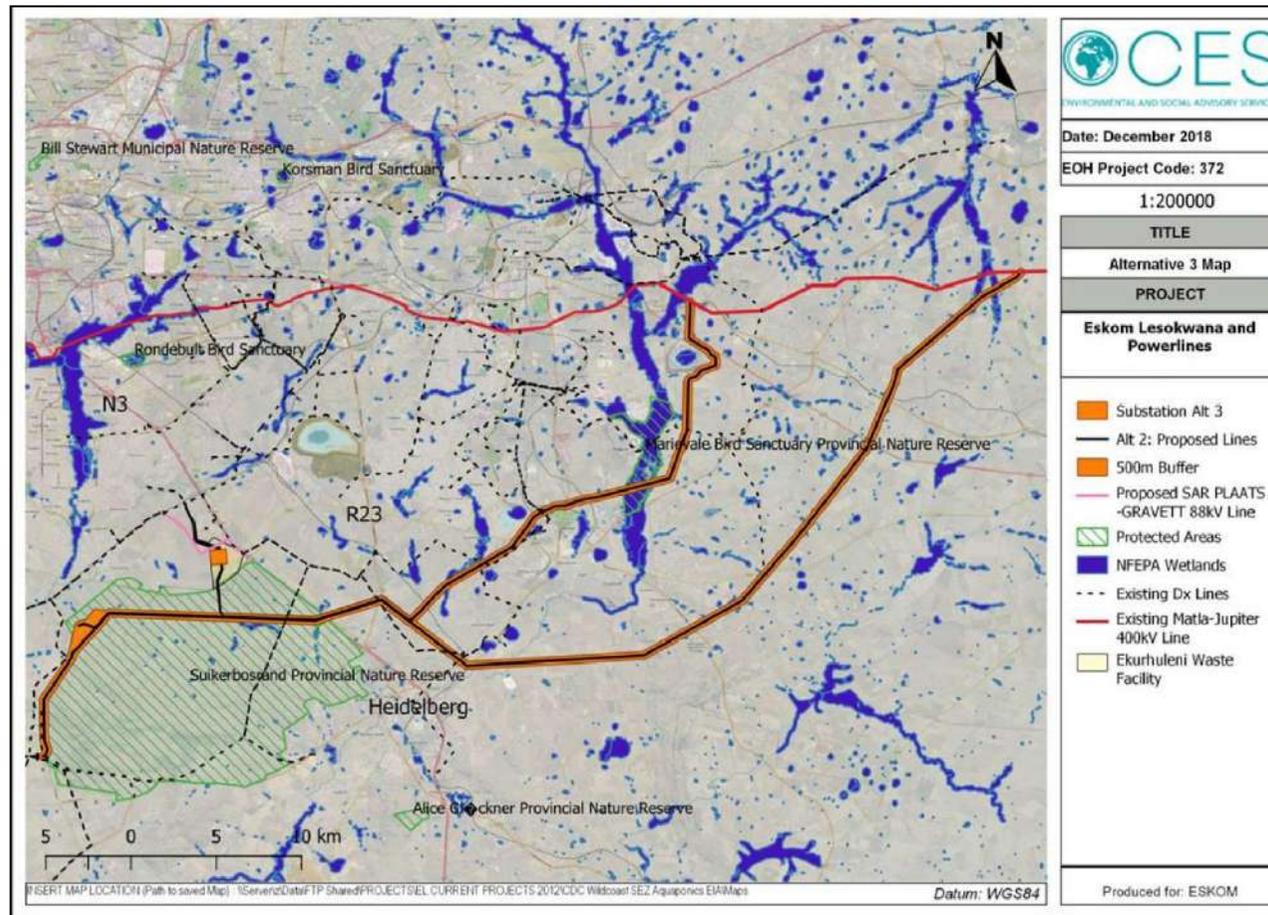


Figure 1-3: Project map indicating the extent of the Nevis-Snowdon and Kendal-Hera power line alignments as discussed in the text.

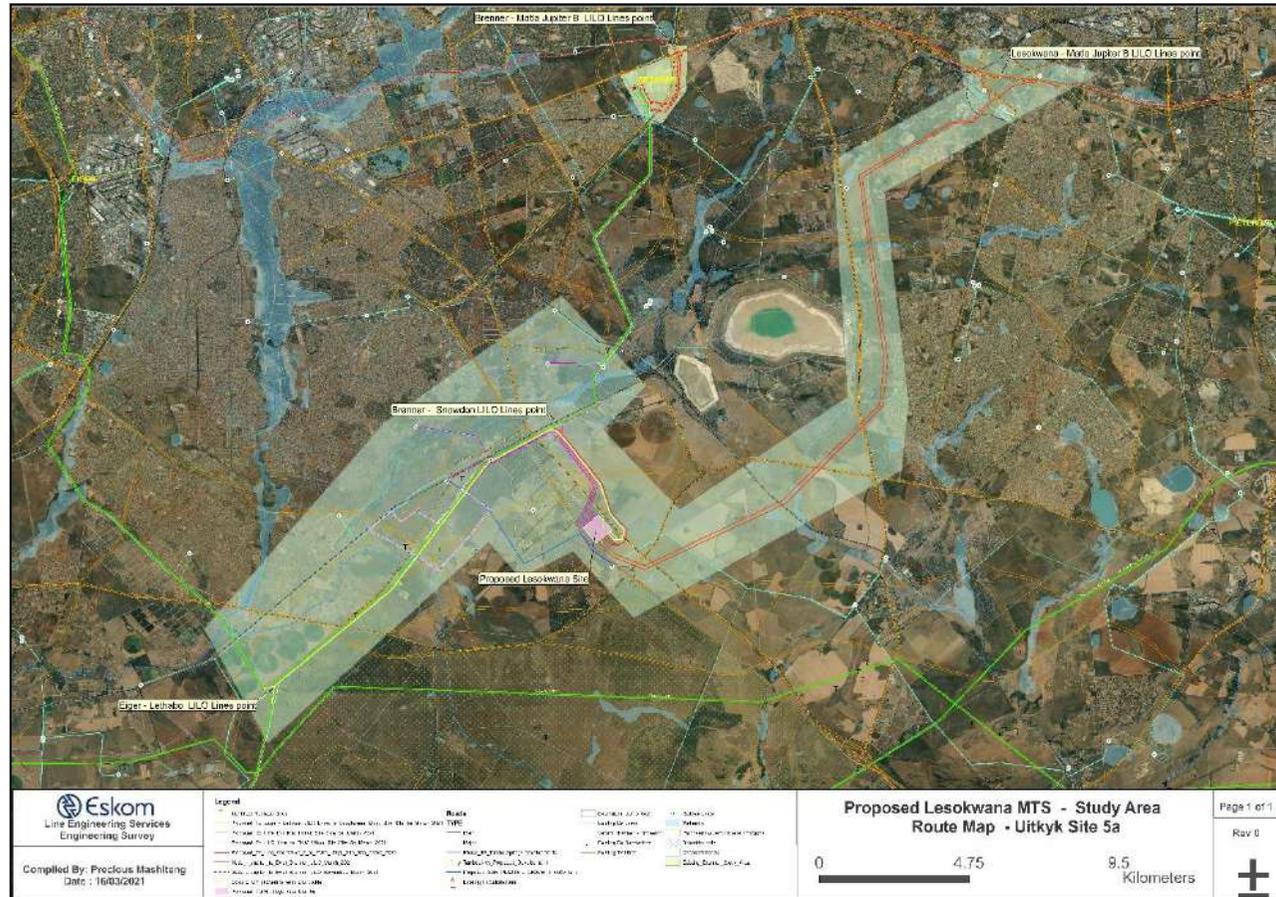


Figure 1-4: Project map indicating the extent of the Lesokwana MTS Line Strengthening and Substation as discussed in the text.

1.4 Terms of Reference

Heritage specialist input into the Environmental Impact Assessment (EIA) process is essential to ensure that, through the management of change, developments still conserve our heritage resources. Heritage specialist input in EIA processes can play a positive role in the development process by enriching an understanding of the past and its contribution to the present. It is also a legal requirement for certain development categories which may have an impact on heritage resources (Refer to Section 2.5.2). Thus, EIAs should always include an assessment of heritage resources. The heritage component of the EIA is provided for in the **National Environmental Management Act, (Act 107 of 1998)** and endorsed by section 38 of the **National Heritage Resources Act (NHRA - Act 25 of 1999)**. In addition, the NHRA protects all structures and features older than 60 years, archaeological sites and material and graves as well as burial sites. The objective of this legislation is to ensure that developers implement measures to limit the potentially negative effects that the development could have on heritage resources. Based hereon, this project functioned according to the following **terms of reference** for heritage specialist input:

- *Provide a detailed description of all archaeological artefacts, structures (including graves) and settlements which may be affected, if any.*
- *Assess the nature and degree of significance of such resources within the area.*
- *Establish heritage informants/constraints to guide the development process through establishing thresholds of impact significance;*
- *Assess and rate any possible impact on the archaeological and historical remains within the area emanating from the proposed development activities.*
- *Propose possible heritage management measures provided that such action is necessitated by the development.*
- *Liaise and consult with the South African Heritage Resources Agency (SAHRA)*

1.5 CRM: Legislation, Conservation and Heritage Management

The broad generic term *Cultural Heritage Resources* refers to any physical and spiritual property associated with past and present human use or occupation of the environment, cultural activities and history. The term includes sites, structures, places, natural features and material of palaeontological, archaeological, historical, aesthetic, scientific, architectural, religious, symbolic or traditional importance to specific individuals or groups, traditional systems of cultural practice, belief or social interaction.

1.5.1 Legislation regarding archaeology and heritage sites

The South African Heritage Resources Agency (SAHRA) and its provincial offices aim to conserve and control the management, research, alteration and destruction of cultural resources of South Africa. It is therefore vitally important to adhere to heritage resource legislation at all times.

a. National Heritage Resources Act No 25 of 1999, section 35

According to the National Heritage Resources Act No 25 of 1999 (section 35) the following features are protected as cultural heritage resources:

- a. Archaeological artifacts, structures and sites older than 100 years
- b. Ethnographic art objects (e.g. prehistoric rock art) and ethnography

- c. Objects of decorative and visual arts
- d. Military objects, structures and sites older than 75 years
- e. Historical objects, structures and sites older than 60 years
- f. Proclaimed heritage sites
- g. Grave yards and graves older than 60 years
- h. Meteorites and fossils
- i. Objects, structures and sites of scientific or technological value.

In addition, the national estate includes the following:

- a. Places, buildings, structures and equipment of cultural significance
- b. Places to which oral traditions are attached or which are associated with living heritage
- c. Historical settlements and townscapes
- d. Landscapes and features of cultural significance
- e. Geological sites of scientific or cultural importance
- f. Archaeological and paleontological importance
- g. Graves and burial grounds
- h. Sites of significance relating to the history of slavery
- i. Movable objects (e.g. archaeological, paleontological, meteorites, geological specimens, military, ethnographic, books etc.)

With regards to activities and work on archaeological and heritage sites this Act states that:

“No person may alter or demolish any structure or part of a structure which is older than 60 years without a permit by the relevant provincial heritage resources authority.” (34. [1] 1999:58)

and

“No person may, without a permit issued by the responsible heritage resources authority-

- (a) destroy, damage, excavate, alter, deface or otherwise disturb any archaeological or palaeontological site or any meteorite;*
- (b) destroy, damage, excavate, remove from its original position, collect or own any archaeological or palaeontological material or object or any meteorite;*
- (c) trade in, sell for private gain, export or attempt to export from the Republic any category of archaeological or palaeontological material or object, or any meteorite; or*
- (d) bring onto or use at an archaeological or palaeontological site any excavation equipment or any equipment which assist in the detection or recovery of metals or archaeological and palaeontological material or objects, or use such equipment for the recovery of meteorites. (35. [4] 1999:58).”*

and

“No person may, without a permit issued by SAHRA or a provincial heritage resources agency-

- (a) destroy, damage, alter, exhume or remove from its original position or otherwise disturb the grave of a victim of conflict, or any burial ground or part thereof which contains such graves;*
- (b) destroy, damage, alter, exhume, remove from its original position or otherwise disturb any grave or burial ground older than 60 years which is situated outside a formal cemetery administered by a local authority;*
- (c) bring onto or use at a burial ground or grave referred to in paragraph (a) or (b) and excavation equipment, or any equipment which assists in the detection or recovery of metals (36. [3] 1999:60).”*

b. Human Tissue Act of 1983 and Ordinance on the Removal of Graves and Dead Bodies of 1925

Graves and burial grounds are commonly divided into the following subsets:

- a. ancestral graves
- b. royal graves and graves of traditional leaders
- c. graves of victims of conflict
- d. graves designated by the Minister
- e. historical graves and cemeteries
- f. human remains

Graves 60 years or older are heritage resources and fall under the jurisdiction of both the National Heritage Resources Act and the Human Tissues Act of 1983. However, graves younger than 60 years are specifically protected by the Human Tissues Act (Act 65 of 1983) and Ordinance on Excavations (Ordinance no. 12 of 1980) as well as any local and regional provisions, laws and by-laws. Such burial places also fall under the jurisdiction of the National Department of Health and the Provincial Health Departments. Approval for the exhumation and re-burial must be obtained from the relevant Provincial MEC as well as the relevant local authorities.

c. National Heritage Resources Act No 25 of 1999, section 35

The National Heritage Resources Act (Act 25 of 1999) states that a survey and evaluation of cultural resources must be done in areas where development projects, that will change the face of the environment, will be undertaken. The impact of the development on these resources should be determined and proposals for the mitigation thereof are made. Environmental management should also take the cultural and social needs of people into account. Any disturbance of landscapes and sites that constitute the nation's cultural heritage should be avoided as far as possible and where this is not possible, the disturbance should be minimized and remedied.

1.5.2 Background to HIA and AIA Studies

South Africa's unique and non-renewable archaeological and palaeontological heritage sites are 'generally' protected in terms of the National Heritage Resources Act (Act No 25 of 1999, section 35) and may not be disturbed at all without a permit from the relevant heritage resources authority. Heritage sites are frequently threatened by development projects and both the environmental and heritage legislation require impact assessments (HIAs & AIAs) that identify all heritage resources in areas to be developed. Particularly, these assessments are required to make recommendations for protection or mitigation of the impact of the sites. HIAs

and AIAs should be done by qualified professionals with adequate knowledge to (a) identify all heritage resources including archaeological and palaeontological sites that might occur in areas of developed and (b) make recommendations for protection or mitigation of the impact on the sites.

A detailed guideline of statutory terms and requirements is supplied in Addendum 1.

2 REGIONAL CONTEXT

2.1 Area Location

The ESKOM Lesokwana Substation and Powerlines Project is located in the eastern Gauteng and south-western Mpumalanga Provinces around the towns of Nigel, Heidelberg and Delmas and in the landscape north and east of the Suikerbosrand Nature Reserve. The project occurs in the Ekurhuleni Metropolitan Municipality, the Sedibeng District Municipality and the Nkangala District Municipality in the Gauteng and Mpumalanga Provinces. The project area appears on 1:250000 map sheet 2628 (see Figure 2-1) and the coordinates for the proposed project are as follows:

- **S26.41029° E28.24663° (substation alternatives)**
- **S26.36474° E28.27139° (Brenner-Snowden line relative midpoint)**
- **S26.35025° E28.52914° (Nevis-Snowden line relative midpoint)**
- **S26.37774° E28.61807° (Kendal-Hera line relative midpoint)**
- **S26.392959° E28.327739° (Lesokwana MTS Line Strengthening proposed Lilo Power Lines corridor)**

2.2 Area Description: Receiving Environment

The development site lies within the Grassland biome. It is characterized by a grassy ground layer and a distinct upper layer of woody plants (trees and shrubs). Even though the area has been completely urbanized, the original vegetation in the larger landscape is classified as Tsakane Clay Grassland (Mucina & Rutherford, 2006). The general landscape is characterised by undulating grasslands that are drained by the Blesbokspruit. The Suikerbosrand Nature Reserve occurs to the south-west of the study area. The Nigel area is situated approximately 1 500m above sea level. It has an annual summer rainfall of approximately 650 mm per annum.

2.3 Site Descriptions

2.3.1 The Substation Alternatives

The project alternatives for the substations are situated on portions of the Farm Tamboekiesfontein 173JR, wedged between the N3 highway and the R550 road to Suikerbosrand, along open fields and disused farmlands. More specifically, the sites for alternative 1 and alternative 2 are situated occur in areas that have, for the largest part, been transformed by historical and more recent agriculture farming and urbanization. The site demarcated for alternative 3 occurs within the boundaries of the current Platkop Waste Facility and as such, this area has been transformed by activities relating to the facility. The settlements of Volsoorus, Magagula Heights and Zonkizizwe occur to the west of the sites. Generally, this landscape is sparsely grassed and can be described as typical Highveld grasslands with regular outcrops of shrubs and bushes and scattered trees are also visible.



Figure 2-1: View of old crop fields along the site demarcated for the substation alternatives.



Figure 2-2: View of grasslands and crop fields along the site demarcated for the substation alternatives.



Figure 2-3: View of grasslands along the site demarcated for the substation alternatives.



Figure 2-4: Current ESKOM power lines along the site demarcated for the substation alternatives.



Figure 2-5: View of tall grasses along the site demarcated for the substation alternatives.



Figure 2-6: Informal settlements along the site demarcated for the substation alternatives.

2.3.2 The Proposed Brenner - Snowdon Power Line alignment

The Brenner – Snowdon line originates along the south-western periphery of the Suikerbosrand Nature Reserve and traverses the western border of the reserve to route north-east towards the N3 highway. From here, the alignment reaches north to pass east of Mapleton to reach its northern offset in Mapleton. The line follows existing power lines over largely developed and transformed farmlands and urban areas. An alternative deviation to this route is proposed for the northern section and this line follows a bulk water pipeline and a Transnet railway line to connect to the initial design at Roodekraal. Generally, the area is sparsely grassed and can be described as typical Highveld grasslands with regular outcrops of shrubs and bushes and scattered trees are also visible.



Figure 2-7: View of general surroundings along the proposed Brenner-Snowdon line alignment.



Figure 2-8: View of existing ESKOM power lines along the proposed Brenner-Snowdon line.



Figure 2-9: View of existing ESKOM power lines along the proposed Brenner-Snowdon line.



Figure 2-10: View of a large water pipeline along proposed Brenner-Snowdon line alternative line deviation.



Figure 2-11: View of a large chicken farm along the proposed Brenner-Snowdon line alternative line deviation.



Figure 2-12: View of Transnet railway lines along the proposed Brenner-Snowdon line alternative line deviation.

2.3.3 The Proposed Nevis - Snowdon Power Line alignment

The Nevis-Snowdon line alignment originates along the northern border of the Suikerbosrand Nature Reserve and routes east over to N3 highway to Driemanskap. It then turns north-east to align past the town of Nigel and Glenverloch. It traverses the Marievale Bird Sanctuary east of Nigel and the routes north over a number of properties of the Manjoh Ranch. It then passes a large slimes dam of the East Daggafontein Gold mine to reach its northern offset north of the N17 at Aston Lake. The landscape of this route ranges from open fields, urban zones, farmlands and conservation areas such as the Suikerbosrand Nature Reserve and the Marievale Bird Sanctuary. Generally, the landscape consists of typical Highveld grasslands with regular outcrops of shrubs and bushes and scattered trees.



Figure 2-13: View of general surroundings along the proposed Nevis-Snowdon line alignment.



Figure 2-14: View of a large mine dump along the proposed Nevis-Snowdon line alignment.



Figure 2-14: View of general surroundings along the proposed Nevis-Snowdon line alignment area.



Figure 2-15: View of general surroundings at the Marievale Bird Sanctuary along the proposed Nevis-Snowdon line alignment area.



Figure 2-16: View of large crop fields along the proposed Nevis-Snowdon line alignment area.



Figure 2-17: View of open fields and grasslands along the proposed Nevis-Snowdon line alignment area.



Figure 2-18: View of maize fields along the proposed Nevis-Snowdon line alignment area.

2.3.4 The Kendal – Hera Power Line alignment

The Kendal – Hera line originates along the south-western periphery of the Suikerbosrand Nature Reserve and traverses the western border and northern borders of the reserve to route east over to N3 highway to Driemanskap. It then passes north of the town of Heidelberg and routes north-east of Nigel towards Endicott. It follows a north-eastern direction to its northern offset at Weilaagte, south of Delmas. The landscape of this route consists predominantly of cultivated farmlands with occasional open fields and smaller settlement areas and farmsteads occurring throughout. A significant portion of the route traverses the Suikerbosrand Nature Reserve to the south. Generally, the landscape consists of typical Highveld grasslands with regular outcrops of shrubs and bushes and scattered trees.



Figure 2-19: View of the Kendal-Hera substation along the southern border of Suikerbosrand.



Figure 2-20: View of general surroundings in the Suikerbosrand Nature Reserve along the Kendal-Hera line alignment.



Figure 2-21: View of general surroundings in open grassland along the Kendal-Hera line alignment.



Figure 2-22: View of general surroundings on farmlands along the Kendal-Hera line alignment.



Figure 2-23: View of a quarry and excavation trenches along the Kendal-Hera line alignment.



Figure 2-24: View of open grasslands along the Kendal-Hera line alignment east of Nigel.



Figure 2-25: View of open grasslands along farms in the Kendal-Hera line alignment.



Figure 2-26: View of crop fields along the Kendal-Hera line alignment south of Delmas



Figure 2-27: View of the northern offset of the Kendal-Hera line alignment east of Delmas.

2.3.5 Lesokwana MTS Line Strengthening (proposed Lilo Power Lines corridor)

The proposed Lilo Power Lines corridor originates along the south-western periphery of the Suikerbosrand Nature Reserve and traverses the western border of the reserve to route north-east towards the N3 highway. From here, the alignment reaches east and north to pass west of Duduza to reach its northern offset south of Springs. The line routes over grasslands, developed and transformed farmlands and urban areas. Generally, the area is sparsely grassed and can be described as typical Highveld grasslands with regular outcrops of shrubs and bushes and scattered trees are also visible.



Figure 2-28: View of the general landscape in the proposed Lilo Power Lines corridor.



Figure 2-29: View of general surroundings in the proposed Lilo Power Lines corridor.



Figure 2-30: View of grassland vegetation along the proposed Lilo Power Lines corridor.



Figure 2-31: View of urban zones in the proposed Lilo Power Lines corridor.

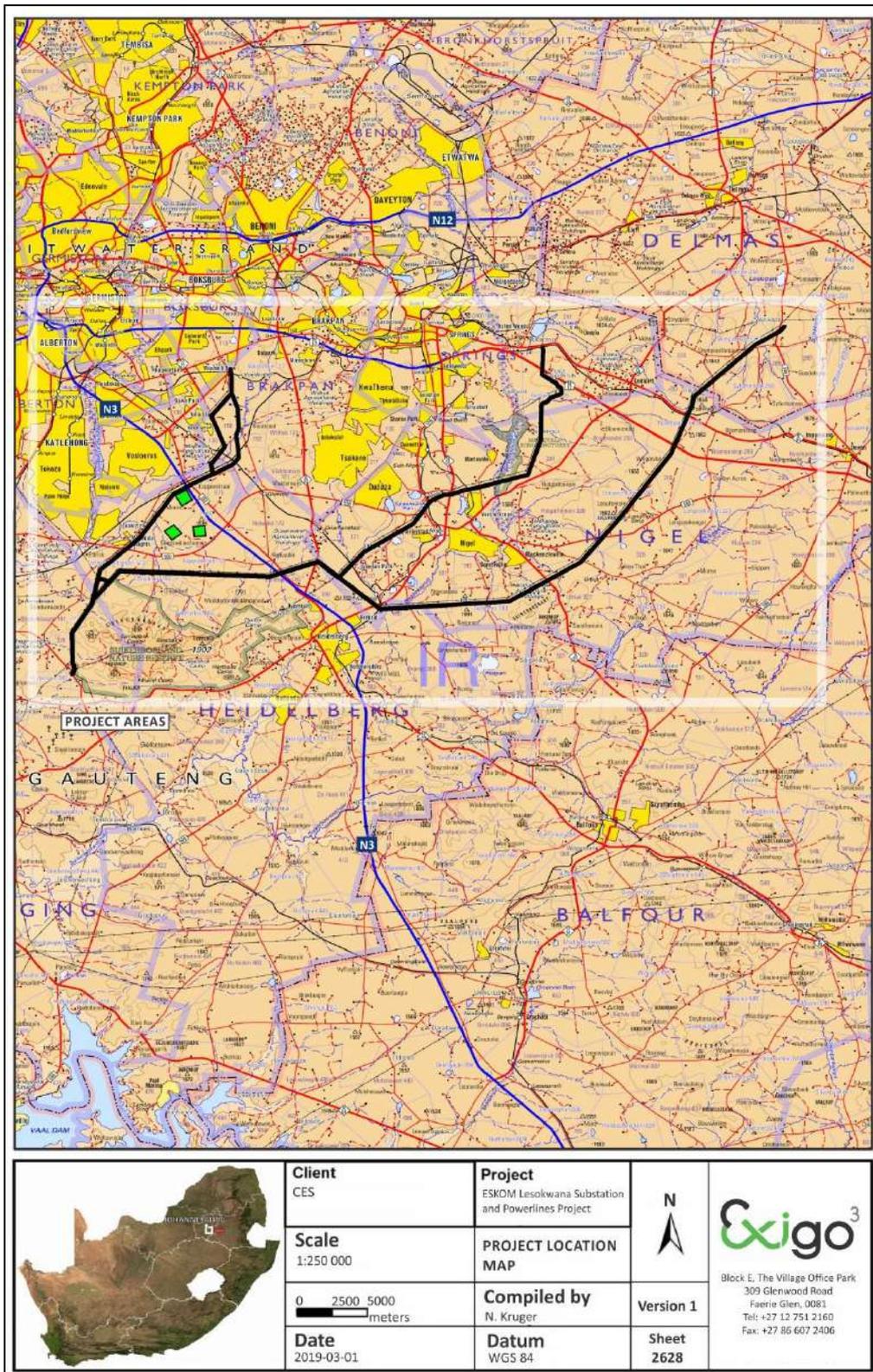


Figure 2-32: 1:250 00 Map representation of the location of the proposed Lesokwana Substation and Powerlines Project (2628AD).

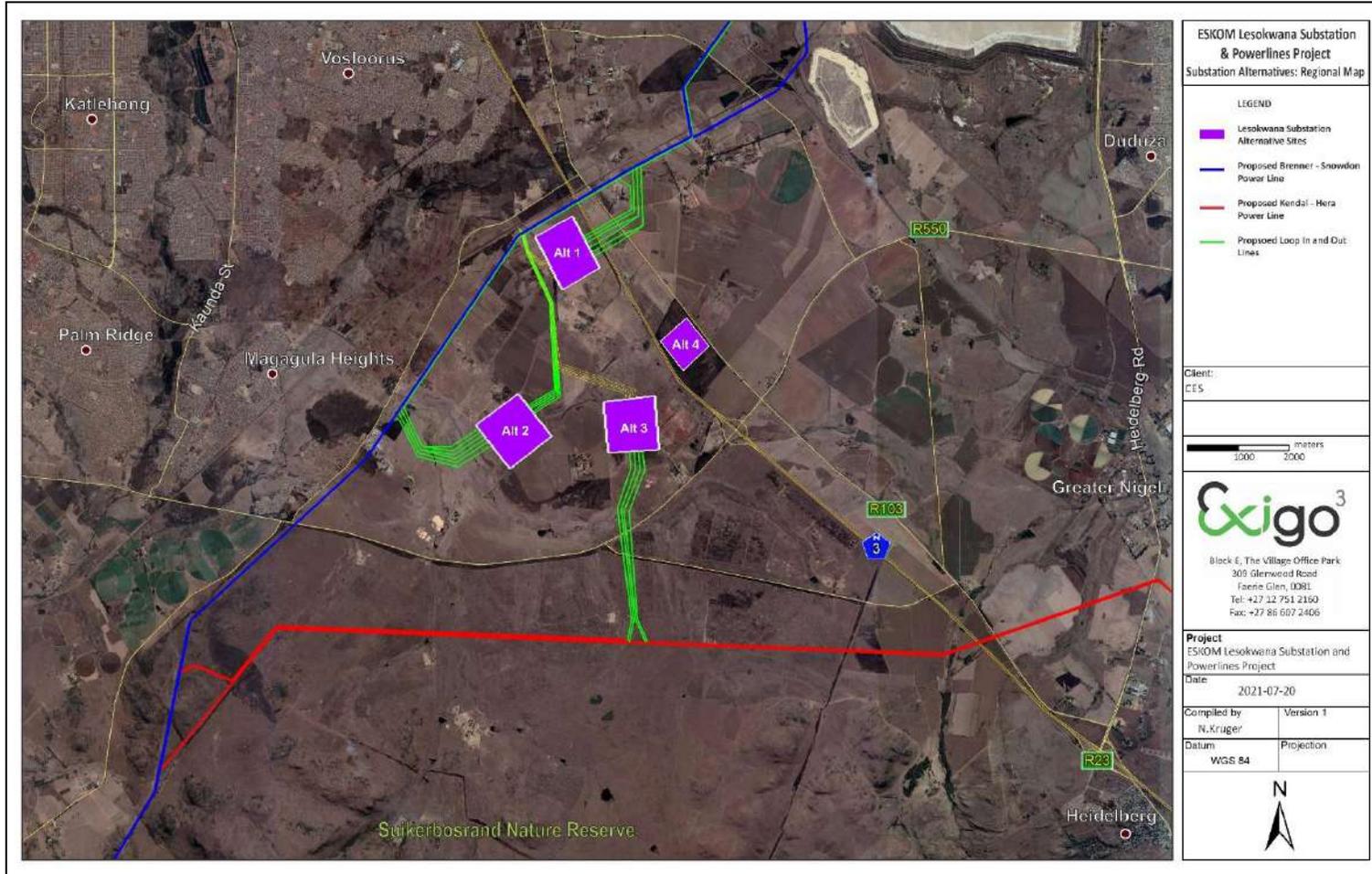


Figure 2-33: Aerial map providing a regional setting for the substation sites for the ESKOM Lesokwana Substation and Powerlines Project.

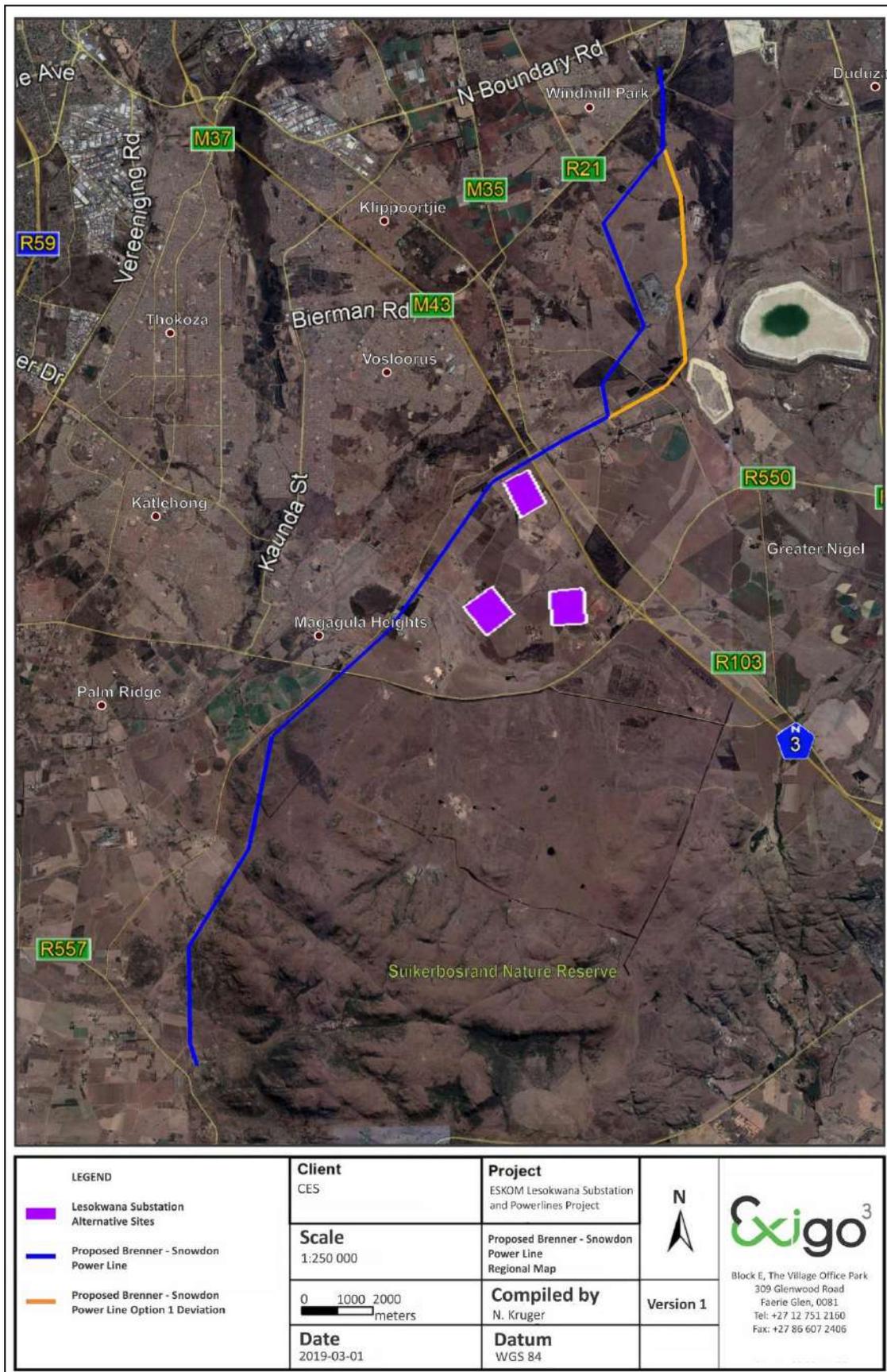


Figure 2-34: Aerial map providing a regional setting for the proposed Brenner-Snowdon line alignment.

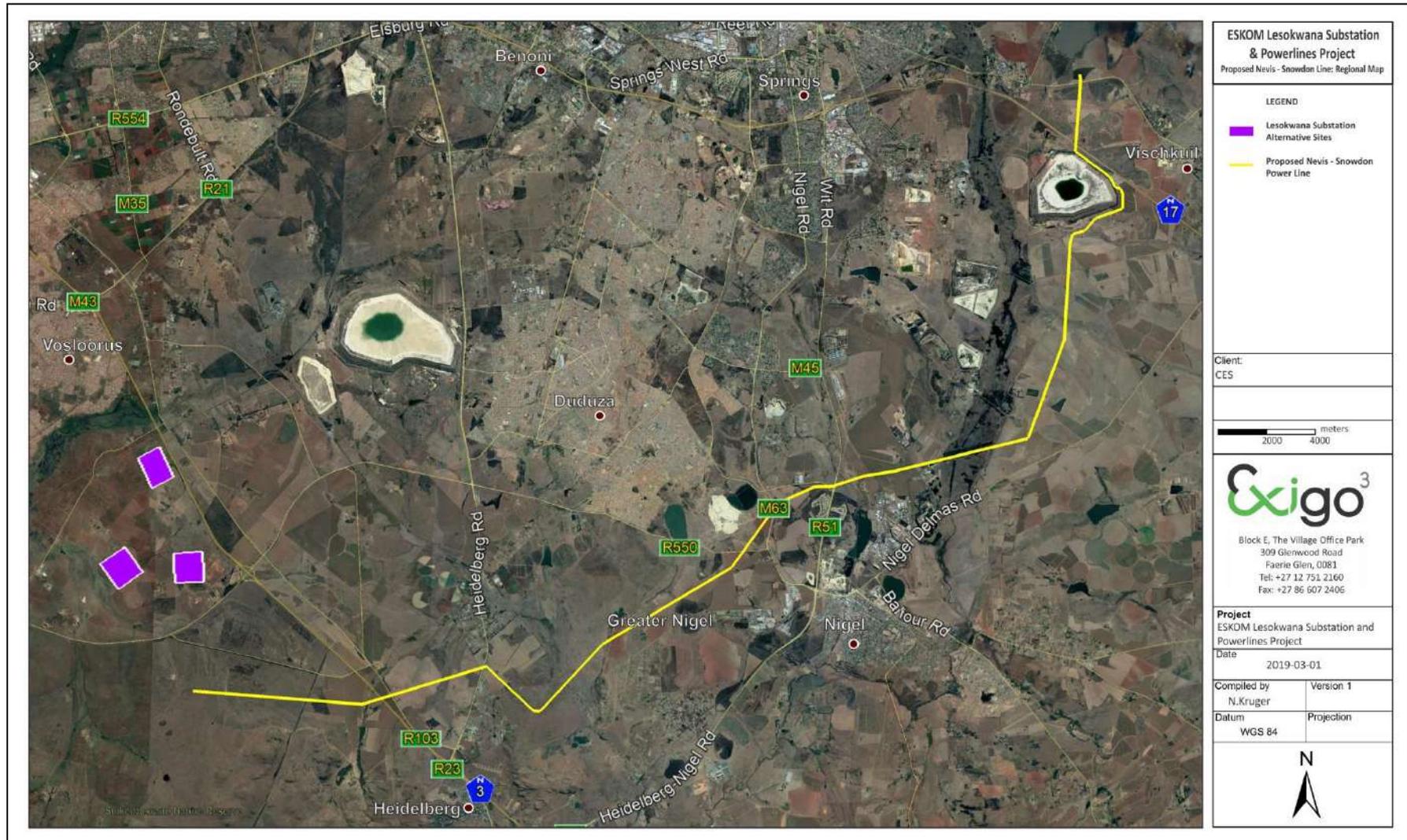


Figure 2-35: Aerial map providing a regional setting for the proposed Nevis-Snowdon line alignment.

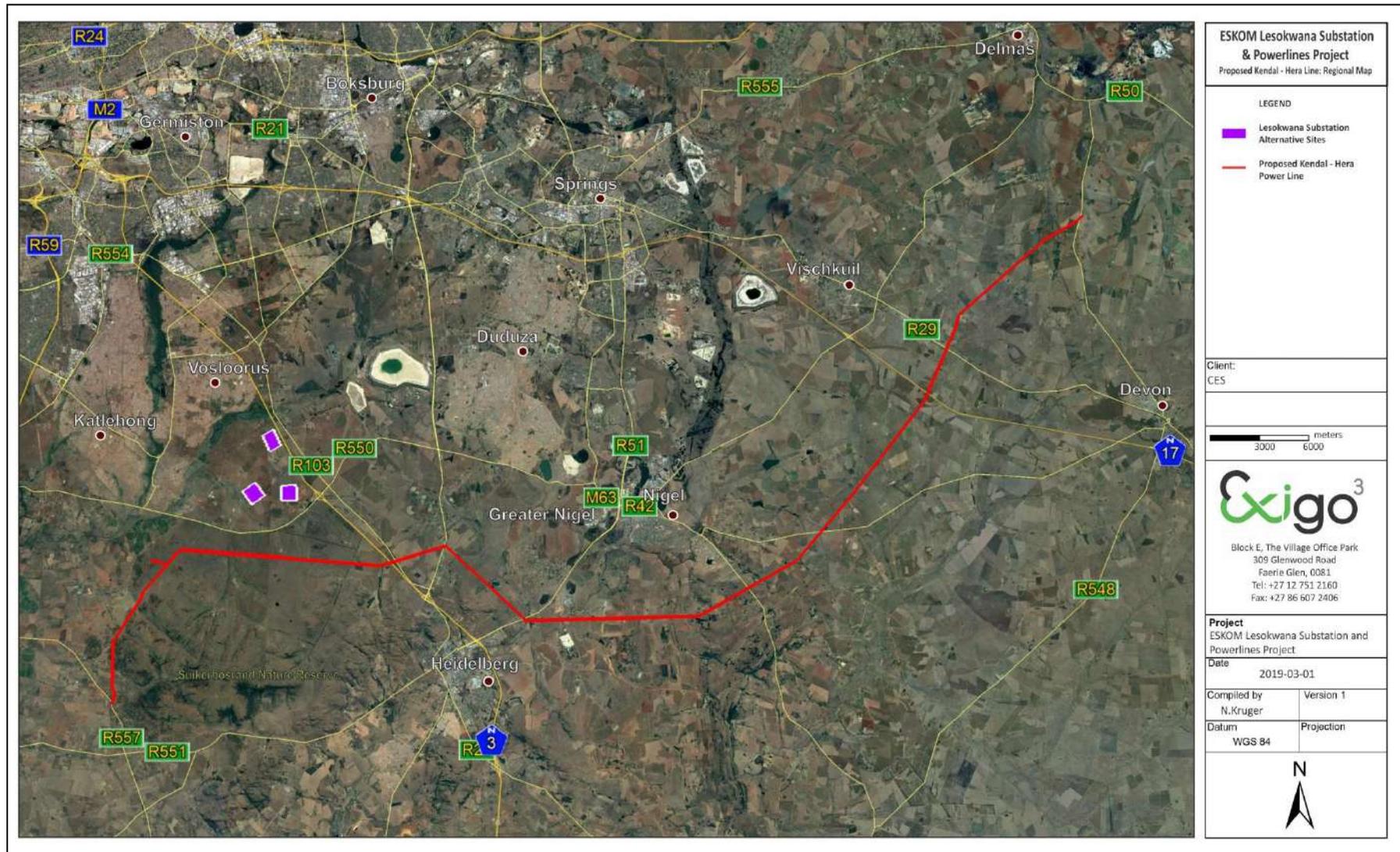


Figure 2-36: Aerial map providing a regional setting for the proposed Kendal-Hera line alignment.



Figure 2-37: Aerial map providing a regional setting for the proposed Lesokwana MTS Line Strengthening and Substation infrastructure.

3 METHOD OF ENQUIRY

3.1 Sources of Information

Data from detailed desktop, aerial and field studies were employed in order to sample surface areas systematically and to ensure a high probability of heritage sites recording.

3.1.1 Desktop Study

A desktop study was prepared in order to contextualize the proposed project within a larger historical milieu. The study focused on relevant previous studies, archaeological and archival sources, aerial photographs, historical maps and local histories, all pertaining to the Southern Highveld area and the larger landscape of this section of the Gauteng and Mpumalanga Provinces. Specifically, the desktop study examined a number of archaeological and historical impact assessments conducted in the region:

- Tomose, N.G. 2014. A Heritage Impact Assessment Study for the Proposed Fortune Metaliks South Africa Nigel Steel Processing Plant, Pretoriusstad, Nigel, Ekurhuleni Metropolitan Municipality, Gauteng Province, South Africa.
- Van Der Walt, J. 2008. Archaeological Impact Assessment: Sluice Gate Upgrade at the Marrievale Nature Reserve, Nigel, Gauteng.
- Fourie, W. 2003. Van Ryn Open Cape Archaeological Survey CCT: Project: Nigel Gold Mining Company Pty Ltd: Cultural Heritage Survey
- Van Schalkwyk, J. & Pelsler, A. 2000. A Survey of Cultural Resources on the Farm Winterhoek 314 IR Nigel District, Gauteng. Previous Studies in the Springs Area:
- Van Der Walt, J. 2008. Archaeological Impact Assessment for the Chief Albert Luthuli Primary School, Springs, Gauteng Province
- Van Vollenhoven, A. 2012. A Report on a Heritage Impact Assessment for the Steynol Umthombo Project near Springs in the Gauteng Province.
- Van Vollenhoven, A. 2013. A Report on a Cultural Impact Assessment for a Proposed Shopping Mall Development close to Springs, Gauteng Province.
- Van Vollenhoven, A. 2012. A Report on a Cultural Heritage Impact Assessment for the Proposed Return Water Dam at the New Kleinfontein Gold Mine close to Springs, Gauteng Province.
- Van Der Walt, J. 2008. Archaeological Impact Assessment: Daggafontein Extension 6, Portions 107 of the Farm Daggafontein 125 IR, Springs, Gauteng Province.
- Van Schalkwyk, J. 2010. Heritage Impact Assessment for the Proposed Payneville Extension 1 Development, Springs Magisterial District, Gauteng Province.
- Van Vollenhoven, A. 2011. A Report on a Cultural Heritage Baseline Study and Impact Assessment for the Proposed New Kleinfontein Goldmine (Modder East Operations) close to Springs, Gauteng Province.
- Kruger, 2016. Heritage Impact Assessment for the proposed Nigel Diesel depot, Nigel, Ekurhuleni. Exigo: Pretoria
- Pelsler, A & Van Vollenhoven, A. 2008. A Report on a Basic Archaeological Assessment for Apollo Bricks on the Farm Grootvaly 124 JR near Springs, Gauteng.
- Van Schalkwyk, J. & Mith, S. 1997. A Survey of Cultural Resources in the Proposed Erwat Sewer Outfall Route, North of Springs, Gauteng Province.
- Gaigher S. 2014. Heritage Impact Assessment for the Proposed Ergo Road Residential Development, Springs, Ekurhuleni.
- Van Der Walt, J. 2008. Archeological Impact Assessment for the Proposed Tsakane Primary School, Tsakane Extension 9, Gauteng Province.

- Kusel, U. 2007. Cultural Heritage Resources Impact Assessment of the Farm Vlaklaagte 161 Tsakane Benoni Gauteng.

3.1.2 Aerial Representations and Survey

Aerial photography is employed to locate and study archaeological sites, particularly where larger scale area surveys are performed. This method was applied to assist the vehicular and foot site survey where depressions, variation in vegetation, soil marks and landmarks were examined. Specific attention was given to shadow sites (shadows of walls or earthworks which are visible early or late in the day), crop mark sites (crop mark sites are visible because disturbances beneath crops cause variations in their height, vigour and type) and soil marks (e.g. differently coloured or textured soil (soil marks) might indicate ploughed-out burial mounds). Attention was also given to moisture differences, as prolonged dampening of soil as a result of precipitation frequently occurs over walls or embankments. By superimposing high frequency aerial photographs with images generated with Google Earth, potential sensitive areas were subsequently identified, geo-referenced and transferred to a handheld GPS device. These areas served as referenced points from where further vehicular and pedestrian surveys were carried out.

The aerial survey suggested a landscape that has been transformed over the past decades by human activity relating to agriculture, settlement and mining with more recent urban developments in the larger Nigel and East Rand landscape (see Figure 3-1).

3.1.3 Mapping of sites

Historical and current maps of the project area were examined. By merging data obtained from the desktop study and the aerial survey, sites and areas of possible heritage potential were plotted on these maps of the Greater Nigel area using GIS software. These maps were then superimposed on high definition aerial representations in order to graphically demonstrate the geographical locations and distribution of potentially sensitive landscapes. Historical maps of the project areas indicate the presence of man-made features such as mining infrastructure, towns, roads and railway lines as well as burials from at least the 1940's (see Figure 3-2).

3.1.4 Field Survey

Archaeological survey implies the systematic procedure of the identification of archaeological sites. Archaeological surveys of the footprints, alignments and routes subject to this study were conducted in December 2018, January 2019 and February 2019 by a team of 2 archaeologists. The survey process encompassed field surveys in accordance with standard archaeological practice by which heritage resources are observed and documented. In order to sample surface areas systematically and to ensure a high probability of site recording, all the substation alternative sites were investigated on foot by means of a transect survey. The respective power line routes were inspected on foot and in a motor vehicle, where access could be obtained. In addition, the noted buffer zones around the propped routes were investigated by means of a judgmental survey, largely based on findings from the aerial survey and mapping investigations. GPS reference points identified during the aerial and mapping surveys were also visited and random spot checks were made (see detail in previous section). Using a Garmin E-trex Montana GPS, the site was geo-referenced and photographed with a Samsung Digital camera. Real time aerial mapping and positioning by means of a hand-held tablet-based Google Earth application was also employed on site to investigate possible disturbed areas during the survey.

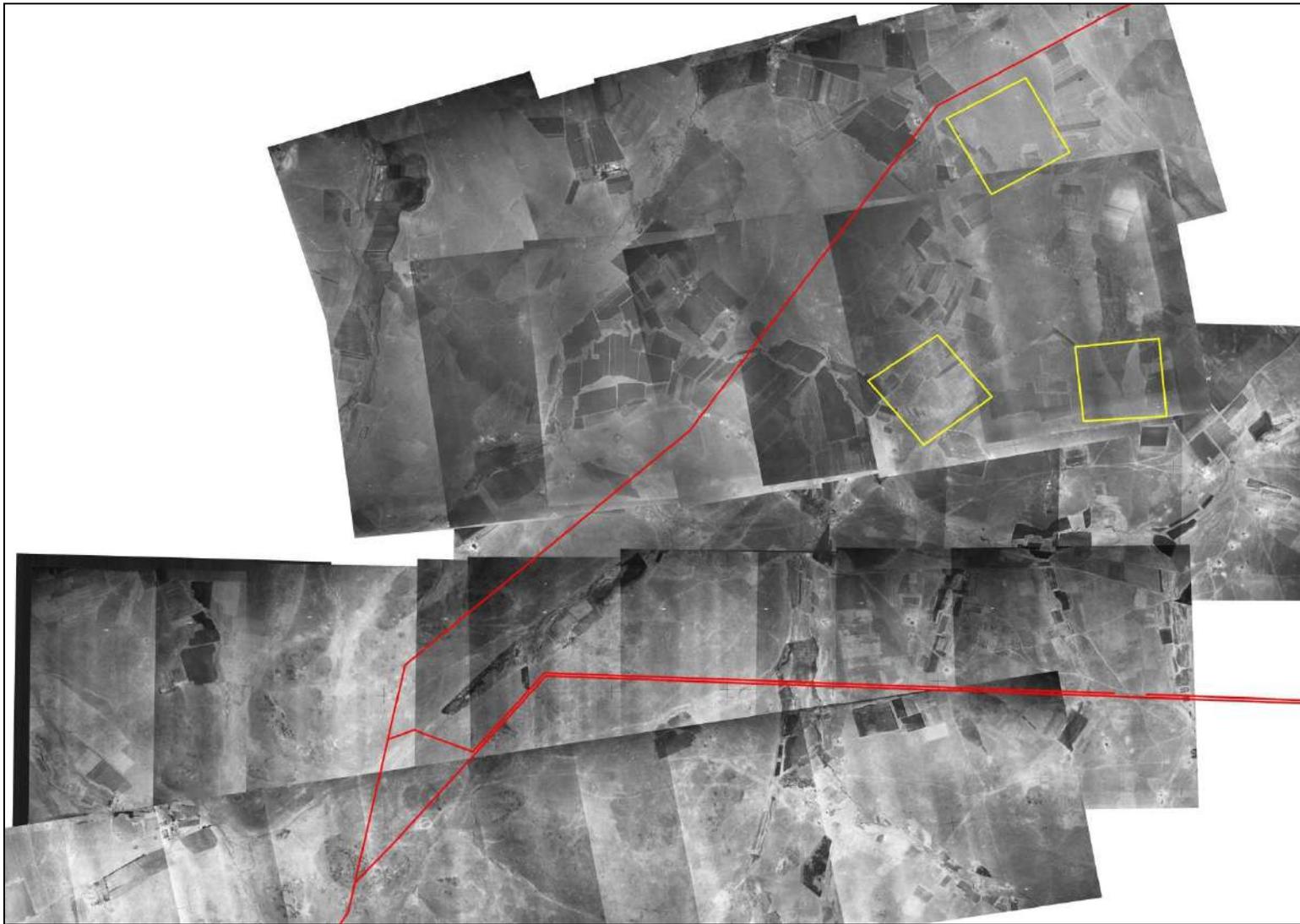


Figure 3-1: Historical aerial images dating to 1938 indicating the project core within the historical landscape.

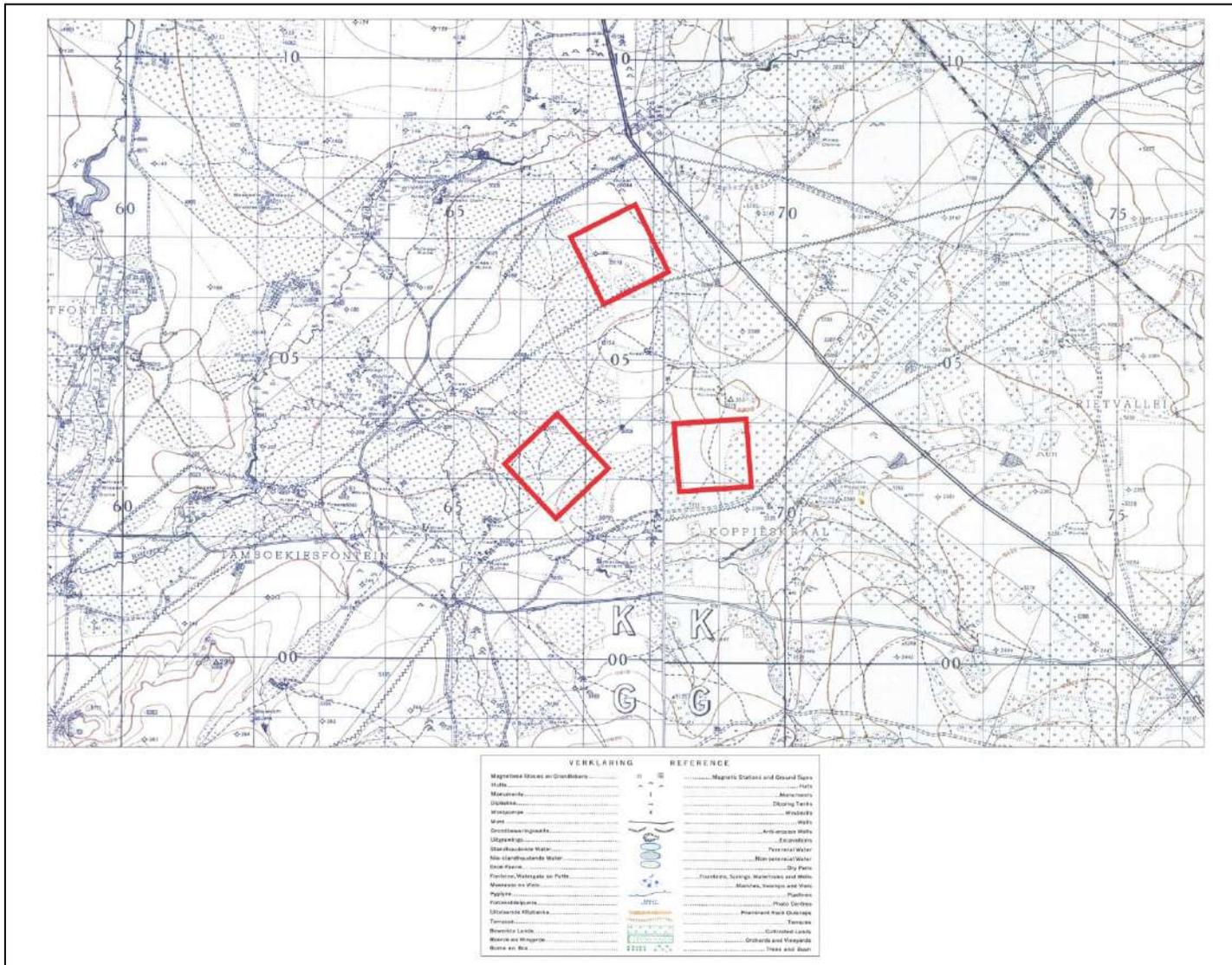


Figure 3-2: A historical topographic map 1945 indicating the substation alternatives within the historical landscape.

3.2 Limitations

3.2.1 Access

For the largest part, project areas were accessed by public roads and farm roads. However, access control is applied to some areas on private farmlands and access restrictions in some survey zones were encountered during the site visit.

3.2.2 Visibility

The surrounding vegetation in the study area is mostly comprised out of mixed grasslands and trees with wetland vegetation in places. Generally, the visibility at the time of the AIA site inspections (November 2018, January 2019 and February 2019) ranged from low to high (see Figures 2-1 to 2-27) as a result of the vast and varied landscape under investigation. In single cases during the survey sub-surface inspection was possible. Where applied, this revealed no archaeological deposits.

3.2.3 Limitations and Constraints Summary

The foot and vehicular site survey for the ESKOM Lesokwana Substation and Powerlines Project primarily focused around areas of potential heritage sensitivity as well as areas of high human settlement catchment probability (for example, in association with vegetation changes or around soil disturbances). To summarize, the following limitations and constraints were encountered.

- **Visibility** proved to be a constraint where denser surface cover obscured surface occurrences.
- **Site Access** proved to be a constraint on privately owned farmlands in some of the survey zones and alignments.
- **Survey Time and Resources** proved to be a constraint due to the vast scope of the project surveys across vast surface areas.

As such, even though it might be assumed that survey findings are representative of the heritage landscape of the project area for the project, it should be stated that the possibility exists that individual sites could be missed due to the localised nature of some heritage remains as well as the possible presence of sub-surface archaeology. Therefore, maintaining due cognisance of the integrity and accuracy of the archaeological survey, it should be stated that the heritage resources identified during the study do not necessarily represent all the heritage resources present in the project area. The subterranean nature of some archaeological sites, dense vegetation cover and visibility constraints sometimes distort heritage representations and any additional heritage resources located during consequent development phases must be reported to the Heritage Resources Authority or an archaeological specialist.

3.3 Impact Assessment

For consistency among specialists, impact assessment ratings by Exigo Specialists are generally done using the Plomp¹ impact assessment matrix scale supplied by Exigo. According to this matrix scale, each heritage receptor in the project area is given an impact assessment. An assessment of potential heritage impacts for the proposed project is included in this report (see Section 6).

¹ Plomp, H., 2004 full reference missing

4 ARCHAEO-HISTORICAL CONTEXT

4.1 The archaeology of Southern Africa

Archaeology in Southern Africa is typically divided into two main fields of study, the **Stone Age** and the **Iron Age** or **Farmer Period**. The following table provides a concise outline of the chronological sequence of periods, events, cultural groups and material expressions in Southern African pre-history and history.

Table 1 Chronological Periods across Southern Africa

Period	Epoch	Associated cultural groups	Typical Material Expressions
Early Stone Age 2.5m – 250 000 YCE	Pleistocene	Early Hominins: <i>Australopithecines</i> <i>Homo habilis</i> <i>Homo erectus</i>	Typically large stone tools such as hand axes, choppers and cleavers.
Middle Stone Age 250 000 – 25 000 YCE	Pleistocene	First <i>Homo sapiens</i> species	Typically smaller stone tools such as scrapers, blades and points.
Late Stone Age 20 000 BC – present	Pleistocene / Holocene	<i>Homo sapiens sapiens</i> including San people	Typically small to minute stone tools such as arrow heads, points and bladelets.
Early Iron Age / Early Farmer Period 300 – 900 AD	Holocene	First Bantu-speaking groups	Typically distinct ceramics, bead ware, iron objects, grinding stones.
Middle Iron Age (Mapungubwe / K2) / early Later Farmer Period 900 – 1350 AD	Holocene	Bantu-speaking groups, ancestors of present-day groups	Typically distinct ceramics, bead ware and iron / gold / copper objects, trade goods and grinding stones.
Late Iron Age / Later Farmer Period 1400 AD -1850 AD	Holocene	Various Bantu-speaking groups including Venda, Thonga, Sotho-Tswana and Zulu	Distinct ceramics, grinding stones, iron objects, trade objects, remains of iron smelting activities including iron smelting furnace, iron slag and residue as well as iron ore.
Historical / Colonial Period ±1850 AD – present	Holocene	Various Bantu-speaking groups as well as European farmers, settlers and explorers	Remains of historical structures e.g. homesteads, missionary schools etc. as well as, glass, porcelain, metal and ceramics.

4.2 The Southern Gauteng Landscape: Specific Themes.

A number of Archaeological Impact Assessments (e.g. van Schalkwyk 2000, Gaiger 2015, Coetzee 2003, Roodt 2008, Van Schalkwyk 2010 and Pistorius 2007) have been conducted in the south-eastern highveld area. Generally, sites documenting Earlier, Middle and Later Stone Age habitation occur across the Highveld, mostly in open air locales or in sediments alongside rivers or pans. Sites dating to the Iron Age occur on the Highveld where environmental factors and population density delegated the spread of Iron Age farming. Moving into recent times, the archaeological record reflects the development of a rich colonial frontier, characterised by, amongst others, a complex industrial archaeological landscape such as mining developments and war events, which herald the modern era in South African history.

4.2.1 The Stone Ages

According to archaeological research, the earliest ancestors of modern humans emerged some two to three million years ago. The remains of Australopithecine and *Homo habilis* have been found in dolomite caves and underground dwellings in the Bankeveld at places such as Sterkfontein and Swartkrans near

Krugersdorp. *Homo habilis*, one of the Early Stone Age hominids, is associated with Oldowan artefacts, which include crude implements manufactured from large pebbles. The Acheulian industrial complex replaced the Oldowan industrial complex during the Early Stone Age. This phase of human existence was widely distributed across South Africa and is associated with *Homo erectus*, who manufactured hand axes and cleavers from as early as one and a half million years ago. Oldowan and Acheulian artefacts were also found four to five decades ago in some of the older gravels (ancient river beds and terraces) of the Vaal River and the Klip River in Vereeniging. The earliest ancestors of modern man may therefore have roamed the Vaal valley at the same time that their contemporaries occupied some of the dolomite caves near Krugersdorp.

Middle Stone Age sites dating from as early as two hundred thousand years ago have been found all over South Africa. Middle Stone Age hunter-gatherer bands also lived and hunted in the Orange and Vaal River valleys. These people, who probably looked like modern humans, occupied campsites near water but also used caves as dwellings. They manufactured a wide range of stone tools, including blades and points that may have had long wooden sticks as hafts and were used as spears. The Late Stone Age commenced twenty thousand years ago or somewhat earlier. The various types of Later Stone Age industries scattered across the country are associated with the historical San and Khoi-Khoi people. The San were renowned as formidable hunter-gatherers, while the Khoi-Khoi herded cattle and small stock during the last two thousand years. Late Stone Age people manufactured tools that were small but highly effective, such as arrow heads and knives.

Two Middle Stone Age sites at the Wittoek Spruit (Brakpan) were researched 17 years ago, but no information on this discovery has been published. San hunter-gatherer bands with their small (microlithic) stone tools may have lived in Eastern Gauteng, as a magnificent engraving site near Duncanville attests to their presence in Vereeniging, south of, but close to Ekurhuleni. Stone Age hunter-gatherers lived well into the 19th century in some places in SA, but may not have been present in this area when the first European colonists crossed the Vaal River during the early part of the 19th century. Stone Age sites may occur all over the area where an unknown number may have been obliterated by mining activities, urbanization, industrialization, agriculture and other development activities during the past decades (Morris 2004).

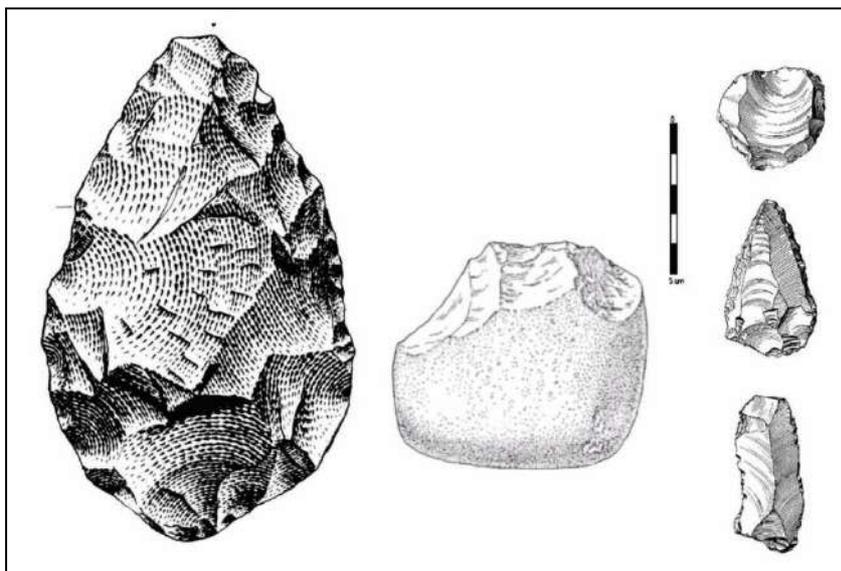


Figure 4-1: Typical ESA hand axe (left) and cleaver (center). To the right is a MSA scraper (right, top), point (right, middle) and blade (right, bottom).

4.2.2 The Iron Age Farmer Period

The beginnings of the Iron Age (Farmer Period) in Southern Africa are associated with the arrival of a new Bantu speaking population group at around the third century AD. These newcomers introduced a new way of life into areas that were occupied by Later Stone Age hunter-gatherers and Khoekhoe herders. Distinctive features of the Iron Age are a settled village life, food production (agriculture and animal husbandry), metallurgy (the mining, smelting and working of iron, copper and gold) and the manufacture of pottery. Iron Age people moved into Southern Africa by c. AD 200, entering the area either by moving down the coastal plains, or by using a more central route. From the coast they followed the various rivers inland. Being cultivators, they preferred rich alluvial soils. The Iron Age can be divided into three phases. The Early Iron Age includes the majority of the first millennium AD and is characterised by traditions such as Happy Rest and Silver Leaves. The Middle Iron Age spans the 10th to the 13th Centuries AD and includes such well known cultures as those at K2 and Mapungubwe. The Late Iron Age is taken to stretch from the 14th Century up to the colonial period and includes traditions such as Icon and Letaba.

Complex stone wall clusters are scattered across the landscapes of the Southern Highveld and the Free State. These stone structures, commonly associated with Bantu speaking farming communities, are the remnants of a complex 500 year old sequence of stone wall building in the central interior of South Africa. Tim Maggs, noted archaeologist of the later Farmer Period in southern Africa, named the first phase in this sequence "Type N" walling, dating to the 15th to 17th centuries AD (Maggs 1976). This phase, which mostly developed in the Free State, was characterised by central cattle kraals linked by outer walls, while the whole settlement was surrounded by a perimeter wall which also incorporated small stock enclosures. After the 17th century, the "Type N" style of building spread across the Vaal River in consecutive phases where it later became known as "Klipriviersberg" type walling (Taylor 1979a). These settlements typically displayed outer scalloped walls that demarcated back courtyards, a large number of small stock kraals and straight walls which separated household units in the domestic zone. Beehive huts would have housed communities on these sites. The Klipriviersberg walling type dates to the 18th and 19th centuries and are associated with the Fokeng cluster of the Sotho-Tswana speaker group. Knowledge of the early history of the Fokeng is limited but we do know that a group of Fokeng predecessors settled in the Free State by the 14th century. Later, two Fokeng groups detached from the main entity and settled near Broederstroom at the foot of the Magaliesberg, and near the Vaal River respectively. The latter yet again divided and one of these divisions settled over a large area in the northern Free State and the southern Highveld.

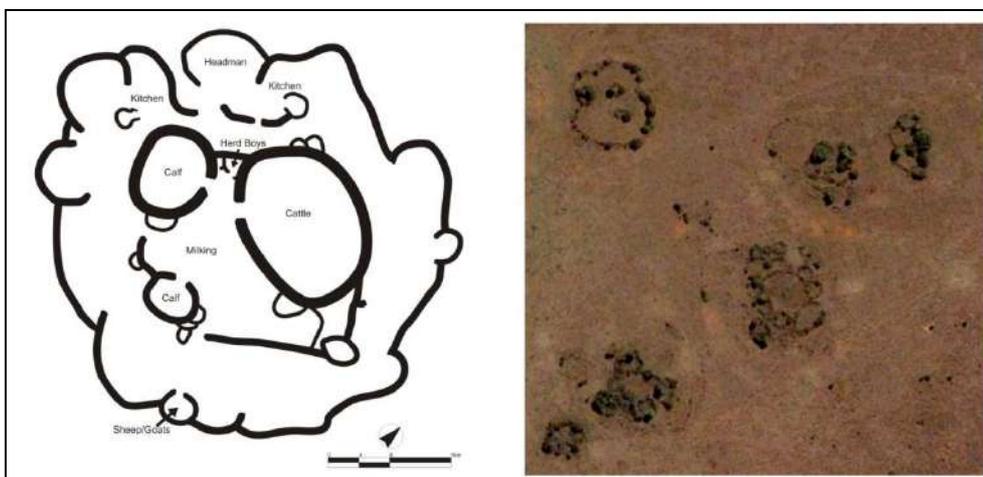


Figure 4-2: Characteristic Klipriviersberg-type stone walled settlements east of Vereeniging on the Highveld (after Huffman [2007]).

Recently, LiDAR technology identified the remains of a large Iron Age capital along the lower western slopes of the Suikerbosrand hills in the Suikerbosrand Nature Reserve. This city was occupied from the 15th century until about 200 years ago and it is one of several large settlements occupied by Tswana-speakers that dotted the northern parts of South Africa for generations before the first European travellers encountered them in the early years of the nineteenth century. In the 1820s all these Tswana city states collapsed in what became known as the Difeqane civil wars. Judging by the dated architectural styles that were common at Suikerbosrand, it's estimated that the builders of the stone walled structures occupied this area from the fifteenth century AD until the second half of the 1800s. It is difficult to estimate the size of its population. Between 750 and 850 homesteads have been counted at Suikerbosrand, but it's hard to tell how many of these were inhabited at the same time, so we cannot easily estimate the city's population at its peak. Given what we know about more recent Tswana settlements, each homestead would have housed an extended family with, at the least, the (male) head of the homestead, one or more wives and their children. Many features of the built environment at Suikerbosrand seem to signal the wealth and status of the homesteads or suburbs that they are associated with. For example, parallel pairs of rock alignments mark sections of passageways in several different parts of the city. South African archaeologist Professor Revil Mason, who has carried out a great deal of research on stone walled ruins around Johannesburg, called these features cattle drives, built to funnel the beasts along certain routes through the city. If these were cattle drives the width and location of these passageways would have signalled the livestock wealth of the ward or homestead that constructed them, even when the cattle were not present.

In the central sector of Suikerbosrand there are two very large stone walled enclosures, with a combined area of just under 10, 000 square meters. They may have been kraals and if so, they could have held nearly a thousand head of cattle. Among the largest features of the built environment at Suikerbosrand are artificial mounds composed of masses of ash from cattle dung fires, mixed with bones of livestock and broken pottery vessels. All this material appears to have been deliberately piled up at the entrance to the larger homesteads. These are the remains of feasts and the ash heaps' size publicised the particular homestead's generosity and wealth.

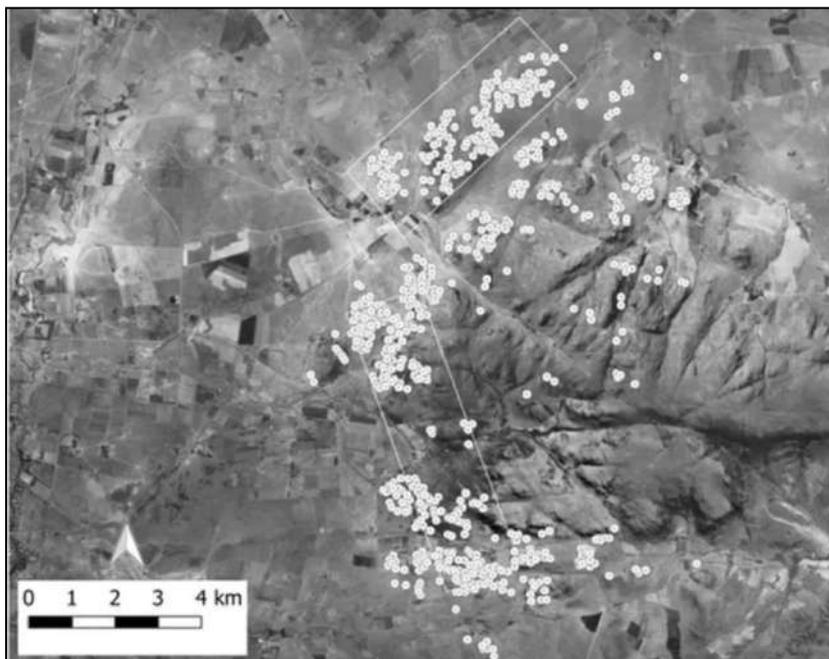


Figure 4-3: The ancient homesteads at Suikerbosrand are shown against an aerial photograph from 1961. The two rectangles show the footprint of the LiDAR imagery (Image: Karim Sadr <https://www.wits.ac.za/news/sources/science-news/2018/how-we-recreated-a-lost-african-city-with-laser-technology.html>).

4.2.3 Historical and Colonial Times and Recent History

The Heidelberg area began in 1862 as a trading station built by a German, Heinrich Julius Ueckermann. A town was laid out around the store and named after Ueckermann's alma mater. In 1866, the District of Heidelberg was created from the eastern portion of the Potchefstroom district with its own magistrate having been laid out as a churchplace in 1865. Heidelberg has played an important part in South African history acting as a capital for the Boer republic during the war with Great Britain. During the First War of Independence, Heidelberg served as capital of the Zuid Afrikaansche Republiek under the Triumvirate of Paul Kruger, P.J. Joubert and M.W. Pretorius, from 1880 to 1883. The British built a concentration camp here during the Second Boer War to house Boer women and children. A monument was erected in the main cemetery to the memory of the women and children. In 1885 the Witwatersrand gold reef was discovered in the Heidelberg district and the office of the Mining Commissioner was established there. Heidelberg developed as a typical rural Victorian town.

Similarly, the town of Nigel, a small town in Gauteng Province, came about as a result of rich gold deposits along the Witwatersrand. A certain prospector, Mr Johnstone discovered gold on the farm Varkensfontein in 1882. He obtained permission from the farm owner, Petrus Johannes Marais (nicknamed Oom Lang Piet) to prospect for gold on the farm. Mr Johnstone's prospecting operations continued for a considerable time shrouded in secrecy. After a random offer to purchase the farm by a stranger, Mr Marais - who was incidentally reading "The Fortunes of Nigel" by Sir Walter Scott at the time - became suspicious and he decided to visit his farm. At the farm his suspicions were confirmed and, determined not to allow himself to be cheated by cunning fortune seekers, he established the Nigel Gold Mining Company in July 1888, two years after the discovery of gold on the Witwatersrand. Mr Marais attributed his luck to the novel he had been reading and, therefore, called his company Nigel, also giving rise to the town of Nigel. In 1888 the State President Paul Kruger declared Nigel a "public digging" under Notice No. 331 and since then the history and development of Nigel are inseparable from those of the gold mines. The town was little more than a mining camp until 1923, when the control of the town was passed into the hands of a Dorpvillage. The Sub Nigel Mine was opened and proved to be a lucrative operation. As a result a great influx of people occurred. Within 7 years the local authority's status was increased to Town Council in 1930. C.L. Mackle was elected as the first Mayor. In these 5 years (hampered only by the outbreak of World War II), 5 new suburbs were proclaimed. A railway line between Springs, Nigel and Heidelberg was opened in October of 1935. It was the discriminatory racial segregation (*apartheid*) legislation, enacted by the Nationalist Party (after coming to power in 1948) that extensively transformed the land-use. Citizens were separated into different townships according to their race with buffer strips of at least 100m wide or by environmental buffer zones. Nigel, with most of the East Rand, became part of the Ekurhuleni Metropolitan Municipality following the creation of the new local government structures in 2000. Today the town is focused primarily on mining and also has various heavy industries.



Figure 4-4: Archive photo of Nigel taken at the turn of the 19th century.

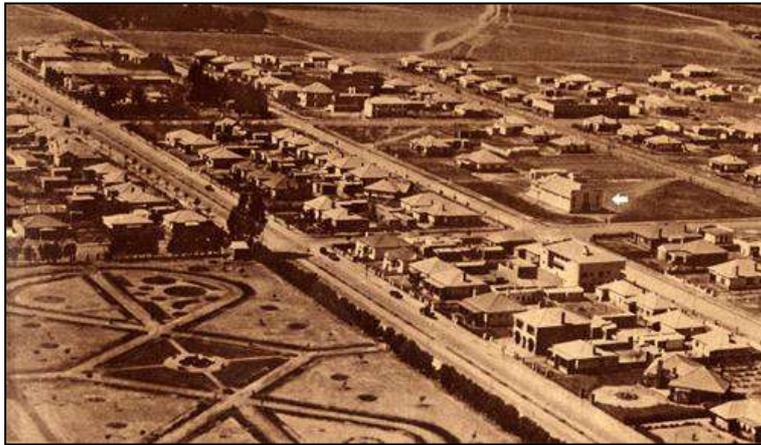


Figure 4-5: Aerial photo of the Nigel CBD dating to 1934.

5 RESULTS: ARCHAEOLOGICAL SURVEY

In terms of heritage resources, the landscape around the project area is primarily well known for the occurrence of Iron Age Farmer and Historical Period sites. However, Stone Age remains associated with caves, outcrops/hills and river courses are known to exist in the larger Gauteng landscape. Generally, the East Rand landscape remains pristine in places with the regular occurrence of transformed zones as a result of agriculture, urbanisation and mining. A large number of occurrences of heritage potential were identified during the site assessment.

5.1 The Substation Alternatives

A number of occurrences of heritage potential were identified in the project area and these were coded “Exigo-LSS” (Exigo Lesokwana Sub Stations).

5.1.1 Colonial / Historical Period Sites

- Site Exigo-LSS-HP01: Historical / Colonial Period Building

A farmstead with associated outbuildings dating to the Historical Period occurs on the farm Tamboekiesfontein 2km west of substation alternative 2 and within the buffer zone of the proposed Brenner – Snowden Powerline alignment. The multi room farmhouse building is constructed out of plastered up brick with a flat corrugated iron roof, metal window frames and wooden doors. A number of brick and stone storage sheds occur at the farmstead. The building, which is not currently occupied, is well preserved and its general appearance resembles early 20th century farmhouse architecture of the area. An analysis of aerial photographs indicates the presence of the building by at least 1938 and the structure is older than 60 years - and generally protected under the National Heritage Resource Act (NHRA 1999). The structure might afford a better understanding of architectural, settlement and social developments in the Nigel landscape and the site is of medium heritage significance. ***The site is approximately 400m west of the proposed Brenner-Snowden power line within its buffer, and 2km west of the substation site for alternative 2 and is therefore unlikely to be impacted, however a permit for the alteration or destruction of the building is required subject to the NHRA should the site be impacted on in any way by the proposed project activities.***



Figure 5-1: The Historical Period farmstead buildings noted at Site Exigo-LSS-HP01.



Figure 5-2: The Historical Period farmstead buildings and storage sheds noted at Site Exigo-LSS-HP01.



Figure 5-3: Historical aerial photo dating to 1938 indicating the presence of the Historical Period farmstead at Site Exigo-LSS-HP01 during the early 20th century. The proposed Brenner-Snowden line is indicated by the red line.



Figure 5-4: A Google Earth render of the location of Site Exigo-LSS-HP01 in relation to the Brenner-Snowden line (blue line) within the buffer zone (yellow line).

- **Site Exigo-LSS-HP02: Historical / Colonial Period Structure**
- **Site Exigo-LSS-HP03: Historical / Colonial Period Remains**

The remains of a farmstead, outbuildings and structures associated with livestock farming as well as the stone foundation remains of dwellings or enclosures were noted on the farm Tamboekiesfontein along the northwestern periphery of the substation alternative 2 site. Here, large square foundation structures - presumably the farmhouse and associated buildings constructed out of a stone and cement, as well as a number of stone foundation remains – probably laborers quarters, occur along vast agricultural fields. The features are not visible on early aerial photographs (1938), but topographic maps suggest that the farmstead was probably in during the second part of the 20th century. As the larger compound is in a ruined state of preservation any potential heritage value attached to the site has probably been lost. ***The site is situated approximately 100m to the west of substation alternative site 2 and impact could be anticipated. It would be advisable to monitor the site during construction in order to avoid the destruction of previously undetected heritage remains.***



Figure 5-5: View of the Historical Period foundation structures at Site Exigo-LSS-HP02.



Figure 5-6: A Google Earth render of the location of Site Exigo-LSS-HP02 in relation to the Lesokwana substation alternative 2 site (purple line).



Figure 5-7: View of the Historical Period building remains at Site Exigo-LSS-HP03.



Figure 5-8: View of the Historical Period foundation structures and building remains at Site Exigo-LSS-HP03.

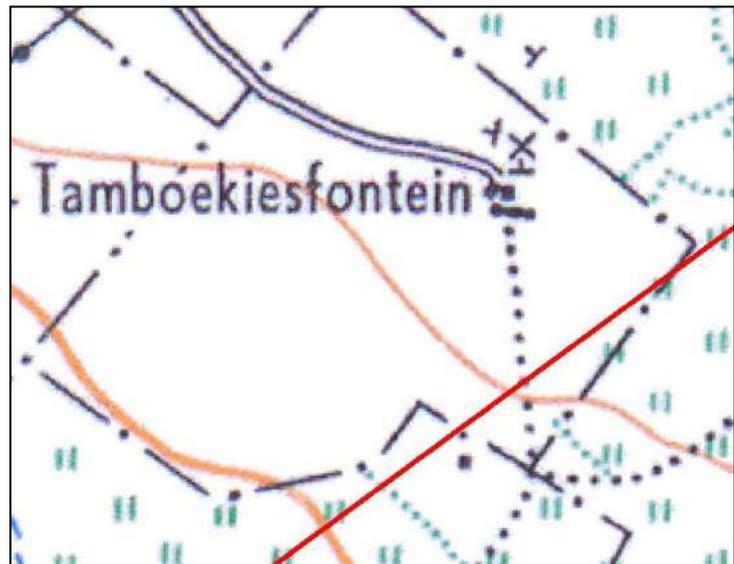


Figure 5-9: Topographic map dating to 1945 indicating the Tamboekiesfontein farmstead, the remains of which are located at Site Exigo-LSS-HP03.

- **Site Exigo-LSS-HP04: Historical / Colonial Period Building**

The remains of a farmstead, outbuildings and structures associated with livestock farming as well as the stone foundation remains of dwellings or enclosures were noted on the farm Uitkyk within the fooyint proposed for substation alternative 4. Here, the remains of a square foundation structures - presumably the farmhouse and associated buildings constructed out of a stone and cement, as well as a number of stone foundation remains – probably laborers quarters, occur along vast agricultural fields. The features are not visible on early aerial photographs (1938), but topographic maps suggest that the farmstead was probably in during the second part of the 20th century. As the larger compound is in a ruined state of preservation any potential heritage value attached to the site has probably been lost. ***The site is situated within substation alternative site 4 and impact could be anticipated. It would be advisable to monitor the site during construction in order to avoid the destruction of previously undetected heritage remains.***



Figure 5-10: The Historical Period farmstead buildings noted at Site Exigo-LSS-HP04.



Figure 5-11: The Historical Period farmstead buildings and storage sheds noted at Site Exigo-LSS-HP04.

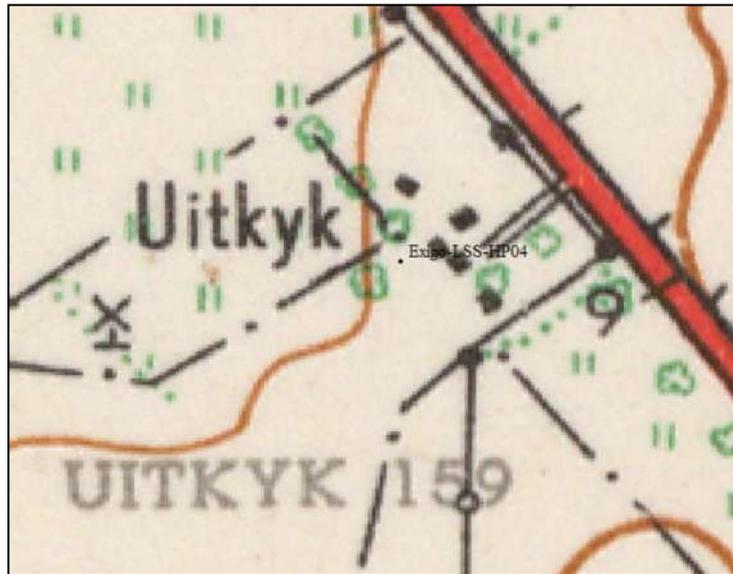


Figure 5-12: Topographic map dating to 1945 indicating the Uitkyk farmstead, the remains of which are located at Site Exigo-LSS-HP04.



Figure 5-13: A Google Earth render of the location of Site Exigo-LSS-HP01 in relation to the Alternative 4 (purple block).

5.1.2 Graves / Human Burial Sites

- Site Exigo-LSS-BP01: Burial Site

A large community cemetery, associated with the nearby Magagula Heights occurs on the farm Tamboekiesfontein 800m west of substation alternative 2 and within the buffer zone of the proposed Brenner – Snowden Powerline alignment Heights. The informal cemetery contains a large number of burial sites, one of which occurs in a palisade enclosure. This burial, which is situated under a single tree, holds 2 graves and grave goods such as clay pots and enamel ware occurs on the graves. It might be assumed that the graves belong to individuals of higher status. The cemetery, which is highly significant in terms of its heritage value, contains graves which seem to be older than 60 years and thus protected by the National Heritage Resource Act (NHRA 1999). ***The site is situated approximately 800m to the west of substation alternative site 2 but within the buffer of the Brenner-Snowden power line and impact could occur. The site should be avoided by means of a 100m conservation buffer or, alternatively legally compliant gravel reaction should be executed if impact is inevitable.***



Figure 5-14: View of burials in an informal cemetery at Site Exigo-LSS-BP01.



Figure 5-15: View of an enclosed and probable high status burial site within the informal cemetery at Site Exigo-LSS-BP01.

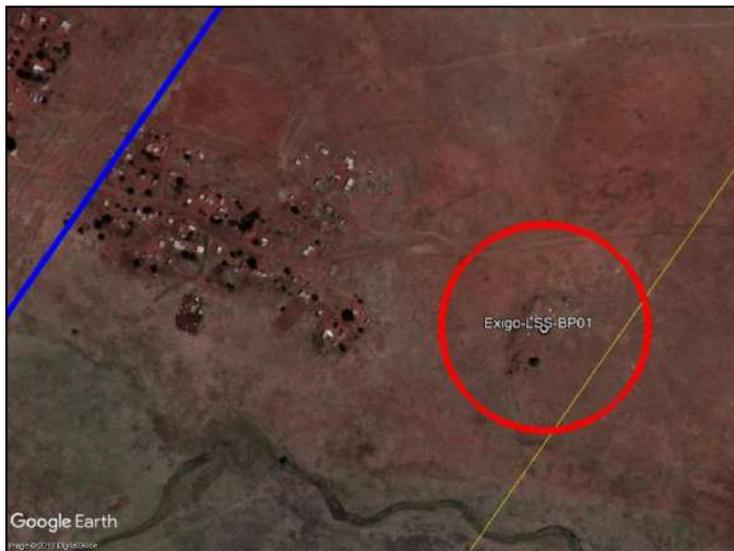


Figure 5-16: A Google Earth render of the location of Site Exigo-LSS-BP01 in relation to the Brenner-Snowden line (blue line) within the buffer zone (yellow lines). The red circle indicates the required 100m conservation buffer.

- **Site Exigo-LSS-BP02: Burial Site**

A newly established municipal cemetery occurs on the farm Tamboekiesfontein 400m west of substation alternative 1 and within the buffer zone of the proposed Brenner – Snowden Powerline alignment. It seems as though no human remains have been interred at the cemetery but the site holds intrinsic value as it will contain human burials in future. *The site is situated approximately 400m to the west of substation alternative site 1 and within the buffer of the Brenner-Snowden power line and impact could occur. The site should be avoided by means of a 100m conservation buffer.*



Figure 5-17: View of a new and unused Municipal cemetery at Site Exigo-LSS-BP02.



Figure 5-18: A Google Earth render of the location of Site Exigo-LSS-BP02 in relation to the Brenner-Snowden line (blue line) within the buffer zone (yellow lines). The red circle indicates the required 100m conservation buffer.

5.2 The Proposed Brenner - Snowdon Power Line alignment

A number of occurrences of heritage potential were identified along this route and these were coded “Exigo-LBS” (Exigo Lesokwana Brenner Snowdon).

5.3 Colonial / Historical Period Sites

- **Site Exigo-LBS-HP01: Historical / Colonial Period Buildings / Remains**

The remains of presumably an old station building, adjacent foundations, a stone railway culvert as well as a large square stone enclosure dating to the Historical Period occurs on the farm Roodekraal 1331R directly south of the expiring Transnet railway line in the Brenner-Snowdon Line buffer area. At the site, the ruins of a multi-room sandstone building – presumably a station - occur along the path of an old railway line. This railway path, which does not contain tracks, traverses a large drainage line over a sandstone culvert east of the station building remains. In addition, a number of square stone foundation structures occur around the station building. A large dry-walled stone enclosure occurs some distance away from the station to the east. Even though the preservation of the site and its features is poor, the buildings display Historical Period architecture and building materials. An analysis of historical maps and aerial photographs established that the station was commissioned during the early 20th century. The site and structures are older than 60 years and generally protected under the National Heritage Resource Act (NHRA 1999). Notwithstanding the preservation condition of the structures, the site might afford a better understanding of architectural and industrial developments in the larger Nigel area and it is of medium heritage significance. ***The site is situated within the buffer of the Brenner-Snowdon line and impact might occur. The careful documentation of the structure will be necessary prior to any alteration the structure. In addition, a permit for the alteration of the structure will be required, subject to terms stipulated in the NHRA.***



Figure 5-19: The Historical Period station building remains noted at Site Exigo-LBS-HP01.



Figure 5-20: View of the Historical Period foundation structures at Site Exigo-LBS-HP01.



Figure 5-21: View of the remains of a large stone enclosure at Site Exigo-LBS-HP01.



Figure 5-22: The Historical Period culvert structure at Site Exigo-LBS-HP01.



Figure 5-23: Historical aerial photo dating to 1938 indicating the presence of the Historical Period station and railway at Site Exigo-LBS-HP01 during the early 20th century.

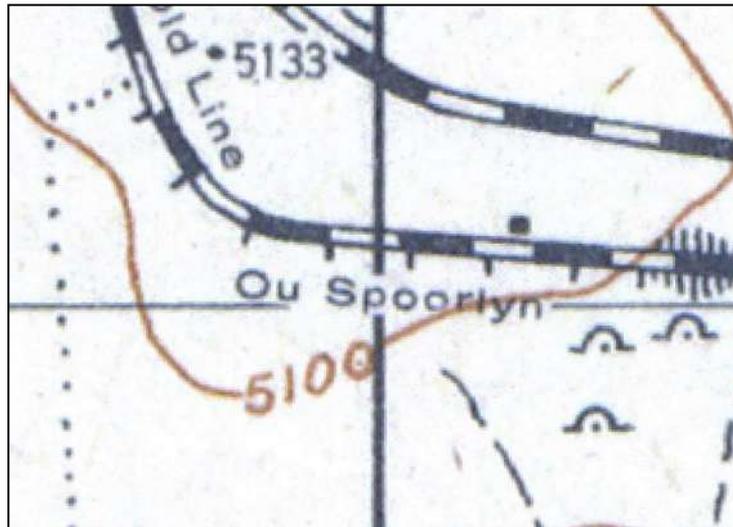


Figure 5-24: Historical topographic map dating to 1945 indicating the presence of the Historical Period station and railway line (“Ou Spoorlyn”) at Site Exigo-LBS-HP01 during the early 20th century.



Figure 5-25: A Google Earth render of the location of Site Exigo-LBS-HP01 in relation to the Brenner-Snowden line (blue line) within the buffer zone (yellow lines). The red polygon indicates the required 20m conservation buffer.

- **Site Exigo-LBS-HP02: Historical / Colonial Period Structure**

A number of square stone foundation remains of dwellings or enclosures were noted on the farm Roodekraal 1331R in the Brenner-Snowdon Line buffer area. Here, square foundation structures of multi-room buildings occur in an open field in association with Sisal Trees. No period-specific material culture was noted in association with the structures. The features are visible on early aerial photographs dating to 1938 which suggest that the site was probably occupied during the first part of the 20th century. Even though the site and structures are older than 60 years and generally protected under the National Heritage Resource Act (NHRA 1999), no special cultural or social association for the structures could be established, they are poorly preserved and rated as of medium-low significance. ***The site is situated within the buffer of the Brenner-Snowdon line and impact might occur. It would be advisable to monitor the site during construction in order to avoid the destruction of previously undetected heritage remains.***



Figure 5-26: View of the Historical Period foundation structures at Site Exigo-LBS-HP02.



Figure 5-27: Historical aerial photo dating to 1938 indicating the presence of Site Exigo-LBS-HP02 during the early 20th century.

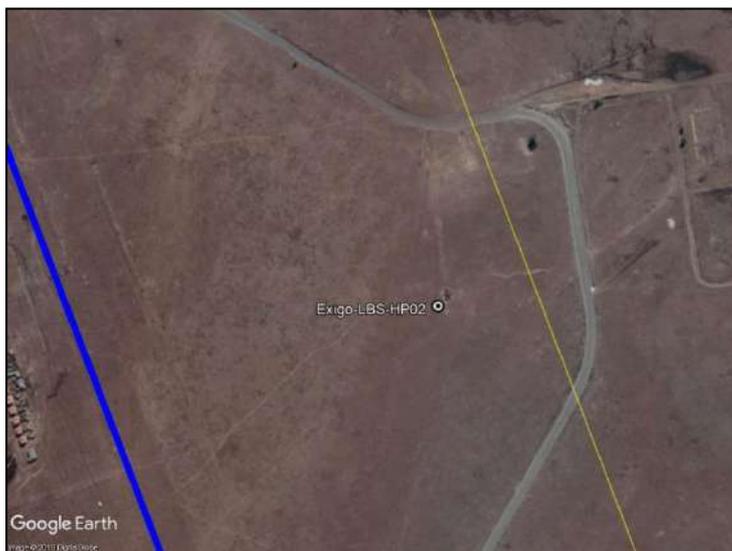


Figure 5-28: A Google Earth render of the location of Site Exigo-LBS-HP02 in relation to the Brenner-Snowden line (blue line) within the buffer zone (yellow lines).

- **Site Exigo-LBS-HP03: Historical / Colonial Period Remains**

The remains of one of the Rooikraal farmsteads occur on the farm Roodekraal 133IR in the buffer area of the alternative deviation for the Brenner-Snowdon Line. Here, a number of ruined walls and square foundation structures of a multi-room building occur in a pocket of trees and shrubs. In addition, the remains of livestock enclosures and concrete water furrows were noted. Material culture such as objects made from glass, plastic, wood and metal were noted in association with the building remains. The site is visible on early aerial photographs dating to 1938 which suggest that the site was probably occupied during the first part of the 20th century. Even though the site and structures are older than 60 years and generally protected under the National Heritage Resource Act (NHRA 1999), no special cultural or social association for the structures could be established, they are poorly preserved and rated as of medium-low significance. ***The site is situated within the buffer of the Brenner-Snowdon line alternative deviation and impact might occur. It would be advisable to monitor the site during construction in order to avoid the destruction of previously undetected heritage remains.***



Figure 5-29: View of the Historical Period foundation structures and building remains at Site Exigo-LBS-HP03.



Figure 5-30: View of the Historical Period foundation structures at Site Exigo-LBS-HP03.



Figure 5-31: Historical aerial photo dating to 1938 indicating the presence of Site Exigo-LBS-HP03 during the early 20th century.

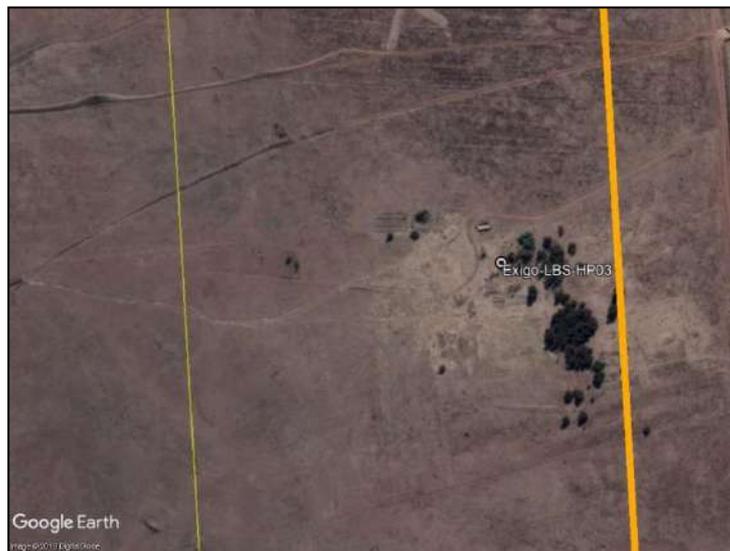


Figure 5-32: A Google Earth render of the location of Site Exigo-LBS-HP03 in relation to the Brenner-Snowden line alternative deviation (orange line) within the buffer zone (yellow lines).

- **Site Exigo-LBS-HP04: Historical / Colonial Period Remains**

The remains of another Rooikraal farmstead occur on the farm Roodekraal 1331R in the buffer area of the alternative deviation for the Brenner-Snowdon Line. Here, the walls of a multi-room stone and concrete building occur in a pocket of trees and shrubs. In addition, the remains of a round concrete dam and concrete foundations of outbuildings were noted. Material culture such as objects made from glass, plastic, wood and metal were noted in association with the building remains. The site is visible on early aerial photographs dating to 1938 which suggest that the site was probably occupied during the first part of the 20th century. The site and structures are older than 60 years and generally protected under the National Heritage Resource Act (NHRA 1999). Notwithstanding the preservation condition of the structures, the site might afford a better understanding of architectural and industrial developments in the larger Nigel area and it is of medium heritage significance. *The site is situated within the buffer of the Brenner-Snowdon line alternative deviation and impact might occur. The careful documentation of the structure will be necessary prior to any alteration the structure. In addition, a permit for the alteration of the structure will be required, subject to terms stipulated in the NHRA.*



Figure 5-33: View of the Historical Period building remains at Site Exigo-LBS-HP04.



Figure 5-34: View of the Historical Period features and foundations at Site Exigo-LBS-HP04.



Figure 5-35: Historical aerial photo dating to 1938 indicating the presence of Site Exigo-LBS-HP04 during the early 20th century.

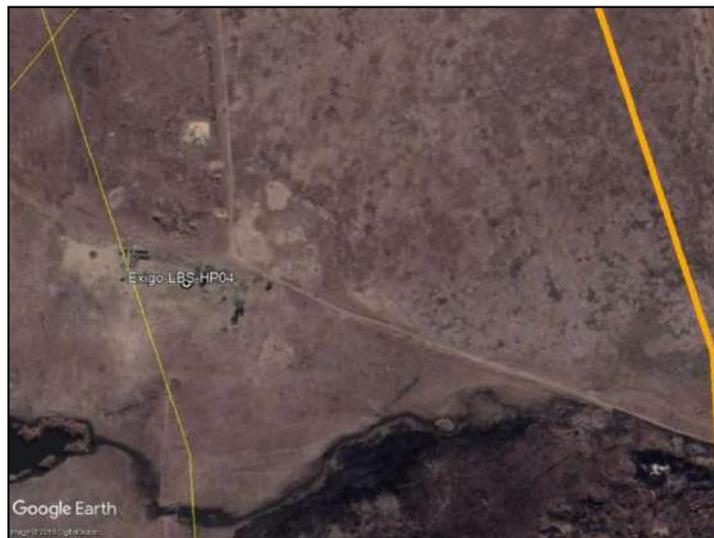


Figure 5-36: A Google Earth render of the location of Site Exigo-LBS-HP04 in relation to the Brenner-Snowden line alternative deviation (orange line) within the buffer zone (yellow lines).

5.3.1 Graves / Human Burial Sites

- Site Exigo-LBS-BP01: Burial Site

A community cemetery, associated with the nearby Magagula Heights occurs on the farm Tamboekiesfontein, in close proximity of the proposed Brenner-Snowdon line alignment. The informal cemetery contains a large amount of burial sites, indicated by marble tombstones and rectangular stone cairns. The cemetery, which is highly significant in terms of its heritage value, contains graves which seem to be older than 60 years and thus protected by the National Heritage Resource Act (NHRA 1999). ***The site is situated in close proximity of the Brenner-Snowden power line alignment and impact could occur. The site should be avoided by means of a 100m conservation buffer or, alternatively legally compliant grave relocation should be executed if impact is inevitable.***



Figure 5-37: View of burials in an informal cemetery at Site Exigo-LBS-BP01.



Figure 5-38: A Google Earth render of the location of Site Exigo-LBS-BP01 in relation to the Brenner-Snowden line (blue line) within the buffer zone (yellow lines). The red circle indicates the required 100m conservation buffer.

- **Site Exigo-LBS-BP02: Burial Site**

A small Historical Period cemetery occurs on the farm Roodekraal 1331R, directly east of the Historical railway station at site Exigo-LBS-HP01 within the proposed Brenner-Snowdon line buffer. The informal cemetery contains a number of poorly preserved graves, indicated by collapsed concrete tombstones and rectangular stone cairns. A large granite memorial stone occurs at the site under Pine Trees, bearing the following inscription in Afrikaans, English, Sepedi and Xhosa:

*ERECTED
TO THE MEMORY OF 22 NATIVES
WHO LOST THEIR LIVES ON 27 JULY 1927*

The cemetery and the memorial, which is highly significant in terms of its heritage value, contains graves which seem to be older than 60 years and of historical importance and the site is protected by the National Heritage Resource Act (NHRA 1999). ***The site is situated in close proximity of the Brenner-Snowden power line alignment and impact could occur. The site should be avoided by means of a 100m conservation buffer or, alternatively legally compliant grave and monument relocation should be executed if impact is inevitable.***



Figure 5-39: View of a granite memorial stone at Site Exigo-LBS-BP02.



Figure 5-40: View of burials in the informal cemetery at Site Exigo-LBS-BP02.



Figure 5-41: A Google Earth render of the location of Site Exigo-LBS-BP02 in relation to the Brenner-Snowden line (blue line) within the buffer zone (yellow lines). The red circle indicates the required 100m conservation buffer.

- **Site Exigo-LBS-BP03: Burial Site**

An informal cemetery occurs on the farm Roodekraal 1331R in close proximity of the proposed Brenner-Snowdon line. The informal cemetery contains a number of graves which are rectangular stone cairns filled with soil. The cemetery is highly significant in terms of its heritage value and it might contain graves which are older than 60 years. The site is protected by the National Heritage Resource Act (NHRA 1999). ***The site is situated in close proximity of the Brenner-Snowden power line alignment and impact could occur. The site should be avoided by means of a 100m conservation buffer or, alternatively legally compliant grave relocation should be executed if impact is inevitable.***



Figure 5-42: View of burials in an informal cemetery at Site Exigo-LBS-BP03.



Figure 5-43: A Google Earth render of the location of Site Exigo-LBS-BP03 in relation to the Brenner-Snowden line (blue line) within the buffer zone (yellow lines). The red circle indicates the required 100m conservation buffer.

- **Site Exigo-LBS-BP04: Burial Site**

A small informal cemetery occurs on the farm Roodekraal 1331R, directly east of the Historical railway station at site Exigo-LBS-HP01 within the proposed Brenner-Snowdon line buffer. The informal cemetery contains at least 4 graves which are rectangular stone structures within an enclosure demarcated by concrete blocks. One of the graves bears an unmarked rock headstone. The cemetery is highly significant in terms of its

heritage value and it might contain graves which are older than 60 years. The site is protected by the National Heritage Resource Act (NHRA 1999). ***The site is situated in close proximity of the Brenner-Snowden power line alignment and impact could occur. The site should be avoided by means of a 100m conservation buffer or, alternatively legally compliant grave relocation should be executed if impact is inevitable.***



Figure 5-44: View of the concrete block demarcation of a cemetery at Site Exigo-LBS-BP04.



Figure 5-45: View of burials at Site Exigo-LBS-BP04.

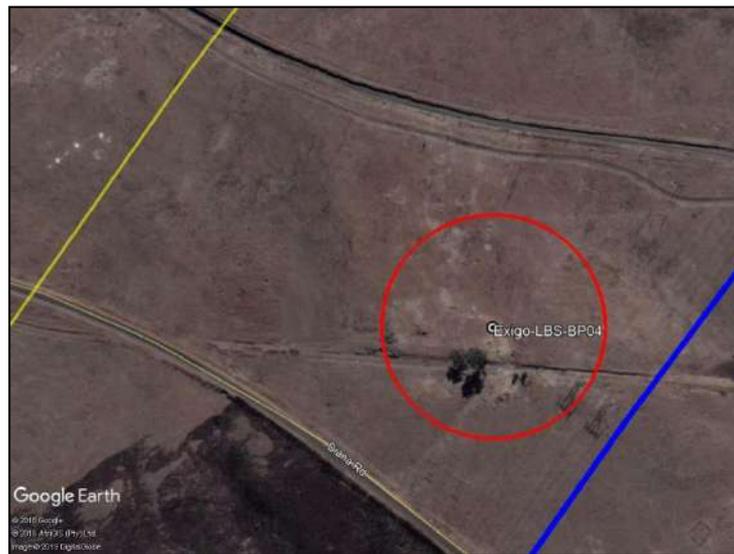


Figure 5-46: A Google Earth render of the location of Site Exigo-LBS-BP04 in relation to the Brenner-Snowden line (blue line) within the buffer zone (yellow lines). The red circle indicates the required 100m conservation buffer.

5.4 The Proposed Nevis - Snowdon Power Line alignment

A number of occurrences of heritage potential were identified in this route alignment and these were coded “Exigo-LNS” (Exigo Lesokwana Nevis Snowdon).

5.4.1 The Iron Age Farmer Period

- Site Exigo-LNS-IA01: Iron Age Farmer Period Site

A later Iron Age Farmer Period stone walled site occurs on the farm Spaarwater 171 within the buffer of the proposed Nevis-Snowdon line alignment. At the site, 2 clusters of stone walls display clear inner and outer enclosures and periphery walls. The stone walling and enclosures display irregular stone building with rough stones and a number of defined entrances. Beside the deposits around the site, no material culture was found in association with the walling and it is therefore not possible to ascertain an absolute temporality for the structures. However, considering similar sites in the Suikerbosrand landscape and the settlement history of Sotho-Tswana groups, the site probably dates to the late 18th early 19th century and might be regarded as part of the Suikerbosrand Iron Age landscape. As such, the site is of scientific value in terms of its regional representation in the Iron Age farmer period landscape of the area and it is rated as of medium significance. ***The site is situated within the buffer of the Nevis-Snowdon line and impact might occur. The careful documentation of the structure by means of a Phase 2 Assessment will be necessary prior to any alteration the site. In addition, a permit for the alteration of the excavation or alteration of the site will be required, subject to terms stipulated in the NHRA.***



Figure 5-47: View of Iron Age Farmer Period stone wall enclosures at Site Exigo-LNS-IA01.



Figure 5-48: Sections of Iron Age Farmer Period stone wall enclosures at Site Exigo-LNS-IA01.



Figure 5-49: Ashy deposits exposed by animal burrowing observed at Site Exigo-LNS-IA01.



Figure 5-50: A Google Earth render of the location of Site Exigo-LNS-IA01 in relation to the Nevis-Snowdon line (green line) within the buffer zone (yellow lines). The red circle indicates the required 20m conservation buffer.

5.4.2 Colonial / Historical Period Sites

- **Site Exigo-LNS-HP01: Historical / Colonial Period Building**

The remains of a mine pit of the East Daggafontein Mine occurs on the farm Rietfontein 2761R within the buffer area of the Nevis-Snowdon Line. The mine, as well as old ruins or “murasies” are indicated on historical topographic maps but the site could not be inspected during the site assessment due to access constraints. The site and indicated structures are older than 60 years and generally protected under the National Heritage Resource Act (NHRA 1999) and an assessment of possible significant building ruins and Historical period remains should be conducted prior to alteration of the site. ***The site is situated within the buffer of the Nevis-Snowdon line and impact might occur. The careful assessment of the site will be necessary prior to any alteration of the site and its features.***



Figure 5-51: View of the approximate location of the remains of the old East Daggafontein Mine at Site Exigo-LNS-HP01.



Figure 5-52: Topographic map dating to 1945 indicating the old East Daggafontein Mine and it's at Site Exigo-LNS-HP01.



Figure 5-53: A Google Earth render of the location of Site Exigo-LNS-HP01 in relation to the Nevis-Snowdon line (green line) within the buffer zone (yellow lines).

- **Site Exigo-LNS-HP02: Historical / Colonial Period Structure**

The remains of the farmstead of the farm Rietfontein 276IR occurs within the buffer area of the Nevis-Snowdon Line. Here, the walls of a multi-room face brick building occur in an open field. The building displays sandstone foundations with a small porch to the south. In addition, the remains of concrete and brick foundations of outbuildings were noted. Material culture such as objects made from glass, plastic, wood and metal were noted in association with the building remains. The site is visible on topographic maps dating to 1954 which suggest that the site was probably occupied during the mid-20th century. The site and structures are older than 60 years and generally protected under the National Heritage Resource Act (NHRA 1999). The site might afford a better understanding of architectural and industrial developments in the larger Nigel area and it is of medium heritage significance. ***The site is situated within the buffer of the Nevis-Snowdon line and impact might occur. The careful documentation of the structure will be necessary prior to any alteration the structure. In addition, a permit for the alteration of the structure will be required, subject to terms stipulated in the NHRA.***



Figure 5-54: View of the Historical Period building remains at Site Exigo-LNS-HP02.

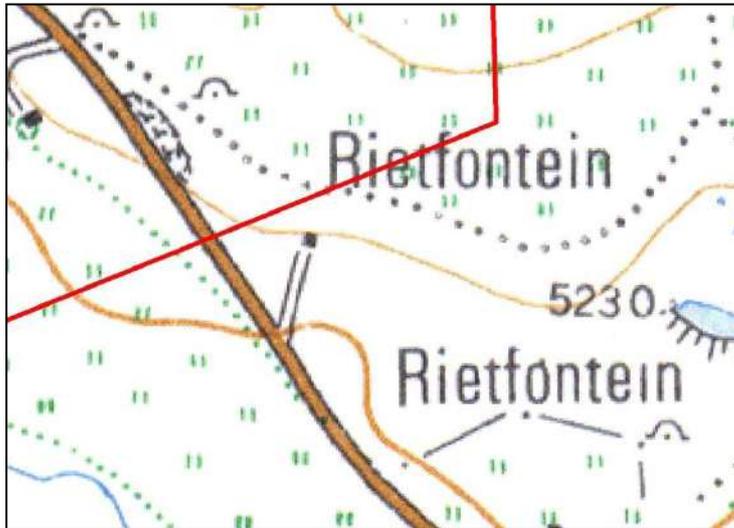


Figure 5-55: Topographic map dating to 1945 indicating the Rietfontein farmstead, the remains of which are located at Site Exigo-LNS-HP02.



Figure 5-56: A Google Earth render of the location of Site Exigo-LNS-HP02 in relation to the Nevis-Snowdon line (green line) within the buffer zone (yellow lines).

- **Site Exigo-LNS-HP03: Historical / Colonial Period Remains**

The poorly preserved foundation remains of a dwelling occur within the buffer area of the Nevis-Snowdon Line. Here, concrete and brick foundations as well as an asbestos water reservoir remain. Material culture such as objects made from glass, plastic, wood and metal were noted in association with the building remains. The site is visible on early aerial imagery dating to 1938 which suggest that the site was probably occupied during the first part of the 20th century. The site and structures are older than 60 years but it is poorly preserved even though protected under the National Heritage Resource Act (NHRA 1999). ***The site is situated within the buffer of the Nevis-Snowdon line and impact might occur. It would be advisable to monitor the site during construction in order to avoid the destruction of previously undetected heritage remains.***



Figure 5-57: View of the Historical Period foundation structures and building remains at Site Exigo-LNS-HP03.



Figure 5-58: Historical aerial photo dating to 1938 indicating the presence of the Historical Period building at Site Exigo-LNS-HP03 during the early 20th century.

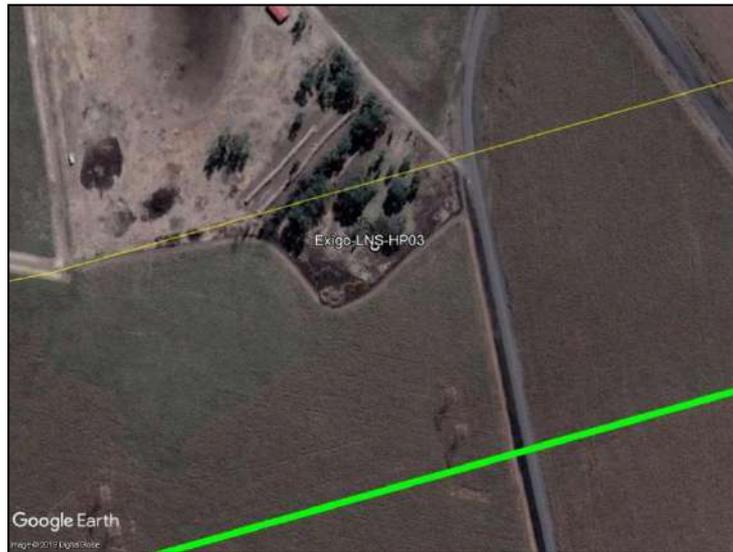


Figure 5-59: A Google Earth render of the location of Site Exigo-LNS-HP03 in relation to the Nevis-Snowdon line (green line) within the buffer zone (yellow lines).

- Exigo-LNS-HP04: Historical / Colonial Period Buildings

The ruined remains of a drive-in theatre occur north of the town of Nigel within the buffer area of the Nevis-Snowdon Line. Here, the foundations of a projector building, and a number of associated building foundation structures constructed out of concrete and brick were noted in an open field. In addition, concentric and semi-circular embankments constructed out of concrete and tar was observed around the structures and these features probably acted as motor vehicle parking bays. Material culture found in association with the structures includes plastic objects, ceramic piping, metal and glass. An analysis of historical maps suggests that the drive-in was established after 1965 and the site is not older than 60 years (which implies that it is not protected under the NHRA). Structural elements of the buildings are poorly preserved and the general site context for artefacts and material culture has been lost. The site therefore carries no heritage value and it is rated as of low heritage significance.



Figure 5-60: View of the remains of the Nigel Drive-In theatre.



Figure 5-61: Topographic map dating to 1976 indicating the situation of the Nigel Drive-In theatre.

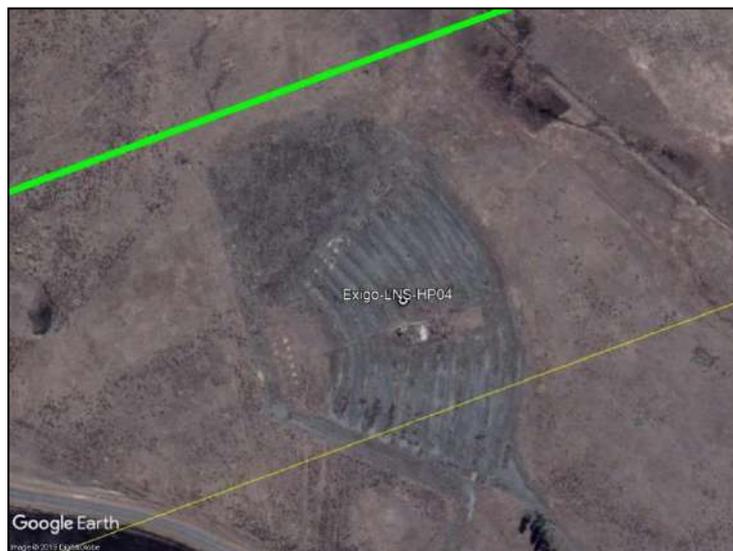


Figure 5-62: A Google Earth render of the location of Site Exigo-LNS-HP04 in relation to the Nevis-Snowdon line (green line) within the buffer zone (yellow lines).

- **Site Exigo-LNS-HP05: Historical / Colonial Period Buildings**

A compound consisting of a dwelling and a free-standing building dating to the Historical Period occurs on the farm Spaarwater 1711R within the buffer area of the Nevis-Snowdon Line. The buildings were constructed out of red face brick with pitched corrugated iron roofs, metal window frames and wooden doors. The buildings are relatively well preserved, and their general appearance resembles later Historical / Colonial Period architecture of the Highveld. An analysis of historical topographical maps and aerial photographs indicate the presence of the building by at least 1938 and the structures are older than 60 years - and generally protected under the National Heritage Resource Act (NHRA 1999). The structures might afford a better understanding of architectural, settlement and social developments in the greater Nigel landscape and the site is of medium heritage significance. ***The site is situated within the buffer of the Nevis-Snowdon line and impact might occur. The careful documentation of the structures will be necessary prior to any alteration the structure. In addition, a permit for the alteration of the structure will be required, subject to terms stipulated in the NHRA***



Figure 5-63: View of a Historical Period building at Site Exigo-LNS-HP05.



Figure 5-64: View of a Historical Period farmhouse at Site Exigo-LNS-HP05.



Figure 5-65: Historical aerial photo dating to 1938 indicating the presence of the Historical Period building at Site Exigo-LNS-HP05 during the early 20th century.



Figure 5-66: A Google Earth render of the location of Site Exigo-LNS-HP05 in relation to the Nevis-Snowdon line (green line) within the buffer zone (yellow lines).

5.4.3 Graves / Human Burial Sites

- Site Exigo-LNS-BP01: Burial Site

A community cemetery, associated with informal settlements in the Greater Nigel area occurs on the farm Spaarwater 1711R within the buffer of the proposed Nevis-Snowdon line alignment. The informal cemetery contains a large amount of burial sites, indicated by marble tombstones and rectangular stone cairns. The majority of the graves are clustered around Sisal Trees but a few burials occur within a clearing in an adjacent crop field. The cemetery, which is highly significant in terms of its heritage value, contains graves which seem to be older than 60 years and thus protected by the National Heritage Resource Act (NHRA 1999). ***The site is situated within the Nevis-Snowden power line buffer and impact could occur. The site should be avoided by means of a 100m conservation buffer or, alternatively legally compliant grave relocation should be executed if impact is inevitable.***



Figure 5-67: View of burials in an informal cemetery at Site Exigo-LNS-BP01.



Figure 5-68: Another view of burials in the informal cemetery at Site Exigo-LNS-BP01.



Figure 5-69: View of overgrown burials in a crop field as part of the informal cemetery at Site Exigo-LNS-BP01.



Figure 5-70: A Google Earth render of the location of Site Exigo-LNS-BP01 in relation to the Nevis-Snowdon line (green line) within the buffer zone (yellow lines). The red circle indicates the required 100m conservation buffer.

- **Site Exigo-LNS-BP02: Burial Site**

The Nigel Municipal Cemetery consists of a large number of burials, it is located along the western outskirts of Nigel and east of the proposed Nevis-Snowden line alignment. The graveyard is fenced off and access control is applied. The cemetery, which is highly significant in terms of its heritage and social value, contains graves which seem to be older than 60 years and thus protected by the National Heritage Resource Act (NHRA 1999). ***The site is situated approximately 1.5km east of the Nevis-Snowden power line buffer and impact is unlikely but cognizance should be taken of the presence of the site within the larger landscape.***



Figure 5-71: View of the Nigel Municipal cemetery at Site Exigo-LNS-BP02.



Figure 5-72: A Google Earth render of the location of the Nigel Municipal Cemetery at Site Exigo-LNS-BP02 in relation to the Nevis-Snowden line (green line) within the buffer zone (yellow lines).

- **Site Exigo-LNS-BP03: Burial Site**

A small family cemetery belonging to the Pistorius family occurs on the farm Spaarwater 1711R within the buffer of the proposed Nevis-Snowden line alignment. The cemetery, which is enclosed by stone walls within a stand of Pine Trees holds at least 10 burials, most of which are dressed with marble, concrete and stone structures (the latter presumably those of house workers close to the Pistorius family). Dates of internment range from 1890 – 1933 and the first owner of the farm Spaarwater, F.A Pistorius is interred here. The

cemetery is not maintained, most of the marble headstones have fallen over and it seems as though single graves were exposed and excavated at some stage. The cemetery, which is highly significant in terms of its heritage value, contains graves which are older than 60 years and thus protected by the National Heritage Resource Act (NHRA 1999). ***The site is situated within the Nevis-Snowden power line buffer and impact could occur. The site should be avoided by means of a 100m conservation buffer or, alternatively legally compliant grave relocation should be executed if impact is inevitable.***



Figure 5-73: The Historical Period cemetery under pine trees at Site Exigo-LNS-BP03.



Figure 5-74: View of the grave of FA Pistorius at Site Exigo-LNS-BP03.



Figure 5-75: Collapsed and damaged grave dressings and headstones at Site Exigo-LNS-BP03.



Figure 5-76: View of unmarked burials at Site Exigo-LNS-BP03.



Figure 5-77: A Google Earth render of the location of Site Exigo-LNS-BP03 in relation to the Nevis-Snowdon line (green line) within the buffer zone (yellow lines). The red circle indicates the required 100m conservation buffer.

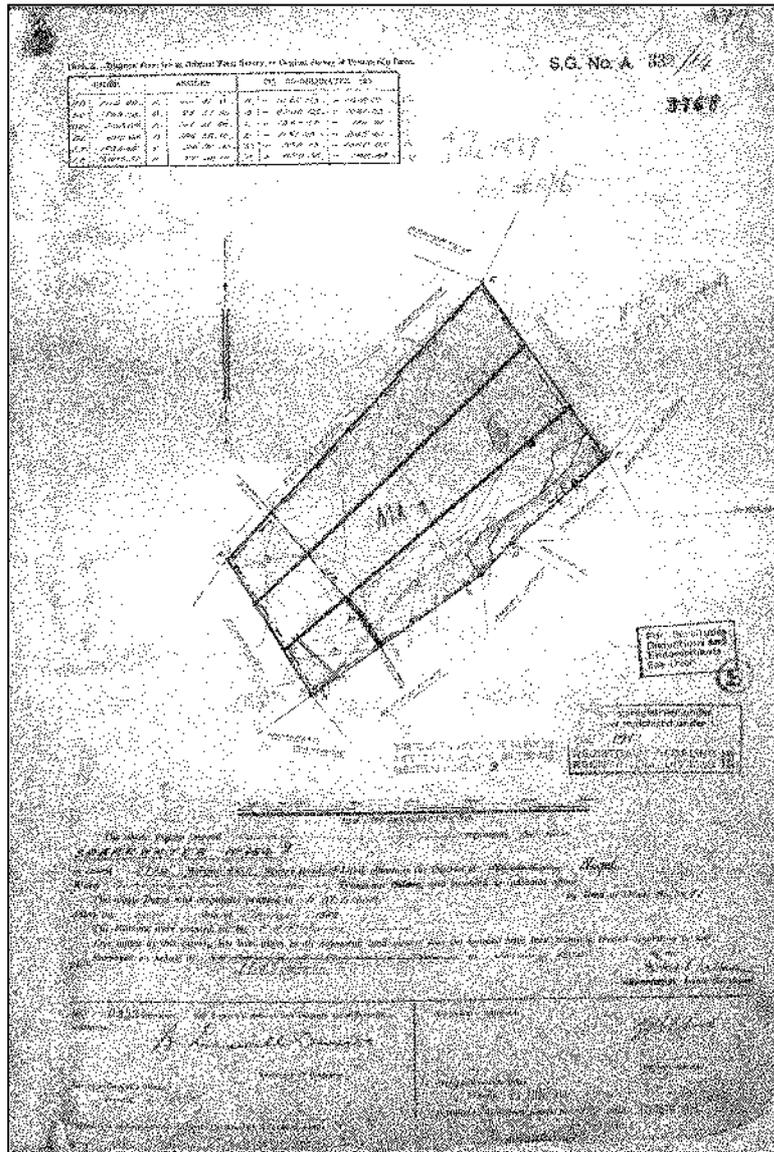


Figure 5-78: Title dee of the farm Spaarwater indicating F.A Pistorius as owner at the time of signing in 1914.

5.5 The Kendal – Hera Power Line alignment

A number of occurrences of heritage potential were identified in this line alignment and these were coded “Exigo-LKH” (Exigo Lesokwana Kendal Hera).

5.5.1 The Stone Age

- Exigo-LKH-SA01: Stone Age Locality

A number of Middle Stone Age tools were found scattered across the project landscape but specifically around the Blesbokspruit on the farm Maraisdrift 190IR within the buffer of the proposed Kendal-Hera line alignment. Artefacts observed include both residue and debris, and formal MSA tools such as scrapers, points, blades, prepared cores and residue flakes. The artefacts were manufactured from banded ironstone and fine-grained dolerite and other Cryptocrystalline Silica (CCS) material. These lithics were found in areas previously cultivated and their primary context has in all probability been lost compromising their scientific value. The occurrences are not unique to this area and they seem to occur in low frequencies on exposed surfaces.



Figure 5-79: A selection of MSA tools from the banks of the Blesbokspruit at Exigo-LKH-SA01.

5.5.2 The Iron Age Farmer Period

- Site Exigo-LKH-IA01: Iron Age Farmer Period Site
- Site Exigo-LKH-IA02: Iron Age Farmer Period Site
- Site Exigo-LKH-IA03: Iron Age Farmer Period Site
- Site Exigo-LKH-IA04: Iron Age Farmer Period Site

A number of densely overgrown clusters of large later Iron Age Farmer Period stone walled sites, consisting out of collapsed stone walling arranged in large scalloping circular enclosures are situated around the western and norther sections of the Suikerbosrand Nature Reserve in the buffer area of the Kendal-Hera line alignment. The cluster of stone walls extends for about 4km north along the western border with numerous smaller overgrown enclosures occurring around the nuclear sites. The structures display irregular stone building with entrances which are demarcated by monoliths in places. No material culture was found in association with the walling and it is therefore not possible to ascertain an absolute temporality for the structures. However, considering similar sites in the surrounding landscape and current research on the vast settlements of Sotho-Tswana groups in this area, the site probably dates to the late 18th early 19th century as part of the large Suikerbosrand Iron Age capitals. The sites are of scientific value in terms of their regional representation in the Iron Age farmer period landscape of the area and it is rated as of high significance. ***The sites are situated within close proximity of the Kendal-Hera line and impact might occur. However, cognizant of the fact that the Iron Age stone walled sites of Suikerbosrand is currently the subject of significant and ongoing research projects, it is recommended that impact to these sites be avoided at all cost by the implementation of conservation buffers in all instances. It would be advisable to monitor all sites during construction in order to avoid the destruction of previously undetected heritage remains.***



Figure 5-80: View of densely overgrown Iron Age Farmer Period stone wall enclosures at Site Exigo-LKH-IA01.



Figure 5-81: View of overgrown Iron Age Farmer Period stone wall enclosures at Site Exigo-LKH-IA02.



Figure 5-82: Sections of overgrown Iron Age Farmer Period stone walling at Site Exigo-LKH-IA03.



Figure 5-83: Sections of collapsed Iron Age Farmer Period stone walling at Site Exigo-LKH-IA04.



Figure 5-84: A Google Earth render of the location of Iron Age stone walled sites (blue outlines) along the western and northern borders of the Suikerbosrand Nature Reserve, in relation to the Kendal-Hera line (red line) within the buffer zone (yellow lines).

- **Site Exigo-LKH-IA05: Iron Age Farmer Period Site**

Another smaller later Iron Age Farmer Period stone walled site occurs on the farm Spaarwater 171 within the buffer of the proposed Kendal-Hera line alignment. At the site, a cluster of stone walls display clear inner and outer enclosures and scalloping periphery walls. The stone walling and enclosures display irregular stone building with rough stones and a number of defined entrances. No material culture was found in association with the walling and it is therefore not possible to ascertain an absolute temporality for the structures. However, considering similar sites in the Suikerbosrand landscape and the settlement history of Sotho-Tswana groups, the site probably dates to the late 18th early 19th century and might be regarded as part of the Suikerbosrand Iron Age landscape. As such, the site is of scientific value in terms of its regional representation in the Iron Age farmer period landscape of the area and it is rated as of medium significance. ***The site is situated within the buffer of the Kendal-Hera line and impact might occur. The careful documentation of the structure by means of a Phase 2 Assessment will be necessary prior to any alteration of the site. In addition, a permit for the alteration of the excavation or alteration of the site will be required, subject to terms stipulated in the NHRA.***



Figure 5-85: Sections of Iron Age Farmer Period stone walling at Site Exigo-LKH-IA05.



Figure 5-86: Iron Age Farmer Period stone wall enclosures at Site Exigo-LKH-IA05.



Figure 5-87: A Google Earth render of the location of Site Exigo-LKH-IA05 in relation to the Kendal-Hera line (light blue line) within the buffer zone (yellow lines). The red polygon indicates the required 20m conservation buffer.

- **Site Exigo-LKH-IA06: Iron Age Farmer Period Site**

A smaller later Iron Age Farmer Period stone walled site occurs on the farm Maraisdrift 190IR within the buffer of the proposed Kendal-Hera line alignment. At the site a single stone enclosure is constructed out of irregular stone walling constructed with rough stones. No material culture was found in association with the walling and the structure is poorly preserved. It might be assumed that the site probably dates to the late 18th early 19th century and might be regarded as an outlying settlement of the Suikerbosrand Iron Age landscape. As such, the site might be of scientific value in terms of its regional representation in the Iron Age farmer period landscape of the area and it is rated as of medium significance. ***The site is situated within the buffer of the Kendal-Hera line and impact might occur. The careful documentation of the structure by means of a Phase 2 Assessment will be necessary prior to any alteration the site. In addition, a permit for the alteration of the excavation or alteration of the site will be required, subject to terms stipulated in the NHRA.***



Figure 5-88: A small presumably Iron Age Farmer Period stone wall enclosures at Site Exigo-LKH-IA06.



Figure 5-89: A Google Earth render of the location of Site Exigo-LKH-IA06 (blue outline) in relation to the Kendal-Hera line (light blue line) within the buffer zone (yellow lines).

- **Site Exigo-LKH-IA07: Iron Age Farmer Period Site**

Another smaller later Iron Age Farmer Period stone walled site occurs on the farm Maraisdrift 190IR within the buffer of the proposed Kendal-Hera line alignment. Here, a cluster of stone walls display smaller enclosures and freestanding walls. The stone walling and enclosures display irregular stone building with rough stones and a number of defined entrances. No material culture was found in association with the walling, and it is therefore not possible to ascertain an absolute temporality for the structures. However, considering similar sites in the Suikerbosrand landscape and the settlement history of Sotho-Tswana groups, the site probably dates to the late 18th early 19th century and might be regarded as an outlying settlement which forms part of the larger Suikerbosrand Iron Age landscape. As such, the site is of scientific value in terms of its regional representation in the Iron Age farmer period landscape of the area and it is rated as of medium significance. ***The site is situated within the buffer of the Kendal-Hera line and impact might occur. The careful documentation of the structure by means of a Phase 2 Assessment will be necessary prior to any alteration the site. In addition, a permit for the alteration of the excavation or alteration of the site will be required, subject to terms stipulated in the NHRA.***



Figure 5-90: Iron Age Farmer Period stone walling at Site Exigo-LKH-IA07.



Figure 5-91: Sections of Iron Age Farmer Period stone walling at Site Exigo-LKH-IA07.



Figure 5-92: View of an Iron Age Farmer Period stone wall enclosure at Site Exigo-LKH-IA07.



Figure 5-93: A Google Earth render of the location of Site Exigo-LKH-IA07 in relation to the Kendal-Hera line (light blue line) within the buffer zone (yellow lines). The red polygon indicates the required 20m conservation buffer.

5.5.3 Colonial / Historical Period Sites

- **Site Exigo-LKH-HP01: Historical / Colonial Period Building**
- **Site Exigo-LKH-HP02: Historical / Colonial Period Structure**

The poorly preserved foundation remains of a Historical Period dwelling occur on the farm Klippoort 1871R in the buffer area of the Kendal-Hera line. Here, the foundation structure of a stone building and a partially collapsed stone wall were noted around a pocket of Eucalyptus trees. In addition, the structural remains of another Klippoort farmstead occur approximately 400m east of this site. At this Historical Period farmstead, the walls of a number of multi-room stone, brick and concrete buildings, a rondavel as well as structures associated with livestock farming remain. Material culture such as objects made from glass, plastic, wood and metal were noted in association with the building remains. The sites are visible on early aerial photographs dating to 1938 which suggest that the farm was probably occupied during the first part of the 20th century. The site and structures are older than 60 years and generally protected under the National Heritage Resource Act (NHRA 1999). Notwithstanding the preservation condition of the structures, the site might afford a better understanding of architectural and industrial developments in the larger Nigel area and it is of medium heritage significance. *The site is situated within the buffer of the Kendal-Hera line and*

impact might occur. The careful documentation of the structure will be necessary prior to any alteration the structure. In addition, a permit for the alteration of the structure will be required, subject to terms stipulated in the NHRA.



Figure 5-94: View of the Historical Period foundation structures and building remains at Site Exigo-LKH-HP01.



Figure 5-95: A section of stone walling at Site Exigo-LKH-HP01.



Figure 5-96: View of the Historical Period building remains at Site Exigo-LKH-HP02.



Figure 5-97: Another view of Historical Period building remains at Site Exigo-LKH-HP02.



Figure 5-98: Historical aerial photo dating to 1938 indicating the presence of the Historical Period building at Site Exigo-LKH-HP01 and Site Exigo-LKH-HP02 during the early 20th century.

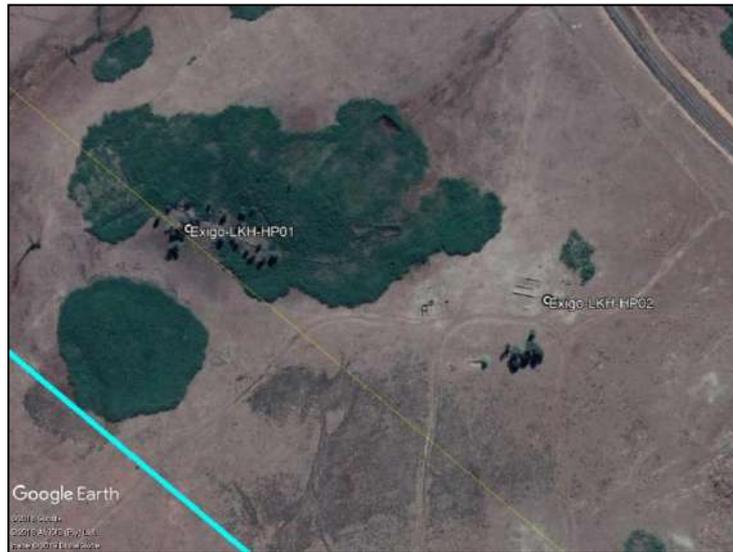


Figure 5-99: A Google Earth render of the location of Site Exigo-LKH-HP01 and Site Exigo-LKH-HP02 in relation to the Kendal-Hera line (light blue line) within the buffer zone (yellow lines).

- **Site Exigo-LKH-HP03: Historical / Colonial Period Remains**

An old railway line traverses a large drainage line over a Historical Period two-arch concrete bridge on the farm Klippoort 1871R. The bridge was constructed out of concrete and embankments were enforced with soil to carry the railway tracks over the drainage. An analysis of historical aerial photographs and topographic maps suggest that the structure was built before 1938 and the structure is thus older than 60 years. The feature is therefore generally protected under the National Heritage Resource Act (NHRA 1999). ***The site is situated approximately 1km north of the Kendal-Hera power line buffer and impact is unlikely but cognizance should be taken of the presence of the site within the larger landscape.***



Figure 5-100: View of the Historical Period railway bridge at Site Exigo-LKH-HP03



Figure 5-101: Historical aerial photo dating to 1938 (left) indicating the presence of the Historical Period railway line and bridge at Site Exigo-LKH-HP03 during the early 20th century.

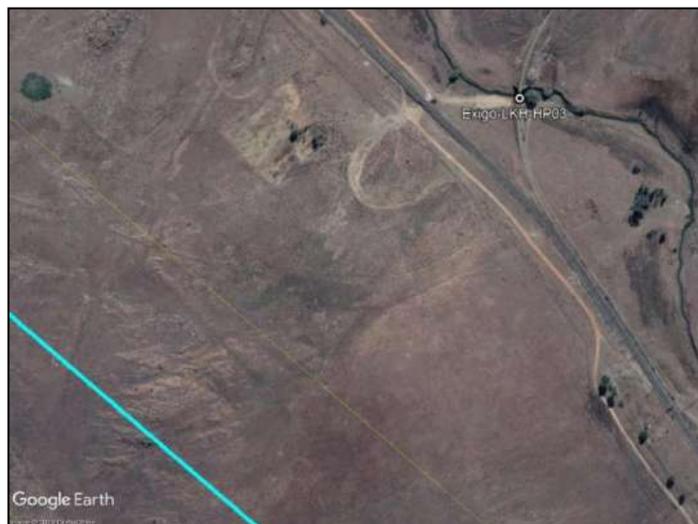


Figure 5-102: A Google Earth render of the location of Site Exigo-LKH-HP03 in relation to the Kendal-Hera line (light blue line) within the buffer zone (yellow lines).

- **Site Exigo-LKH-HP04: Historical / Colonial Period Buildings**

A number of Historical Period buildings and dwellings occur at the site of the Kaydale Railway Station on the farm Klippoort 187IR. Here, multi-room brick and concrete buildings occur in a pocket of Eucalyptus Trees along the existing Transnet Railway Line. Some of the buildings are currently in use but most of the structures are visible on early aerial photographs dating to 1938 which suggest that these buildings were probably constructed during the first part of the 20th century. The site and structures are older than 60 years and generally protected under the National Heritage Resource Act (NHRA 1999). ***The site is situated approximately 100m north of the Kendal-Hera power line buffer and impact is unlikely but cognizance should be taken of the presence of the site within the larger landscape.***



Figure 5-103: View of the Historical Period building remains at the former Kaydale station at Site Exigo-LKH-HP04.



Figure 5-104: View of the Historical Period buildings at the former Kaydale station at Site Exigo-LKH-HP04.



Figure 5-105: Historical aerial photo dating to 1938 of the Kaydale Station during the early 20th century.

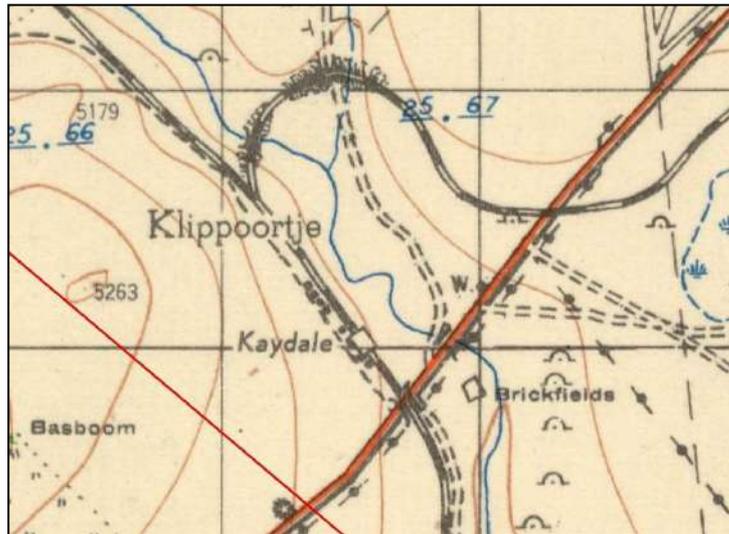


Figure 5-106: Topographic map dating to 1944 indicating the Kaydale station and the old railway line on the farm Klippoortje.

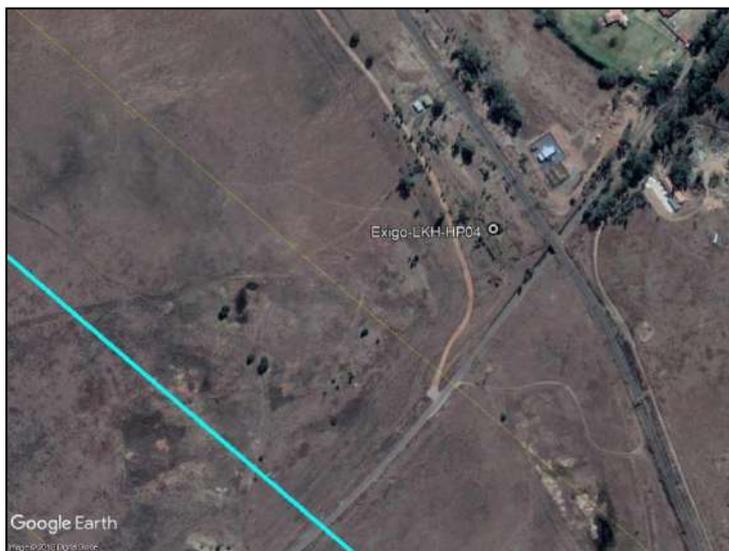


Figure 5-107: A Google Earth render of the location of Site Exigo-LKH-HP04 in relation to the Kendal-Hera line (light blue line) within the buffer zone (yellow lines).

- Site Exigo-LKH-HP05: Historical / Colonial Period Buildings

The current Rietpoort farmstead occurs on the farm Rietpoort 193IR in the buffer area of the Kendal-Hera Line. A number of well-preserved Historical Period houses and building constructed out of stone, plastered brick and concrete occur at the farmstead which is currently occupied. The site is visible on early aerial photographs dating to 1938 which suggest that the site was probably occupied during the first part of the 20th century. The site and structures are older than 60 years and generally protected under the National Heritage Resource Act (NHRA 1999). The site might afford a better understanding of architectural and industrial developments in the larger Nigel area and it is of medium heritage significance. ***The site is situated within the buffer of the Kendal-Hera line and impact might occur. The careful documentation of the structure will be necessary prior to any alteration the structure. In addition, a permit for the alteration of the structure will be required, subject to terms stipulated in the NHRA***



Figure 5-108: The Historical Period farmstead buildings and houses noted at Site Exigo-LKH-HP05
 Period building at Site Exigo-LKH-HP05 during the early 20th century.



Figure 5-109: Historical aerial photo dating to 1938 indicating the presence of at Site Exigo-LKH-HP05 during the early 20th century.

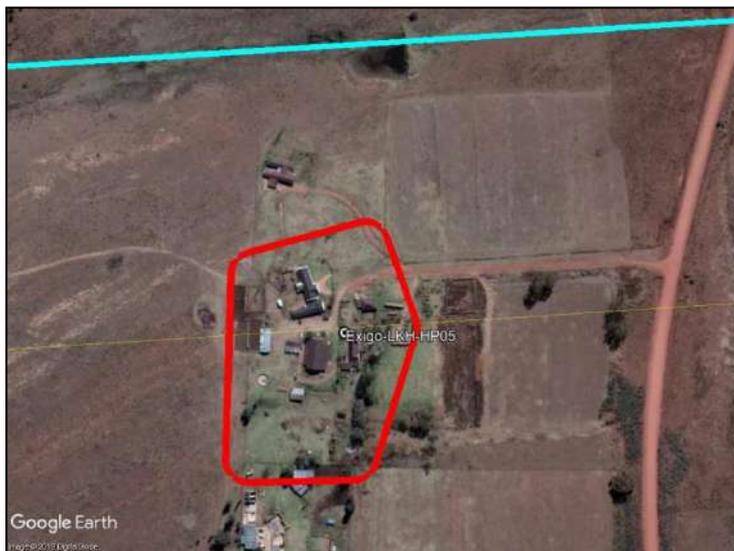


Figure 5-110: A Google Earth render of the location of Site Exigo-LKH-HP05 in relation to the Kendal-Hera line (light blue line) within the buffer zone (yellow lines). The red circle indicates the required 20m conservation buffer.

5.5.4 Graves / Human Burial Sites

- Site Exigo-LKH-BP01: Burial Site

The Heritage Officer of the Suikerbosrand Nature Reserve indicated the presence of an informal cemetery along the northern border of the Suikerbosrand Nature Reserve in a pocket of Black Wattle trees. The site could not be located during the site assessment as the Wattles have been removed but the tree pocket is visible on Google Earth aerial photography. The presumed cemetery is highly significant in terms of its heritage and social value and it is protected by the National Heritage Resource Act (NHRA 1999). ***The site is situated approximately 3km south of the Kendal-Hera power line buffer and impact is unlikely but cognizance should be taken of the presence of the site within the larger landscape.***



Figure 5-111: A Google Earth render of the presumed location of Site Exigo-LKH-BP01 south of the Kendal-Hera line (light blue line) and the buffer zone (yellow lines). The red circle indicates the required 100m conservation buffer.

- Site Exigo-LKH-BP02: Burial Site

A small informal cemetery occurs along a crop field on the farm Eendracht 1851R in close proximity of the Kendal-Hera line buffer. The cemetery is densely overgrown and two burials could be identified indicated by rectangular stone cairns. The cemetery, which is highly significant in terms of its heritage value, contains graves which might to be older than 60 years and thus protected by the National Heritage Resource Act (NHRA 1999). ***The site is situated approximately 3km south of the Kendal-Hera power line buffer and impact is unlikely but cognizance should be taken of the presence of the site within the larger landscape.***



Figure 5-112: View of the approximate locations of densely overgrown burials in an informal cemetery at Site Exigo-LKH-BP02.



Figure 5-113: A Google Earth render of the location of Site Exigo-LKH-BP02 in relation to the Kendal-Hera line (light blue line) near the buffer zone (yellow lines). The red circle indicates the required 100m conservation buffer.

- **Site Exigo-LKH-BP03: Burial Site**

Another informal cemetery occurs in a crop field on the farm Eendracht 185IR in close proximity of the Kendal-Hera line. The cemetery is densely overgrown and three burials could be identified indicated by rectangular stone cairns. The cemetery, which is highly significant in terms of its heritage value, contains graves which might to be older than 60 years and thus protected by the National Heritage Resource Act (NHRA 1999). ***The site is situated in close proximity of the Kendal-Hera power line alignment and impact could occur. The site should be avoided by means of a 100m conservation buffer or, alternatively legally compliant grave relocation should be executed if impact is inevitable.***



Figure 5-114: View of the approximate locations of densely overgrown burials at Site Exigo-LKH-BP03.



Figure 5-115: A Google Earth render of the location of Site Exigo-LKH-BP03 in relation to the Kendal-Hera line (light blue line) within the buffer zone (yellow lines). The red circle indicates the required 100m conservation buffer.

- **Site Exigo-LKH-BP04: Burial Site**

An informal cemetery occurs in a crop field on the farm Eendracht 185IR in close proximity of the Kendal-Hera line. The cemetery is densely overgrown and two burials could be identified indicated by rectangular stone cairns. The cemetery, which is highly significant in terms of its heritage value, contains graves which might to be older than 60 years and thus protected by the National Heritage Resource Act (NHRA 1999). ***The site is situated in close proximity of the Kendal-Hera power line alignment and impact could occur. The site should be avoided by means of a 100m conservation buffer or, alternatively legally compliant grave relocation should be executed if impact is inevitable***



Figure 5-116: View of the approximate locations of densely overgrown burials at Site Exigo-LKH-BP04.



Figure 5-117: A Google Earth render of the location of Site Exigo-LKH-BP04 in relation to the Kendal-Hera line (light blue line) within the buffer zone (yellow lines). The red circle indicates the required 100m conservation buffer.

- **Site Exigo-LKH-BP05: Burial Site**

An informal cemetery occurs along a crop field on the farm Eendracht 185IR in close proximity of the Kendal-Hera line buffer. The cemetery is densely overgrown but a large number of burials could be identified. These burials are marked by concrete headstones or rectangular stone cairns and a stone wall encloses the graveyard to the east. The cemetery, which is highly significant in terms of its heritage value, contains graves which might to be older than 60 years and thus protected by the National Heritage Resource Act (NHRA 1999). *The site is situated approximately 50m south of the Kendal-Hera power line buffer and impact is unlikely but cognizance should be taken of the presence of the site within the larger landscape. It would be advisable to monitor the site for any impact emanating from the development.*



Figure 5-118: View of burials in an informal cemetery at Site Exigo-LKH-BP05.



Figure 5-119: View of a gravestone in the informal cemetery at Site Exigo-LKH-BP05.



Figure 5-120: A stone wall flanking the east of the cemetery at Site Exigo-LKH-BP05.



Figure 5-121: A Google Earth render of the location of Site Exigo-LKH-BP05 in relation to the Kendal-Hera line (light blue line) directly south of the buffer zone (yellow lines). The red circle indicates the required 100m conservation buffer.

- **Site Exigo-LKH-BP06: Burial Site**

A burial site is indicated on historical topographic maps of the farm Klippoortjie 1871R within a pocket of Poplar trees and in association with Historical Period farmstead remains at site Exigo-LKH-HP01. These burials could not be located during the site assessment but the presumed cemetery is highly significant in terms of its heritage and social value and it is protected by the National Heritage Resource Act (NHRA 1999). ***The site is situated in close proximity of the Kendal-Hera power line alignment and impact could occur. The site should be avoided by means of a 100m conservation buffer or, alternatively legally compliant grave relocation should be executed if impact is inevitable.***



Figure 5-122: View of a pocket of Poplar Trees indicating the approximate location of presumed burials at Site Exigo-LKH-BP06.

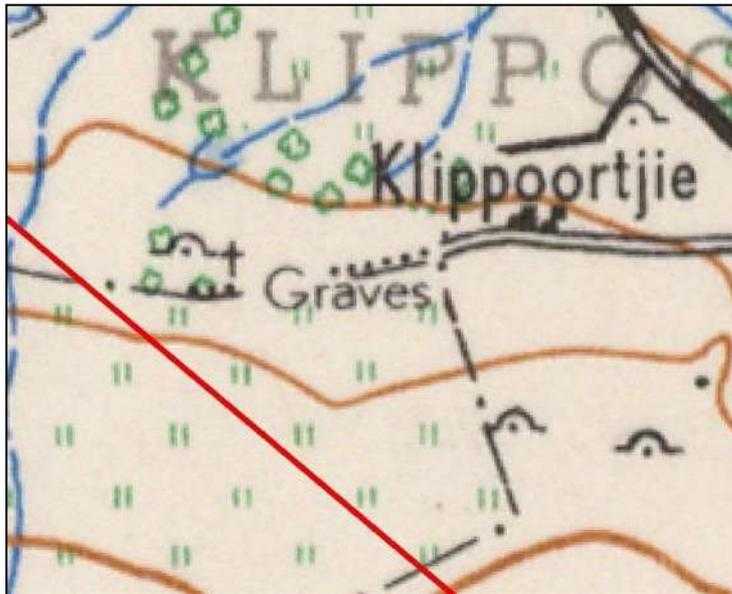


Figure 5-123: Topographic map dating to 1944 indicating the presence of burials on the farm Klippoortjie at Site Exigo-LKH-BP06.



Figure 5-124: A Google Earth render of the presumed location of Site Exigo-LKH-BP06 in relation to the Kendal-Hera line (light blue line) within the buffer zone (yellow lines). The red circle indicates the required 100m conservation buffer.

- **Site Exigo-LKH-BP07: Burial Site**

A large informal cemetery occurs on the farm Maraisdrift 190IR in close proximity of the proposed Kendal-Hera line alignment. The informal cemetery contains a large amount of burial sites, indicated by concrete tombstones and rectangular stone cairns. The cemetery, which is highly significant in terms of its heritage value, contains graves which seem to be older than 60 years and thus protected by the National Heritage Resource Act (NHRA 1999). ***The site is situated in close proximity of the Kendal-Hera power line alignment and impact could occur. The site should be avoided by means of a 100m conservation buffer or, alternatively legally compliant grave relocation should be executed if impact is inevitable.***



Figure 5-125: View of burials in an informal cemetery at Site Exigo-LKH-BP07.



Figure 5-126: View of burials in an informal cemetery at Site Exigo-LKH-BP07.

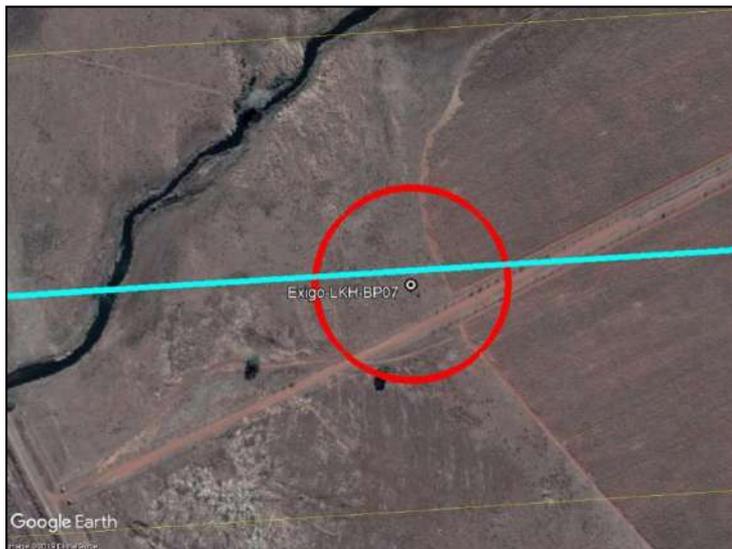


Figure 5-127: A Google Earth render of the location of Site Exigo-LKH-BP07 in relation to the Kendal-Hera line (light blue line) within the buffer zone (yellow lines). The red circle indicates the required 100m conservation buffer.

- **Site Exigo-LKH-BP08: Burial Site**

A family cemetery belonging to the Jacobs family occurs on a small ridge next to the regional road on the farm Rietpoort 193IR. The cemetery holds in excess of 20 burials, most all of which are dressed with marble, concrete and slab stone tombstones. A few burials, presumably those of house workers close to the Jacobs family, are indicated by rectangular stone cairns. Dates of internment range from 1891 to 2001 and the cemetery is not maintained. The cemetery, which is highly significant in terms of its heritage value, contains graves which seem to be older than 60 years and thus protected by the National Heritage Resource Act (NHRA 1999). ***The site is situated approximately 100m north of the Kendal-Hera power line buffer and impact is unlikely but cognizance should be taken of the presence of the site within the larger landscape. It would be advisable to monitor the site for any impact emanating from the development.***



Figure 5-128: View of a Historical Period cemetery of the Jacobs family at Site Exigo-LKH-BP08.

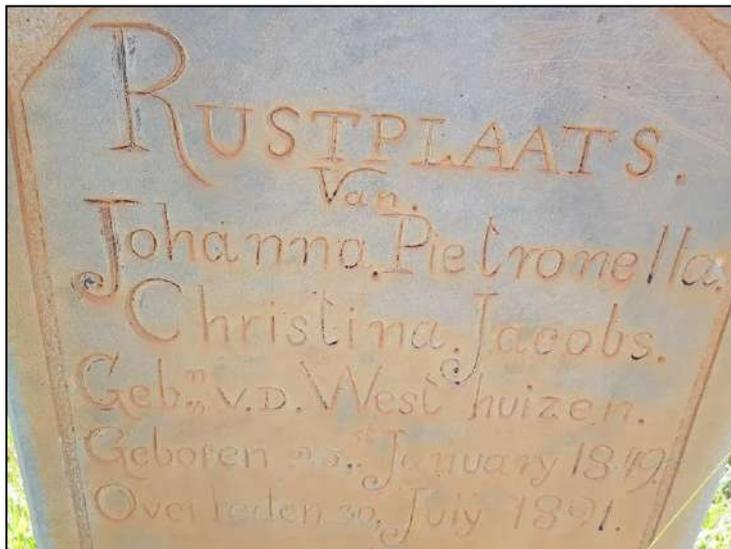


Figure 5-129: A grave of a member of the Jacobs family dating to 1891 at Site Exigo-LKH-BP08.



Figure 5-130: An unmarked grave visible at Site Exigo-LKH-BP08.



Figure 5-131: A Google Earth render of the location of Site Exigo-LKH-BP08 north of the Kendal-Hera line (light blue line) and the buffer zone (yellow lines). The red circle indicates the required 100m conservation buffer.

- **Site Exigo-LKH-BP09: Burial Site**

A large informal cemetery occurs on the farm Nooitgedacht 286IR in close proximity of the proposed Kendal-Hera line alignment. The informal cemetery contains a large amount of burial sites, indicated by marble tombstones and rectangular stone cairns. The cemetery, which is highly significant in terms of its heritage value, contains graves which seem to be older than 60 years and thus protected by the National Heritage Resource Act (NHRA 1999). ***The site is situated in close proximity of the Brenner-Snowden power line alignment and impact could occur. The site should be avoided by means of a 100m conservation buffer or, alternatively legally compliant grave relocation should be executed if impact is inevitable***



Figure 5-132: View of burials in an informal cemetery at Site Exigo-LKH-BP09.



Figure 5-133: View of burials in an informal cemetery at Site Exigo-LKH-BP09.



Figure 5-134: A Google Earth render of the location of Site Exigo-LKH-BP09 in relation to the Kendal-Hera line (light blue line) within the buffer zone (yellow lines). The red circle indicates the required 100m conservation buffer.

- **Site Exigo-LKH-BP10: Burial Site**

A burial site is indicated on historical topographic maps of the farm Nooitgedacht 286IR in close proximity of the Kendal-Hera line. The burial site could not be located during the site assessment and it is not clear if the grave remains in existence, the site is nonetheless of heritage and social value and it is protected by the National Heritage Resource Act (NHRA 1999). ***The site is situated in close proximity of the Kendal-Hera power line alignment and impact could occur. The site should be avoided by means of a 100m conservation buffer or, alternatively legally compliant grave relocation should be executed if impact is inevitable.***



Figure 5-135: Topographic map dating to 1945 indicating the existence of a grave on the farm Nooitgedacht at Exigo-LKH-BP10.



Figure 5-132: A Google Earth render of the presumed location of Site Exigo-LKH-BP10 in relation to the Kendal-Hera line (light blue line) within the buffer zone (yellow lines). The red circle indicates the required 100m conservation buffer.

5.6 The Lesokwana MTS Line Strengthening

A number of occurrences of heritage potential were identified in the project area and these were coded "Exigo-MTS".

5.6.1 Colonial / Historical Period Sites

- Site Exigo- MTS-HP01: Historical / Colonial Period Building

The remains of a farmstead and outbuildings were noted on the farm Zonnestraal north of proposed loop in/out lines to the Lesokwana alternative 4 site. Here, a large square building - presumably the farmhouse constructed out of a stone and cement, as well as a number of stone foundation remains – probably laborers quarters, occur along vast agricultural fields. The features are not visible on early aerial photographs (1938) but topographic maps suggest that the farmstead was probably in during the second part of the 20th century. As the larger compound is in a ruined state of preservation any potential heritage value attached to the site has probably been lost. ***The site is situated approximately 100m to the north of loop in loop out lines and impact could be anticipated. It would be advisable to monitor the site during construction in order to avoid the destruction of previously undetected heritage remains.***



Figure 5-136: The Historical Period farmstead building remains noted at Site Exigo-MTS-HP01.



Figure 5-137: Topographic map dating to 1945 indicating the Zonnestraal farmstead, the remains of which are located at Site Exigo-MTS-HP01.

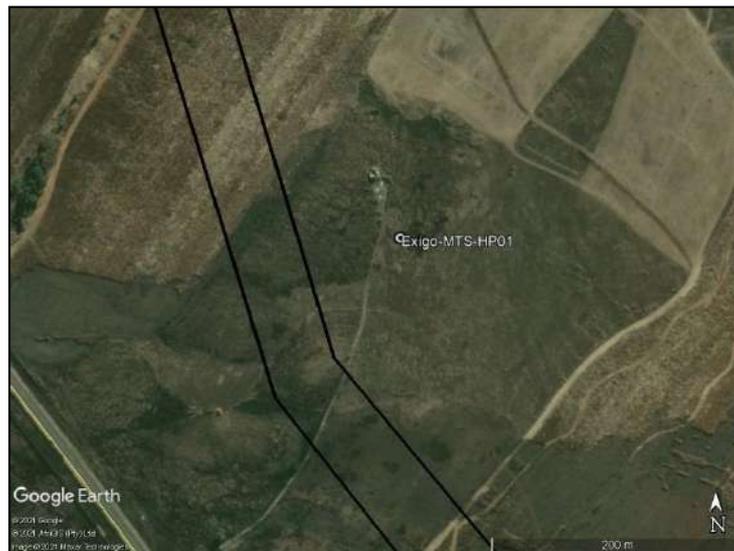


Figure 5-138: A Google Earth render of the location of Site Exigo-MTS-HP01 in relation to the proposed Lilo Power Lines corridor (black line) within the buffer zone.

- **Site Exigo- MTS -HP02: Historical / Colonial Period Structure**

A compound of small thatched square houses dating to the Historical Period occurs on the farm Withok 2km west of the proposed Lilo Power Lines corridor. The multi room buildings are constructed out of plastered up brick with gables and thatched roofs. The buildings are well preserved and their general appearance resembles early 20th century farmhouse architecture of the area. An analysis of aerial photographs indicate the presence of the buildings by at least 1938 and the structure is older than 60 years - and generally protected under the National Heritage Resource Act (NHRA 1999). The structures might afford a better understanding of architectural, settlement and social developments in the Nigel landscape and the site is of medium heritage significance. ***The site is approximately 400m west of the proposed Lilo Power Lines corridor within its buffer, and is therefore unlikely to be impacted, however a permit for the alteration or destruction of the building is required subject to the NHRA should the site be impacted on in any way by the proposed project activities***



Figure 5-139: View of the Historical Period building compound at Site Exigo-MTS-HP02.



Figure 5-140: A Google Earth render of the location of Site Exigo-MTS-HP02 in relation to the proposed Lilo Power Lines corridor (black line).



Figure 5-141: Topographic map dating to 1945 indicating the Withok farmstead, the remains of which are located at Site Exigo-MTS-HP02.

5.6.2 Graves / Human Burial Sites

- Site Exigo- MTS-BP01: Burial Site

A Historical Period cemetery occurs on the farm Witpoort 800m northwest of proposed Lilo Power Lines corridor. The cemetery contains many burials sites, some of which date to the late 19th century. Some headstones have been vandalized and the state of preservation of the site is poor. The cemetery, which is highly significant in terms of its heritage value, contains graves which are older than 60 years and thus protected by the National Heritage Resource Act (NHRA 1999). ***The site is situated approximately 800m to the northwest of proposed Lilo Power Lines corridor and impact seems unlikely but the site should be avoided by means of a 100m conservation buffer or, alternatively legally compliant gravel reaction should be executed if impact is inevitable.***



Figure 5-142: View of burials in an informal cemetery at Site Exigo-MTS-BP01.



Figure 5-143: View of vandalized and poorly preserved graves at Site Exigo-MTS-BP01.



Figure 5-144: A Google Earth render of the location of Site Exigo-MTS-BP01 in relation to the proposed Lilo Power Lines corridor (black line). The red circle indicates the required 100m conservation buffer.

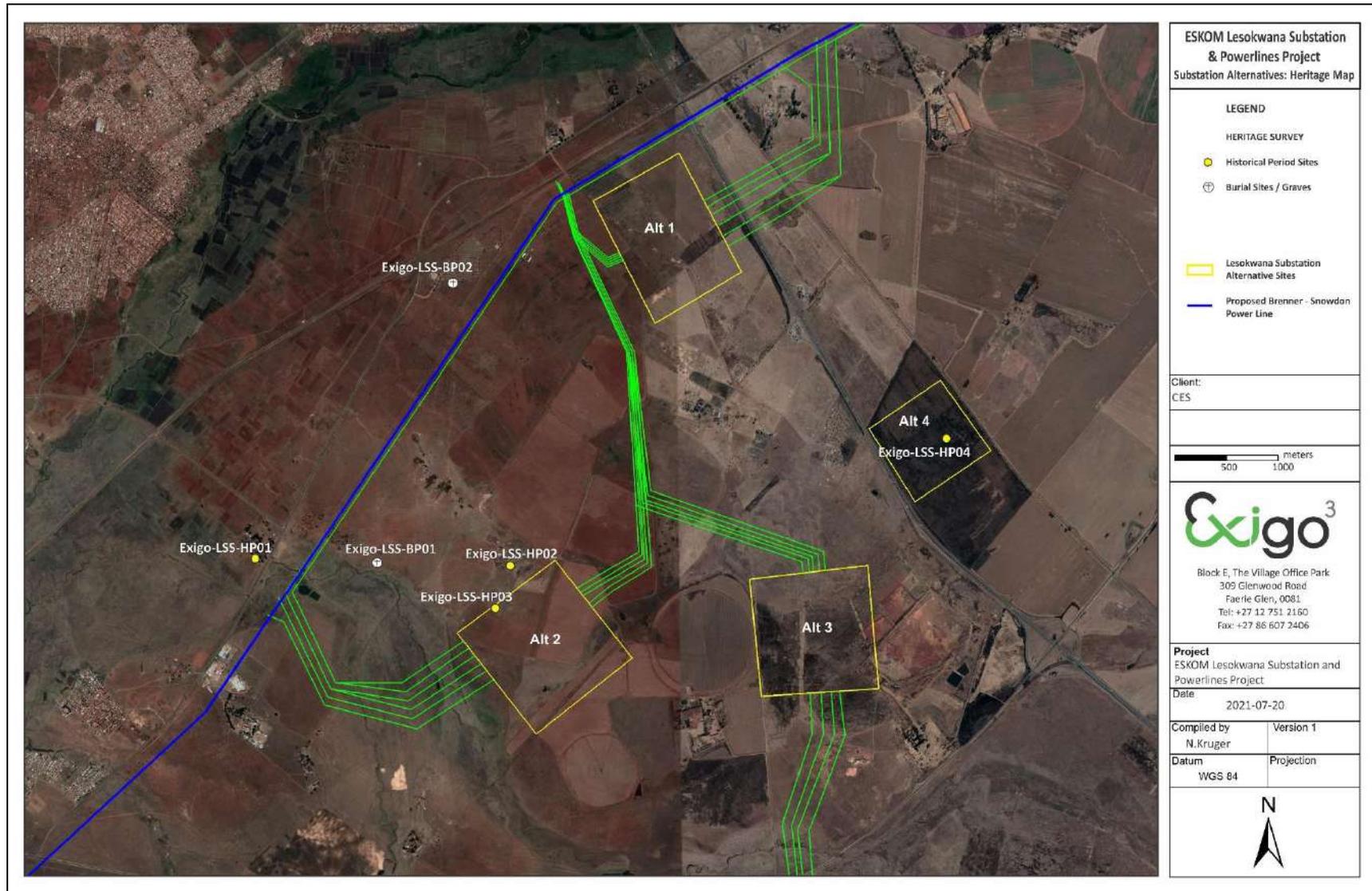


Figure 5-145: Aerial map indicating the locations of occurrences of heritage potential in the substation alternative sites areas, discussed in the text.

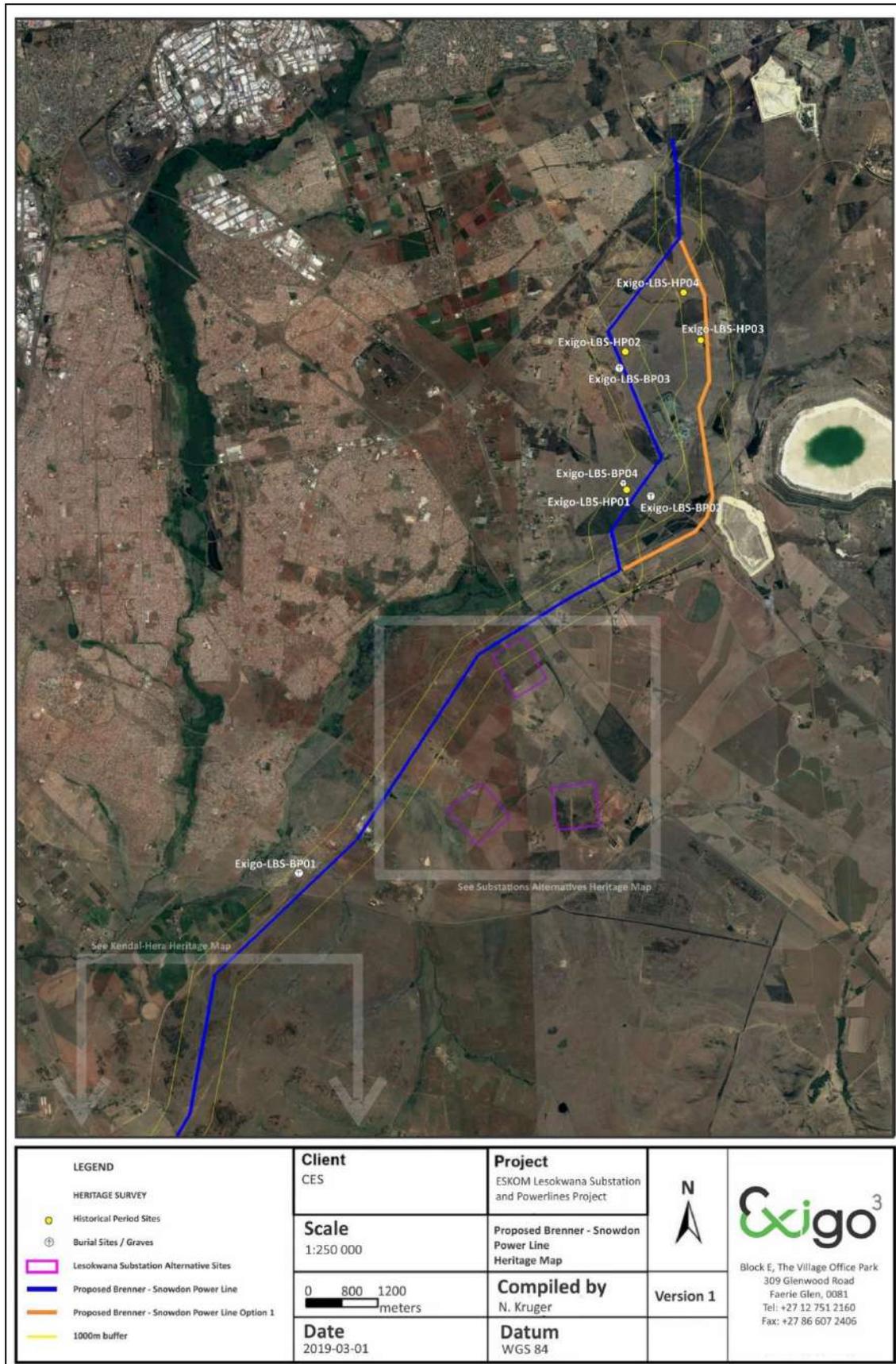


Figure 5-146: Aerial map indicating the locations of occurrences of heritage potential along the proposed Brenner-Snowdon line alignment, as discussed in the text.



Figure 5-147: Aerial map indicating the locations of occurrences of heritage potential along the proposed Nevis-Snowdon alignment, discussed in the text.



Figure 5-148: Aerial map indicating the locations of occurrences of heritage potential in the proposed Kendal-Hera alignment, as discussed in the text



Figure 5-149: Aerial map indicating the locations of occurrences of heritage potential in the proposed Lesokwana MTS Line Strengthening and Substation, as discussed in the text

6 RESULTS: IMPACT RATING, MITIGATION & SITE OPTION ANALYSIS

6.1 Potential Impacts and Significance Ratings²

The following section provides a background to the identification and assessment of possible impacts and alternatives, as well as a range of risk situations and scenarios commonly associated with heritage resources management. A guideline for the rating of impacts and recommendation of management actions for areas of heritage potential within the project area is supplied in Section 10.2 of the Addendum.

6.1.1 General assessment of impacts on resources

Generally, the value and significance of archaeological and other heritage sites might be impacted on by any activity that would result immediately or in the future in the destruction, damage, excavation, alteration, removal or collection from its original position, any archaeological material or object (as indicated in the National Heritage Resources Act (No 25 of 1999)). Thus, the destructive impacts that are possible in terms of heritage resources would tend to be direct, once-off events occurring during the initial construction period. However, in the long run, the proximity of operations in any given area could result in secondary indirect impacts. The EIA process therefore specifies impact assessment criteria which can be utilised from the perspective of a heritage specialist study which elucidates the overall extent of impacts.

6.1.2 Direct impact rating

Direct or primary effects on heritage resources occur at the same time and in the same space as the activity, e.g. loss of historical fabric through demolition work. **Indirect effects or secondary effects** on heritage resources occur later in time or at a different place from the causal activity, or as a result of a complex pathway, e.g. restriction of access to a heritage resource resulting in the gradual erosion of its significance, which is dependent on ritual patterns of access (refer to Section 10.3 in the Addendum for an outline of the relationship between the significance of a heritage context, the intensity of development and the significance of heritage impacts to be expected). The significance of the impacts were determined through a synthesis of the criteria below:

Probability: This describes the likelihood of the impact actually occurring.	
Improbable:	The possibility of the impact occurring is very low, due to the circumstances, design or experience.
Probable:	There is a probability that the impact will occur to the extent that provision must be made therefore.
Highly Probable	It is most likely that the impact will occur at some stage of the development.
Definite:	The impact will take place regardless of any prevention plans, and there can only be relied on mitigatory actions or contingency plans to contain the effect.
Duration: The lifetime of the impact	
Short term:	The impact will either disappear with mitigation or will be mitigated through natural processes in a time span shorter than any of the phases.
Medium term:	The impact will last up to the end of the phases, where after it will be negated.
Long term:	The impact will last for the entire operational phase of the project but will be mitigated by direct human action or by natural processes thereafter.
Permanent:	Impact that will be non-transitory. Mitigation either by man or natural processes will not occur in such a way or in such a time span that the impact can be considered transient.
Scale: The physical and spatial size of the impact	
Local:	The impacted area extends only as far as the activity, e.g. footprint

² Based on: Winter, S. & Baumann, N. 2005. *Guideline for involving heritage specialists in EIA processes: Edition 1.*

Site:	The impact could affect the whole, or a measurable portion of the above mentioned properties.
Regional:	The impact could affect the area including the neighbouring residential areas.
Magnitude/ Severity: Does the impact destroy the environment, or alter its function.	
Low:	The impact alters the affected environment in such a way that natural processes are not affected.
Medium:	The affected environment is altered, but functions and processes continue in a modified way.
High:	Function or process of the affected environment is disturbed to the extent where it temporarily or permanently ceases.
Significance: This is an indication of the importance of the impact in terms of both physical extent and time scale, and therefore indicates the level of mitigation required.	
Negligible:	The impact is non-existent or unsubstantial and is of no or little importance to any stakeholder and can be ignored.
Low:	The impact is limited in extent, has low to medium intensity; whatever its probability of occurrence is, the impact will not have a material effect on the decision and is likely to require management intervention with increased costs.
Moderate:	The impact is of importance to one or more stakeholders, and its intensity will be medium or high; therefore, the impact may materially affect the decision, and management intervention will be required.
High:	The impact could render development options controversial or the project unacceptable if it cannot be reduced to acceptable levels; and/or the cost of management intervention will be a significant factor in mitigation.

The following weights were assigned to each attribute:

Aspect	Description	Weight
Probability	Improbable	1
	Probable	2
	Highly Probable	4
	Definite	5
Duration	Short term	1
	Medium term	3
	Long term	4
	Permanent	5
Scale	Local	1
	Site	2
	Regional	3
Magnitude/Severity	Low	2
	Medium	6
	High	8
Significance	Sum (Duration, Scale, Magnitude) x Probability	
	Negligible	<20
	Low	<40
	Moderate	<60
	High	>60

The significance of each activity is rated without mitigation measures and with mitigation measures for both construction and operational phases of the development. The mitigation effect of each impact will be indicated without and with mitigation measures as follows:

- Can be reversed
- Can be avoided, managed or mitigated
- May cause irreplaceable loss of resources

The following table summarizes impacts to the heritage receptors within and in close proximity of the project areas:

Nr	Activity	Impact	Without or With Mitigation	Nature (Negative or Positive Impact)	Probability		Duration		Scale		Magnitude/ Severity		Significance		Mitigation Measures	Mitigation Effect
					Magnitude	Score	Magnitude	Score	Magnitude	Score	Magnitude	Score	Score	Magnitude		
Planning Phase																
1	Stone Age Occurrences and sites within the project components or buffer areas.	Potential loss of Stone Age material	WOM	Negative	Improbable	1	Short term	1	Site	2	Low	2	5	Negligible	No mitigation required.	May cause irreplaceable loss of resources
			WM	Positive	Improbable	1	Short term	1	Local	1	Low	2	4	Negligible		May cause irreplaceable loss of resources
2	Iron Age Farmer Occurrences and sites within the project components or buffer areas.	Potential loss of Iron Age Archaeology	WOM	Negative	Improbable	1	Short term	1	Site	2	Medium	6	9	Negligible	Avoidance: planning of 20m conservation buffer. Phase 2 Documentation of the structure and apply for alteration permits	May cause irreplaceable loss of resources
			WM	Positive	Improbable	1	Short term	1	Local	1	Low	2	4	Negligible		May cause irreplaceable loss of resources
3	Historical Period Occurrences and sites within the project components or buffer areas.	Potential damage to Historical Period structures / sites	WOM	Negative	Improbable	1	Short term	1	Site	2	Medium	6	9	Negligible	Avoidance: planning of 20m conservation buffer. Phase 2 Documentation of the structure and apply for alteration permits	May cause irreplaceable loss of resources
			WM	Positive	Improbable	1	Short term	1	Site	2	Low	2	5	Negligible		May cause irreplaceable loss of resources
4	Graves or burial sites within the project components or buffer areas.	Potential damage to burial sites / graves	WOM	Negative	Improbable	1	Short term	1	Site	2	Medium	6	9	Negligible	Avoidance. Frequent site monitoring by heritage specialist / ECO, heritage site management plan. Possible grave relocation.	May cause irreplaceable loss of resources
			WM	Positive	Improbable	1	Short term	1	Regional	3	Low	2	6	Negligible		May cause irreplaceable loss of resources
Construction Phase																
5	Stone Age Occurrences and sites within the project components or buffer areas.	Potential loss of Stone Age material	WOM	Negative	Definite	5	Medium term	3	Site	2	Low	2	35	Low	No mitigation required, general site monitoring recommended.	May cause irreplaceable loss of resources
			WM	Positive	Improbable	1	Short term	1	Local	1	Low	2	4	Negligible		May cause irreplaceable loss of resources
6	Iron Age Farmer Occurrences	Potential loss of Iron Age Archaeology	WOM	Negative	Definite	5	Medium term	3	Site	2	Medium	6	55	Moderate	Avoidance: planning of 20m conservation buffer.	May cause irreplaceable loss of resources

Nr	Activity	Impact	Without or With Mitigation	Nature (Negative or Positive Impact)	Probability		Duration		Scale		Magnitude/ Severity		Significance		Mitigation Measures	Mitigation Effect
					Magnitude	Score	Magnitude	Score	Magnitude	Score	Magnitude	Score	Score	Magnitude		
	and sites within the project components or buffer areas.		WM	Positive	Improbable	1	Short term	1	Local	1	Low	2	4	Negligible	Phase 2 Documentation of the structure and apply for alteration permits	May cause irreplaceable loss of resources
7	Historical Period Occurrences and sites within the project components or buffer areas.	Potential damage to Historical Period structures / sites	WOM	Negative	Definite	5	Medium term	3	Site	2	Medium	6	55	Moderate	Avoidance: planning of 20m conservation buffer. Phase 2 Documentation of the structure and apply for alteration permits. Frequent site monitoring by heritage specialist / ECO, heritage site management plan.	May cause irreplaceable loss of resources
			WM	Positive	Improbable	1	Short term	1	Site	2	Low	2	5	Negligible		May cause irreplaceable loss of resources
8	Graves or burial sites within the project components or buffer areas.	Potential damage to burial sites / graves	WOM	Negative	Definite	5	Medium term	3	Site	2	High	8	65	High	Avoidance. Frequent site monitoring by heritage specialist / ECO, heritage site management plan.	May cause irreplaceable loss of resources
			WM	Positive	Improbable	1	Long term	4	Regional	3	Low	2	9	Negligible	Possible grave relocation.	May cause irreplaceable loss of resources
Operational Phase																
9	Stone Age Occurrences and sites within the project components or buffer areas.	Potential loss of Stone Age material	WOM	Negative	Probable	2	Long term	4	Site	2	Low	2	16	Negligible	Frequent site monitoring by heritage specialist / ECO.	May cause irreplaceable loss of resources
			WM	Positive	Improbable	1	Short term	1	Site	2	Low	2	5	Negligible		May cause irreplaceable loss of resources
10	Iron Age Farmer Occurrences and sites within the project components or buffer areas.	Potential loss of Iron Age Archaeology	WOM	Negative	Probable	2	Long term	4	Site	2	Medium	6	24	Low	Frequent site monitoring by heritage specialist / ECO, heritage site management plan.	May cause irreplaceable loss of resources
			WM	Positive	Improbable	1	Short term	1	Site	2	Low	2	5	Negligible		May cause irreplaceable loss of resources
11	Historical Period Occurrences and sites within the project	Potential damage to Historical Period structures / sites	WOM	Negative	Probable	2	Long term	4	Site	2	Medium	6	24	Low	Frequent site monitoring by heritage specialist / ECO, heritage site management plan.	May cause irreplaceable loss of resources
			WM	Positive	Improbable	1	Short term	1	Local	1	Low	2	4	Negligible		May cause irreplaceable loss of resources

ESKOM Lesokwana Substation and Powerlines Project

Archaeological Impact Assessment Report

Nr	Activity	Impact	Without or With Mitigation	Nature (Negative or Positive Impact)	Probability		Duration		Scale		Magnitude/ Severity		Significance		Mitigation Measures	Mitigation Effect
					Magnitude	Score	Magnitude	Score	Magnitude	Score	Magnitude	Score	Score	Magnitude		
	components or buffer areas.															
12	Graves or burial sites within the project components or buffer areas.	Potential damage to burial sites / graves	WOM	Negative	Probable	2	Long term	4	Site	2	High	8	28	Low	Frequent site monitoring by heritage specialist / ECO, heritage site management plan.	May cause irreplaceable loss of resources
			WM	Positive	Improbable	1	Short term	1	Regional	3	Low	2	6	Negligible		May cause irreplaceable loss of resources

6.2 Evaluation Impacts

Previous studies conducted in the larger Gauteng landscape around the project area suggest a rich and diverse archaeological landscape. The project landscape has been intensively inhabited and developed during historical times where large portions of land have been transformed for mining and agriculture. Cognisance should be taken of archaeological material that might be present in surface and sub-surface deposits.

6.2.1 Archaeology

The study identified a large number of densely overgrown clusters of large later Iron Age Farmer Period stone walled sites which are of scientific value in terms of their regional representation in the Iron Age farmer period landscape of the area and it is rated as of high significance. As the Iron Age farmer Period landscape is currently the subject of notable research projects, it is recommended that impact on Iron Age walled sites around the core of Suikerbosrand be avoided at all cost by the implementation of conservation buffers in all instances.

6.2.2 Built Environment

A number of Historical Period buildings and the remains of buildings relating to urban development and mining occur in the general landscape which implies that the project area bears significance in terms of the built environment. However, no impact on these buildings or remains is anticipated provided that proposed mitigation and management measures be implemented.

6.2.3 Cultural Landscape

The larger area comprises a rich cultural horizon and the natural landscape surrounding the proposed project encompasses open grasslands typical of the southern Highveld of Gauteng. The cultural landscape holds Iron Age farmer and Colonial Period farmsteads and Historical towns. Should recommendations in the report be adhered to, the proposed project is unlikely to result in a significant impact on the cultural landscape of this area.

6.2.4 Graves / Human Burials Sites

A large number of burial sites were encountered along project zones during the course of this assessment. These receptors are of high significance for their social and cultural value and the implementation of mitigation measures (avoidance, site management, site monitoring / grave relocation) is essential. In the rural areas of the Gauteng, graves and cemeteries sometimes occur within settlements or around homesteads but they are also randomly scattered around archaeological and historical settlements. The probability of additional and informal human burials encountered during development should thus not be excluded. In addition, human remains and burials are commonly found close to archaeological sites; they may be found in "lost" graveyards, or occur sporadically anywhere as a result of prehistoric activity, victims of conflict or crime. It is often difficult to detect the presence of archaeological human remains on the landscape as these burials, in most cases, are not marked at the surface. Human remains are usually observed when they are exposed through erosion. In some instances, packed stones or rocks may indicate the presence of informal pre-colonial burials. Should any unmarked human burials/remains be found during the course of construction, work in the immediate vicinity should cease and the find must immediately be reported to the archaeologist, or the South African Heritage Resources Agency (SAHRA). Where human remains are part of a burial they would need to be exhumed under a permit from SAHRA (for pre-colonial burials as well as burials later than about AD 1500). Under no circumstances may burials be disturbed or removed until such time as necessary statutory procedures required for grave relocation have been met.

6.3 Management actions

Recommendations for relevant heritage resources management actions are vital to the conservation of heritage resources. A general guideline for recommended management actions is included in Section 10.4 of the Addendum. The following management measures should be considered during implementation of the proposed ESKOM Lesokwana Substation and Powerlines Project.

OBJECTIVE: prevent unnecessary disturbance and/or destruction of previously undetected heritage receptors.

- No specific mitigation measures in terms of further heritage resources management are required for the more recent Nigel Drive in Theatre at **Site Exigo-LNS-HP04**

- In addition, no specific mitigation measures in terms of further heritage resources management are required for sites occurring outside project footprints and buffers such as the Nigel Municipal Cemetery (**Site Exigo-LNS-BP02**), the Historical Period bridge (**Site Exigo-LKH-HP03**), the Kaydale Railway Station (**Site Exigo-LKH-HP04**), as well as a family cemetery (**Site Exigo-LKH-BP08**). However, cognizance should be taken of the presence of these sites within the larger landscape around the project.

- It should be noted that the remains of the East Daggafontein Mine (**Site Exigo-LNS-HP01**) could not be inspected and assessment of possible significant building ruins and Historical period remains should be conducted prior to possible impact on the site.

- For Historical Period features of low significance (**Site Exigo-LSS-HP02, Site Exigo-LSS-HP03, Site Exigo-LSS-HP04, Site Exigo-LBS-HP03, Site Exigo-LNS-HP03, Site Exigo-MTS-HP01**) the following general recommendations should be considered:

PROJECT COMPONENT/S	All phases of construction and operation.		
POTENTIAL IMPACT	Damage/destruction of sites.		
ACTIVITY RISK/SOURCE	Digging foundations and trenches into sensitive deposits that are not visible at the surface.		
MITIGATION: TARGET/OBJECTIVE	To locate previously undetected heritage remains / graves as soon as possible after disturbance so as to maximize the chances of successful rescue/mitigation work.		
MITIGATION: ACTION/CONTROL	RESPONSIBILITY	TIMEFRAME	
Fixed Mitigation Procedure (required)			
Site Monitoring: Regular examination of trenches and excavations.	ECO	Monitor	as frequently as practically possible.
PERFORMANCE INDICATOR	Archaeological sites are discovered and mitigated with the minimum amount of unnecessary disturbance.		
MONITORING	Successful location of sites by person/s monitoring.		

- For the Iron Age Farmer Period sites of medium significance (**Site Exigo-LNS-IA01, Site Exigo-LKH-IA05- Site Exigo-LKH-IA07**), the following are required in terms of heritage management and mitigation:

PROJECT COMPONENT/S	All phases of construction and operation.		
POTENTIAL IMPACT	Damage/destruction of sites.		
ACTIVITY RISK/SOURCE	Digging foundations and trenches into sensitive deposits that are not visible at the surface.		
MITIGATION: TARGET/OBJECTIVE	To conserve the historical fabric of the sites and to locate undetected heritage remains as soon as possible after disturbance so as to maximize the chances of successful rescue/mitigation work.		
MITIGATION: ACTION/CONTROL	RESPONSIBILITY	TIMEFRAME	
Fixed Mitigation Procedure (required)			
<p>Avoidance: Implement a heritage conservation buffer of at least 20m around the heritage resource, redesign the proposed alignment to avoid the heritage resource and the proposed conservation buffer.</p> <p>Site Monitoring: Regular examination of trenches and excavations.</p>	ECO, HERITAGE ASSESSMENT PRACTITIONER	Monitor as frequently as practically possible.	
Alterative Mitigation Procedure (if preferred mitigation procedure is not feasible)			
Documentation of sites if features are to be impacted on by development (mapping, desktop study Phase 2 site sampling). Permitting if and when required.	HERITAGE ASSESSMENT PRACTITIONER	Prior to the commencement of construction and earth-moving.	
PERFORMANCE INDICATOR	Archaeological sites are discovered and mitigated with the minimum amount of unnecessary disturbance.		
MONITORING	Successful location of sites by person/s monitoring.		

- For the For the Iron Age Farmer Period sites of high significance (Site Exigo-LKH-IA01 Site Exigo-LKH-IA04, the following are required in terms of heritage management and mitigation:

PROJECT COMPONENT/S	All phases of construction and operation.		
POTENTIAL IMPACT	Damage/destruction of sites.		
ACTIVITY RISK/SOURCE	Digging foundations and trenches into sensitive deposits that are not visible at the surface.		
MITIGATION: TARGET/OBJECTIVE	To conserve the historical fabric of the sites and to locate undetected heritage remains as soon as possible after disturbance so as to maximize the chances of successful rescue/mitigation work.		
MITIGATION: ACTION/CONTROL	RESPONSIBILITY	TIMEFRAME	
Fixed Mitigation Procedure (required)			
<p>Avoidance: Implement a heritage conservation buffer of at least 20m around the heritage resource, redesign the proposed alignment to avoid the heritage resource and the proposed conservation buffer.</p> <p>Site Monitoring: Regular examination of trenches and excavations.</p> <p>Site Management Plan: Implement a site management plan detailing strict site management conservation measures.</p>	ECO, HERITAGE ASSESSMENT PRACTITIONER	Monitor as frequently as practically possible.	

PERFORMANCE INDICATOR	Archaeological sites are discovered and mitigated with the minimum amount of unnecessary disturbance.
MONITORING	Successful location of sites by person/s monitoring.

- For the Historical Period buildings of medium significance (**Site Exigo-LSS-HP01, Site Exigo-LBS-HP01, Site Exigo-LBS-HP04, Site Exigo-LNS-HP02, Site Exigo-LNS-HP03, Site Exigo-LKH-HP01, Site Exigo-LKH-HP02, Site Exigo-LKH-HP01, Site Exigo-LKH-HP05, Site Exigo-MTS-HP01**) the following are required in terms of heritage management and mitigation:

PROJECT COMPONENT/S	All phases of construction and operation.		
POTENTIAL IMPACT	Damage/destruction of sites.		
ACTIVITY RISK/SOURCE	Digging foundations and trenches into sensitive deposits that are not visible at the surface.		
MITIGATION: TARGET/OBJECTIVE	To conserve the historical fabric of the sites and to locate undetected heritage remains as soon as possible after disturbance so as to maximize the chances of successful rescue/mitigation work.		
MITIGATION: ACTION/CONTROL	RESPONSIBILITY	TIMEFRAME	
Fixed Mitigation Procedure (required)			
Avoidance: Implement a heritage conservation buffer of at least 20m around the heritage resource, redesign the proposed alignments to avoid the heritage resource and the proposed conservation buffer. Site Monitoring: Regular examination of trenches and excavations.	ECO, HERITAGE ASSESSMENT PRACTITIONER	Monitor as frequently as practically possible.	
Alternative Mitigation Procedure (if preferred mitigation procedure is not feasible)			
Documentation of sites if features are to be impacted on by development (mapping, desktop study Phase 2 site sampling). Permitting if and when required.	HERITAGE ASSESSMENT PRACTITIONER	Prior to the commencement of construction and earth-moving.	
PERFORMANCE INDICATOR	Archaeological sites are discovered and mitigated with the minimum amount of unnecessary disturbance.		
MONITORING	Successful location of sites by person/s monitoring.		

- For the highly significant burial sites (**Site Exigo-LSS-BP01, Site Exigo-LBS-BP01 - Site Exigo-LBS-BP04, Site Exigo-LNS-BP01, Site Exigo-LNS-BP03, Site Exigo-LKH-BP02 - Site Exigo-LKH-BP05, Site Exigo-LKH-BP06, Site Exigo-LKH-BP07, Site Exigo-LKH-BP09, Site Exigo-LKH-BP10, Site Exigo-MTS-BP01**) the following are required in terms of heritage management and mitigation:

PROJECT COMPONENT/S	All phases of construction and operation.		
POTENTIAL IMPACT	Damage/disturbance to subsurface burials and surface burial features.		
ACTIVITY RISK/SOURCE	Digging foundations and trenches into sensitive deposits that are not visible at the surface.		
MITIGATION: TARGET/OBJECTIVE	To locate human burials as soon as possible after disturbance so as to maximize the chances of successful rescue/mitigation work.		
MITIGATION: ACTION/CONTROL	RESPONSIBILITY	TIMEFRAME	
Preferred Mitigation Procedure			

Avoidance: Implement a heritage conservation buffer of at least 100m around the graves / cemeteries, redesign the project layouts to avoid the heritage resource and the proposed conservation buffer. Fence all burial places and apply access control. Implement a site management plan detailing strict site management conservation measures.	QUALIFIED HERITAGE SPECIALIST DEVELOPER	Avoidance: Prior to the commencement of construction and earth-moving.
Alternative Mitigation Procedure (if preferred mitigation procedure is not feasible)		
Grave Relocation: Relocation of burials and documentation of site, full social consultation with affected parties, possible conservation management and protection measures. Subject to authorisations and relevant permitting from heritage authorities and affected parties.	QUALIFIED HERITAGE SPECIALIST	Prior to the commencement of construction and earth-moving.
Fixed Mitigation Procedure (required)		
Site Monitoring: The project site should be monitored bi-monthly by the heritage consultant of an ECO familiar with the heritage occurrences of the site: regular examination of trenches and excavations and site clearing in order to detect and preserve previously undocumented heritage receptors.	QUALIFIED HERITAGE SPECIALIST ECO	Monitor monthly.
PERFORMANCE INDICATOR	Archaeological sites are discovered and mitigated with the minimum amount of unnecessary disturbance.	
MONITORING	Successful location of sites by person/s monitoring.	

6.4 Alternatives Option Analysis

6.4.1 The Substation Alternatives

The following table provides an assessment of each of the Substation Alternatives in terms of potential heritage sensitivity and project suitability. As this table indicates, Alternative 3 is the **preferred alternative** and likely to have the least impact on Heritage resources, but all of the alternatives can be considered as long as the required heritage mitigation measures to minimize and avoid these impacts are applied.

Alt	Positives	Negatives	Recommendation
1	Large portions of the site has been degraded and transformed and the probability of previously undetected heritage remains occurring here is relatively low.	There is a cemetery located within 400m west of this site and this will require a 100m conservation buffer that will not impact on the substation site. Even though the site has largely been transformed, there is a slight probability of previously undetected heritage remains occurring here, especially along erosion gullies in the surroundings.	3 rd most suitable option from a heritage management perspective.

Alt	Positives	Negatives	Recommendation
2	This site has been degraded and transformed by agriculture in its entirety and the probability of previously undetected heritage remains occurring here is low.	There are two historical buildings requiring a 20m buffer and cemetery that is located 800m west of the site, which will require a 100m conservation buffer. One of these occurs within the boundaries of the proposed substation site. Even though the site has largely been transformed, there is a slight probability of previously undetected, potentially subsurface heritage remains occurring here.	Least suitable from a heritage management perspective
3	No known archaeological or heritage resources would be impacted by this alternative substation site. In addition, large portions of the site has been degraded and transformed and the probability of previously undetected heritage remains occurring here is relatively low.	Even though the site has largely been transformed, there is a slight probability of previously undetected heritage remains occurring here.	Most suitable option from a heritage management perspective.
4	Large portions of the site has been degraded and transformed and the probability of previously undetected heritage remains occurring here is relatively low.	The remains of a farmstead occur within the site but the farmstead is poorly preserved and of low significance. Even though the site has largely been transformed, there is a slight probability of previously undetected, potentially subsurface heritage remains occurring here.	2 nd most suitable option from a heritage management perspective.

6.4.2 The Powerline Alternatives

The following table provides an assessment of each of the Power Line Alternatives in terms of potential heritage sensitivity and project suitability. As this table indicates, Alternative 1 is the **preferred alternative** and likely to have the least impact on Heritage resources, but all of the alternatives can be considered as long as the required heritage mitigation measures to minimize and avoid these impacts are applied.

Alt	Positives	Negatives	Recommendation
1	<p>Alternative 1 has the least heritage impacts. This alternative also follows existing power lines along previously developed and transformed landscapes and the probability of undetected heritage remains occurring here is low. In addition, no access constraints were encountered during the site assessment of this alternative and its heritage sensitivity status is largely known.</p>	<p>Alternative 1 might impact a cemetery (LBS-BP 01) located within the Buffer zone along the line and 2 historical period sites (LBS HP 03 & 04) within the Option 1 buffer zone. Even though landscapes along this alignment have largely been transformed, there is a slight probability of previously undetected heritage remains occurring here.</p>	<p>Most suitable option from a heritage management perspective.</p>
2	<p>Alternative 2 follows existing power lines along previously developed and transformed landscapes and the probability of previously undetected heritage remains occurring here is low.</p>	<p>Alternative 2 will impact 3 cemeteries (LBS-BP 01, 02 & 03) within the powerline line buffer zone, and 2 historical period sites with old structures (LBS-BP 04 & 02). Even though landscapes along this alignment have largely been transformed, there is a slight probability of previously undetected heritage remains occurring here. In addition, minor access constraints were encountered during the site assessment of this alternative and the heritage sensitivity status of some regions along this alignment remains unconfirmed.</p>	<p>2nd most suitable option from a heritage management perspective.</p>
3	<p>Certain portions the landscapes along this alignment have been degraded and transformed and the probability of undetected heritage remains occurring in these transformed areas here is lower.</p>	<p>Both the northern and southern lines for Alternative 3 potentially impact numerous heritage sites. The northern Nevis-Snowdon line will impact 2 cemeteries (LNS BP 01 & 03) within the buffer zone and another (LNS BP02) outside but close to the buffer zone, as well as 5 historical period sites with old structures (LNS-PH01-05) and one iron age farmer site (LNS-IA01) within the line's buffer zones. The southern Kendal-Hera line will have more numerous and significant heritage impacts. It will impact on 9 burial sites</p>	<p>Least suitable from a heritage management perspective.</p>

Alt	Positives	Negatives	Recommendation
		<p>or cemeteries (LKH-BP 02-10) within the line buffer and another outside of the buffer zone (LKH-BP 01); five historical period sites with old structures or ruins of structures close to the powerline buffer or within it (LKH-HP 01-05); one stone age locality (LKH-SA01) within the powerline buffer; and seven iron age farmer sites within or adjacent to the powerline buffer zone (LKH-IA 01-07) with the first of these being an important research site that needs to be avoided at all. Alternative 3 does not follow existing power lines but traverse along intact and pristine landscapes in places and probability of previously undetected heritage remains occurring here is higher. In addition, access constraints were encountered during the site assessment of this alternative and the heritage sensitivity status of some regions along this alignment remains unconfirmed.</p>	

7 RECOMMENDATIONS

In terms of heritage resources, the landscape around the project area is primarily well known for the occurrence of Iron Age farmer sites and a Colonial frontier denoting industrial expansion in Gauteng. The landscape around Nigel has been inhabited, developed and exploited continuously for centuries, the remnants of which are visible in transformed agriculture and rural settlement as well as mining areas. The following general recommendations are made based on general observations in the proposed ESKOM Lesokwana Substation and Powerlines Project area pertaining to a number of identified occurrences of heritage potential:

The Substation Alternatives

- A farmstead with associated outbuildings dating to the Historical Period (**Site Exigo-LSS-HP01**) occurs on the farm Tamboekiesfontein 2km west of substation alternative 2 and within the buffer zone of the proposed Brenner – Snowden Powerline alignment. The site is generally protected under the National Heritage Resource Act (NHRA 1999) and the site should be avoided by means of the implementation of a 20m conservation buffer. Should impact on the building prove inevitable, the structure should be adequately documented by means of Phase 2 Specialist Study. Such a study should minimally include the mapping, documentation and possible sampling of the feature in order to conserve the historical fabric of the heritage resources. The necessary alteration and destruction permits should be obtained from the relevant Heritage Resources Authorities prior to site sampling

and destruction. Generally, the site should be monitored by an informed ECO in order to avoid the destruction of previously undetected heritage remains.

- The remains of a farmstead, outbuildings and structures associated with livestock farming as well as the stone foundation remains of dwellings or enclosures (**Site Exigo-LSS-HP02**, **Site Exigo-LSS-HP03**) were noted on the farm Tamboekiesfontein along the northwestern periphery of the substation alternative 2 site. The larger compound is in a ruined state of preservation any potential heritage value attached to the site has probably been lost but it would be advisable to monitor the site during construction in order to avoid the destruction of previously undetected heritage remains.
- The remains of a farmstead, outbuildings and structures associated with livestock farming as well as the stone foundation remains of dwellings or enclosures (**Site Exigo-LSS-HP04**) were noted on the farm Uitkyk within the substation alternative 4 site. The larger compound is in a ruined state of preservation any potential heritage value attached to the site has probably been lost but it would be advisable to monitor the site during construction in order to avoid the destruction of previously undetected heritage remains.
- A large community cemetery (**Site Exigo-LSS-BP01**), associated with the nearby Magagula Heights occurs on the farm Tamboekiesfontein 800m west of substation alternative 2 and within the buffer zone of the proposed Brenner – Snowden Powerline alignment Heights and impact could occur. The site should be avoided by means of a 100m conservation buffer or, alternatively legally compliant gravel reaction should be executed if impact is inevitable.
- A newly established municipal cemetery (**Site Exigo-LSS-BP02**) occurs on the farm Tamboekiesfontein 400m west of substation alternative 1 and within the buffer zone of the proposed Brenner – Snowden Powerline alignment. It seems as though no human remains have been interred at the cemetery but the site holds intrinsic value as it will contain human burials in future. The site should be avoided by means of a 100m conservation buffer.

The Proposed Brenner - Snowdon Power Line alignment

- The remains of presumably an old station building, adjacent foundations, a stone railway culvert as well as a large square stone enclosure (**Site Exigo-LBS-HP01**) dating to the Historical Period occurs on the farm Roodekraal 133IR directly south of the existing Transnet railway line in the Brenner-Snowdon Line buffer area. The site and structures are older than 60 years and generally protected under the National Heritage Resource Act (NHRA 1999) and the site should be avoided by means of a 20m conservation buffer. Should impact on the buildings prove inevitable, the structure should be adequately documented by means of Phase 2 Specialist Study. Such a study should minimally include the mapping, documentation and possible sampling of the feature in order to conserve the historical fabric of the heritage resources. The necessary alteration and destruction permits should be obtained from the relevant Heritage Resources Authorities prior to site sampling and destruction. Generally, the site should be monitored by an informed ECO in order to avoid the destruction of previously undetected heritage remains.
- A number of square stone foundation remains of dwellings or enclosures (**Site Exigo-LBS-HP02**) as well as the remains of one of the Rooikraal farmsteads (**Site Exigo-LBS-HP03**) were noted on the farm Roodekraal 133IR in the Brenner-Snowdon Line buffer area. Even though the sites are older than 60 years and generally protected under the National Heritage Resource Act (NHRA 1999), no special cultural or social association for the structures could be established, they are poorly preserved and it is recommended that the sites be monitored the site during construction in order to avoid the destruction of previously undetected heritage remains.
- The remains of another Rooikraal farmstead occur on the farm Roodekraal 133IR in the buffer area of the alternative deviation for the Brenner-Snowdon Line (**Site Exigo-LBS-HP04**). The site and

structures are older than 60 years and generally protected under the National Heritage Resource Act (NHRA 1999) and it might afford a better understanding of architectural and industrial developments in the larger Nigel. The site should be avoided by means of a 20m conservation buffer. Should impact on the building prove inevitable, the structures should be adequately documented by means of Phase 2 Specialist Study. Such a study should minimally include the mapping, documentation and possible sampling of the feature in order to conserve the historical fabric of the heritage resources. The necessary alteration and destruction permits should be obtained from the relevant Heritage Resources Authorities prior to site sampling and destruction. Generally, the site should be monitored by an informed ECO in order to avoid the destruction of previously undetected heritage remains.

- A community cemetery (**Site Exigo-LBS-BP01**) on the farm Tamboekiesfontein, two Historical Period cemeteries (**Site Exigo-LBS-BP02**, **Site Exigo-LBS-BP04**) and an informal cemetery (**Site Exigo-LBS-BP03**) on the farm Roodekraal occur in close proximity of the proposed Brenner-Snowdon line alignment. The cemeteries, which are highly significant in terms of heritage value, contain graves which are to be older than 60 years and thus protected by the National Heritage Resource Act (NHRA 1999). It is crucial that the sites be avoided by means of a 100m conservation buffer or, alternatively legally compliant grave relocation should be conducted if impact is proven to be inevitable.

The Proposed Nevis - Snowdon Power Line alignment

- A later Iron Age Farmer Period stone walled site (**Site Exigo-LNS-IA01**) occurs on the farm Spaarwater 171 within the buffer of the proposed Nevis-Snowdon line alignment. The site probably dates to the late 18th early 19th century and might be regarded as part of the Suikerbosrand Iron Age landscape. As such, the site is of scientific value in terms of its regional representation in the Iron Age farmer period landscape of the area and it should be avoided by means of a 20m conservation buffer. Should impact on the site prove inevitable, the structure should be adequately documented by means of Phase 2 Specialist Study. Such a study should minimally include the mapping, documentation and possible sampling of the feature in order to conserve the historical fabric of the heritage resources. The necessary alteration and destruction permits should be obtained from the relevant Heritage Resources Authorities prior to site sampling and destruction. Generally, the site should be monitored by an informed ECO in order to avoid the destruction of previously undetected heritage remains.
- The remains of a mine of pit the East Daggafontein Mine **Site Exigo-LNS-HP01** occur on the farm Rietfontein 2761R within the buffer area of the Nevis-Snowdon Line. The mine, as well as old ruins or "murasies" are indicated on historical topographic maps but the site could not be inspected during the site assessment due to access constraints. The site and indicated structures are older than 60 years and generally protected under the National Heritage Resource Act (NHRA 1999) and an assessment of possible significant building ruins and Historical period remains should be conducted prior to alteration of the site.
- The remains of the farmstead of the farm Rietfontein 2761R (**Site Exigo-LNS-HP02**) as well as a compound consisting out of a dwelling and a free-standing building dating to the Historical Period on the farm Spaarwater 1711R (**Site Exigo-LNS-HP03**) occur within the buffer area of the Nevis-Snowdon. The sites and associated structures are older than 60 years and generally protected under the National Heritage Resource Act (NHRA 1999). The resources might afford a better understanding of architectural and industrial developments in the larger Nigel area and the sites should be avoided by means of a 20m conservation buffer. Should impact on the buildings prove inevitable, the structure should be adequately documented by means of Phase 2 Specialist Study. Such a study should minimally include the mapping, documentation and possible sampling of the

features in order to conserve the historical fabric of the heritage resources. The necessary alteration and destruction permits should be obtained from the relevant Heritage Resources Authorities prior to site sampling and destruction. Generally, the site should be monitored by an informed ECO in order to avoid the destruction of previously undetected heritage remains.

- The poorly preserved foundation remains of a dwelling (**Site Exigo-LNS-HP03**) occur within the buffer area of the Nevis-Snowdon Line. The site and structures are older than 60 years but it is poorly preserved even though protected under the National Heritage Resource Act (NHRA 1999). It would be advisable to monitor the site during construction in order to avoid the destruction of previously undetected heritage remains.
- The ruined remains of a drive-in theatre (**Site Exigo-LNS-HP04**) occurs north of the town of Nigel within the buffer area of the Nevis-Snowdon Line. The site is not older than 60 years (which implies that it is not protected under the NHRA) and it therefore carries no heritage value. No further actions in terms of heritage management is recommended for the site.
- A community cemetery (**Site Exigo-LNS-BP01**) and a small family cemetery belonging to the Pistorius family Site (**Exigo-LNS-BP03**) occurs on the farm Spaarwater 171IR within the buffer of the proposed Nevis-Snowdon line alignment. In both instances, the cemeteries which are highly significant in terms of its heritage value, contain graves which seem to be older than 60 years and thus protected by the National Heritage Resource Act (NHRA 1999). The sites should be avoided by means of a 100m conservation buffer or, alternatively legally compliant grave relocation should be executed if impact is inevitable.
- The Nigel Municipal Cemetery (**Site Exigo-LNS-BP02**) containing a large number of burials occurs in along the western outskirts of Nigel and east of the proposed Nevis-Snowden line alignment. The cemetery, which is highly significant in terms of its heritage and social value, contains graves which seem to be older than 60 years and thus protected by the National Heritage Resource Act (NHRA 1999). The site is situated approximately 1.5km east of the Nevis-Snowden power line buffer and impact is unlikely but cognizance should be taken of the presence of the site within the larger landscape.

The Kendal – Hera Power Line alignment

- A number of Middle Stone Age tools (**Exigo-LKH-SA01**) occur scattered across the project landscape but specifically around the Blesbokspruit on the farm Maraisdrift 190IR within the buffer of the proposed Kendal-Hera line alignment. These lithics were found in areas previously cultivated and their primary context has in all probability been lost compromising their scientific value. The occurrences are not unique to this area and they seem to occur in low frequencies on exposed surfaces. No further actions in terms of heritage management is recommended for the site
- A large number of densely overgrown clusters of large later Iron Age Farmer Period stone walled sites, consisting out of collapsed stone walling arranged in large scalloping circular enclosures (**Site Exigo-LKH-IA01 Site Exigo-LKH-IA04**) are situated around the southern, western and norther sections of the Suikerbosrand Nature Reserve within the buffer area for the Kendal-Hera line alignment. These sites date to the late 18th early 19th centuries as part of the large Suikerbosrand Iron Age capitals and the resources are of scientific value in terms of their regional representation in the Iron Age farmer period landscape of the area and it is rated as of high significance. Cognizant of the fact that the Iron Age stone walled sites of Suikerbosrand and its surroundings are currently the subject of significant and ongoing research projects, it is recommended that impact to these sites be avoided at all cost by the implementation of conservation buffers in all instances. It would be advisable to monitor all sites during construction in order to avoid the destruction of previously undetected heritage remains.

- In addition, smaller satellite later Iron Age Farmer Period stone walled site (**Site Exigo-LKH-IA05-Site Exigo-LKH-IA07**) occur in a number of locations north and east of the town of Heidelberg within the buffer of the proposed Kendal-Hera line alignment. The sites, dating to the late 18th early 19th centuries are of scientific value in terms of the larger Suikerbosrand Iron Age farmer period landscape and the sites should be avoided by means of the implementation of a 20m conservation buffer zone. Should impact on the sites prove inevitable, the structure should be adequately documented by means of Phase 2 Specialist Study. Such a study should minimally include the mapping, documentation and possible sampling of the features in order to conserve the historical fabric of the heritage resources. The necessary alteration and destruction permits should be obtained from the relevant Heritage Resources Authorities prior to site sampling and destruction. Generally, the site should be monitored by an informed ECO in order to avoid the destruction of previously undetected heritage remains.
- The poorly preserved foundation remains of a Historical Period dwelling (**Site Exigo-LKH-HP01**) as well as the structural remains of another farmstead (**Site Exigo-LKH-HP02**) occur on the farm Klippoort 187IR in the buffer area of the Kendal-Hera line. In both cases, the sites are older than 60 years and generally protected under the National Heritage Resource Act (NHRA 1999). Notwithstanding the preservation condition of the structures, the sites might afford a better understanding of architectural and industrial developments in the larger Nigel area and they sites should be avoided by means of the implementation of a 20m conservation buffer. Should impact on the buildings prove inevitable, the structure should be adequately documented by means of Phase 2 Specialist Study. Such a study should minimally include the mapping, documentation and possible sampling of the features in order to conserve the historical fabric of the heritage resources. The necessary alteration and destruction permits should be obtained from the relevant Heritage Resources Authorities prior to site sampling and destruction. Generally, the site should be monitored by an informed ECO in order to avoid the destruction of previously undetected heritage remains.
- An old railway line traverses a large drainage line over a Historical Period two-arch concrete bridge on the farm Klippoort 187IR (**Site Exigo-LKH-HP03**). In addition, a number of Historical Period buildings and dwellings occur at the site of the Kaydale Railway Station (**Site Exigo-LKH-HP04**) east of the bridge. In both cases, the features are situated outside of the Kendal-Hera power line buffer and impact is unlikely but cognizance should be taken of the presence of the site within the larger landscape.
- The currently occupied Rietpoort farmstead (**Site Exigo-LKH-HP05**) occurs on the farm Rietpoort 193IR in the buffer area of the Kendal-Hera Line. The site and structures are older than 60 years and generally protected under the National Heritage Resource Act (NHRA 1999). The site might afford a better understanding of architectural and industrial developments in the larger Nigel area and it should be avoided by the implementation of a 20m conservation buffer. As the site is currently occupied, alteration of the farmstead is not advisable. However, should impact on the buildings prove inevitable, the structure should be adequately documented by means of Phase 2 Specialist Study. Such a study should minimally include the mapping, documentation and possible sampling of the features in order to conserve the historical fabric of the heritage resources. The necessary alteration and destruction permits should be obtained from the relevant Heritage Resources Authorities prior to site sampling and destruction. Generally, the site should be monitored by an informed ECO in order to avoid the destruction of previously undetected heritage remains.
- An apparent informal cemetery (**Site Exigo-LKH-BP01**) occurs along the northern border of the Suikerbosrand Nature Reserve in a pocket of Black Wattle trees. The site could not be located during the site assessment but the cemetery is highly significant in terms of its heritage and social value and it is protected by the National Heritage Resource Act (NHRA 1999). The site is situated

- approximately 3km south of the Kendal-Hera power line buffer and impact is unlikely but cognizance should be taken of the presence of the site within the larger landscape.
- Four informal cemeteries (**Site Exigo-LKH-BP02 - Site Exigo-LKH-BP05**) occur within and around crop fields on the farm Eendracht 185IR in close proximity of the Kendal-Hera line buffer. The cemetery is densely overgrown and two burials could be identified indicated by rectangular stone cairns. The cemeteries, which are highly significant in terms of its heritage value, contain graves which might be older than 60 years and thus protected by the National Heritage Resource Act (NHRA 1999). In all instances, the sites should be avoided by means of 100m conservation buffers or, alternatively legally compliant grave relocation should be executed if impact on the sites prove inevitable.
 - A burial site (**Site Exigo-LKH-BP06**) is indicated on historical topographic maps of the farm Klippoortjie 187IR within a pocket of Poplar trees. These burials could not be located during the site assessment but presumed cemetery is highly significant in terms of its heritage and social value and it is protected by the National Heritage Resource Act (NHRA 1999). The site should be avoided by means of a 100m conservation buffer or, alternatively legally compliant grave relocation should be executed if impact on the sites prove inevitable.
 - A large informal cemetery on the farm Maraisdrift 190IR (**Site Exigo-LKH-BP07**) and another cemetery on the farm Nooitgedacht 286IR (**Site Exigo-LKH-BP09**) are situated in close proximity of the proposed Kendal-Hera line alignment. The cemeteries, which are highly significant in terms of heritage value, contain graves which seem to be older than 60 years and thus protected by the National Heritage Resource Act (NHRA 1999). The sites should be avoided by means of the implementation of a 100m conservation buffer or, alternatively legally compliant grave relocation should be executed if impact is inevitable.
 - A family cemetery belonging to the Jacobs family (**Site Exigo-LKH-BP08**) on the farm Rietpoort 193IR is situated approximately 100m north of the Kendal-Hera power line buffer and impact is unlikely but cognizance should be taken of the presence of the site within the larger landscape. It would be advisable to monitor the site for any impact emanating from the development.
 - A burial site is indicated on historical topographic maps of the farm Nooitgedacht 286IR in close proximity of the Kendal-Hera line (**Site Exigo-LKH-BP10**). The burial site could not be located during the site assessment and it is not clear if the grave remains in existence but the site is nonetheless of heritage and social value and it is protected by the National Heritage Resource Act (NHRA 1999). The site should be avoided by means of the implementation of a 100m conservation buffer or, alternatively legally compliant grave relocation should be executed if impact is inevitable.

The Proposed Lesokwana MTS Line Strengthening

- The poorly preserved remains of a farmstead (**Site Exigo-MTS-HP01**) were noted on the farm Zonnestraal in the proposed Lilo Power Lines corridor. Even though the sites are older than 60 years and generally protected under the National Heritage Resource Act (NHRA 1999), no special cultural or social association for the structures could be established, they are poorly preserved and it is recommended that the sites be monitored the site during construction in order to avoid the destruction of previously undetected heritage remains.
- A compound of Historical Period buildings occur on the farm Withok in the proposed Lilo Power Lines corridor (**Site Exigo-MTS-HP02**). The site and structures are older than 60 years and generally protected under the National Heritage Resource Act (NHRA 1999) and it might afford a better understanding of architectural and industrial developments in the larger Nigel. The site should be avoided by means of a 20m conservation buffer. Should impact on the building prove inevitable, the structures should be adequately documented by means of Phase 2 Specialist Study. Such a study should minimally include the mapping, documentation and possible sampling of the feature in order to conserve the historical fabric of the heritage resources. The necessary alteration and destruction

permits should be obtained from the relevant Heritage Resources Authorities prior to site sampling and destruction. Generally, the site should be monitored by an informed ECO in order to avoid the destruction of previously undetected heritage remains

- A Historical Period cemetery (**Site Exigo-MTS-BP01**) on the farm Witpoort occur in the general proximity of the proposed Lilo Power Lines corridor. The cemetery, which are highly significant in terms of heritage value, contain graves which are to be older than 60 years and thus protected by the National Heritage Resource Act (NHRA 1999). It is crucial that the sites be avoided by means of a 100m conservation buffer or, alternatively legally compliant grave relocation should be conducted if impact is proven to be inevitable.

The following general recommendations should be observed for all project components:

- It is advised that all burial grounds should be fenced off and access control should be applied. Here, wire fences of at least 1.5 m in height should be erected within the conservation buffers around the burial sites. The fences should have access gates which should be locked and clear signage on the fences should indicate the significance and protection status of the sites and it should provide contact details for site access. In all instances, the fences should not be erected closer than 5m from graves along the outer periphery of the burial grounds. In addition, Site Management Plans (SMP) should be compiled outlining required and continued mitigation and conservation requirements and measures for the burials. The contents of the SMP should be communicated to all consultants, contractors and workers entering and moving around on project sites. **Should impact on any human burial occur, development should be suspended and the heritage specialist should be consulted. The conservation of burial sites should be ensured and full grave relocations are recommended should impact be unavoidable. This measure should be undertaken by a qualified archaeologist, and in accordance with relevant legislation, permitting, statutory permissions and subject to any local and regional provisions and laws and by-laws pertaining to human remains. A full social consultation process should occur in conjunction with the mitigation of cemeteries and burials (see Addendum B).**
- Considering the localised nature of heritage remains, the general monitoring of the development progress by an ECO is recommended during the planning and construction phases of the project. Should any subsurface palaeontological, archaeological or historical material, or burials be exposed during construction activities, all activities should be suspended and the archaeological specialist should be notified immediately.
- It is essential that cognisance be taken of the larger archaeological landscape of the area in order to avoid the destruction of previously undetected heritage sites. It should be stated that the possibility of undetected archaeological remains occurring elsewhere in the project area should not be excluded. Burials and historically significant structures dating to the Colonial Period occur on farms in the area and these resources should be avoided during all phases of construction and development, including the operational phases of the development

8 GENERAL COMMENTS AND CONDITIONS

This AIA report serves to confirm the extent and significance of the heritage landscape of the proposed ESKOM Lesokwana Substation and Powerlines Project area. The larger heritage horizon encompasses rich and diverse archaeological landscapes and cognisance should be taken of heritage resources and archaeological material that might be present in surface and sub-surface deposits. If, during construction, any possible archaeological material culture discoveries are made, the operations must be stopped, and a qualified archaeologist be contacted for an assessment of the find. Such material culture might include:

- Formal Earlier Stone Age stone tools;
- Formal MSA stone tools;
- Formal LSA stone tools;
- Potsherds;
- Iron objects;
- Beads made from ostrich eggshell and glass;
- Ash middens and cattle dung deposits and accumulations;
- Faunal remains;
- Human remains/graves;
- Stone walling or any sub-surface structures;
- Historical glass, tin or ceramics; and
- Fossils.

If such sites were to be encountered or impacted by any proposed developments, recommendations contained in this report, as well as endorsement of mitigation measures as set out by Gauteng-PHRA, SAHRA, the National Resources Act and the CRM section of ASAPA will be required. It must be emphasised that the conclusions and recommendations expressed in this archaeological heritage sensitivity investigation are based on the visibility of archaeological sites/features and may not therefore, represent the area's complete archaeological legacy. Many sites/features may be covered by soil and vegetation and might only be located during sub-surface investigations. If subsurface archaeological deposits, artefacts or skeletal material were to be recovered in the area during construction activities, all activities should be suspended and the archaeological specialist should be notified immediately (*cf. NHRA (Act No. 25 of 1999), Section 36 (6)*). It must also be clear that Archaeological Specialist Reports will be assessed by the relevant heritage resources authority (SAHRA).

9 BIBLIOGRAPHY

9.1 Published Literature

- Bergh, J.S. 1999. Geskiedenisatlas van Suid-Afrika: die vier noordelike provinsies. Pretoria: J.L. van Schaik
- Childs, S.T & Killich, D. 1993. Indigenous African Metallurgy Nature and Culture. Annual Review of Anthropology: 22 (317-337)
- Deacon, J. 1996. Archaeology for Planners, Developers and Local Authorities. National Monuments Council. Publication no. P021E
- Deacon, J. 1997. Report: Workshop on Standards for the Assessment of Significance and Research Priorities for Contract Archaeology. In: Newsletter No 49, Sept 1998. Association for Southern African Archaeologists
- Denbow, J.R. 1979. *Cenchrus ciliaris*: an ecological indicator of Iron Age middens using aerial photography in eastern Botswana. South African Journal of Science 75:405—408
- Evers, T.M. 1981. The Iron Age in eastern Transvaal, South Africa. In: Voigt, E.A. (ed.) Guide to archaeological sites in the northern and eastern Transvaal. Pretoria: Transvaal Museum
- Evers, T.M. 1988. The recognition of Groups in the Iron Age of Southern Africa. PhD thesis. Johannesburg: University of the Witwatersrand
- Fourie, W. 2003. Van Ryn Open Cape Archaeological Survey CCT: Project: Nigel Gold Mining Company Pty Ltd: Cultural Heritage Survey
- Hall, M. 1987. The Changing Past: Farmers, Kings & Traders in Southern Africa 200 – 1860 Cape Town, Johannesburg: David Philip
- Hall, M. 1996. Archaeology Africa. Cape Town, Johannesburg: David Philip
- Huffman, T.N. 2002. Regionality in the Iron Age: the case of the Sotho-Tswana. Southern African Humanities. Vol 14. Pietermaritzburg
- Huffman, T.N. 2007. Handbook to the Iron Age. Pietermaritzburg: University of Kwazulu-Natal Press
- Mason, R.J. 1986. Origins of black people of Johannesburg and the southern western central Transvaal AD 350-1880. Johannesburg: Witwatersrand University Press
- Mucina, L & Rutherford, M. C. 2006. The vegetation of South Africa, Lesotho and Swaziland. Strelitzia 19, SANBI, Pretoria
- Phillipson, D.W. 1985. African Archaeology (second edition). Cambridge: Cambridge University Press

Swanepoel, N. et al (Eds.) 2008. Five hundred years rediscovered. Johannesburg: Wits University Press

Van Warmelo, N.J. 1935. A Preliminary Survey of the Bantu Tribes of South Africa. Ethnographic Publications No. 5. Pretoria: Government Printer

9.2 Unpublished Sources and Reports

Gaigher S. 2014. Heritage Impact Assessment for the Proposed Ergo Road Residential Development, Springs, Ekurhuleni

Hutten, M. 2010. Heritage Impact Assessment for the proposed De Put Residential Township Development south of Northam, Limpopo Province

Kaplan., J. 2013. Recommended Exemption from having to conduct an Archaeological Impact Study: The Proposed Impala Platinum Precious Metals Refinery Expansion Project in Springs, Gauteng Province

Kusel, U. 2007. Cultural Heritage Resources Impact Assessment of the Farm Vlaklaagte 161 Tsakane Benoni Gauteng

Pistorius, J.C.C. 2007. A Phase 1 Heritage Impact Assessment Study for ESKOM's proposed new 400kV Power Line route between the Matimba B Power Station and the Marang Substation near Rustenburg. Pretoria

Pelser, A & Van Vollenhoven, A. 2008. A Report on a Basic Archaeological Assessment for Apollo Bricks on the Farm Grootvaly 124 JR near Springs, Gauteng

Tomose, N.G. 2014. A Heritage Impact Assessment Study for the Proposed Fortune Metaliks South Africa Nigel Steel Processing Plant, Pretoriusstad, Nigel, Ekurhuleni Metropolitan Municipality, Gauteng Province, South Africa

Van Der Walt, J. 2008. Archeological Impact Assessment for the Proposed Tsakane Primary School, Tsakane Extension 9, Gauteng Province

Van Der Walt, J. 2008. Archaeological Impact Assessment: Daggafontein Extension 6, Portions 107 of the Farm Daggafontein 125 IR, Springs, Gauteng Province

Van Der Walt, J. 2008. Archaeological Impact Assessment for the Chief Albert Luthuli Primary School, Springs, Gauteng Province

Van Der Walt, J. 2008. Archaeological Impact Assessment: Sluice Gate Upgrade at the Marrievale Nature Reserve, Nigel, Gauteng

Van Schalkwyk, J. & Mith, S. 1997. A Survey of Cultural Resources in the Proposed Erwat Sewer Outfall Route, North of Springs, Gauteng Province

Van Schalkwyk, J. & Pelsler, A. 2000. A Survey of Cultural Resources on the Farm Winterhoek 314 IR Nigel District, Gauteng. Previous Studies in the Springs Area

Van Schalkwyk, J. 2010. Heritage Impact Assessment for the Proposed Payneville Extension 1 Development, Springs Magisterial District, Gauteng Province

Van Vollenhoven, A. 2011. A Report on a Cultural Heritage Baseline Study and Impact Assessment for the Proposed New Kleinfontein Goldmine (Modder East Operations) close to Springs, Gauteng Province

Van Vollenhoven, A. 2012. A Report on a Heritage Impact Assessment for the Steynol Umthombo Project near Springs in the Gauteng Province

Van Vollenhoven, A. 2013. A Report on a Cultural Impact Assessment for a Proposed Shopping Mall Development close to Springs, Gauteng Province

Van Vollenhoven, A. 2012. A Report on a Cultural Heritage Impact Assessment for the Proposed Return Water Dam at the New Kleinfontein Gold Mine close to Springs, Gauteng Province

9.3 Archive Maps and Legislation

Human Tissue Act and Ordinance 7 of 1925, Government Gazette, Cape Town

National Resource Act No.25 of 1999, Government Gazette, Cape Town

SAHRA, 2005. Minimum Standards for the Archaeological and the Palaeontological Components of Impact Assessment Reports, Draft version 1.4

9.4 Web Sources

www.sahra.org.za/sahris

accessed 2019-01-15

www.csg.dla.gov.za

accessed 2019-01-20

<https://www.wits.ac.za/news/sources/science-news/2018/how-we-recreated-a-lost-african-city-with-laser-technology.html>

accessed 2019-02-20

10 ADDENDUM 1: HERITAGE LEGISLATION BACKGROUND

10.1 CRM: Legislation, Conservation and Heritage Management

The broad generic term Cultural Heritage Resources refers to any physical and spiritual property associated with past and present human use or occupation of the environment, cultural activities and history. The term includes sites, structures, places, natural features and material of palaeontological, archaeological, historical, aesthetic, scientific, architectural, religious, symbolic or traditional importance to specific individuals or groups, traditional systems of cultural practice, belief or social interaction.

10.1.1 Legislation regarding archaeology and heritage sites

The South African Heritage Resources Agency (SAHRA) and their provincial offices aim to conserve and control the management, research, alteration and destruction of cultural resources of South Africa. It is therefore vitally important to adhere to heritage resource legislation at all times.

d. National Heritage Resources Act No 25 of 1999, section 35

According to the National Heritage Resources Act of 1999 a historical site is any identifiable building or part thereof, marker, milestone, gravestone, landmark or tell older than 60 years. This clause is commonly known as the "60-years clause". Buildings are amongst the most enduring features of human occupation, and this definition therefore includes all buildings older than 60 years, modern architecture as well as ruins, fortifications and Iron Age settlements. "Tell" refers to the evidence of human existence which is no longer above ground level, such as building foundations and buried remains of settlements (including artefacts).

The Act identifies heritage objects as:

- 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
- any other prescribed category

With regards to activities and work on archaeological and heritage sites this Act states that:

"No person may alter or demolish any structure or part of a structure which is older than 60 years without a permit by the relevant provincial heritage resources authority." (34. [1] 1999:58)

and

"No person may, without a permit issued by the responsible heritage resources authority-

- (d) *destroy, damage, excavate, alter, deface or otherwise disturb any archaeological or palaeontological site or any meteorite;*
- (e) *destroy, damage, excavate, remove from its original position, collect or own any archaeological or palaeontological material or object or any meteorite;*

- (f) *trade in, sell for private gain, export or attempt to export from the Republic any category of archaeological or palaeontological material or object, or any meteorite; or*
- (g) *bring onto or use at an archaeological or palaeontological site any excavation equipment or any equipment which assist in the detection or recovery of metals or archaeological and palaeontological material or objects, or use such equipment for the recovery of meteorites. (35. [4] 1999:58)."*

and

"No person may, without a permit issued by SAHRA or a provincial heritage resources agency-

- (h) *destroy, damage, alter, exhume or remove from its original position or otherwise disturb the grave of a victim of conflict, or any burial ground or part thereof which contains such graves;*
- (i) *destroy, damage, alter, exhume, remove from its original position or otherwise disturb any grave or burial ground older than 60 years which is situated outside a formal cemetery administered by a local authority;*
- (j) *bring onto or use at a burial ground or grave referred to in paragraph (a) or (b) and excavation equipment, or any equipment which assists in the detection or recovery of metals (36. [3] 1999:60)."*

e. Human Tissue Act of 1983 and Ordinance on the Removal of Graves and Dead Bodies of 1925

Graves 60 years or older are heritage resources and fall under the jurisdiction of both the National Heritage Resources Act and the Human Tissues Act of 1983. However, graves younger than 60 years are specifically protected by the Human Tissues Act (Act 65 of 1983) and the Ordinance on the Removal of Graves and Dead Bodies (Ordinance 7 of 1925) as well as any local and regional provisions, laws and by-laws. Such burial places also fall under the jurisdiction of the National Department of Health and the Provincial Health Departments. Approval for the exhumation and re-burial must be obtained from the relevant Provincial MEC as well as the relevant Local Authorities.

10.1.2 Background to HIA and AIA Studies

South Africa's unique and non-renewable archaeological and palaeontological heritage sites are 'generally' protected in terms of the National Heritage Resources Act (Act No 25 of 1999, section 35) and may not be disturbed at all without a permit from the relevant heritage resources authority. Heritage sites are frequently threatened by development projects and both the environmental and heritage legislation require impact assessments (HIAs & AIAs) that identify all heritage resources in areas to be developed. Particularly, these assessments are required to make recommendations for protection or mitigation of the impact of the sites. HIAs and AIAs should be done by qualified professionals with adequate knowledge to (a) identify all heritage resources including archaeological and palaeontological sites that might occur in areas of developed and (b) make recommendations for protection or mitigation of the impact on the sites.

The National Heritage Resources Act (Act No. 25 of 1999, section 38) provides guidelines for Cultural Resources Management and prospective developments:

"38. (1) Subject to the provisions of subsections (7), (8) and (9), any person who intends to undertake a

development categorised as:

- (a) the construction of a road, wall, powerline, pipeline, canal or other similar form of linear development or barrier exceeding 300m in length;
- (b) the construction of a bridge or similar structure exceeding 50m in length;
- (c) any development or other activity which will change the character of a site:
 - (i) exceeding 5 000 m² in extent; or
 - (ii) involving three or more existing erven or subdivisions thereof; or
 - (iii) involving three or more erven or divisions thereof which have been consolidated within the past five years; or
 - (iv) the costs of which will exceed a sum set in terms of regulations by SAHRA or a provincial heritage resources authority;
- (d) the re-zoning of a site exceeding 10 000 m² in extent; or
- (e) any other category of development provided for in regulations by SAHRA or a provincial heritage resources authority,

must at the very earliest stages of initiating such a development, notify the responsible heritage resources authority and furnish it with details regarding the location, nature and extent of the proposed development."

And:

"The responsible heritage resources authority must specify the information to be provided in a report required in terms of subsection (2)(a): Provided that the following must be included:

- (k) The identification and mapping of all heritage resources in the area affected;
- (l) an assessment of the significance of such resources in terms of the heritage assessment criteria set out in section 6(2) or prescribed under section 7;
- (m) an assessment of the impact of the development on such heritage resources;
- (n) an evaluation of the impact of the development on heritage resources relative to the sustainable social and economic benefits to be derived from the development;
- (o) the results of consultation with communities affected by the proposed development and other interested parties regarding the impact of the development on heritage resources;
- (p) if heritage resources will be adversely affected by the proposed development, the consideration of alternatives; and
- (q) plans for mitigation of any adverse effects during and after the completion of the proposed development (38. [3] 1999:64)."

Consequently, section 35 of the Act requires Heritage Impact Assessments (HIAs) or Archaeological Impact Assessments (AIAs) to be done for such developments in order for all heritage resources, that is, all places or objects of aesthetics, architectural, historic, scientific, social, spiritual, linguistic or technological value or significance to be protected. Thus any assessment should make provision for the protection of all these heritage components, including archaeology, shipwrecks, battlefields, graves, and structures older than 60

years, living heritage, historical settlements, landscapes, geological sites, palaeontological sites and objects. Heritage resources management and conservation.

10.2 Assessing the Significance of Heritage Resources

Archaeological sites, as previously defined in the National Heritage Resources Act (Act 25 of 1999) are places in the landscape where people have lived in the past – generally more than 60 years ago – and have left traces of their presence behind. In South Africa, archaeological sites include hominid fossil sites, places where people of the Earlier, Middle and Later Stone Age lived in open sites, river gravels, rock shelters and caves, Iron Age sites, graves, and a variety of historical sites and structures in rural areas, towns and cities. Palaeontological sites are those with fossil remains of plants and animals where people were not involved in the accumulation of the deposits. The basic principle of cultural heritage conservation is that archaeological and other heritage sites are valuable, scarce and *non-renewable*. Many such sites are unfortunately lost on a daily basis through development for housing, roads and infrastructure and once archaeological sites are damaged, they cannot be re-created as site integrity and authenticity is permanently lost. Archaeological sites have the potential to contribute to our understanding of the history of the region and of our country and continent. By preserving links with our past, we may not be able to revive lost cultural traditions, but it enables us to appreciate the role they have played in the history of our country.

- Categories of significance

Rating the significance of archaeological sites, and consequently grading the potential impact on the resources is linked to the significance of the site itself. The significance of an archaeological site is based on the amount of deposit, the integrity of the context, the kind of deposit and the potential to help answer present research questions. Historical structures are defined by Section 34 of the National Heritage Resources Act, 1999, while other historical and cultural significant sites, places and features, are generally determined by community preferences. The guidelines as provided by the NHRA (Act No. 25 of 1999) in Section 3, with special reference to subsection 3 are used when determining the cultural significance or other special value of archaeological or historical sites. In addition, ICOMOS (the Australian Committee of the International Council on Monuments and Sites) highlights four cultural attributes, which are valuable to any given culture:

- *Aesthetic value:*

Aesthetic value includes aspects of sensory perception for which criteria can and should be stated. Such criteria include consideration of the form, scale, colour, texture and material of the fabric, the general atmosphere associated with the place and its uses and also the aesthetic values commonly assessed in the analysis of landscapes and townscape.

- *Historic value:*

Historic value encompasses the history of aesthetics, science and society and therefore to a large extent underlies all of the attributes discussed here. Usually a place has historical value because of some kind of influence by an event, person, phase or activity.

- *Scientific value:*

The scientific or research value of a place will depend upon the importance of the data involved, on its rarity, quality and on the degree to which the place may contribute further substantial information.

- *Social value:*

Social value includes the qualities for which a place has become a focus of spiritual, political, national or other cultural sentiment to a certain group.

It is important for heritage specialist input in the EIA process to take into account the heritage management structure set up by the NHR Act. It makes provision for a 3-tier system of management including the South Africa Heritage Resources Agency (SAHRA) at a national level, Provincial Heritage Resources Authorities (PHRAs) at a provincial and the local authority. The Act makes provision for two types or forms of protection of heritage resources; i.e. formally protected and generally protected sites:

Formally protected sites:

- Grade 1 or national heritage sites, which are managed by SAHRA
- Grade 2 or provincial heritage sites, which are managed by the provincial HRA (MP-PHRA).
- Grade 3 or local heritage sites.

Generally protected sites:

- Human burials older than 60 years.
- Archaeological and palaeontological sites.
- Shipwrecks and associated remains older than 60 years.
- Structures older than 60 years.

With reference to the evaluation of sites, the certainty of prediction is definite, unless stated otherwise and if the significance of the site is rated high, the significance of the impact will also result in a high rating. The same rule applies if the significance rating of the site is low. The significance of archaeological sites is generally ranked into the following categories.

Significance	Rating Action
No significance: sites that do not require mitigation.	None
Low significance: sites, which may require mitigation.	2a. Recording and documentation (Phase 1) of site; no further action required 2b. Controlled sampling (shovel test pits, auguring), mapping and documentation (Phase 2 investigation); permit required for sampling and destruction
Medium significance: sites, which require mitigation.	3. Excavation of representative sample, C14 dating, mapping and documentation (Phase 2 investigation); permit required for sampling and destruction [including 2a & 2b]
High significance: sites, where disturbance should be avoided.	4a. Nomination for listing on Heritage Register (National, Provincial or Local) (Phase 2 & 3 investigation); site management plan; permit required if utilised for education or tourism
High significance: Graves and burial places	4b. Locate demonstrable descendants through social consulting; obtain permits from applicable legislation, ordinances and regional by-laws; exhumation and reinterment [including 2a, 2b & 3]

Furthermore, the significance of archaeological sites was based on six main criteria:

- Site integrity (i.e. primary vs. secondary context),
- Amount of deposit, range of features (e.g., stonewalling, stone tools and enclosures),
- Density of scatter (dispersed scatter),
- Social value,
- Uniqueness, and
- Potential to answer current and future research questions.

A fundamental aspect in assessing the significance and protection status of a heritage resource is often

whether or not the sustainable social and economic benefits of a proposed development outweigh the conservation issues at stake. When, for whatever reason the protection of a heritage site is not deemed necessary or practical, its research potential must be assessed and mitigated in order to gain data / information, which would otherwise be lost.

11 ADDENDUM 2: CONVENTIONS USED TO ASSESS THE SIGNIFICANCE OF HERITAGE

11.1 Site Significance Matrix

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

2. SITE EVALUATION			
2.1 Heritage Value (NHRA, section 2 [3])	High	Medium	Low
It has importance to the community or pattern of South Africa's history or pre-colonial history.			
It possesses unique, uncommon, rare or endangered aspects of South Africa's natural or cultural heritage.			
It has potential to yield information that will contribute to an understanding of South Africa's natural and cultural heritage.			
It is of importance in demonstrating the principle characteristics of a particular class of South Africa's natural or cultural places or objects.			
It has importance in exhibiting particular aesthetic characteristics valued by a particular community or cultural group.			
It has importance in demonstrating a high degree of creative or technical achievement at a particular period.			
It has marked or special association with a particular community or cultural group for social, cultural or spiritual reasons (sense of place).			
It has strong or special association with the life or work of a person, group or organisation of importance in the history of South Africa.			
It has significance through contributing towards the promotion of a local sociocultural identity and can be developed as a tourist destination.			
It has significance relating to the history of slavery in South Africa.			
It has importance to the wider understanding of temporal changes within cultural landscapes, settlement patterns and human occupation.			
2.2 Field Register Rating			
National/Grade 1 [should be registered, retained]			
Provincial/Grade 2 [should be registered, retained]			
Local/Grade 3A [should be registered, mitigation not advised]			
Local/Grade 3B [High significance; mitigation, partly retained]			
Generally Protected A [High/Medium significance, mitigation]			
Generally protected B [Medium significance, to be recorded]			
Generally Protected C [Low significance, no further action]			
2.3 Sphere of Significance	High	Medium	Low
International			
National			
Provincial			
Local			
Specific community			

11.2 Impact Assessment Criteria

The following table provides a guideline for the rating of impacts and recommendation of management actions for sites of heritage potential.

Significance of the heritage resource

This is a statement of the nature and degree of significance of the heritage resource being affected by the activity. From a heritage management perspective, it is useful to distinguish between whether the significance is embedded in the physical fabric or in associations with events or persons or in the experience of a place; i.e. its visual and non-visual qualities. This statement is a primary informant to the nature and degree of significance of an impact and thus needs to be thoroughly considered. Consideration needs to be given to the significance of a heritage resource at different scales (i.e. site-specific, local, regional, national or international) and the relationship between the heritage resource, its setting and its associations.

Nature of the impact

This is an assessment of the nature of the impact of the activity on a heritage resource, with some indication of its positive and/or negative effect/s. It is strongly informed by the statement of resource significance. In other words, the nature of the impact may be historical, aesthetic, social, scientific, linguistic or architectural, intrinsic, associational or contextual (visual or non-visual). In many cases, the nature of the impact will include more than one value.

Extent

Here it should be indicated whether the impact will be experienced:

- On a site scale, i.e. extend only as far as the activity;
- Within the immediate context of a heritage resource;
- On a local scale, e.g. town or suburb
- On a metropolitan or regional scale; or
- On a national/international scale.

Duration

Here it should be indicated whether the lifespan of the impact will be:

- Short term, (needs to be defined in context)
- Medium term, (needs to be defined in context)
- Long term where the impact will persist indefinitely, possibly beyond the operational life of the activity, either because of natural processes or by human intervention; or
- Permanent where mitigation either by natural process or by human intervention will not occur in such a way or in such a time span that the impact can be considered transient.

Of relevance to the duration of an impact are the following considerations:

- Reversibility of the impact; and
- Renewability of the heritage resource.

Intensity

Here it should be established whether the impact should be indicated as:

- Low, where the impact affects the resource in such a way that its heritage value is not affected;
- Medium, where the affected resource is altered but its heritage value continues to exist albeit in a modified way; and
- High, where heritage value is altered to the extent that it will temporarily or permanently be damaged or destroyed.

Probability

This should describe the likelihood of the impact actually occurring indicated as:

- Improbable, where the possibility of the impact to materialize is very low either because of design or historic experience;
- Probable, where there is a distinct possibility that the impact will occur;
- Highly probable, where it is most likely that the impact will occur; or
- Definite, where the impact will definitely occur regardless of any mitigation measures

Confidence

This should relate to the level of confidence that the specialist has in establishing the nature and degree of impacts. It relates to the level and reliability of information, the nature and degree of consultation with I&AP's and the dynamic of the broader socio-political context.

- High, where the information is comprehensive and accurate, where there has been a high degree of consultation and the socio-political context is relatively stable.
- Medium, where the information is sufficient but is based mainly on secondary sources, where there has been a limited targeted consultation and socio-political context is fluid.
- Low, where the information is poor, a high degree of contestation is evident and there is a state of socio-political flux.

Impact Significance

The significance of impacts can be determined through a synthesis of the aspects produced in terms of the nature and degree of heritage significance and the nature, duration, intensity, extent, probability and confidence of impacts and can be described as:

- Low; where it would have a negligible effect on heritage and on the decision
- Medium, where it would have a moderate effect on heritage and should influence the decision.
- High, where it would have, or there would be a high risk of, a big effect on heritage. Impacts of high significance should have a major influence on the decision;
- Very high, where it would have, or there would be high risk of, an irreversible and possibly irreplaceable negative impact on heritage. Impacts of very high significance should be a central factor in decision-making.

11.3 Direct Impact Assessment Criteria

The following table provides an outline of the relationship between the significance of a heritage context, the intensity of development and the significance of heritage impacts to be expected

HERITAGE CONTEXT	TYPE OF DEVELOPMENT			
	CATEGORY A	CATEGORY B	CATEGORY C	CATEGORY D
CONTEXT 1 High heritage Value	Moderate heritage impact expected	High heritage impact expected	Very high heritage impact expected	Very high heritage impact expected
CONTEXT 2 Medium to high heritage value	Minimal heritage impact expected	Moderate heritage impact expected	High heritage impact expected	Very high heritage impact expected
CONTEXT 3 Medium to low heritage value	Little or no heritage impact expected	Minimal heritage impact expected	Moderate heritage impact expected	High heritage impact expected
CONTEXT 4 Low to no heritage value	Little or no heritage impact expected	Little or no heritage impact expected	Minimal heritage value expected	Moderate heritage impact expected
NOTE: A DEFAULT "LITTLE OR NO HERITAGE IMPACT EXPECTED" VALUE APPLIES WHERE A HERITAGE RESOURCE OCCURS OUTSIDE THE IMPACT ZONE OF THE DEVELOPMENT.				
HERITAGE CONTEXTS		CATEGORIES OF DEVELOPMENT		
<p>Context 1: Of high intrinsic, associational and contextual heritage value within a national, provincial and local context, i.e. formally declared or potential Grade 1, 2 or 3A heritage resources</p> <p>Context 2: Of moderate to high intrinsic, associational and contextual value within a local context, i.e. potential Grade 3B heritage resources.</p> <p>Context 3:</p>		<p>Category A: Minimal intensity development</p> <ul style="list-style-type: none"> - No rezoning involved; within existing use rights. - No subdivision involved. - Upgrading of existing infrastructure within existing envelopes - Minor internal changes to existing structures - New building footprints limited to less than 1000m². <p>Category B: Low-key intensity development</p> <ul style="list-style-type: none"> - Spot rezoning with no change to overall zoning of a site. - Linear development less than 100m 		

<p>Of medium to low intrinsic, associational or contextual heritage value within a national, provincial and local context, i.e. potential Grade 3C heritage resources</p> <p>Context 4: Of little or no intrinsic, associational or contextual heritage value due to disturbed, degraded conditions or extent of irreversible damage.</p>	<ul style="list-style-type: none"> - Building footprints between 1000m2-2000m2 - Minor changes to external envelop of existing structures (less than 25%) - Minor changes in relation to bulk and height of immediately adjacent structures (less than 25%). <p>Category C: Moderate intensity development</p> <ul style="list-style-type: none"> - Rezoning of a site between 5000m2-10 000m2. - Linear development between 100m and 300m. - Building footprints between 2000m2 and 5000m2 - Substantial changes to external envelop of existing structures (more than 50%) - Substantial increase in bulk and height in relation to immediately adjacent buildings (more than 50%) <p>Category D: High intensity development</p> <ul style="list-style-type: none"> - Rezoning of a site in excess of 10 000m2 - Linear development in excess of 300m. - Any development changing the character of a site exceeding 5000m2 or involving the subdivision of a site into three or more erven. - Substantial increase in bulk and height in relation to immediately adjacent buildings (more than 100%)
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11.4 Management and Mitigation Actions

The following table provides a guideline of relevant heritage resources management actions is vital to the conservation of heritage resources.

<p>No further action / Monitoring</p> <p>Where no heritage resources have been documented, heritage resources occur well outside the impact zone of any development or the primary context of the surroundings at a development footprint has been largely destroyed or altered, no further immediate action is required. Site monitoring during development, by an ECO or the heritage specialist are often added to this recommendation in order to ensure that no undetected heritage\ remains are destroyed.</p> <p>Avoidance</p> <p>This is appropriate where any type of development occurs within a formally protected or significant or sensitive heritage context and is likely to have a high negative impact. Mitigation is not acceptable or not possible. This measure often includes the change / alteration of development planning and therefore impact zones in order not to impact on resources.</p> <p>Mitigation</p> <p>This is appropriate where development occurs in a context of heritage significance and where the impact is such that it can be mitigated to a degree of medium to low significance, e.g. the high to medium impact of a development on an archaeological site could be mitigated through sampling/excavation of the remains. Not all negative impacts can be mitigated.</p> <p>Compensation</p> <p>Compensation is generally not an appropriate heritage management action. The main function of management actions should be to conserve the resource for the benefit of future generations. Once lost it cannot be renewed. The circumstances around the potential public or heritage benefits would need to be exceptional to warrant this type of action, especially in the case of where the impact was high.</p> <p>Rehabilitation</p> <p>Rehabilitation is considered in heritage management terms as a intervention typically involving the adding of a new heritage layer to enable a new sustainable use. It is not appropriate when the process necessitates the removal of previous historical layers, i.e. restoration of a building or place to the previous state/period. It is an appropriate heritage management action in the following cases:</p> <ul style="list-style-type: none"> - The heritage resource is degraded or in the process of degradation and would benefit from rehabilitation. - Where rehabilitation implies appropriate conservation interventions, i.e. adaptive reuse, repair and maintenance, consolidation and minimal loss of historical fabric. - Where the rehabilitation process will not result in a negative impact on the intrinsic value of the resource. <p>Enhancement</p>
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