



ESKOM DISTRIBUTION NORTH WEST REGION

Frankfort Strengthening Project: Proposed Construction of a Substation and a 132kV Power Line from Heilbron (via Frankfort) to Villiers, Free State Province

Draft Basic Assessment Report


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ESKOM DISTRIBUTION NORTH WESTERN REGION

PROPOSED CONSTRUCTION OF A SUBSTATION AND A 132KV POWER LINE FROM HEILBRON (VIA FRANKFORT) TO VILLIERS, FREE STATE PROVINCE

DRAFT BASIC ASSESSMENT REPORT

Executive Summary

Eskom Holdings SOC Limited (hereafter referred to as Eskom) is proposing to construct a single 132kV line from Heilbron to Villiers, passing Frankfort. The power line will be approximately 95km in length and will consist of four sections that will connect to four existing and one newly proposed substation via a loop-in loop-out connection. The four existing substations include Frankfort Municipal Substation, Windfield Rural Substation, Villiers Municipal Substation and Heilbron Municipal Substation. The newly proposed substation will be located near to the existing Tweefort Rural Substation.

The network in the area needs to be strengthened as there is no additional load growth possible on the existing 88kV network in the Heilbron/Frankfort/Villiers area. All developments have therefore been halted as electricity provision could not be guaranteed.

SiVEST Environmental Division has been appointed as independent Environmental Assessment Practitioner (EAP) by Eskom to undertake a Basic Assessment (BA) for the proposed project. The proposed development requires environmental authorisation from the National Department of Environmental Affairs (DEA). Provincial authorities have also been consulted i.e. The Free State Department of Economic Development, Tourism and Environmental Affairs (DETEA). The BA for the proposed development will be conducted in terms of the 2010 Environmental Impact Assessment (EIA) Regulations promulgated in terms of section 24(5) and section 44 of the National Environmental Management Act (No. 107 of 1998) (NEMA), as amended, in Government Notice (GN) No. R543. In terms of these regulations, a Basic Assessment (BA) is required for the proposed project. All relevant legislations and guidelines were consulted during the BA process and will be complied with at all times.

Depending on the issuing date of the Environmental Authorisation (EA), should it be granted by the National Department of Environmental Affairs (DEA), it is proposed that Eskom will commence construction in March 2014. The construction period for the proposed power line and substation is estimated to be 18 months. This includes the clearing of the servitude (where required), construction of the towers, stringing of the conductors and commissioning of the newly proposed line and substation.

The proposed power line will consist of a series of connecting lines between the existing substations (**Figure i**). The four main sections and the associated alternatives for the proposed power line include the following:

- Alternative 1C – Heilbron to New Proposed Northern Tweefort Rural Substation (approximately 37km in length);
- Alternative 1D – Heilbron to New Proposed Southern Tweefort Rural Substation (approximately 43km in length);
- Alternative 1E – Heilbron to New Proposed Northern Tweefort Rural Substation (approximately 40km in length);
- Alternative 1F – Heilbron to New Proposed Southern Tweefort Rural Substation (approximately 41km in length);
- Alternative 2C – New Proposed Northern Tweefort Rural Substation to Frankfort Municipal Substation (approximately 22km in length);
- Alternative 2D – New Proposed Southern Tweefort Rural Substation to Frankfort Municipal Substation (approximately 28km in length);
- Alternative 2E – New Proposed Southern Tweefort Rural Substation to Frankfort Municipal Substation (approximately 31km in length);
- Alternative 2F – New Proposed Northern Tweefort Rural Substation to Frankfort Municipal Substation (approximately 31.5km in length);
- Alternative 3A – Frankfort Substation to Windfield Rural Substation (approximately 15km);
- Alternative 3B – Frankfort Substation to Windfield Rural Substation (approximately 15km);
- Alternative 4A – Windfield Rural Substation to Villiers Substation (approximately 15km); and
- Alternative 4B – Windfield Rural Substation to Villiers Substation (approximately 16km).

The two alternatives for the proposed substation at Tweefort (**Figure i**) include the following:

- Alternative 1 – Proposed Northern Tweefort Rural Substation
- Alternative 2 – Proposed Southern Tweefort Rural Substation

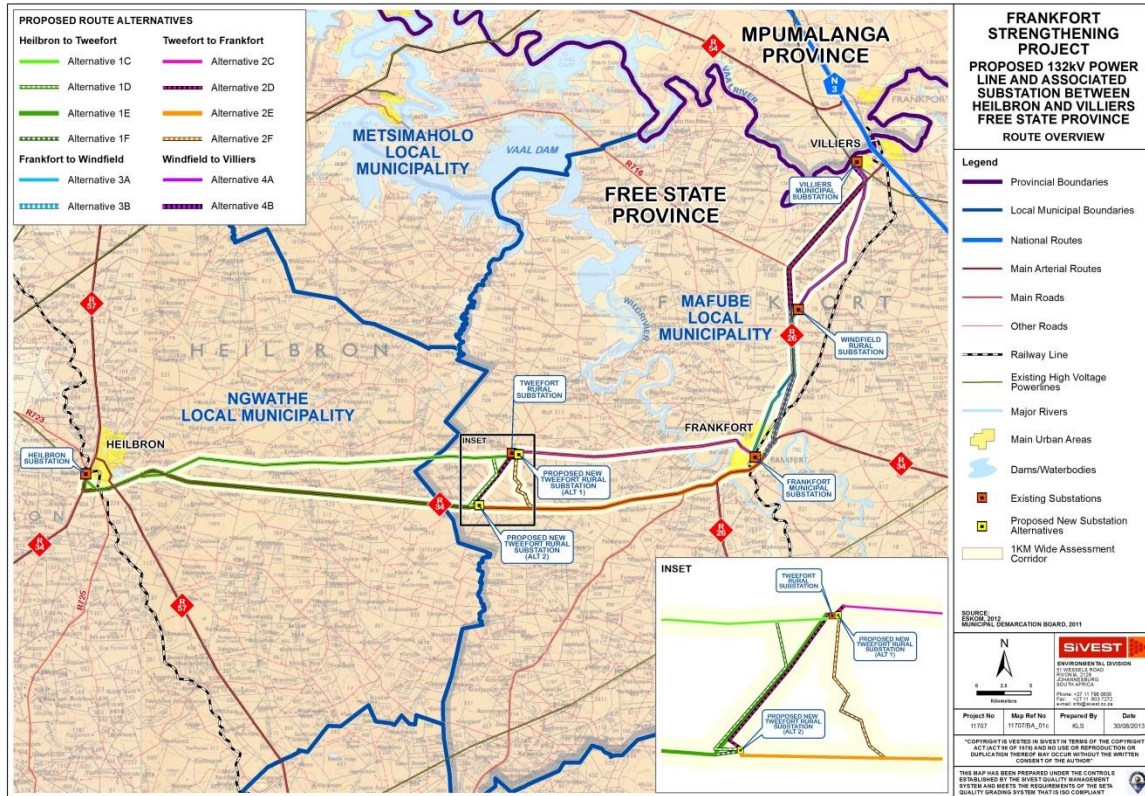


Figure i: Locality Map of the proposed route corridor and substation alternatives

The study area is located within the Free State Province in the heart of South Africa’s Maize triangle. The proposed power lines fall within the greater Fezile Dabe District Municipality and traverse two local municipal areas namely Ngwathe and Mafube Local Municipalities. The proposed line originates from the town of Heilbron and routes eastwards to Frankfort where it then deviates to the north at Villiers. The proposed power line follows on or near to the R34 and the R26. The landscape is predominantly rural in character. Land uses for the greater part of the power line encompass agricultural farming activities. Commercial and residential land uses can be found in the towns of Heilbron, Frankfort and Villiers. All the proposed route corridor alternatives traverse open agricultural areas for the vast majority of their alignments. Where possible, the alternatives run parallel to major and minor roadways, farm boundaries, existing power lines and along the outer periphery of urban areas.

Several specialist studies were conducted during the BA to identify the issues associated with the proposed development. These include:

- Biodiversity (fauna, flora and avifauna)
- Surface water
- Floodlines
- Agricultural potential and soil
- Visual Impact
- Heritage

- Socio-economic

Table i: Summary of findings

Environmental Parameter	Summary of major findings	Recommendations
Biodiversity	<ul style="list-style-type: none"> ▪ The survey area does not include conserved areas, important birding areas, areas of conservation significance or areas of plant endemism. ▪ Migratory routes however of avifaunal species were identified. The survey area falls within the grassland biome. ▪ Cultivation and livestock is common through-out the area. ▪ No protected or Red Data List (RDL) floral species have been recorded ▪ Two orange listed species have been recorded as declining (<i>Boophane disticha</i> & <i>Crinum bulbispermum</i>). ▪ Of the 76 mammalian species that have been historically recorded from the region and the only RDL species is <i>Mystromys albicaudatus</i> (white tailed rat). ▪ Various groups of avi fauna are represented in the area. ▪ Inclusion of endemic reptilian species are relatively high (19 of 43 recorded species). Only the Giant girdled lizard (sungazer) <i>Cordylus giganteus</i> is of conservational significance and is regarded as vulnerable. ▪ There are 11 amphibian species recorded from the region. However none of these species are considered to be of conservational concern. 	<ul style="list-style-type: none"> ▪ Due to the higher disturbance factors (newly-established and existing tarred roads, overhead distribution power lines and telephone lines, and the greatest proportion of buildings), the alternatives that follow the main roads (Options 1F, 2E, 3B and 4B) are therefore the preferred alternatives and are thought to have the least overall ecological impact within the region. ▪ There was no preferred site for the proposed Tweefort Substation locality. ▪ Impacts on biodiversity and habitat conservation can be successfully mitigated with the sincere efforts of the contractor and construction teams. ▪ A walk through survey of the proposed alternative should be undertaken once a set route has been established. ▪ For potential avi-faunal impacts, it is recommended that the appropriate mitigation measures are taken by means of marking all of the sections of the power lines that pass through migratory routes. ▪ Towers should be fitted with perching aversion fixtures. ▪ It is also further recommended that routine surveys be undertaken once construction has been completed in order to identify any further avifaunal collision hotspot areas. The sections of line within these areas should also

Environmental Parameter	Summary of major findings	Recommendations
		<p>be marked.</p> <ul style="list-style-type: none"> ▪ A holistic habitat conservation approach should be adopted by keeping general habitat destruction and construction footprints to an absolute minimum.
Surface Water	<ul style="list-style-type: none"> ▪ Twenty eight (28) channelled valley bottom wetlands, forty nine (49) unchannelled valley bottom wetlands, ten (10) floodplain wetlands, seventeen (17) depression (pan) wetlands and twenty one (21) artificial wetlands were identified. ▪ Two major river systems included Wilge and Vaal rivers. ▪ A 50m buffer was applied to the delineated wetlands and a buffer zone of 100m was applied to the riparian habitat of the Vaal and Wilge rivers. ▪ A generic rehabilitation plan has been proposed to remediate anticipated potential construction impacts to the sensitive areas. 	<ul style="list-style-type: none"> ▪ The following alternatives are proposed as having the least potential impact: <ul style="list-style-type: none"> ○ Alternative 2 – Proposed Southern Tweefort Substation; ○ Alternative 1F ○ Alternative 2D ○ Alternative 3B ○ Alternative 4B ▪ A final wetland walk-down study is to be conducted once the final power line route has been planned. ▪ Present Ecological Status (PES) and Environmental Importance and Sensitivity (EISC) assessments should also be undertaken where relevant for the wetlands that fall directly within the power line route. A surface water risk assessment should accompany this assessment.
Floodlines	<p>Several water courses and rivers are intersected by the various route alternatives. The points of intersection are where the route corridors overlap the 1:100 year flood lines. Some routes intersect more 1:100 year flood lines than others. A summary of the impact of each of the routes on the flood lines is as follows:-</p> <ul style="list-style-type: none"> ▪ Alternative 1A – Intersects 6 flood lines. ▪ Alternative 1B – Intersects 4 flood lines. ▪ Alternative 2A – Intersects 6 flood 	<p>Flood lines should serve only as a guideline to Eskom in the selection of the routing and the siting of towers. A demarcated 1:100 year flood line does not mean that a tower cannot be sited in the delineated area. But it does mean that if such a siting is intended, then a WULA will have to be applied for, and the engineering of the tower will need to take into account flood protection.</p> <p>The preferred routing from a floodline perspective includes:</p> <ul style="list-style-type: none"> ▪ Alternative 1F Heilbron to Tweefort,

Environmental Parameter	Summary of major findings	Recommendations
	<p>lines.</p> <ul style="list-style-type: none"> ▪ Alternative 2B – Intersects 6 flood lines. ▪ Alternative 3A – Intersects 2 flood lines. ▪ Alternative 3B – Intersects 1 flood lines. ▪ Alternative 4A – Intersects 1 flood lines. ▪ Alternative 4B – Intersects 1 flood lines. <p>The main factors or features of the flood lines that impact on the power line routes are:-</p> <ul style="list-style-type: none"> ▪ The width of the flood line envelopes impacts on the siting of the towers and the available tower spacing to swing the power lines across the flood lines. ▪ The elongation of the flood lines within the power line corridors impacts on the available width within the corridors to route the power lines past the flood lines. ▪ The number of successive flood lines that need to be crossed by the power lines impacts on the efficient and uniform spacing of the towers. 	<ul style="list-style-type: none"> ▪ Alternative 2E Tweefort to Frankfort, ▪ Alternative 3B Frankfort to Windfield, and ▪ Alternative 4B Windfield to Villiers.
<p>Agricultural potential and soils</p>	<ul style="list-style-type: none"> ▪ Agricultural (cultivation and grazing) is one of the dominant land uses. ▪ High value agricultural resources are relatively scarce and found in pockets throughout the study area. These areas are of primary concern and need to be protected from non-agricultural land uses and developments. ▪ The only loss of agricultural land will be directly below the proposed electricity tower footprints which are 	<ul style="list-style-type: none"> ▪ It is recommended that careful routing of the power line and tower placement should be considered to mitigate potential impacts. ▪ Tower placement should be on the edge of existing agricultural areas and span active agricultural fields as far as possible. ▪ Following existing roads and utilising the edge of road servitudes is also highly recommended due to the existing impacts associated with

Environmental Parameter	Summary of major findings	Recommendations
	relatively insignificant.	<p>these areas.</p> <ul style="list-style-type: none"> ▪ The following alternative routes were preferred: <ul style="list-style-type: none"> ○ Alternative 1C & 1D ○ Alternative 2F ○ Alternative 3A ○ Alternative 4B ▪ Both substation alternatives (1 and 2) avoid actively cultivated land and are both located on unimproved veld and thus are acceptable from an agricultural perspective. ▪ If the recommendations and mitigation measures outlined are implemented then the proposed developments will have a very limited impact on agricultural production.
Visual	<ul style="list-style-type: none"> ▪ Most of the study area has a rural pastoral visual character. ▪ No visually sensitive receptors were identified. ▪ Several farmsteads are present and the proposed development may be an unwelcome intrusion ▪ Visual sensitivity varies across the study area. ▪ The proposed development would have a low to moderate visual impact on receptors within most of the study area. 	<ul style="list-style-type: none"> ▪ The following alternatives were preferred from a visual perspective: <ul style="list-style-type: none"> ○ Alternative 1C ○ Alternative 2C ○ Alternative 3A or 3B ○ Alternative 4A or 4B ○ Alternative 1 Tweefort Substation ▪ Align the power line as far away from sensitive receptor locations as possible. ▪ Align the power line to run parallel to existing power lines of equal or greater magnitude. ▪ Avoid crossing areas of higher elevation, especially ridges, koppies or hills. ▪ Avoid areas of natural wooded vegetation where possible. ▪ The visual impacts resulting from the proposed power line and substation would be low as long as the recommended mitigation measures

Environmental Parameter	Summary of major findings	Recommendations
		are implemented.
Heritage	<ul style="list-style-type: none"> ▪ The study area is located mainly within a highly modified agricultural area. ▪ The only sites of heritage significance that were identified were two burial sites. ▪ The first burial site consists of several thousand graves in the Namahadi Township and the second burial site is much smaller consisting of at least four graves. 	<ul style="list-style-type: none"> ▪ The first burial site should preferably not be traversed. The township access road could be used as an alternative to avoid the burial sites. However, it is suggested that the second alternative (Alternative 3B) to the south be utilized. ▪ The second burial site could easily be avoided through specific pylon placement. The choice of alternative 4B will avoid the large cemetery site. ▪ Two burial sites are located within the alternative corridors. It is possible that further sites might be found in the various alternative corridors that have not been identified by the initial study. It is therefore recommended that the chosen alternative undergoes a walk-down evaluation on the final pylon placement choice. ▪ The following power line alternatives were preferred: ▪ The following power line alternatives are recommended and preferred: <ul style="list-style-type: none"> ○ Alternative 1E ○ Alternative 2E ○ Alternative 3B ○ Alternative 4A or 4B ▪ The following substation alternatives are recommended and preferred: <ul style="list-style-type: none"> ○ Alternative 2 – Proposed Southern Tweefort Substation.
Socio-economic	<ul style="list-style-type: none"> ▪ The calculated increase in population in these study areas will translate into an increased demand for electricity and therefore require greater electrical capacity. ▪ The projected increase in the number of households will have an 	<ul style="list-style-type: none"> ▪ The following power line alternatives are recommended and preferred: <ul style="list-style-type: none"> ○ Alternative 1F ○ Alternative 2E ○ Alternative 3B ○ Alternative 4B ▪ The following substation alternatives

Environmental Parameter	Summary of major findings	Recommendations
	<p>upward impact on electricity demand in the study area, thus requiring greater electrical capacity.</p> <ul style="list-style-type: none"> ▪ There is insufficient load growth capacity in the Frankfort region to increase household connectivity to 100%, thus implying the need for investment in electrical infrastructure. ▪ The relative importance of agriculture and agro-processing to the local economy indicates the need to balance electricity provision with farmland preservation. ▪ Positive growth in the study area, particularly in the Mafube LM, is indicative of an increased demand for electricity. Growth in economic output and thus electricity consumption is also expected to accelerate in the coming years as the economy continues to recover. ▪ The labour force profile indicates high demand for employment in the narrow study area. The proposed power line and substation can address this issue, albeit marginally, through direct job creation during the construction phase. The project may also facilitate small business and industrial growth/employment by providing greater electrical capacity to the region. ▪ The labour intensity of agriculture implies a need to balance farming activity with infrastructure development. Therefore, the impact of constructing the proposed power line and substation on farmland should be minimised. ▪ The skills profile indicates that the availability of local labour for the 	<p>are recommended and preferred:</p> <ul style="list-style-type: none"> ○ Alternative 2 – Proposed Southern Tweefort Substation.

Environmental Parameter	Summary of major findings	Recommendations
	<p>proposed project is limited largely to low-skilled construction workers and a small number of skilled electrical staff. These workers should however be utilised as much as possible in order to alleviate local unemployment.</p> <ul style="list-style-type: none"> ▪ The lower average income levels in the narrow study area (Mafube LM and Ngwathe LM) indicate a higher demand for employment and a lower level of household electricity consumption than in the wider economy. ▪ The farming activities currently conducted along the proposed power line routes and near the proposed substation can be safely continued underneath and around the planned 132KV power line. Therefore the anticipated impact of these activities on local farming output is minimal. ▪ The three villages situated along the proposed power line route currently serve as regional nodes in the larger rural economy. As identified in the Municipal IDPs these nodes have the potential for accelerated economic growth fuelled by the agro-processing, service and tourism industries. However, the further development of Heilbron, Frankfort and Villiers requires access to reliable electricity underscoring the importance of the proposed power line upgrade. ▪ The Namahadi village, located adjacent to Frankfort, is the only residential settlement which may be directly impacted by the proposed power line. 	

Environmental Parameter	Summary of major findings	Recommendations
	<ul style="list-style-type: none"> ▪ The on-going operation of existing small businesses and agro-industries and the establishment of new enterprise requires access to reliable electricity supply. At present the only businesses that may be directly impacted by the proposed power line operate in the Namahadi village adjacent to Frankfort. ▪ Construction of the proposed power line along alternative routes 2A and 3A will have a significant impact on Namahadi village. This includes, at minimum, the relocation of 159 homes, 8 businesses and 12 subsistence farms. 	

An impact assessment was conducted to ascertain the level of each identified impact, as well as mitigation measures which may be required. The potential positive and negative impacts associated with the proposed development were evaluated and rated accordingly. The results of the specialist studies have indicated that no fatal flaws exist as a result of the proposed development.

Based on the findings of all the specialist studies, a composite environmental sensitivity map was generated to highlight sensitive areas and inform the selection of a preferred power line corridor alternative route and preferred alternative substation location. This is shown in **Figure ii**.

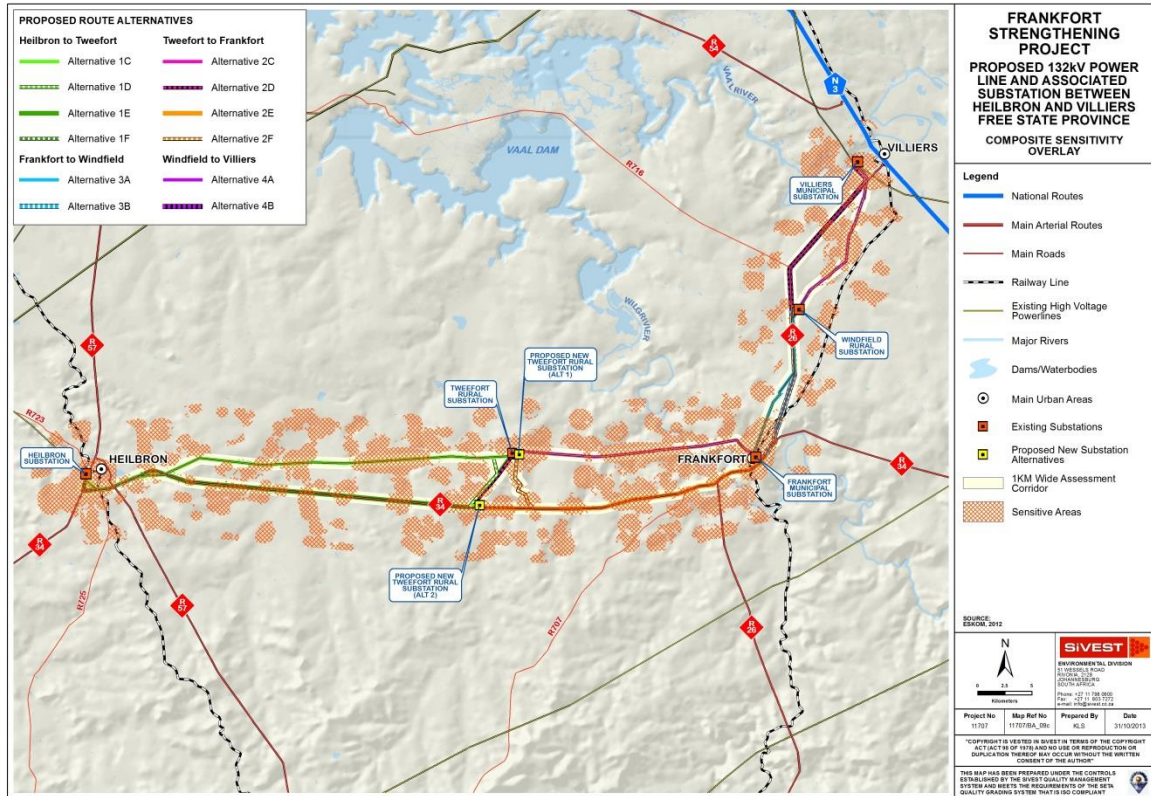


Figure ii: Composite Environmental Sensitivity Map

Accordingly, the following power line alternatives are recommended and preferred:

- **Alternative 1F**
- **Alternative 2E**
- **Alternative 3B**
- **Alternative 4B**

The following substation alternatives are recommended and preferred:

- **Alternative 2 – Proposed Southern Tweefort Substation.**

The preferred route alignment, according to the specialist findings, is indicated in **Figure iii**.

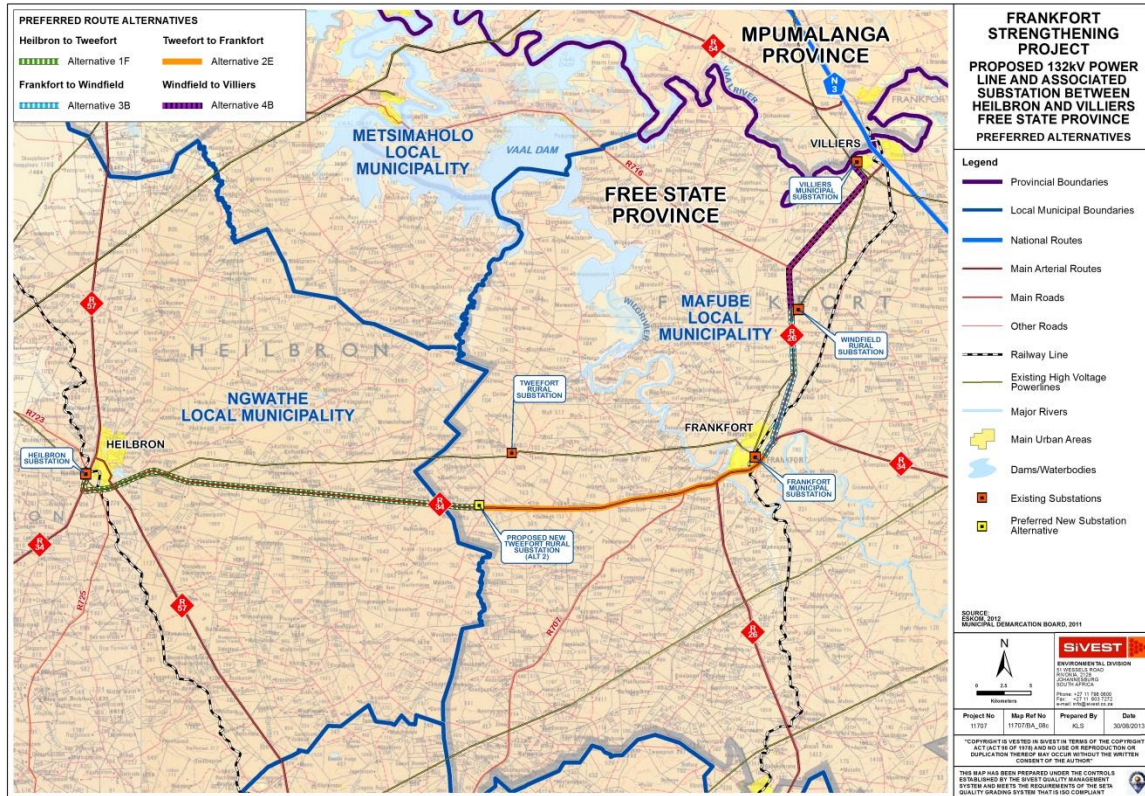


Figure iii: Preferred Power Line Corridor and Substation Site

A thorough public participation process (PPP) was undertaken as part of the BA. During this process on-going consultation took place with various key stakeholders and organs of state, which include provincial, district and local authorities, relevant government departments, parastatals and NGO's.

It is the opinion of the EAP that the proposed project should be allowed to proceed provided that the recommended mitigation measures are implemented, and provided the following conditions are adhered to:

- All mitigation measures recommended by the various specialists should be strictly implemented.
- Final EMPr should be approved by DEA prior to construction.

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DRAFT BASIC ASSESSMENT REPORT

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Appendix D2: Surface Water Impact Assessment

Appendix D3: Agricultural Potential and Soils Assessment

Appendix D4: Heritage Impact Assessment

Appendix D5: Visual Impact Assessment

Appendix D6: Socio-economic Impact Assessment

Appendix D7: Floodline Assessment

Appendix D8: Specialist Terms of Reference (ToR)

Appendix E: Public Participation Report

Appendix E1: Proof of Advertisements and Site Notices

Appendix E2: Proof of Written Notification to Stakeholders

Appendix E3: Comments and Response Report

Appendix E4: Proof of Written Notification to Authorities and Organs of State

Appendix E5: I&APs Database

Appendix E6: Correspondence and Meeting Minutes (Meeting Minutes will be included in FBAR)

Appendix F: Impact Assessment

Appendix G: Environmental Management Programme (EMPr)

Appendix H: Details of the EAP and Expertise

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Appendix J3: Coordinate Spreadsheets

Appendix J4: Property Description Spreadsheet

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Appendix J6: Photographs of Typical Construction Activities

Glossary of terms

Biodiversity: The variety of life in an area, including the number of different species, the genetic wealth within each species, and the natural areas where they are found.

Basic Assessment: The process of collecting, organising, analysing, interpreting and communicating information that is relevant to the consideration of the application.

Environment: NEMA defines "environment" as "the surroundings within which humans exist and that are made up of the land, water and atmosphere of the earth; micro-organisms, plant and animal life; any interrelationships among and between them and the physical, chemical aesthetic and cultural properties and conditions that influence human health and well-being".

Environmental Control Officer (ECO): Person/organisation appointed by the Contractor who will provide direction to the Project Manager concerning the activities within the Construction Zone, and who will be responsible for conducting the environmental audit of the project during the construction phase of the project according to the provisions of the Environmental Management Plan.

Environmental Management Programme (EMPr): The EMPr is a detailed plan for the implementation of the mitigation measures to minimise negative environmental impacts during the life-cycle of a project. The EMPr contributes to the preparation of the contract documentation by developing clauses to which the contractor must adhere for the protection of the environment. The EMPr specifies how the construction of the project is to be carried out and includes the actions required for the Post-Construction Phase to ensure that all the environmental impacts are managed for the duration of the project's life-cycle.

Rehabilitation: Rehabilitation is defined as the return of a disturbed area to a state which approximates the state (where possible) which it was in before disruption. Rehabilitation for the purposes of this specification is aimed at post-reinstatement re-vegetation of a disturbed area and the insurance of a stable land surface. Re-vegetation should aim to accelerate the natural succession processes so that the plant community develops in the desired way, i.e. promote rapid vegetation establishment.

List of abbreviations

BA	Basic Assessment
BAR	Basic Assessment Report
C&RR	Comments and Response Report
DAFF	Department of Agriculture, Forestry and Fisheries
DETEA	Department of Economic Development, Tourism and Environmental Affairs
DWA	Department of Water Affairs
DWA	Department of Water Affairs and Forestry
EAP	Environmental Assessment Practitioner
EIA	Environmental Impact Assessment
EMF	Electric and Magnetic Fields
EMPr	Environmental Management Programme
EWT	Endangered Wildlife Trust
GIS	Geographic Information System
GN	Government Notice
HIA	Heritage Impact Assessment
I&AP	Interested and Affected Party
IDP	Integrated Development Plan
kV	Kilovolt
NEMA	National Environmental Management Act, 1998 (Act No.107 of 1998)
NEMBA	National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004)
NFA	National Forests Act, 1998 (Act No. 84 of 1998)
NHRA	National Heritage Resources Act, 1999 (Act No. 25 of 1999)
NWA	National Water Act, 1998 (Act No. 36 of 1998)
PPP	Public Participation Process
RDL	Red Data List
SAHRA	South African Heritage Resources Agency
SANBI	South African National Biodiversity Institute
SANRAL	South African National Roads Agency SOC Limited
SDF	Spatial Development Framework
SG	Surveyor General
SKA	Square Kilometre Array
SOC	State Owned Company

ESKOM DISTRIBUTION NORTH WESTERN REGION

PROPOSED CONSTRUCTION OF A SUBSTATION AND A 132KV POWER LINE FROM HEILBRON (VIA FRANKFORT) TO VILLIERS, FREE STATE PROVINCE

DRAFT BASIC ASSESSMENT REPORT

INTRODUCTION

Eskom Distribution North Western Region (hereafter referred to as Eskom) is proposing to construct a substation and a single 132kV line from Heilbron to Villiers, passing through Frankfort. The power line will be approximately 95km in length and will consist of four main sections that will connect to the four existing substations and to the newly proposed substation via a loop-in loop-out connection. SiVEST Environmental Division has been appointed as independent Environmental Assessment Practitioner (EAP) by Eskom to undertake a Basic Assessment (BA) for the proposed project.

The network in the area needs to be strengthened as there is no additional load growth possible on the existing 88kV network in the Heilbron/Frankfort/Villiers area. All developments have therefore been halted as electricity provision could not be guaranteed.

1. Project Description

The project is for the proposed construction of a substation and a single 132kV power line. The power line will be approximately 95km in length and will consist of four main sections that will connect to four existing substations and one newly proposed substation via a loop-in loop-out connection. The four existing substations include Frankfort Municipal Substation, Windfield Rural Substation, Villiers Municipal Substation and Heilbron Municipal Substation. The newly proposed substation will be located near to the existing Tweefort Rural Substation. The proposed power lines therefore are not separate power lines but rather connecting lines between the existing substations and the newly proposed substation along the greater power line network. The registered servitude width will be 31 metres (15.5 metres either side of the centre line). The four main sections of power lines include the following:

- Proposed construction of a power line from Heilbron Substation to the newly proposed Tweefort Substation near Tweefort Rural Substation (approximately 40km in length);
- Proposed construction of a power line from Tweefort Substation to Frankfort Municipal Substation (approximately 25km in length);
- Proposed construction of a power line from Frankfort Municipal Substation to Windfield Rural Substation (approximately 15km); and

- Proposed construction of a power line from Windfield Rural Substation to Villiers Substation (approximately 15km).

a) Proposed Route Alternatives

For each section of the proposed power line, two main alternative routes are proposed for the four main power line connections. Additionally, four sub-alternatives are proposed for the proposed power line alignments from the main alternative power lines originating from Heilbron routing to the newly proposed Tweefort Substation. Twelve alternative alignments are therefore proposed in total. The proposed study area for each of the alternative power lines includes a corridor width of 1km (500m either side of the centre line). The width of the corridor will provide Eskom with sufficient space to negotiate and secure a servitude of 31m that would be required for the proposed 132kV power line. Each Alternative Route is outlined below:

- Alternative 1C – Heilbron to New Proposed Northern Tweefort Rural Substation (approximately 37km in length);
- Alternative 1D – Heilbron to New Proposed Southern Tweefort Rural Substation (approximately 43km in length);
- Alternative 1E – Heilbron to New Proposed Northern Tweefort Rural Substation (approximately 40km in length);
- Alternative 1F – Heilbron to New Proposed Southern Tweefort Rural Substation (approximately 41km in length);
- Alternative 2C – New Proposed Northern Tweefort Rural Substation to Frankfort Municipal Substation (approximately 22km in length);
- Alternative 2D – New Proposed Southern Tweefort Rural Substation to Frankfort Municipal Substation (approximately 28km in length);
- Alternative 2E – New Proposed Southern Tweefort Rural Substation to Frankfort Municipal Substation (approximately 31km in length);
- Alternative 2F – New Proposed Northern Tweefort Rural Substation to Frankfort Municipal Substation (approximately 31.5km in length);
- Alternative 3A – Frankfort Substation to Windfield Rural Substation (approximately 15km);
- Alternative 3B – Frankfort Substation to Windfield Rural Substation (approximately 15km);
- Alternative 4A – Windfield Rural Substation to Villiers Substation (approximately 15km); and
- Alternative 4B – Windfield Rural Substation to Villiers Substation (approximately 16km).

b) Tower Types

The tower types that are to be used will vary in relationship between the structure, the terrain to be traversed, ground clearance requirements, geology, etc. The various tower types include the following:

- Mono-pole guyed intermediate suspension structures;
- Mono-pole self-supporting intermediate suspension structures;
- Mono-pole angle suspension structures;

- Mono-pole strain structures;
- H-Pole structures; and
- 3 Pole strain structures.

The type of tower that would be used for this proposed 132kV power line will be determined once a routing has been negotiated and a servitude has been secured.

The foundation depths will range between 1.5-2m. Spanning lengths between tower type structures will be between 225-250m. The tower type structures will vary in length from 18-24m in height. Finally, a Chickadee conductor is to be used.

An illustration of an example of one of the proposed towers is provided in **Figure 1** below.



Figure 1. Proposed Tower Type

c) **Proposed Substation**

Tweefort Rural 88/22kV Substation is fed with a T-off from the Heilbron Rural – Frankfort Municipality 88kV line. Should there be a fault on the line it will cause total loss of the Tweefort Rural Substation. Three 22kV feeders are fed from this sub namely; Beta, Grasplaats and Kalkfontein feeder. The total length of the Kalkfontein feeder is 298km which it makes maintenance difficult. A large group of customers are affected for long periods of time during outages (due to time taken for maintenance on the long power line and adverse weather conditions). The unplanned durations per customer connected therefore are high, on the Kalkfontein line. If the Kalkfontein line is to be split at the TK32 T-off, it will minimize the number of customers affected and the time taken to resolve a fault. Therefore it is proposed that a new Tweefort Substation will be constructed. This will include the installation of a 132kV busbar (to accommodate 2 x 132kV feeder bays and 2 x transformer bays). 2 x 132kV feeder bays will be installed. The existing 1 x 4MVA complete transformer bay will be relocated from the Tweefort Rural Substation to the new Tweefort Substation. A 22kV busbar (to accommodate

2 x transformer bays and 5 x 22kV feeder bays) will be installed as well as 4 x 22kV feeder bays. A new control room and yard stones will be required. The construction of a new access road as well as 2 x 14m lightning masts equipped with lights will be installed. The servitude to the substation will also be fenced off.

The substation will occupy an area of approximately 100m x 100m. The specifications of the substation will include the following:

- Install 132kV busbar (to accommodate 2 x 132kV feeder bays and 2 x transformer bays);
- Install 2 x 132kV feeder bays;
- Install 1 x 5MVA complete transformer bay;
- Make provision for additional transformer for future growth;
- Install 22kV busbar (to accommodate 2 x transformer bays and 5 x 22kV feeder bays);
- Install 4 x 22kV feeder bays;
- Make provision for additional 22kV feeder bay for future growth;
- Build a new control room;
- Add yard stones;
- Build a new access road;
- Install 2 x 14m lightning masts and equip with lights; and
- Fence off the substation servitude.

The two alternatives for the proposed substation at Tweefort include the following:

- Alternative 1 – Proposed Northern Tweefort Rural Substation
- Alternative 2 – Proposed Southern Tweefort Rural Substation

2. Brief Description of the Receiving Environment

The study area (Figure 2) is located in the Free State Province near the towns Heilbron, Frankfort and Villiers. The proposed power lines will route through the Ngwathe and Mafube Local Municipality. Both local municipalities fall within the greater Fezile Dabe District Municipality. All the proposed alternatives run between the towns from Heilbron and route eastwards to Frankfort where it then deviates to the north to Villiers. The proposed power line follows on or in parallel to the R34 and the R26.

The landscape throughout the survey area is predominately rural in character. Land uses for the greater part of the proposed power line encompasses agricultural farming activities. Commercial and residential land uses can be found in the towns of Heilbron, Frankfort and Villiers.

The study area falls within the Grassland bioregion (Mucina and Rutherford, 2006). Within a bioregion, smaller groupings of vegetation units are classified which contain a set of general but more local biophysical characteristics as opposed to the entire bioregion. The proposed substation and power line is situated within the Frankfort Highveld Grassland vegetation unit.

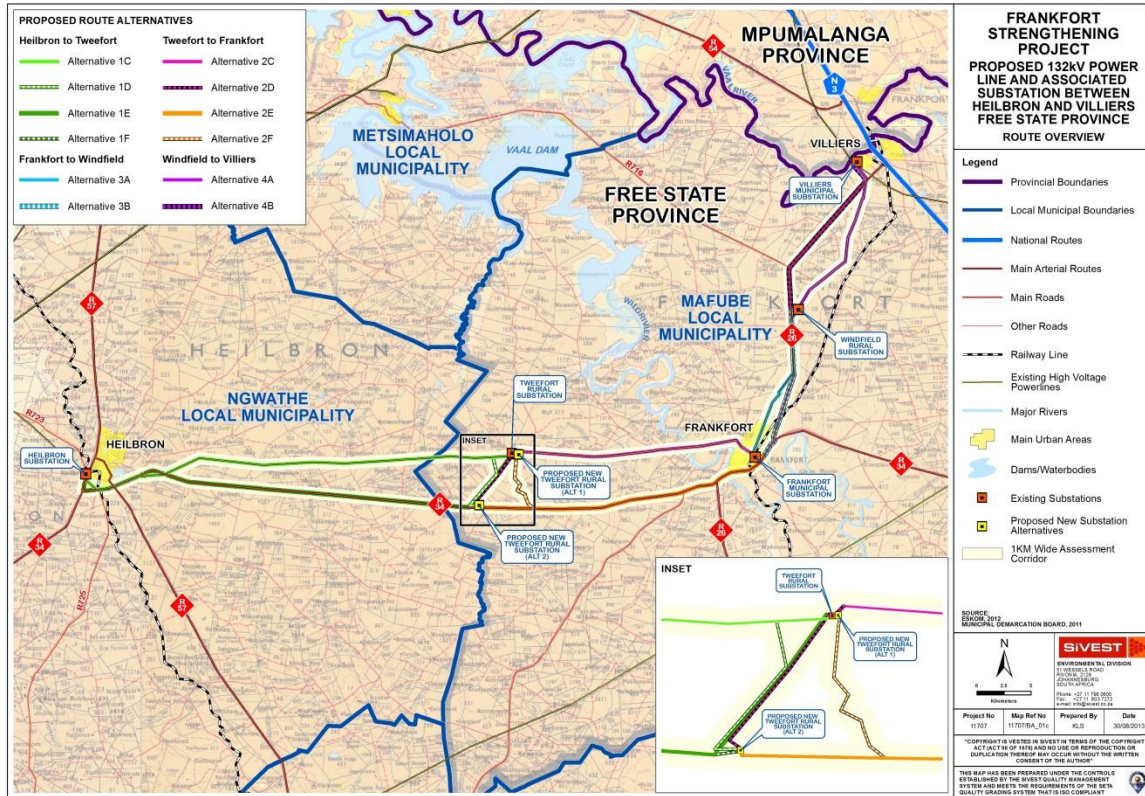


Figure 2: Route Overview Map

3. Expertise of Environmental Assessment Practitioner

Table 1: Environmental Consultants

SPECIALIST STUDY	SPECIALIST UNDERTAKING THE STUDY
Rebecca Thomas, SiVEST	Project Leader
Shaun Taylor, SiVEST	Environmental Consultant
Daniela Venzo, SiVEST	Junior Environmental Consultant
Alistair Fyfe, SiVEST	Junior Environmental Consultant
Biodiversity (Flora, Fauna and Avifauna)	Matthew Ross – EnviRoss cc
Floodlines	Warwick Pearce- SiVEST
Surface Water	Shaun Taylor – SiVEST
Agriculture and Soils	Kurt Barichievy – SiVEST
Visual Impact	Andrea Gibb – SiVEST; Kerry Schwartz – SiVEST
Heritage	Stephan Gaigher – G & A Heritage Consultants
Socio-economic	Stevie Snyman – Urban Econ
Public Participation	Nicolene Venter – Zitholele Consulting
GIS and Mapping	Kerry Schwartz – SiVEST

Please refer to attached CV's for more information (See **Appendix H**).

4. Authority Consultation

The Department of Environmental Affairs (DEA) is the competent authority on this application.

The following consultation took place with the DEA:

- The original application for the proposed power lines only was submitted to the DEA on 4th January 2013. The application was acknowledged on 15th January 2013 and the following reference numbers were allocated for the project:
 - i. DEA Ref No: 14/12/16/3/3/1/800
 - ii. NEAS Ref No: DEA/EIA/0001625/2013
- Due to a project scope change for the inclusion of a substation and the, an updated application form was submitted to the DEA on the 13th September 2013.

All authority consultation is included within **Appendix J1**.

5. Basic Assessment Report Structure

This Draft Basic Assessment Report (DBAR) is structured as follows:

- **Section A** describes the activity and technical project components, including the proposed alternatives, location and physical size of the activity. This section also provides an activity motivation by describing the need and desirability for the proposed project. Section A expands on the legal ramifications applicable to the project and describes relevant development strategies and guidelines. Finally the section explains the infrastructural requirements of the proposed project such as waste, effluent, emission water use and energy efficiency.
- **Section B** provides a description of the site and region in which the proposed development is intended to be located. Although the chapter provides a broad overview of the region, it is also specific to the application.
- **Section C** describes the Public Participation Process (PPP) undertaken during the Basic Assessment and tables issues and concerns raised by Interested and Affected Parties (I&APs).
- **Section D** provides a summary and anticipated significance of the potential direct, indirect and cumulative impacts that are likely to occur as a result of the planning and design phase, construction phase, operational phase, decommissioning and closure phase of the proposed project. It also details the mitigation measures that may eliminate or reduce the potential impacts listed.
- **Section E** outlines the recommendations of the Environmental Assessment Practitioner (EAP).

6. Assumptions

The following assumptions and limitations have been taken into account when compiling this DBAR:

- It is assumed that all technical information provided by Eskom is technically acceptable and accurate.
- The scope of the study is limited to assessing the environmental impacts associated with the proposed development of a single 132kV power line and a substation.
- The project is still in the planning stages and therefore some of the specific details technical details are not available. Should these become available during the BA process, they will be included in the report before final submission to the DEA.
- It is assumed that the information provided by the various specialists is unbiased and accurate.
- The following assumptions, uncertainties and gaps in knowledge were encountered by the various specialists:
 - **Agricultural Potential and Soils Limitations:** The desktop component of the agricultural assessment was used to identify any major agricultural impacts relating to the proposed developments. Due to the extensive nature of the project area an agricultural delineation and rating system was developed in order to classify area of high agricultural value.
 - It should be clearly noted that for the agricultural assessment, the spatial information used in portions of this report is of a reconnaissance nature, only broad/large scale climate, land use and soil details are provided. Due to the extensive nature of this integration project, detailed (i.e. hand auguring) soil classification was not possible and only general soil characteristics were noted during the field verification.
 - **Floodline Limitations:** Topographical data was sourced from the Z co-ordinate of satellite imagery in 1m intervals.
 - However, this contributed to a conservative approach in the determination of the flood levels.
 - These flood lines have been developed for the purposes of providing Eskom with a comparative assessment of one proposed route over the other, and one proposed substation over the other, so that development decisions can be made regarding the selection of a final route.
 - The flood lines have further been calculated to limit Eskom's risk in the siting of power line towers and substations along the preferred route, or to inform Eskom as to where additional flood protection techniques may have to be employed in the siting of a power line tower or substation if siting within a flood line cannot be avoided.
 - Furthermore, the flood lines have been developed to inform Eskom where they may require Water Use License Applications (WULAs) for the siting of their power line towers or substations if siting within a flood line cannot be avoided.
 - The flood lines have been produced to inform the location of power line towers and proposed substations only. It is important to note that the above points are the limitations on the calculations and use of the flood line data in this report. The results of the report cannot be exported to users other than Eskom who may want to use these results to strategically locate their or other types of infrastructure.

- It should also be noted that these flood line results are only relevant for the catchment in its current state of development. Future development of these catchments on a large scale will impact on the catchment characteristics and ultimately impact on the flood flow calculations.
- **Socio-economic Limitations:** The socio-economic assessment was conducted using the most recent data available:
 - i. Secondary data was drawn from the 2011 South African Census and the 2007 Community Survey.
 - ii. Primary data was gathered during a site visit conducted from the 25th to the 27th of February, 2013.
- Information regarding the capital expenditure (CAPEX) for the proposed power line was received in April 2013 and data for the proposed sub-station was received in October 2013 (Eskom) and is assumed to represent the most accurate data available at current prices.
- The proposed power line and sub-station will be constructed alongside existing electrical infrastructure. It is therefore assumed that there will be no change in operational expenditure (OPEX) as a result of the project.
- It is assumed that no imports will be utilised during power line and substation construction.
- In accounting for the cost of land only the legal costs of transferring land ownership are modeled.
- The assessment is based on the assumption that the local economy will experience no major shocks in the construction and early operation phase.
- It was assumed that construction will commence as scheduled in July 2014 and be completed in late 2015.
- **Surface Water Limitations:** The surface water assessment has focused on the delineation of surface water resources along the power line route within the proposed 1km corridors as provided and stipulated by Eskom. Due to the extensive nature of the proposed development, the size of the study area and the high number of wetlands, a full and accurate delineation of each wetland was not undertaken.
- Delineation of wetlands and water courses was therefore primarily undertaken at a desktop level. This study is focused on the delineation of surface water resources, and therefore does not include aquatic assessments (fish, invertebrates etc.).
- The surface water assessment only provides a preliminary conservation importance, functionality and impact assessment. Further more detailed assessments will need to form part of the final walk-down surface water report.
- **Visual Limitations:** The identification of visual receptors has been based on a combination of desktop assessment as well as field-based observation.
- For the purpose of this visual assessment, the study area is assumed to encompass a zone of 5km from all three proposed power line alternatives.
- Viewsheds have not been generated for the proposed power line due to the complexity associated with generating viewsheds off multiple points within the context of a corridor. In addition, detailed digital data was not available and the topography within the study area is relatively flat.

- Visualisation modelling has not been undertaken for the proposed development due to budget limitations.
- **Biodiversity Limitations:** The following conclusions to overall perceived impacts and the choices for the preferred power line route alternatives that are considered to impose the least overall ecological impacts have been based on a desktop survey that was reiterated by ground-truthing through two field surveys of all the pertinent areas of the power line route alternatives. Even though every effort was undertaken to identify ecologically sensitive habitats, the presence of RDL and protected species and other pertinent ecological issues relating to the project, the large extent of the project necessitated certain assumptions regarding the potential presence or absence of species. These assumptions were largely based on the professional judgement that is supported by similar field experience within similar areas of the specialist. More accurate species accounts (especially in terms of specific localities of RDL and protected species) will be possible following the walk-through survey.
- Please note that the mapping of ecological features for the surrounding areas for all alternatives is aimed at indicating the general features of the surrounding habitat units. It is not intended as an accurate account of the boundaries of each habitat unit and should not be construed as such. This is especially pertinent to any wetland habitat units.
- Any reference to technical constraints of the construction of the power lines are meant for explanatory and supplementary purposes only and are not aimed at superseding the expertise of the designated engineers.
- **Heritage Limitations:** Site investigations were performed both on foot and by vehicle where possible. Areas, which have been significantly altered, (mainly mielie fields) were not investigated in any detail on the presumption that these activities would have totally destroyed any tangible remains of heritage sites.

SECTION A: ACTIVITY INFORMATION

Has a specialist been consulted to assist with the completion of this section?

YES ✓

If YES, please complete the form entitled "Details of specialist and declaration of interest" for the specialist appointed and attach in Appendix I.

1. Project Description

a) Describe the project associated with the listed activities applied for

The project is for the proposed construction of a substation and a single 132kV power line. The power line will be approximately 95km in length and will consist of four main sections that will connect to four existing substations and one newly proposed substation via a loop-in loop-out connection. The four existing substations include Frankfort Municipal Substation, Windfield Rural Substation, Villiers Municipal Substation and Heilbron Municipal Substation. The newly proposed substation will be located near to the existing Tweefort Rural Substation. The proposed power lines therefore are not separate power lines but rather connecting lines between the existing substations and the newly proposed substation along the greater power line network. The registered servitude width will be 31 metres (15.5 metres either side of the centre line). The four main sections of power lines include the following:

- Proposed construction of a power line from Heilbron Substation to the newly proposed Tweefort Substation near Tweefort Rural Substation (approximately 40km in length);
- Proposed construction of a power line from Tweefort Substation to Frankfort Municipal Substation (approximately 25km in length);
- Proposed construction of a power line from Frankfort Municipal Substation to Windfield Rural Substation (approximately 15km); and
- Proposed construction of a power line from Windfield Rural Substation to Villiers Substation (approximately 15km).

Proposed Route Alternatives

For each section of the proposed power line, two main alternative routes are proposed for the four main power line connections. Additionally, four sub-alternatives are proposed for the proposed power line alignments from the main alternative power lines originating from Heilbron routing to the newly proposed Tweefort Substation. Twelve alternative alignments are therefore proposed in total. The proposed study area for each of the alternative power lines includes a corridor width of 1km (500m either side of the centre line). The width of the corridor will provide Eskom with sufficient space to negotiate and secure a servitude of 31m that would be required for the proposed 132kV power line. Each Alternative Route is outlined below:

- Alternative 1C – Heilbron to New Proposed Northern Tweefort Rural Substation (approximately 37km in length);
- Alternative 1D – Heilbron to New Proposed Southern Tweefort Rural Substation (approximately

43km in length);

- Alternative 1E – Heilbron to New Proposed Northern Tweefort Rural Substation (approximately 40km in length);
- Alternative 1F – Heilbron to New Proposed Southern Tweefort Rural Substation (approximately 41km in length);
- Alternative 2C – New Proposed Northern Tweefort Rural Substation to Frankfort Municipal Substation (approximately 22km in length);
- Alternative 2D – New Proposed Southern Tweefort Rural Substation to Frankfort Municipal Substation (approximately 28km in length);
- Alternative 2E – New Proposed Southern Tweefort Rural Substation to Frankfort Municipal Substation (approximately 31km in length);
- Alternative 2F – New Proposed Northern Tweefort Rural Substation to Frankfort Municipal Substation (approximately 31.5km in length);
- Alternative 3A – Frankfort Substation to Windfield Rural Substation (approximately 15km);
- Alternative 3B – Frankfort Substation to Windfield Rural Substation (approximately 15km);
- Alternative 4A – Windfield Rural Substation to Villiers Substation (approximately 15km); and
- Alternative 4B – Windfield Rural Substation to Villiers Substation (approximately 16km).

Tower Types

The tower types that are to be used will vary in relationship between the structure, the terrain to be traversed, ground clearance requirements, geology, etc. The various tower types include the following:

- Mono-pole guyed intermediate suspension structures;
- Mono-pole self-supporting intermediate suspension structures;
- Mono-pole angle suspension structures;
- Mono-pole strain structures;
- H-Pole structures; and
- 3 Pole strain structures.

The type of tower that would be used for this proposed 132kV power line will be determined once a routing has been negotiated and a servitude has been secured.

The foundation depths will range between 1.5-2m. Spanning lengths between tower type structures will be between 225-250m. The tower type structures will vary in length from 18-24m in height. Finally, a Chickadee conductor is to be used.

Proposed Substation

Tweefort Rural 88/22kV Substation is fed with a T-off from the Heilbron Rural – Frankfort Municipality 88kV line. Should there be a fault on the line it will cause total loss of the Tweefort Rural Substation. Three 22kV feeders are fed from this sub namely; Beta, Grasplaats and Kalkfontein feeder. The total length of the Kalkfontein feeder is 298km which it makes maintenance difficult. A large group of customers are affected for long periods of time during outages (due to time taken for maintenance on the long power line and adverse weather conditions). The unplanned

durations per customer connected therefore are high, on the Kalkfontein line. If the Kalkfontein line is to be split at the TK32 T-off, it will minimize the number of customers affected and the time taken to resolve a fault. Therefore it is proposed that a new Tweefort Substation will be constructed. This will include the installation of a 132kV busbar (to accommodate 2 x 132kV feeder bays and 2 x transformer bays). 2 x 132kV feeder bays will be installed. The existing 1 x 4MVA complete transformer bay will be relocated from the Tweefort Rural Substation to the new Tweefort Substation. A 22kV busbar (to accommodate 2 x transformer bays and 5 x 22kV feeder bays) will be installed as well as 4 x 22kV feeder bays. A new control room and yard stones will be required. The construction of a new access road as well as 2 x 14m lightning masts equipped with lights will be installed. The servitude to the substation will also be fenced off.

The substation will occupy an area of approximately 100m x 100m. The specifications of the substation will include the following:

- Install 132kV busbar (to accommodate 2 x 132kV feeder bays and 2 x transformer bays);
- Install 2 x 132kV feeder bays;
- Install 1 x 5MVA complete transformer bay;
- Make provision for additional transformer for future growth;
- Install 22kV busbar (to accommodate 2 x transformer bays and 5 x 22kV feeder bays);
- Install 4 x 22kV feeder bays;
- Make provision for additional 22kV feeder bay for future growth;
- Build a new control room;
- Add yard stones;
- Build a new access road;
- Install 2 x 14m lightning masts and equip with lights; and
- Fence off the substation servitude.

The two alternatives for the proposed substation at Tweefort include the following:

- Alternative 1 – Proposed Northern Tweefort Rural Substation
- Alternative 2 – Proposed Southern Tweefort Rural Substation

In light of the above, the following activities will be applied for:

- Listing Notice 1 - GN. 544, Item 10, 11 and 18
- Listing Notice 3 – GN. 546, Item 13(c), 14

b) Provide a detailed description of the listed activities associated with the project as applied for

In terms of the Environmental Impact Assessment (EIA) Regulations 2010, Government Notice (GN) No. R543 promulgated in terms of section 24(5) and section 44 of the National Environmental Management Act (No. 107 of 1998) (NEMA), as amended, the following listed activities pertain to the development.

Listed activity as described in GN R.544 and 546	Description of project activity
<p>GN R.544 Item 10 The construction of facilities or infrastructure for the transmission and distribution of electricity –</p> <p>(i) Outside urban areas or industrial complexes with a capacity of more than 33 but less than 275 kilovolts.</p>	<p>The proposed development will be for a 132kV power line.</p>
<p>GN R.544 Item 11 The construction of:</p> <p>(xi) infrastructure or structures covering 50 square metres or more</p> <p>where such construction occurs within a watercourse or within 32 metres of a watercourse, measured from the edge of a watercourse, excluding where such construction will occur behind the development setback line.</p>	<p>The proposed development will require construction within 32 metres of several water courses.</p>
<p>GN R.544 Item 18 The infilling or depositing of any material of more than 5 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock from</p> <p>(i) a watercourse;</p> <p>but excluding where such infilling, depositing, dredging, excavation, removal or moving</p> <p>(i) is for maintenance purposes undertaken in accordance with a management plan agreed to by the relevant environmental authority; or</p> <p>(ii) occurs behind the development setback line.</p>	<p>The proposed development is likely to require the construction of a number of tower structures within a water course which will result in the removal of more than 5 cubic metres of soil or rock.</p>
<p>GN R.546 Item 13(c) The clearance of an area of 1 hectare or more of vegetation where 75% or more of the vegetative cover constitutes indigenous vegetation, except where such removal of vegetation is required for:</p> <p>(3) (c) In Eastern Cape, Free State, KwaZulu-Natal, Limpopo, Mpumalanga, Northern Cape and Western Cape:</p> <p>iii. In urban areas, the following:</p> <p>Areas on the watercourse side of the development setback line or within 100 metres from the edge of a watercourse where no such setback line has been determined.</p>	<p>The proposed development is likely to require the construction of a number of tower structures within 100 metres from the edge of a watercourse.</p>
<p>GN R.546 Item 14 The clearance of an area of</p>	<p>The proposed development may route through</p>

<p>5 hectares or more of vegetation where 75% or more of the vegetative cover constitutes indigenous vegetation, except where such removal of vegetation is required for:</p> <p>(a) In Eastern Cape, Free State, KwaZulu-Natal, Limpopo, Mpumalanga and Northern Cape:</p> <p>i. In urban areas: Areas zoned for use as public open space.</p>	<p>areas zoned as public open space.</p>
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2. Feasible and reasonable alternatives

“**alternatives**”, in relation to a proposed activity, means different means of meeting the general purpose and requirements of the activity, which may include alternatives to—

- (a) the property on which or location where it is proposed to undertake the activity;
- (b) the type of activity to be undertaken;
- (c) the design or layout of the activity;
- (d) the technology to be used in the activity;
- (e) the operational aspects of the activity; and
- (f) the option of not implementing the activity.

Describe alternatives that are considered in this application as required by Regulation 22(2)(h) of GN R.543. Alternatives should include a consideration of all possible means by which the purpose and need of the proposed activity (NOT PROJECT) could be accomplished in the specific instance taking account of the interest of the applicant in the activity. The no-go alternative must in all cases be included in the assessment phase as the baseline against which the impacts of the other alternatives are assessed.

The determination of whether site or activity (including different processes, etc.) or both is appropriate needs to be informed by the specific circumstances of the activity and its environment. After receipt of this report the, competent authority may also request the applicant to assess additional alternatives that could possibly accomplish the purpose and need of the proposed activity if it is clear that realistic alternatives have not been considered to a reasonable extent.

The identification of alternatives should be in line with the Integrated Environmental Assessment Guideline Series 11, published by the DEA in 2004. Should the alternatives include different locations and lay-outs, the co-ordinates of the different alternatives must be provided. The co-ordinates should be in degrees, minutes and seconds. The projection that must be used in all cases is the WGS84 spheroid in a national or local projection.

a) **Substation Site Alternatives**

Alternative 1		
Description	Lat (DDMMSS)	Long (DDMMSS)
Alternative 1 – Proposed Northern Tweefort Rural Substation (Located on Portion 1 of the Farm Leeuw 162)	27° 16' 24.66"	28° 18' 41.62"
Alternative 2 (Preferred)		
Description	Lat (DDMMSS)	Long (DDMMSS)
Alternative 2 – Proposed Southern Tweefort Rural Substation (Located on the Farm Bethal 1162)	27° 18' 57.58"	28° 16' 51.26"
Alternative 3		
Description	Lat (DDMMSS)	Long (DDMMSS)
Alternative 4		
Description	Lat (DDMMSS)	Long (DDMMSS)

b) **Powerline route alternatives**

In the case of linear activities:

Alternative:

Latitude (S):

Longitude (E):

Alternative 1C

- Starting point of the activity
- Middle/Additional point of the activity
- End point of the activity

27° 17' 26.28"	27° 57' 12.14"
27° 16' 50.94"	28° 10' 08.50"
27° 16' 24.66"	28° 18' 41.62"

Alternative 1D

- Starting point of the activity
- Middle/Additional point of the activity
- End point of the activity

27° 16' 29.58"	28° 17' 31.56"
27° 18' 25.80"	28° 09' 47.84"
27° 18' 57.58"	28° 16' 51.26"

Alternative 1E

- Starting point of the activity
- Middle/Additional point of the activity
- End point of the activity

27° 17' 24.24"	27° 57' 15.09"
27° 18' 01.93"	28° 17' 09.21"
27° 16' 24.66"	28° 18' 41.62"

Alternative 1F (Preferred)

- Starting point of the activity
- Middle/Additional point of the activity
- End point of the activity

27° 19' 02.16"	28° 16' 21.63"
27° 19' 00.11"	28° 16' 36.09"
27° 18' 57.58"	28° 16' 51.26"

Alternative 2C

▪ Starting point of the activity	27° 16' 24.66"	28° 18' 41.62"
▪ Middle/Additional point of the activity	27° 16' 13.18"	28° 25' 34.73"
▪ End point of the activity	27° 16' 32.44"	28° 30' 39.60"

Alternative 2D

▪ Starting point of the activity	27° 18' 57.58"	28° 16' 51.26"
▪ Middle/Additional point of the activity	27° 17' 49.66"	28° 17' 25.77"
▪ End point of the activity	27° 16' 14.64"	28° 18' 48.96"

Alternative 2E (Preferred)

▪ Starting point of the activity	27° 18' 57.58"	28° 16' 51.26"
▪ Middle/Additional point of the activity	27° 18' 41.78"	28° 24' 19.28"
▪ End point of the activity	27° 16' 32.56"	28° 30' 39.67"

Alternative 2F

▪ Starting point of the activity	27° 16' 24.66"	28° 18' 41.62"
▪ Middle/Additional point of the activity	27° 18' 12.29"	28° 18' 44.62"
▪ End point of the activity	27° 19' 06.11"	28° 19' 34.25"

Alternative 3A

▪ Starting point of the activity	27° 16' 32.44"	28° 30' 39.60"
▪ Middle/Additional point of the activity	27° 12' 16.36"	28° 32' 32.71"
▪ End point of the activity	27° 09' 10.92"	28° 32' 45.22"

Alternative 3B (Preferred)

▪ Starting point of the activity	27° 16' 32.44"	28° 30' 39.60"
▪ Middle/Additional point of the activity	27° 12' 16.36"	28° 32' 32.71"
▪ End point of the activity	27° 09' 10.92"	28° 32' 45.22"

Alternative 4A

▪ Starting point of the activity	27° 09' 10.87"	28° 32' 44.97"
▪ Middle/Additional point of the activity	27° 05' 45.35"	28° 35' 13.03"
▪ End point of the activity	27° 01' 52.71"	28° 35' 39.34"

Alternative 4B (Preferred)

▪ Starting point of the activity	27° 09' 10.87"	28° 32' 44.97"
▪ Middle/Additional point of the activity	27° 05' 27.85"	28° 33' 45.55"
▪ End point of the activity	27° 01' 52.71"	28° 35' 39.34"

For route alternatives that are longer than 500m, please provide an addendum with co-ordinates taken every 250 meters along the route for each alternative alignment.

In the case of an area being under application, please provide the co-ordinates of the corners of the site as indicated on the lay-out map provided in Appendix A.

Please refer to **Appendix J3** for the coordinates of the power line corridor alternatives taken every 250 meters along each alternative alignment.

e) No-go alternative

The “no-go” alternative assumes that the proposed activity does not go-ahead, implying a continuation of the current situation or the status quo. In the case of this project, the no go alternative would result in no 132kV power line or substation being constructed.

Paragraphs 3 – 13 below should be completed for each alternative.

3. Physical size of the activity

a) Indicate the physical size of the preferred activity/technology as well as alternative activities/technologies (footprints):

Substation Alternatives:

Substation Alternative 1

Substation Alternative 2 (Preferred)

Alternative 3 (if any)

Alternative 4 (if any)

Size of the activity:

Approximately 10 000m ²
Approximately 10 000m ²

“Alternative 1-4.” refers to activity, process, technology or other alternatives.

or, for linear activities:

Power Line Alternatives:

Alternative 1C

Alternative 1D

Alternative 1E

Alternative 1F (Preferred)

Alternative 2C

Alternative 2D

Alternative 2E (Preferred)

Alternative 2F

Alternative 3A

Alternative 3B (Preferred)

Alternative 4A

Alternative 4B (Preferred)

Length of the activity:

Approximately 37 km
Approximately 43 km
Approximately 40km
Approximately 41km
Approximately 22 km
Approximately 28 km
Approximately 31km
Approximately 31.5km
Approximately 15 km
Approximately 15 km
Approximately 15 km
Approximately 16 km

b) Indicate the size of the alternative sites or servitudes (within which the above footprints will occur):

Substation Alternatives:

Substation Alternative 1

Substation Alternative 2 (Preferred)

Size of the servitude:

Approximately 10 000m ²
Approximately 10 000m ²

Power Line Alternatives:

Alternative 1C

Alternative 1D

Alternative 1E

Alternative 1F (Preferred)

Alternative 2C

Alternative 2D

Alternative 2E (Preferred)

Alternative 2F

Alternative 3A

Alternative 3B (Preferred)

Alternative 4A

Alternative 4B (Preferred)

Size of the servitude:

31 m servitude
31 m servitude
31 m servitude
31 m servitude
31 m servitude
31 m servitude
31 m servitude
31 m servitude
31 m servitude
31 m servitude
31 m servitude
31 m servitude

4. Site Access

Does ready access to the site exist?

If NO, what is the distance over which a new access road will be built

YES /	
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Describe the type of access road planned:

Include the position of the access road on the site plan and required map, as well as an indication of the road in relation to the site.

5. Locality map

An A3 locality map must be attached to the back of this document, as Appendix A. The scale of the locality map must be relevant to the size of the development (at least 1:50 000. For linear activities of more than 25 kilometres, a smaller scale e.g. 1:250 000 can be used. The scale must be indicated on the map.). The map must indicate the following:

- an accurate indication of the project site position as well as the positions of the alternative sites, if any;
- indication of all the alternatives identified;
- closest town(s);
- road access from all major roads in the area;
- road names or numbers of all major roads as well as the roads that provide access to the site(s);
- all roads within a 1km radius of the site or alternative sites; and
- a north arrow;
- a legend; and
- locality GPS co-ordinates (Indicate the position of the activity using the latitude and longitude of the centre point of the site for each alternative site. The co-ordinates should be in degrees and decimal minutes. The minutes should have at least three decimals to ensure adequate accuracy. The projection that must be used in all cases is the WGS84 spheroid in a national or local projection).

An A3 locality map is included in **Appendix A**.

6. Layout/route plan

A detailed site or route plan(s) must be prepared for each alternative site or alternative activity. It must be attached as Appendix A to this document.

The site or route plans must indicate the following:

- the property boundaries and numbers of all the properties within 50 metres of the site;
- the current land use as well as the land use zoning of the site;
- the current land use as well as the land use zoning each of the properties adjoining the site or sites;
- the exact position of each listed activity applied for (including alternatives);
- servitude(s) indicating the purpose of the servitude;
- a legend; and
- a north arrow.

A layout/route plan indicating the alternative route corridor alternatives is included in **Appendix A**.

7. Sensitivity map

The layout/route plan as indicated above must be overlain with a sensitivity map that indicates all the sensitive areas associated with the site, including, but not limited to:

- watercourses;
- the 1:100 year flood line (where available or where it is required by DWA);
- ridges;

- cultural and historical features;
- areas with indigenous vegetation (even if it is degraded or infested with alien species); and
- critical biodiversity areas.

The sensitivity map must also cover areas within 100m of the site and must be attached in Appendix A.

The sensitivity map indicating sensitive areas associated with the route alternatives is included in **Appendix A**.

8. Site photographs

Colour photographs from the centre of the site must be taken in at least the eight major compass directions with a description of each photograph. Photographs must be attached under Appendix B to this report. It must be supplemented with additional photographs of relevant features on the site, if applicable.

Site photographs taken at the substation alternative locations are attached to **Appendix B**.

9. Facility illustration

A detailed illustration of the activity must be provided at a scale of at least 1:200 as Appendix C for activities that include structures. The illustrations must be to scale and must represent a realistic image of the planned activity. The illustration must give a representative view of the activity.

A schematic drawing of the proposed tower types is included in **Appendix C**.

10. Activity motivation

Motivate and explain the need and desirability of the activity (including demand for the activity):

1. Is the activity permitted in terms of the property's existing land use rights?	YES √	<input type="checkbox"/>	Please explain
The project in question is for the proposed construction of a single 132kV power line, which will include a 31m wide servitude along the length of the power line. A change in land use will not be required and the servitude will be considered as special use within the existing land use.			
2. Will the activity be in line with the following?			
(a) Provincial Spatial Development Framework (PSDF)	YES √	<input type="checkbox"/>	Please explain

The proposed project falls within the Free State Province. The main objectives of the Spatial Development Framework (SDF) are to facilitate the provision of electricity in the Fezile Dabi District and to improve the network (Integrated Development Plan: Fezile Dabi District Municipality 2012-2017). The SDF is one of the fundamental implementation instruments, which provides the spatial dimensions for achieving the strategies of the province. One such, strategy includes the growth and development goal, which seeks to fight poverty and unemployment by promoting economic growth (Integrated Development Plan: Fezile Dabi District Municipality 2012-2017). In this way, the proposed development is aligned with the provincial SDF as it would promote economic growth by improving the network in the area and supplying electricity to new customers.

(b) Urban edge / Edge of Built environment for the area		NO ✓	Please explain
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Majority of the proposed development would fall outside the urban edge (excluding where the propose power lines will route from Heilbron through Frankfort and into Villiers. Although the proposed development does not fit entirely within the surrounding area, the majority of the proposed alternatives follow existing power lines and on or near the R34 and R26.

(c) Integrated Development Plan (IDP) and Spatial Development Framework (SDF) of the Local Municipality (e.g. would the approval of this application compromise the integrity of the existing approved and credible municipal IDP and SDF?).	YES ✓		Please explain
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The proposed development is situated partly within the Ngwathe and Mafube Local Municipality. The Integrated development plan (IDPs) for the Mafube Local Municipality has identified electricity as a service delivery need and has acknowledged various strategies to improve the electricity supply (IDP Mafube Local Municipality 2007-2012). The Mafube Local Municipality delivery targets are to maintain electricity provision and to ensure an uninterrupted good quality electricity supply. In this way the proposed development is aligned with the municipal objectives and priorities for service delivery and infrastructural development in the area.

(d) Approved Structure Plan of the Municipality		NO ✓	Please explain
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The proposed development is for service infrastructure and therefore will not have any bearing on the Municipalities' Structure Plans.

(e) An Environmental Management Framework (EMF) adopted by the Department (e.g. Would the approval of this application compromise the integrity of the existing environmental management priorities for the area and if so, can it be justified in terms of sustainability considerations?)		NO ✓	Please explain
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The proposed development would not compromise the integrity of the environmental management priorities for the area.

(f) Any other Plans (e.g. Guide Plan)	YES ✓		Please explain
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The proposed development is aligned with Eskom's Integrated Strategic Electricity Planning (ISEP) process, which is intended to provide strategic projections of supply-side and demand-side options to be implemented in order to meet long-term load forecasts.

<p>3. Is the land use (associated with the activity being applied for) considered within the timeframe intended by the existing approved SDF agreed to by the relevant environmental authority (i.e. is the proposed development in line with the projects and programmes identified as priorities within the credible IDP)?</p>	<p>YES ✓</p>	<p>Please explain</p>
<p>As mentioned above, the Integrated Development Plan (IDPs) for the Mafube Local Municipality has identified electricity as a service delivery need and has acknowledged various strategies to improve the electricity supply (IDP Mafube Local Municipality 2007-2012). The Mafube Local Municipality delivery targets are to maintain electricity provision and to ensure an uninterrupted good quality electricity supply. In this way the proposed development is aligned with the priority projects and programmes identified within the IDPs for the local and district municipalities.</p>		
<p>4. Does the community/area need the activity and the associated land use concerned (is it a societal priority)? (This refers to the strategic as well as local level (e.g. development is a national priority, but within a specific local context it could be inappropriate.)</p>	<p>YES ✓</p>	<p>Please explain</p>
<p>The proposed development could improve the lives of the local communities by assisting the Local Government in providing and strengthening electricity to them. Local employment benefit would result during the construction of the power line. In addition education levels are extremely low within the surrounding area. The development would act as catalysed promoting economic growth, thus providing future opportunities for the surrounding communities by improving education and helping reverse urbanization.</p>		
<p>5. Are the necessary services with adequate capacity currently available (at the time of application), or must additional capacity be created to cater for the development? (Confirmation by the relevant Municipality in this regard must be attached to the final Basic Assessment Report as Appendix K1.)</p>	<p>YES ✓</p>	<p>Please explain</p>
<p>Past experience from similar electricity project in the area have indicated that the necessary services and adequate capacity are available. All relevant local and district municipalities will be provided with the opportunity to comment on the proposed development as well as this draft Basic Assessment Report.</p>		
<p>6. Is this development provided for in the infrastructure planning of the municipality, and if not what will the implication be on the infrastructure planning of the municipality (priority and placement of services and opportunity costs)? (Comment by the relevant Municipality in this regard must be attached to the final Basic Assessment Report as Appendix K1.)</p>	<p>YES ✓</p>	<p>Please explain</p>
<p>The development will contribute to the service infrastructure of the municipality. All relevant local and district municipalities will be provided with the opportunity to comment on the proposed development as well as this draft Basic Assessment Report.</p>		

7. Is this project part of a national programme to address an issue of national concern or importance?	YES ✓		Please explain
Stable electricity provision in South Africa is a critical issue. It is impossible to create an economically sound country without a secure and reliable energy source. As mentioned above, the network in the area does not have sufficient capacity for customer demand, therefore the proposed development will help regulate and improve the reliability of the network, thereby creating capacity for new customers in area.			
8. Do location factors favour this land use (associated with the activity applied for) at this place? (This relates to the contextualisation of the proposed land use on this site within its broader context.)	YES ✓		Please explain
Although the proposed development does not entirely fit the surrounding area, majority of the proposed alternatives follow adjacent to existing power lines and/or close to the R34 and R26.			
9. Is the development the best practicable environmental option for this land/site?	YES ✓		Please explain
The proposed development is a suitable development and will conform to the typical visual character and pattern of elements that make up the landscape form.			
10. Will the benefits of the proposed land use/development outweigh the negative impacts of it?	YES ✓		Please explain
The absence of the proposed power line would mean that the power supply in the area would not be strengthened. This will have negative implications on new customers in the area which will in turn have a negative impact on overall development and economic growth. The socio economic benefits of the proposed project are considered to outweigh the negative environmental impacts identified (Section D: Impact Assessment).			
11. Will the proposed land use/development set a precedent for similar activities in the area (local municipality)?		NO ✓	Please explain
Infrastructure for service provision, as proposed, would not set a precedent for similar activities in the area at large. Should additional power lines be required in the area in the future it may be beneficial to align them parallel in order to consolidate the impacts.			
12. Will any person's rights be negatively affected by the proposed activity/ies?	YES ✓		Please explain
The proposed development may impact on individuals where a proposed tower structure is to be constructed on the land on which they are residing. The preferred use of the farmland, which is usually commercial, may be impacted upon in the future as the electricity servitude area will need to be considered in all aspects of development planning for the farm. For instance, Eskom does not allow development within their servitude and no buildings can be constructed below a power line. The land is usually sold on a once-off purchase, as a result chances of the landowner re-obtaining the land is improbable. However, compensation is provided to affected landowners.			
13. Will the proposed activity/ies compromise the "urban edge" as defined by the local municipality?		NO ✓	Please explain
Infrastructure for service provision, as proposed, would not alter the urban edge.			
14. Will the proposed activity/ies contribute to any of the 17 Strategic Integrated Projects (SIPS)?	YES ✓		Please explain

18 Strategic Integrated Projects (SIPs) have been identified based on a spatial analysis of the South Africa's needs. The proposed development would contribute to SIP number 2: Durban-Free State-Gauteng logistics and industrial corridor. Amongst others, the project seeks to improve and expand electricity transmission and distribution (Provincial and Local Government conference: A Summary of the Infrastructure Plan, 2012). In this way the proposed development would contribute this project by improving the electricity supply in the Free State. The proposed development would also contribute to SIP number 10, which involves expanding the distribution network to address historical imbalances by providing access to electricity for all and supporting economic development (Provincial and Local Government conference: A Summary of the Infrastructure Plan, 2012).

15. What will the benefits be to society in general and to the local communities?	Please explain
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The increased electricity strengthening and supply may encourage residential and urban development in the area, which in turn may provide job opportunities for local communities. In addition, the proposed development could improve the lives of the local community by assisting the Local Government in providing electricity to them. The development may act as catalysed promoting economic growth in the area, which may result in future opportunities for the surrounding communities by improving education and helping reverse urbanization.

16. Any other need and desirability considerations related to the proposed activity?	Please explain
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As mentioned above the project is needed in order to improve the reliability of the electricity supply in the area, to promote economic growth and to stabilise the electricity supply in the area.

17. How does the project fit into the National Development Plan for 2030?	Please explain
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The National Development Plan sets out various goals in order to eliminate poverty and reduce inequality by 2030 (National Development Plan, 2011). It mentions the need to create 11 million more jobs and promote economic growth and development through the provision of quality, reliable and efficient energy services by 2030. In this way, the proposed power line project is aligned with the National Development Plan, as it will help promote economic growth by improving the reliability of the network and creating capacity for new customers in the area, which in turn could promote local job opportunities.

18. Please describe how the general objectives of Integrated Environmental Management as set out in section 23 of NEMA have been taken into account.

In terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA) the required BA and public participation process (PPP) is being undertaken for the proposed power line and substation in order to investigate and assess any potential environmental impacts associated with the development prior to implementation. As part of the BA process several specialist studies were conducted to evaluate the predicted potential impact that the proposed development could have on the biophysical environment (fauna, flora, avi-fauna, soils and water resources), socio-economic conditions and cultural heritage within the study area. In line with the general objectives of Integrated Environmental Management, the risks and consequences of the various corridor alternatives were assessed and mitigation measures were recommended by each specialist in order to minimise the negative impacts and maximise the benefits of the proposed project. In addition, a thorough PPP was undertaken as part of the BA, which will involve consultation with various key stakeholders and organs of state, including provincial, district and local authorities, relevant government departments, parastatals and NGO's.

19. Please describe how the principles of environmental management as set out in section 2 of NEMA have been taken into account.

The principles of environmental management as set out in section 2 of the NEMA require that environmental management must place people and their needs at the forefront of development and that development must be socially, environmentally and economically sustainable. As described above; these principles are being taken into account by undertaking a thorough PPP in order to ensure that all Interested and Affected Parties (I&APs) are given the opportunity to be involved in the BA process and ultimately that their comments are taken into consideration by the DEA when reviewing the application. Several specialist studies were also undertaken to ensure that the development is sustainable and that disturbance to the environment is avoided where possible, minimised through appropriate mitigation measures and remedied via appropriate measures.

11. Applicable legislation, policies and/or guidelines

List all legislation, policies and/or guidelines of any sphere of government that are applicable to the application as contemplated in the EIA regulations, if applicable:

Title of legislation, policy or guideline	Applicability to the project	Administering authority	Date
Legislation			
National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA)	In terms of the NEMA the proposed development must be considered, investigated and assessed prior to implementation.	Department of Environmental Affairs (DEA)	1998
National Heritage Resources Act, 1999 (Act No. 25 of 1999)	In terms of section 38 of the NHRA, the responsible heritage resources authority can call for a Heritage Impact Assessment (HIA) where a	South African Heritage Resources Authority (SAHRA)	1999

	power line is being proposed.		
National Water Act, 1998 (Act 36 of 1998)	If the development may need to take place within a 500m radius of a delineated wetland a water use license is likely to be required with regards to water uses (c) and (i) of the NWA.	Department of Water Affairs (DWA)	1998
National Environmental Management: Biodiversity Act, 2004 (Act No. of 2004)	Under NEMBA the project proponent is required to take appropriate reasonable measures to limit the impacts on biodiversity, to obtain permits if required and to invite SANBI to provide commentary on any documentation resulting from the proposed development.	Department of Environmental Affairs (DEA) and South African National Biodiversity Institute (SANBI)	2004
Conservation of Agricultural Resources Act, 1983 (Act No. 43 of 1983) (CARA)	The construction of power lines may impact on agricultural resources and vegetation on the site. The CARA prohibits the spreading of weeds and prescribes control measures that need to be complied with in order to achieve this.	Department of Agriculture, Forestry and Fisheries (DAFF)	1983
National Road Traffic Act, 1996 (No. 93 Of 1996)	All the requirements stipulated in the NRTA regarding traffic matters will need to be complied with during the construction and operational phases of the proposed power line.	South African National Roads Agency Limited (SANRAL)	1996
Regulations			
NEMA EIA 2010 Regulations	In terms of the EIA 2010 Regulations, a basic assessment process is required for this proposed project.	Department of Environmental Affairs (DEA)	2010
Guidelines			
Integrated strategic Electricity planning (ISEP), 2005	The ISEP provides a framework for Eskom to investigate a wide range of	Eskom	2005

	new supply-side and demand-side technologies with a view to optimising investments and returns.		
National Development Plan (NDP), 2011	National development goals for energy generation and distribution.		2011
Provincial and Local Government conference: A Summary of the Infrastructure Plan, 2012	Contribution to electrical infrastructure.		2012
Integrated Development Plan (IDP) Mafube Local Municipality 2007-2012	Mafube Local Municipality addresses pertinent issues and the proposed development is to be aligned with the IDP.	Mafube Local Municipality	2007
Integrated Development Plan (IDP): Fezile Dabi District Municipality 2012-2017	Fezile Dabi District Municipality addresses pertinent issues and the proposed development is to be aligned with the IDP.	Fezile Dabi District	2012

12. Waste, effluent, emission and noise management

a) Solid waste management

Will the activity produce solid construction waste during the construction/initiation phase?

If YES, what estimated quantity will be produced per month?

YES /

Approximately 1.25 tons per month. However, this will be taken to Eskom for recycling and is not to be disposed of at registered landfills.

How will the construction solid waste be disposed of (describe)?

All excess solid waste that will not be recycled will be collected shall be disposed of at registered/licensed landfill site. Skip waste containers and waste collection bins will be maintained on site and the contractor will arrange for them to be collected regularly and transported to the landfill site.

Under no circumstances will waste be burned or buried on site.

Hazardous materials and contaminants will be stored carefully to prevent contamination until being disposed of at a licensed landfill site.

Where will the construction solid waste be disposed of (describe)?

All solid waste will be disposed of at a registered landfill site.

Will the activity produce solid waste during its operational phase?

NO ✓

If YES, what estimated quantity will be produced per month?

How will the solid waste be disposed of (describe)?

All solid waste will be collected and dispose of. Waste separation and recycling will take place as far as possible.

If the solid waste will be disposed of into a municipal waste stream, indicate which registered landfill site will be used.

All solid waste will be disposed of at the Namahadi registered landfill site.

Where will the solid waste be disposed of if it does not feed into a municipal waste stream (describe)?

The waste will be disposed of at other nearby registered landfill sites (Villiers or Vrede Landfill).

If the solid waste (construction or operational phases) will not be disposed of in a registered landfill site or be taken up in a municipal waste stream, then the applicant should consult with the competent authority to determine whether it is necessary to change to an application for scoping and EIA.

All hazardous components will be discarded at a licensed hazardous waste disposal facility. The waste produced will be under that stipulated in the waste management listing activities and therefore it is not anticipated that the application will not need to be changed to an application for scoping and EIA.

Can any part of the solid waste be classified as hazardous in terms of the NEM: WA?

NO ✓

If YES, inform the competent authority and request a change to an application for scoping and EIA. An application for a waste permit in terms of the NEM: WA must also be submitted with this application.

Is the activity that is being applied for a solid waste handling or treatment facility?

NO ✓

If YES, then the applicant should consult with the competent authority to determine whether it is necessary to change to an application for scoping and EIA. An application for a waste permit in terms of the NEM: WA must also be submitted with this application.

b) Liquid effluent

Will the activity produce effluent, other than normal sewage, that will be disposed of in a municipal sewage system?

	NO ✓
--	------

If YES, what estimated quantity will be produced per month?

m ³

Will the activity produce any effluent that will be treated and/or disposed of on-site?

	NO ✓
--	------

If YES, the applicant should consult with the competent authority to determine whether it is necessary to change to an application for scoping and EIA.

Will the activity produce effluent that will be treated and/or disposed of at another facility?

	NO ✓
--	------

If YES, provide the particulars of the facility:

Facility name:		
Contact person:		
Postal address:		
Postal code:		
Telephone:	Cell:	
E-mail:	Fax:	

Describe the measures that will be taken to ensure the optimal reuse or recycling of waste water, if any:

Waste water will not be generated by the activity.
--

c) Emissions into the atmosphere

Will the activity release emissions into the atmosphere other than exhaust emissions and dust associated with construction phase activities?

	NO ✓
--	------

If YES, is it controlled by any legislation of any sphere of government?

YES	NO
-----	----

If YES, the applicant must consult with the competent authority to determine whether it is necessary to change to an application for scoping and EIA.

If NO, describe the emissions in terms of type and concentration:

Other than exhaust emissions and dust associated with construction phase activities, the activity will not release emissions into the atmosphere.

d) Waste permit

Will any aspect of the activity produce waste that will require a waste permit in terms of the NEM: WA?

YES /	NO /
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If YES, please submit evidence that an application for a waste permit has been submitted to the competent authority

e) Generation of noise

Will the activity generate noise?

YES /	NO /
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If YES, is it controlled by any legislation of any sphere of government?

If YES, the applicant should consult with the competent authority to determine whether it is necessary to change to an application for scoping and EIA.

If NO, describe the noise in terms of type and level:

Noise will be generated during the construction phase. This impact is transient and is unlikely to be heard by many noise receptors due to the limited human habitation in the area. The impact of the project on noise does therefore not warrant a specialist noise impact assessment.

During the operational phase the power line will generate a low hissing noise, known as corona. This noise will vary depending on the weather conditions and in dry conditions; the noise level will be comparative with the usual ambient noise level in the environment.

13. Water use

Please indicate the source(s) of water that will be used for the activity by ticking the appropriate box(es):

Municipal /	Water board	Groundwater	River, stream, dam or lake	Other	The activity will not use water
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If water is to be extracted from groundwater, river, stream, dam, lake or any other natural feature, please indicate the volume that will be extracted per month:

litres

Does the activity require a water use authorisation (general authorisation or water use license) from the Department of Water Affairs?

A water use license is likely to be required in terms of the NWA should construction need to take place inside any of the wetlands or watercourses. Once the final alignment is established a final surface water walk-down study would need to be conducted at the final propose tower positions to identify if a water use license would be required.

If YES, please provide proof that the application has been submitted to the Department of Water Affairs.

14. Energy efficiency

Describe the design measures, if any that have been taken to ensure that the activity is energy efficient:

The proposed development would not consume power.

Describe how alternative energy sources have been taken into account or been built into the design of the activity, if any:

Energy efficiency measures are not applicable to this proposed project.

SECTION B: SITE/AREA/PROPERTY DESCRIPTION

Important notes:

For linear activities (pipelines, etc) as well as activities that cover very large sites, it may be necessary to complete this section for each part of the site that has a significantly different environment. In such cases please complete copies of Section B and indicate the area, which is covered by each copy No. on the Site Plan.

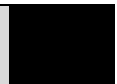
Section B Copy No. (e.g. A):



1. Paragraphs 1 - 6 below must be completed for each alternative.

2. Has a specialist been consulted to assist with the completion of this section?

YES /



If YES, please complete the form entitled "Details of specialist and declaration of interest" for each specialist thus appointed and attach it in Appendix I. All specialist reports must be contained in Appendix D.

A 'specialist declaration of interest' for each specialist is included in Appendix I and all specialist reports are contained in **Appendix D**.

Property description/physical address:

Province	
District Municipality	
Local Municipality	
Ward Number(s)	
Farm name and number	
Portion number	
SG Code	

Where a large number of properties are involved (e.g. linear activities), please attach a full list to this application including the same information as indicated above.

Refer to Appendix J4 for a full list of the properties (including farm names, numbers and Surveyor General (SG) codes) traversed by the proposed power line alternatives. The province, district municipality, local municipality and ward numbers are also indicated.

Current land-use zoning as per local municipality IDP/records:

Properties in the Ngwathe Local Municipality include Agricultural, Urban and Vacant landuses.
 Properties in the Mafube Local Municipality include Agricultural, Urban and Vacant landuses.
 See **Appendix J4** for properties list. An A3 Land-use Map is included in **Appendix J2**.

In instances where there is more than one current land-use zoning, please attach a list of current land use zonings that also indicate which portions each use pertains to, to this application.

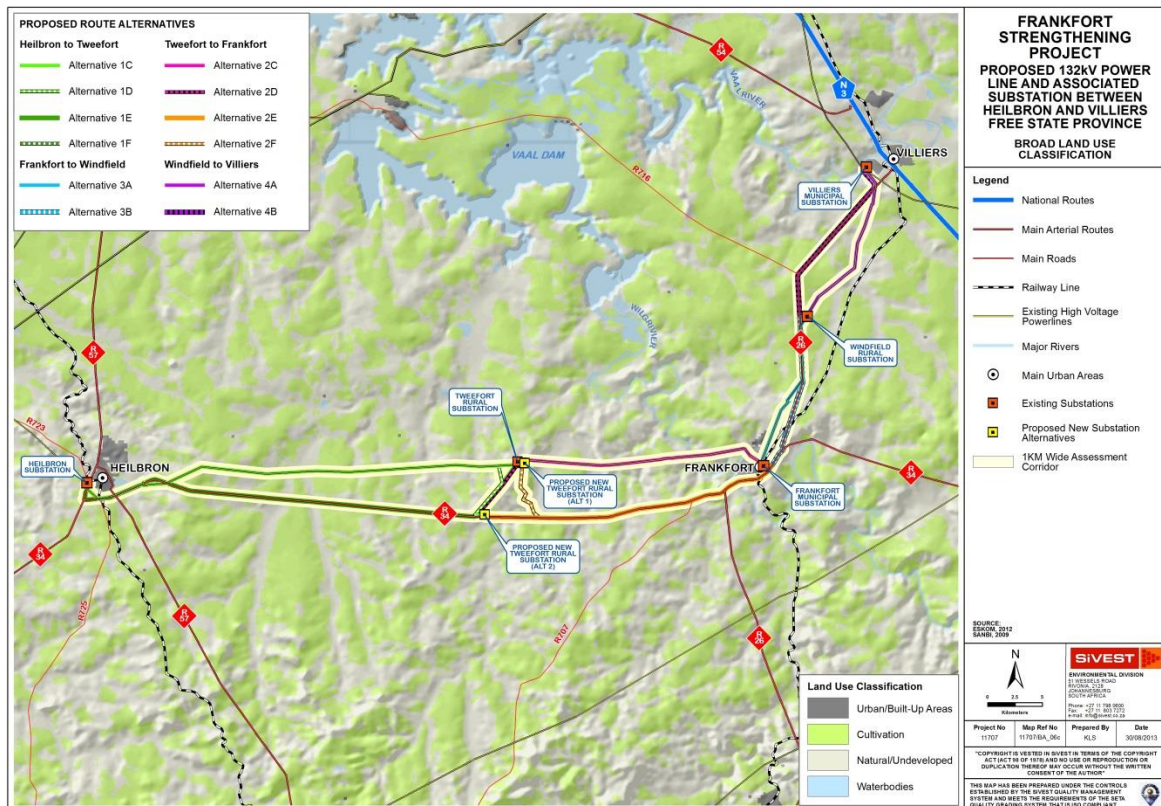


Figure 3: Land-use Map

Is a change of land-use or a consent use application required?

NO ✓

1. Gradient of the site

Indicate the general gradient of the site.

Alternative 1C:

Flat	1:50 – 1:20 ✓	1:20 – 1:15	1:15 – 1:10	1:10 – 1:7,5	1:7,5 – 1:5	Steeper than 1:5
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Alternative 1D (if any):

Flat	1:50 – 1:20 ✓	1:20 – 1:15	1:15 – 1:10	1:10 – 1:7,5	1:7,5 – 1:5	Steeper than 1:5
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Alternative 1E:

Flat	1:50 – 1:20 ✓	1:20 – 1:15	1:15 – 1:10	1:10 – 1:7,5	1:7,5 – 1:5	Steeper than 1:5
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Alternative 1F (if any):

Flat	1:50 – 1:20 ✓	1:20 – 1:15	1:15 – 1:10	1:10 – 1:7,5	1:7,5 – 1:5	Steeper than 1:5
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Alternative 2C (if any):

Flat	1:50 – 1:20 ✓	1:20 – 1:15	1:15 – 1:10	1:10 – 1:7,5	1:7,5 – 1:5	Steeper than 1:5
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Alternative 2D (if any):

Flat	1:50 – 1:20 ✓	1:20 – 1:15	1:15 – 1:10	1:10 – 1:7,5	1:7,5 – 1:5	Steeper than 1:5
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Alternative 2E (if any):

Flat	1:50 – 1:20 ✓	1:20 – 1:15	1:15 – 1:10	1:10 – 1:7,5	1:7,5 – 1:5	Steeper than 1:5
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Alternative 2F (if any):

Flat	1:50 – 1:20 ✓	1:20 – 1:15	1:15 – 1:10	1:10 – 1:7,5	1:7,5 – 1:5	Steeper than 1:5
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Alternative 3A (if any):

Flat	1:50 – 1:20 ✓	1:20 – 1:15	1:15 – 1:10	1:10 – 1:7,5	1:7,5 – 1:5	Steeper than 1:5
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Alternative 3B (if any):

Flat	1:50 – 1:20 ✓	1:20 – 1:15	1:15 – 1:10	1:10 – 1:7,5	1:7,5 – 1:5	Steeper than 1:5
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Alternative 4A (if any):

Flat	1:50 – 1:20 ✓	1:20 – 1:15	1:15 – 1:10	1:10 – 1:7,5	1:7,5 – 1:5	Steeper than 1:5
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Alternative 4B (if any):

Flat	1:50 – 1:20	1:20 – 1:15	1:15 – 1:10	1:10 – 1:7,5	1:7,5 – 1:5	Steeper
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All of the proposed route alignments follow a topographical similar landscape as they run roughly parallel to one another in relatively close proximity. Most of the terrain in the study area is flat to moderately undulating. An A3 Slope Classification Map and Topography Map are included in Appendix J2.

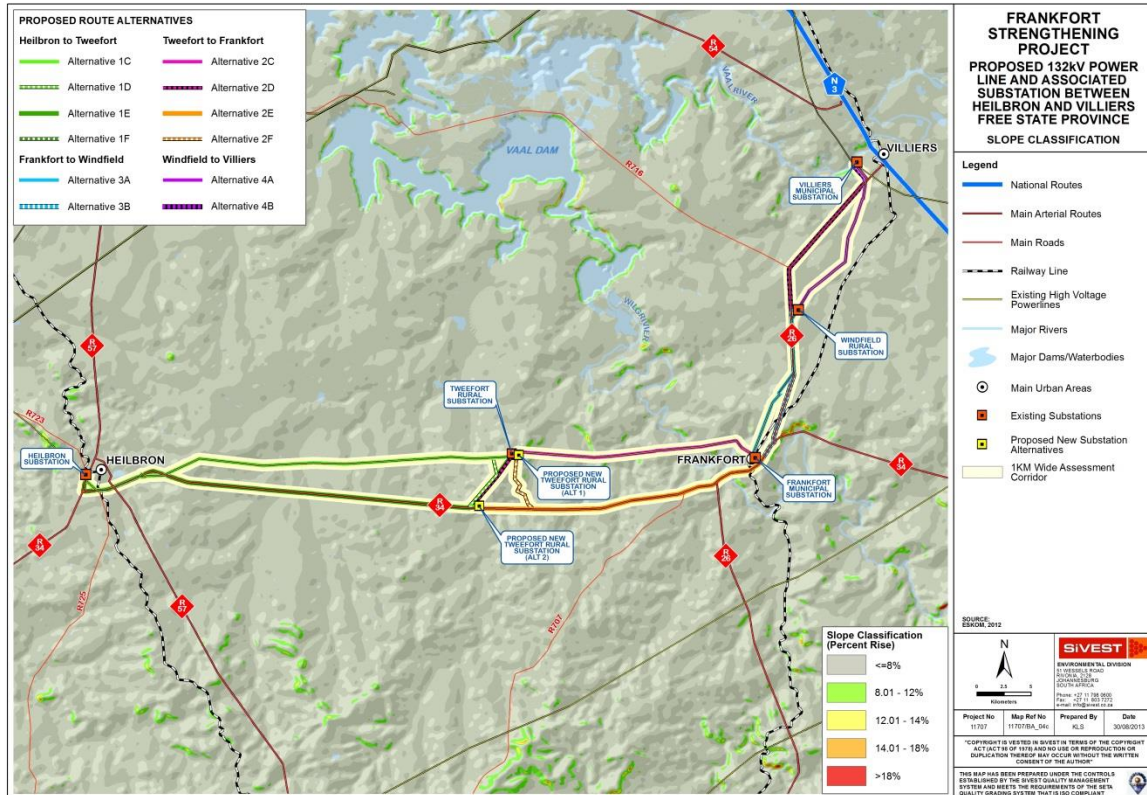


Figure 4: Slope Classification Map

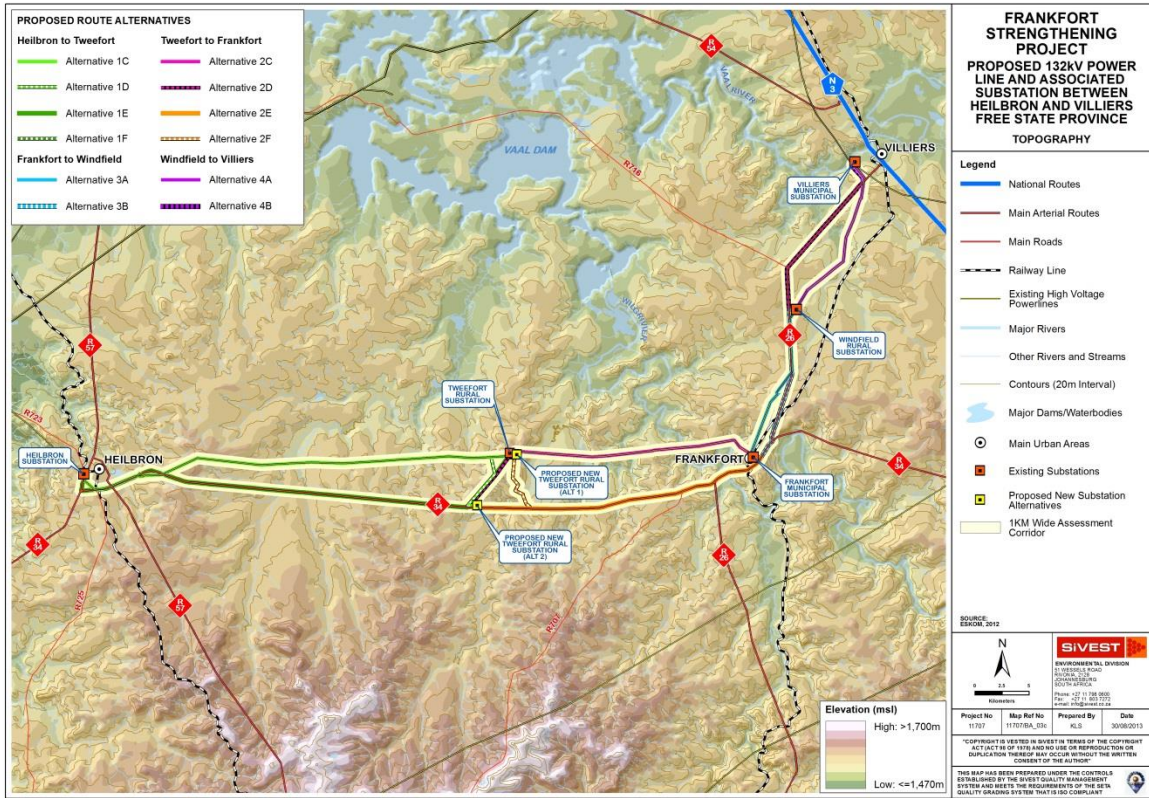


Figure 5: Topography Map

2. Location in landscape

Indicate the landform(s) that best describes the site:

2.1 Ridgeline	slope of	<input type="checkbox"/>	2.4 Closed valley	<input type="checkbox"/>	2.7 Undulating plain / low hills	<input checked="" type="checkbox"/>
2.2 Plateau		<input type="checkbox"/>	2.5 Open valley	<input type="checkbox"/>	2.8 Dune	<input type="checkbox"/>
2.3 Side hill/mountain		<input type="checkbox"/>	2.6 Plain	<input checked="" type="checkbox"/>	2.9 Seafront	<input type="checkbox"/>

3. Groundwater, Soil and Geological stability of the site

Is the site(s) located on any of the following?

	Alt 1C	Alt 1D	Alt 1E	Alt 1F	Alt 2C	Alt 2D	Alt 2E	Alt 2F	Alt 3A	Alt 3B	Alt 4A	Alt 4B	Sub- Alt 1	Sub- Alt 2
Shallow water table (less than 1.5m deep)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No
Dolomite, sinkhole or doline areas	No	No	No	No	No	No	No	No	No	No	No	No	No	No
Seasonally wet soils (often close to water bodies)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No
Unstable rocky slopes or steep slopes with loose soil	No	No	No	No	No	No	No	No	No	No	No	No	No	No
Dispersive soils (soils that dissolve in water)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Soils with high clay content (clay fraction more than 40%)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No
Any other unstable soil or geological feature	No	No	No	No	No	No	No	No	No	No	No	No	No	No
An area sensitive to erosion	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No

If you are unsure about any of the above or if you are concerned that any of the above aspects may be an issue of concern in the application, an appropriate specialist should be appointed to assist in the completion of this section. Information in respect of the above will often be available as part of the project information or at the planning sections of local authorities. Where it exists, the 1:50 000 scale Regional Geotechnical Maps prepared by the Council for Geo Science may also be consulted.

The proposed power lines will traverse a large area whereby the only sensitive areas as related to shallow water tables, seasonally wet soils, dispersive soils, soils with high clay content, and areas sensitive to erosion relate to the areas associated with wetlands and watercourses. However, invariably most of these areas will be avoided during the construction phase once the final alignments have been routed away from any wetlands and watercourses in most cases. Where this is not possible engineering solutions will be proposed in the very few cases to account for instability impacts.

4. Groundcover

Indicate the types of groundcover present on the site. The location of all identified rare or endangered species or other elements should be accurately indicated on the site plan(s).

Natural veld - good condition ^E	Natural veld with scattered aliens ^E	Natural veld with heavy alien infestation ^E	Veld dominated by alien species ^E	Gardens
Sport field	Cultivated land	Paved surface	Building or other structure	Bare soil

If any of the boxes marked with an “^E” is ticked, please consult an appropriate specialist to assist in the completion of this section if the environmental assessment practitioner doesn’t have the necessary expertise.

5. Surface water

Indicate the surface water present on and or adjacent to the site and alternative sites?

Perennial River	YES ✓	
Non-Perennial River	YES ✓	
Permanent Wetland	YES ✓	
Seasonal Wetland	YES ✓	
Artificial Wetland	YES ✓	
Estuarine / Lagoonal wetland	NO ✓	

If any of the boxes marked YES or UNSURE is ticked, please provide a description of the relevant watercourse.

A specialist surface water study was undertaken by SiVEST and is included in **Appendix D2**. Please refer to report for full descriptions of surface water resources and associated map. An A3 Surface Water Map is included in **Appendix J2**.

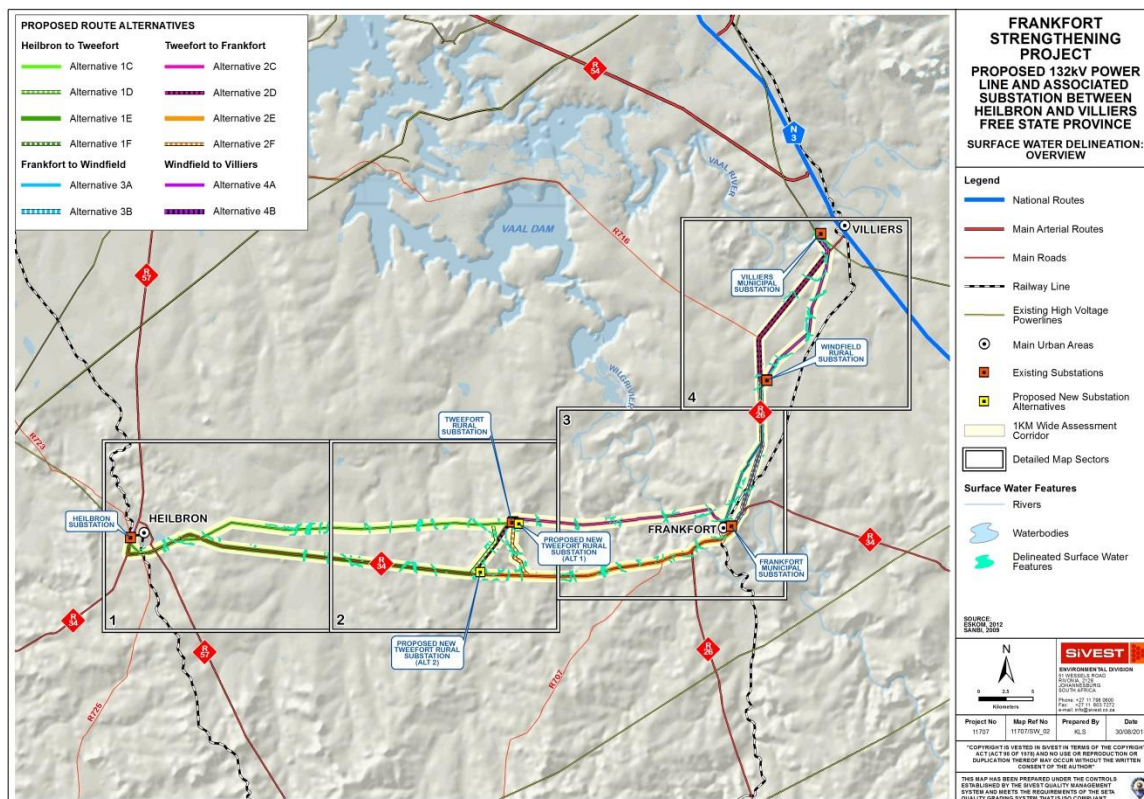


Figure 6: Surface Water Map

6. Land use character of surrounding area

Indicate land uses and/or prominent features that currently occur within a 500m radius of the site and give description of how this influences the application or may be impacted upon by the application:

Natural area – Power line corridors and the substation sites traverse natural area.	Dam or reservoir – Power line corridors traverse several man-made dams.	Polo fields
Low density residential – Power line corridors traverse low density residential area.	Hospital/medical centre	Filling station ^H
Medium density residential –	School	Landfill or waste treatment site

Power line corridors traverse medium density residential area.		
High density residential – Power line corridors traverse medium density residential area.	Tertiary education facility	Plantation
Informal residentialA – Power line corridors traverse informal residential area.	Church	Agriculture – Power line corridors traverse informal residential area.
Retail commercial & warehousing	Old age home	River, stream or wetland - – Power line corridors traverse several rivers, streams and wetlands.
Light industrial	Sewage treatment plant ^A	Nature conservation area
Medium industrial ^{AN}	Train station or shunting yard ^N	Mountain, koppie or ridge
Heavy industrial ^{AN}	Railway line^N – Power line corridors traverse a railway line.	Museum
Power station	Major road (4 lanes or more) ^N	Historical building
Office/consulting room	Airport ^N	Protected Area
Military or police base/station/compound	Harbour	Graveyard – Power line corridors traverse informal graveyards.
Spoil heap or slimes dam ^A	Sport facilities	Archaeological site
Quarry, sand or borrow pit	Golf course	Other land uses (describe)

If any of the boxes marked with an ^N “are ticked, how will this impact / be impacted upon by the proposed activity?

- **Railway line^N** – The railway runs from Villiers to Frankfort almost parallel to the N26. The route corridor alternatives 2E, 2C, 3A and 3B would traverse the aligned railway line and would need to cross the railway at various sections. Should construction commence, there will be short outages required during the stringing of the power lines which will span the railway line(s).

If any of the boxes marked with an ^{AN} are ticked, how will this impact / be impacted upon by the proposed activity? Specify and explain:

Informal residential^A – Informal settlements are located partially within Corridor alternative 3A and 3B. The proposed power lines may need to traverse the settlement areas. However it is recommended that the power lines do not route through the settlement areas unless absolutely required.

If any of the boxes marked with an "H" are ticked, how will this impact / be impacted upon by the proposed activity? Specify and explain:

All the proposed power line alternatives traverse open agricultural areas for the vast majority of their alignments. Additionally, the proposed substation alternative sites are located on open vacant land. In terms of the proposed power lines corridors, the alternatives run parallel to major and minor roadways, farm boundaries, existing power lines and along the outer periphery of urban areas. The dominant built-up areas in the study area include the town of Frankfort and Heilbron. An A3 Land Use Map is included in **Appendix J2** to illustrate the land uses affected by the proposed power lines.

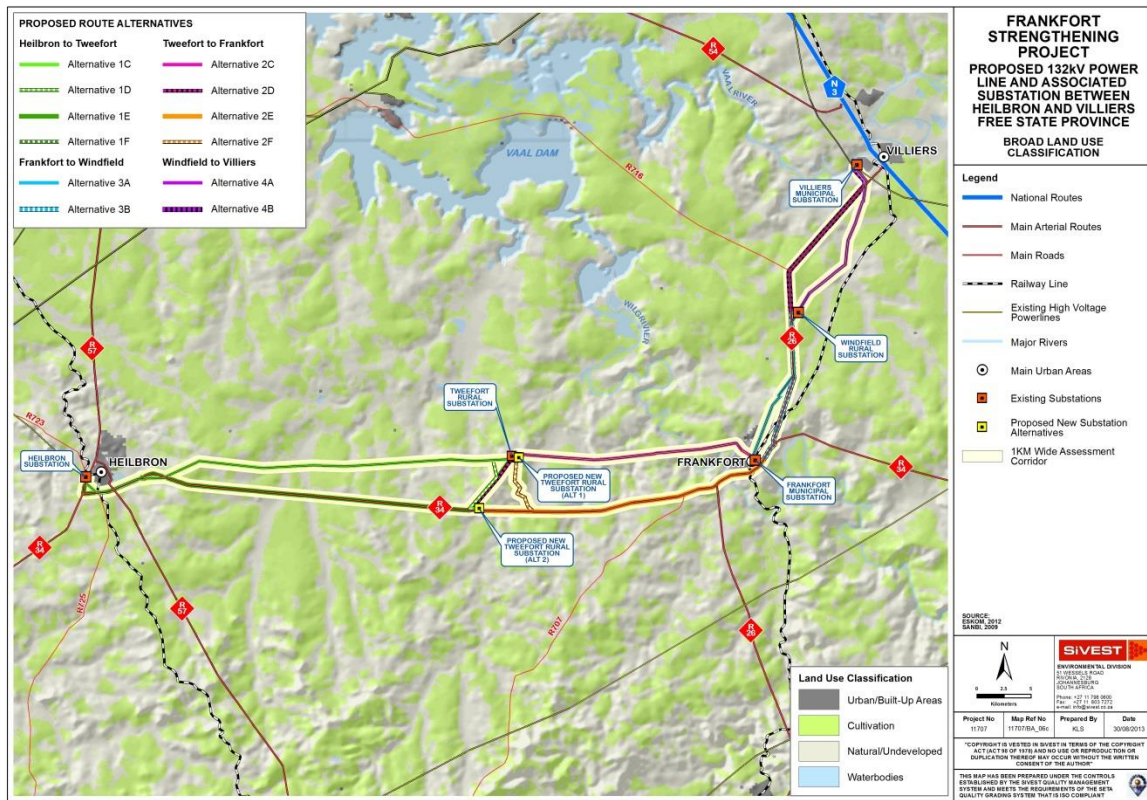


Figure 7: Land Use Map

Does the proposed site (including any alternative sites) fall within any of the following:

Critical Biodiversity Area (as per provincial conservation plan)	NO ✓
Core area of a protected area?	NO ✓
Buffer area of a protected area?	NO ✓
Planned expansion area of an existing protected area?	NO ✓
Existing offset area associated with a previous Environmental Authorisation?	NO ✓
Buffer area of the SKA?	NO ✓

If the answer to any of these questions was YES, a map indicating the affected area must be included in Appendix A.

7. Cultural/Historical Features

Are there any signs of culturally or historically significant elements, as defined in section 2 of the National Heritage Resources Act, 1999, (Act No. 25 of 1999), including Archaeological or paleontological sites, on or close (within 20m) to the site? If YES, explain:

YES ✓

A Heritage Assessment was conducted by Stephan Gaigher in order to assess the impact of the proposed development on heritage resources in the study area. The only sites, features and/or objects of cultural significance that were identified were 2 graveyard sites. The specialist Heritage Assessment can be found in **Appendix D4**.

If uncertain, conduct a specialist investigation by a recognised specialist in the field (archaeology or palaeontology) to establish whether there is such a feature(s) present on or close to the site. Briefly explain the findings of the specialist:

The study area is located mainly within highly modified agricultural areas. This has led to the destruction of most sites within these areas. The only two sites of heritage significance that could be identified within these corridors were two burial sites.

The one site is located in the Namahadi Township along Alternative Corridor 3A which consists of numerous graves and should preferably not be traversed. There is an option (Alternative Corridor 3B) to follow the township access road, which should avoid the burial sites however space is limited. It is therefore suggested from a heritage management point of view that the second alternative 3B to the south be utilised.

The second burial site is much smaller and could easily be avoided through specific pylon placement.

It is further recommended that the chosen alternative undergoes a walk-down evaluation on the final pylon placement choice.

Will any building or structure older than 60 years be affected in any way?

NO ✓

Is it necessary to apply for a permit in terms of the National Heritage Resources Act, 1999 (Act 25 of 1999)?

NO ✓

If YES, please provide proof that this permit application has been submitted to SAHRA or the relevant provincial authority.

8. Socio-economic character

a) Local Municipality

Please provide details on the socio-economic character of the local municipality in which the proposed site(s) are situated.

Level of unemployment:

A large portion (40.8%) of the economically active population is unemployed (Free State Province, Provincial Growth and Development strategy 2005-2014).

Economic profile of local municipality:

The following social and economic profile was extrapolated from the Fezile Dabi District Municipality: Reviewed IDP 2011/12:

- The total population is approximately 474 089 people;
- There is extreme poverty throughout the district with a majority earning R1 600 or less a month) and 29 % of households earn up to R800 or have no monthly income;
- The economic growth has increased by approximately 2.1% per annum between 1996 and 2004.
- Access to electricity has improved but it has been identified as one of many priorities to upgrade and improve this service.
- Health and sanitation services have been noted as a challenged area.

The poverty rates in the two local municipalities traversed by the proposed power line corridor alternatives are as follows:

- Ngwathe Local Municipality –37,9% (IDP Ngwathe Local Municipality 2012-2017)
- Mafube Local Municipality –77% (IDP Mafube Local Municipality 2007-2012)

Level of education:

The education levels within the area are extremely low.

b) Socio-economic value of the activity

What is the expected capital value of the activity on completion?

R 85 Million

What is the expected yearly income that will be generated by or as a result of the activity?

Unknown

Will the activity contribute to service infrastructure?

YES ✓

Is the activity a public amenity?

NO ✓

How many new employment opportunities will be created in the development and construction phase of the activity/ies?	366 direct, indirect and induced jobs. Eskom does an open tender to employ suitable contractors to carry out the construction. Contractors are required to employ local unskilled labourers for non-specialized work
What is the expected value of the employment opportunities during the development and construction phase?	The cumulative income generated by this total employment is expected to be approximately R32.31 million. This can only be established once the contractor is appointed
What percentage of this will accrue to previously disadvantaged individuals?	>= 90 %
How many permanent new employment opportunities will be created during the operational phase of the activity?	Unknown
What is the expected current value of the employment opportunities during the first 10 years?	Unknown – It should be noted however that most of the employment and income generated by this project is short-term
What percentage of this will accrue to previously disadvantaged individuals?	Unknown

9. Biodiversity

Please note: The Department may request specialist input/studies depending on the nature of the biodiversity occurring on the site and potential impact(s) of the proposed activity/ies. To assist with the identification of the biodiversity occurring on site and the ecosystem status consult

<http://bgis.sanbi.org> or BGIShelp@sanbi.org. Information is also available on compact disc (cd) from the Biodiversity-GIS Unit, Ph (021) 799 8698. This information may be updated from time to time and it is the applicant/ EAP's responsibility to ensure that the latest version is used. A map of the relevant biodiversity information (including an indication of the habitat conditions as per (b) below) and must be provided as an overlay map to the property/site plan as Appendix D to this report.

a) Indicate the applicable biodiversity planning categories of all areas on site and indicate the reason(s) provided in the biodiversity plan for the selection of the specific area as part of the specific category)

Systematic Biodiversity Planning Category				If CBA or ESA, indicate the reason(s) for its selection in biodiversity plan
Critical Biodiversity Area (CBA)	Ecological Support Area (ESA)	Other Natural Area (ONA)	No Natural Area Remaining (NNR)	

b) Indicate and describe the habitat condition on site

Habitat Condition	Percentage of habitat condition class (adding up to 100%)	Description and additional Comments and Observations (including additional insight into condition, e.g. poor land management practices, presence of quarries, grazing, harvesting regimes etc).
Natural	20%	The open farming areas that were not transformed through formal agriculture were largely dominated by <i>Themeda triandra</i> (being an indicator of overall good ecological integrity and good veld management). Other important grass species noted were <i>Setaria sphacelata</i> , <i>Eragrostis curvula</i> , <i>Eragrostis teff</i> , <i>Aristida bipartita</i> , <i>Aristida adscensionis</i> , <i>Brachiaria serrata</i> , <i>Eragrostis chloromelas</i> , <i>Heteropogon contortus</i> , <i>Tristachya leucothrix</i> , <i>Cymbopogon caesius</i> , <i>Andropogon appendiculatus</i> , <i>Diheteropogon amplexans</i> and <i>Eragrostis plana</i> . Forb species noted within the grassland areas included <i>Haplocarpha scaposa</i> , <i>Dicoma anomala</i> , <i>Helichrysum nudifolium</i> , <i>Hermannia depressa</i> , <i>Hypoxis rigidula</i> and <i>Helichrysum rugulosum</i> .
Near Natural (includes areas with low to moderate level of alien invasive plants)	30%	The areas closer to the towns that incorporate smallholdings were noted to have been subject to heavy grazing pressure, mostly from small-scale sheep farming. This, together with the general increased density of infrastructure development had largely led to vegetation transformation, with a high inclusion of exotic vegetation and plagioclimax grass species (such as <i>Hyparrhenia</i>

		<i>hirta</i>). A high inclusion of the pioneering grass species, namely <i>Cynodon dactylon</i> , being an indicator of disturbance factors, was also noted within these areas.
Degraded areas (includes areas heavily invaded by alien plants)	5%	Watercourses within the area incorporated the greatest inclusion of exotic vegetation. Exotic trees that dominated included <i>Salix babylonica</i> , <i>Populous x canescens</i> , <i>Populous deltoidea</i> , <i>Populous nigra-italica</i> , <i>Robinnia pseudo-acacia</i> , <i>Melia azedarach</i> and <i>Eucalyptus camaldulensis</i> . The road reserves throughout the survey area as well as fringing agricultural areas, where disturbance factors were noticeably high, included annual exotic pioneering weeds such as <i>Cosmos bipinnatus</i> , <i>Tagetes minuta</i> , <i>Bidens bipinnata</i> , <i>Bidens pilosa</i> and <i>Schkuhria bipinnata</i> .
Transformed (includes cultivation, dams, urban, plantation, roads, etc)	45%	Transformed areas mainly pertain to the urbanized areas near Heilbron, Frankfort and Villiers. A number of cultivated areas were also noted for maize and soy bean cultivation. A number of small isolated impoundments were found dispersed across the study area.

c) Complete the table to indicate:

- (i) the type of vegetation, including its ecosystem status, present on the site; and
- (ii) whether an aquatic ecosystem is present on site.

Terrestrial Ecosystems		Aquatic Ecosystems			
Ecosystem threat status as per the National Environmental Management: Biodiversity Act (Act No. 10 of 2004)	Critical	Wetland (including rivers, depressions, channelled and unchannelled wetlands, flats, seeps, pans, and artificial wetlands)	Estuary	Coastline	
	Endangered				
	Vulnerable				
	Least Threatened				
		YES ✓		NO ✓	NO ✓

d) Please provide a description of the vegetation type and/or aquatic ecosystem present on site, including any important biodiversity features/information identified on site (e.g. threatened species and special habitats)

The study area falls within the Grassland bioregion (Mucina and Rutherford, 2006), with Frankfort Highveld Grassland (a Vulnerable vegetation type) being the main vegetation. The survey area does not include conserved areas, important birding areas, areas of conservation significance or areas of plant endemism. No protected or Red Data List (RDL) floral species have been recorded from the QDS areas associated with the proposed development area. The only species regarded as being Orange listed and categorised as Declining that have been recorded from the survey area are; *Boophane disticha* and *Crinum bulbispermum*.

Watercourses within the area incorporated the greatest inclusion of exotic vegetation. Exotic trees that dominated included *Salix babylonica*, *Populus x canescens*, *Populus deltoidea*, *Populus nigra-italica*, *Robinia pseudo-acacia*, *Melia azedarach* and *Eucalyptus camaldulensis*. The road reserves throughout the survey area as well as fringing agricultural areas, where disturbance factors were noticeably high, included annual exotic pioneering weeds such as *Cosmos bipinnatus*, *Tagetes minuta*, *Bidens bipinnata*, *Bidens pilosa* and *Schkhuria bipinnata*.

The mammalian species of conservational concern, which occur within the area, are limited to highly-mobile bat species, small carnivores, small rodents and insectivores. Larger species (e.g. rhino) occur within the region, but are confined to reserves and do not occur naturally within the region. 76 mammalian species have been historically recorded from the region pertaining to the survey area. The only species recorded from the area that is RDL is *Mystromys albicaudatus* (White tailed rat).

The area has an overall recorded avifaunal species count of 305 species (Gibbon, 2002). A major cause of unnatural mortality of birds emanates from collisions and electrocutions by overhead lines the proposed mitigation measures should be implemented. Groups of species that are represented within the survey area include bustards, storks, cranes, eagles, vultures, ibises, etc. Further groups at risk are fast-flying waterfowl, especially ducks and geese. Another group of birds that are known to migrate at night are flamingos (ACEE, 2001; van Rooyen, 2004).

There are 43 reptilian species recorded from the region pertaining to the survey area (Branch, 1998; ADU, 2013). Inclusion of endemic reptilian species within the survey area is relatively high (19 of the 43 recorded species). Only the Giant girdled lizard (Sungazer) *Cordylus giganteus* is of conservational significance and is regarded as Vulnerable.

There are 11 amphibian species recorded from the region. None of these species are considered to be of conservational concern, with a widespread distribution.

With respect to wetlands and watercourses, overall one hundred and twenty five (125) wetlands and two (2) major rivers (smaller systems such as the Brakspruit for example, were found to be encompassed by the delineated wetlands and defined as such) were verified in the field. More specifically, twenty eight (28) channelled valley bottom wetlands, forty nine (49) unchannelled valley bottom wetlands, ten (10) floodplain wetlands, seventeen (17) depression (pan) wetlands and twenty one (21) artificial wetlands were identified. The two major river systems identified include the Wilge and Vaal rivers.

SECTION C: PUBLIC PARTICIPATION

A Public Participation Report has been compiled, outlining the detailed public participation process undertaken as part of this basic assessment. The Public Participation Report is included in **Appendix E**.

1. Advertisement and Notice

Publication name	Heilbron Herald	
Date published	14 February 2013	
Publication name	Vrystaat	
Date published	14 February 2013	
Site notice position (Villiers SS Site)	Latitude	Longitude
	27° 01' 52.77"S	28°35' 39.60"E
Date placed	5th February 2013	
Site notice position (Windfield Rural SS)	Latitude	Longitude
	27° 09' 10.92"S	28° 32' 45.75"E
Date placed	5th February 2013	
Site notice position (Frankfort SS)	Latitude	Longitude
	27° 16' 32.89"S	28° 30' 39.46"E
Date placed	5th February 2013	
Site notice position (Heilbron SS)	Latitude	Longitude
	27° 16' 26.97"S	28° 18' 39.73"E
Date placed	5th February 2013	

Include proof of the placement of the relevant advertisements and notices in Appendix E1.

Proof of the Advertisements and Site notices are included in **Appendix E1**.

2. Determination of appropriate measures

Provide details of the measures taken to include all potential I&APs as required by Regulation 54(2)(e) and 54(7) of GN R.543.

Refer to Appendix E for further details of the measures taken to notify all potential I&APs of the proposed project.

Key stakeholders (other than organs of state) identified in terms of Regulation 54(2)(b) of GN R.543:

Title, Name and Surname	Affiliation/ key stakeholder status	Contact details (tel number and/ e-mail address)
Mr. Van Der Westhuizen	Landowner	Confidential - To be requested directly from SiVEST SA (Pty) Ltd.
Mr Moller	Landowner	
Mr Jan de Klerk	Landowner	
Mr Jannie Schabort	Landowner	
Mr. Dirkie Schabort	Landowner	
Mr Olivier Braam	Landowner (Glen Alphen)	
Mr. Maarten Maartens	Landowner (Holfontein)	
Mr. Neels Cilliers	Landowner (Sararust & Weshoek)	
Mr. Piet Schabort	Landowner (Alphen & Sheffield farm)	
Ms. Magda Dysel	Landowner (Ausker's Dale)	
Mrs. Elna Oosthuizen	Landowner (Excelsior no. 621)	
Mr. Frikkie Oosthuizen	Landowner (Excelsior no. 621)	
Mr. J. Potgieter	Landowner (Jucane- Welkom)	
Mr. Piet Minnie	Landowner (Mooispruit Boerdery) - director	
Mr. J. Du Plessis	Landowner (Platkop no. 598)	
Mr. Dirk Van Rensburg	Landowner (Pleasant view no.620)	
Mr. Hennie Van Rensburg	Landowner (Welverdiend no. 240 + Kelkieskuil no. 1250)	
Mrs. Inalize Cilliers	Landowner (Weshoek)	
Mrs. Anamaria Botha	Owner of Water Puts Tuisnywerheid	
Ms. Elana Bester	Villiers Public Library	
Ms. Pindiwe Motlounq	Namahadi Public Library	
Mr. David Motaung	BKB Auctioneers	
Mr. Wetznel Vorster	BKB Properties	
Mr. Andre Botha	Lekoa Lodge	
Mr. Marvin Tsosetsi	Villiers Public Library	

Include proof that the key stakeholder received written notification of the proposed activities as Appendix E2. This proof may include any of the following:

- e-mail delivery reports;
- registered mail receipts;
- courier waybills;
- signed acknowledgements of receipt; and/or
- or any other proof as agreed upon by the competent authority.

Proof that the key stakeholder received written notification of the proposed activities is included in **Appendix E2.**

3. Issues raised by interested and affected parties

Summary of main issues raised by I&APs	Summary of response from EAP
None at present.	None at present.

4. Comments and response report

The practitioner must record all comments received from I&APs and respond to each comment before the Draft BAR is submitted. The comments and responses must be captured in a comments and response report as prescribed in the EIA regulations and be attached to the Final BAR as Appendix E3.

The Comments and Response Report (C&RR) is included in **Appendix E3**.

5. Authority participation

Authorities and organs of state identified as key stakeholders:

Authority/Organ of State	Contact person (Title, Name and Surname)	Tel No	e-mail	Postal address
Birdlife Free State	Mrs. Louise Coetzee	082 382 1341	loucoetsee@mweb.co.za	Not available
Chambers of Commerce		051 447 3369	info@bccci.co.za	PO Box 87, Bloemfontein 9300
Department of Agriculture, Forestry and Fisheries (DWAFF) – Free State	Mr. Life Mukoni	051 861 8400/8432	imukoni@fs.agric.za	Private Bag X02, Bloemfontein 9360
Department of Economic Development, Tourism and Environmental Affairs (DETEA)	Mrs. Grace Mkhosana	082 789 4611	mkhosana@detea.fs.gov.za	Private Bag X20801, Bloemfontein 9300
Department of Agriculture,	Anneliza Collett	012 319 7508	annelizac@nda.agric.za	Private Bag X120, Pretoria,

Forestry and Fisheries (DWAFF)				0001
Department of Mineral Resources (DMR) – Free State	Mr. S. Kewuti	057 391 1300	Kalipa.Kewuti@dmr.gov.za	Private Bag X 33, Welkom 9460
Department of Water Affairs (DWA) – Free State		051 405 9000	Not available	PO Box 528, Bloemfontein 9300
South African National Roads Agency Limited (SANRAL)		041 398 3200	Not available	PO Box 27230, Green Acres 6057
Spoornet	Ms. Suzan Finger	083 278 9500	Mojabuthof@spoornet.co.za	222 Smit Street, Braamfontein 2000
Free State Agriculture	Mrs Elana Bester	Not available	elena@vslandbou.co.za	Not available
Archaeological Heritage Impact Assessor – SAHRA Head Office	Ms. Kathryn Smuts	021 462 4502	ksmuts@sahra.org.za	PO Box 4637, Cape Town
Director of Community Health and Environmental Department – Fezile Dabi District Municipality	Ms Nonhlahla Sgudu	016 970 8810	nonhlahlas@nfsdc.co.za	PO BOX 10, Sasolburg 1947
Executive Mayor – Fezile Dabi District Municipality	Councillor Moeketsi Moshodi	016 970 8600	exmayor@nfsdc.co.za	PO BOX 10, Sasolburg 1947
Land Use and Soil Management – Department of Agriculture, Forestry and Fisheries	Mr. Paul Avenant	012 319 7548	paula@daff.gov.za	Private Bag X120, Pretoria 0001
Spoornet	Mr. Francis	011 774 4664	francisr@spoornet.co.za	PO Box 31084,

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	Rahlanpane			Braamfontein 2017
Fezile Dabi District Municipality	Ms. Lindi Molibeli	016 970 8607	lindim@nfsdc.co.za	PO BOX 10, Sasolburg, 1947
Ngwathe Local Municipality	Mr. Norman Selai	056 816 2700	Not available	P.O Box 359, Parys 9585
Mafube Local Municipality	Ms. Phetha Londeka	058 813 9728	Not available	P.O Box 2, Frankfort 9830
Tekom SA (Pty) Ltd	Mr. Martin Potgieter	058 303 0571	PotgiMP@telkom.co.za	14 Koub-Smit Street, Bethlehem 9701
WESSA – Lowveld Region	Mr. Ricky Potts	083 630 1782	lowveldchair@wessa.co. za	PO Box 150, White River 1240
Telkom SA (Pty) Ltd	Mrs. Heleen Van Der Heever	051 401 6829	VDHeevHD@telkom.co. za	Wayleave Management Private Bag x20700, Bloemfontein 9300

Include proof that the Authorities and Organs of State received written notification of the proposed activities as appendix E4.

In the case of renewable energy projects, Eskom and the SKA Project Office must be included in the list of Organs of State.

Proof that the Authorities and Organs of State received written notification of the proposed activities in included in **Appendix E4**.

6. Consultation with other stakeholders

Note that, for any activities (linear or other) where deviation from the public participation requirements may be appropriate, the person conducting the public participation process may deviate from the requirements of that sub-regulation to the extent and in the manner as may be agreed to by the competent authority.

Proof of any such agreement must be provided, where applicable. Application for any deviation from the regulations relating to the public participation process must be submitted prior to the commencement of the public participation process.

A list of registered I&APs must be included as appendix E5.

Copies of any correspondence and minutes of any meetings held must be included in Appendix E6.

A list of registered I&APs is included in **Appendix E5**.

Full detail of the correspondence and minutes of meetings will be included in **Appendix E6**.

SECTION D: IMPACT ASSESSMENT

The assessment of impacts must adhere to the minimum requirements in the EIA Regulations, 2010, and should take applicable official guidelines into account. The issues raised by interested and affected parties should also be addressed in the assessment of impacts.

Impacts that may result from the planning and design, construction, operational, decommissioning and closure phases as well as proposed management of identified impacts and proposed mitigation measures

Provide a summary and anticipated significance of the potential direct, indirect and cumulative impacts that are likely to occur as a result of the planning and design phase, construction phase, operational phase, decommissioning and closure phase, including impacts relating to the choice of site/activity/technology alternatives as well as the mitigation measures that may eliminate or reduce the potential impacts listed. This impact assessment must be applied to all the identified alternatives to the activities identified in Section A(2) of this report.

Activity	Impact summary	Significance	Proposed mitigation
Biodiversity	Direct impacts:		
	Decrease in habitat integrity through indiscriminate habitat destruction and unnecessarily large construction footprints will displace sensitive species	High negative impact	<ul style="list-style-type: none"> ▪ Limit the construction and impact footprint ▪ Avoid habitats units known to support high diversity of faunal species (rocky outcroppings, wetland and riparian areas) ▪ Refuse and wastes must be managed appropriately to avoid opportunism and potential dependency from various faunal species
	Destruction of suitable habitat (wetlands,	High negative impact	<ul style="list-style-type: none"> ▪ Limit the construction and impact footprint; ▪ Avoid habitat units known to support high diversity of faunal species

Activity	Impact summary	Significance	Proposed mitigation		
	riparian zones, and open grasslands) will displace many amphibians, especially sensitive species		(grasslands in good condition, wetland and riparian areas)		
	Vegetation stripping constitutes habitat destruction and therefore these two aspects are intricately linked.	High negative impact	<ul style="list-style-type: none"> ▪ Contractors should utilize existing roadways wherever possible (railway servitudes, farm roads, etc); ▪ Where an existing servitude cannot be utilized, a single roadway should be constructed and must be confined to using the single roadway only; ▪ Indiscriminate habitat destruction should be avoided; ▪ Destruction to wetland, riparian and rocky outcropping habitat should be avoided as a priority; ▪ Building materials and construction equipment should be stored within the construction footprint and not impact unnecessarily on surrounding areas; ▪ Excess building material must be removed and stored within appropriate and designated areas; ▪ Indiscriminate harvesting of trees by construction workers (e.g. for firewood) must be avoided; ▪ Impacting features surrounding the individual towers can be reduced after the construction phase is completed by re-landscaping the area to reflect the original topographical features, replacement of the topsoil layer and re-vegetating with floral species from the adjacent natural veld. 		
	Vegetation clearing & stripping of topsoil in preparation for tower construction.				
	Vegetation stripping to establish a servitude roadway.				
Indirect impacts:					

Activity	Impact summary	Significance	Proposed mitigation
	Aggravation of soil erosion leading to siltation of the aquatic habitat and fish species displacement.	Medium negative impact	<ul style="list-style-type: none"> ▪ Limit the construction and impact footprint; ▪ Avoid habitat units known to support high diversity of faunal species (grasslands in good condition, wetland and riparian areas)
Contamination of watercourses through fuel or oil leaks of construction vehicles, informal ablutions of construction teams or refuse dumping within riparian zones and watercourses;	Badly designed watercourse crossings that could pose a threat to migratory freedom through creating a migratory barrier to migrating fish.		
Destruction of viable habitat throughout the survey region will impact on all invertebrate taxa.	High negative impact		

Activity	Impact summary	Significance	Proposed mitigation
	Collision impacts with overhead power lines by larger species; Electrocution impacts leading to mortalities of perched individuals of larger species.	High negative impact	<ul style="list-style-type: none"> ▪ Power lines pose a risk to avifaunal species through collisions and electrocutions. This is an aspect that requires mitigation (bird flappers on earth lines within the identified migratory routes and perching averters on pylons); ▪ Refuse and wastes must be managed appropriately to avoid opportunism and potential dependency from various avifaunal species.
	Cumulative impacts:		
	Negligible cumulative impacts	Low Negative Cumulative Impact	<ul style="list-style-type: none"> ▪ There is an existing transmission power line, and various distribution lines within the region, together with telephone lines, roads, urban areas and other infrastructure development. This impact is therefore considered to be low.
Surface Water	Direct impacts:		
	Vehicle and machinery degradation	Medium negative impact	<ul style="list-style-type: none"> ▪ Preventing Physical Degradation of Wetlands – Wetlands, riparian habitats and the associated buffer zones that are to be affected must be designated as “sensitive” and any impact must be limited to the minimum possible extent should the requisite environmental authorisations and water use licenses be obtained for the proposed development. All wetlands, riparian habitats and the associated buffer zones must be demarcated prior to construction activities taking place. The demarcation of all wetlands, riparian habitats and the associated buffer zones to be affected must last for the duration of the construction phase. ▪ Preventing Soil and Wetland Contamination – All vehicles and machinery are to be checked for oil, fuel or any other fluid leaks before entering the construction areas. ▪ A single one way access route or “Right of Way” (RoW) is to be established

Activity	Impact summary	Significance	Proposed mitigation
	Human degradation of wetland, riparian habitat and the associated buffer zones flora and fauna	Low negative impact	<ul style="list-style-type: none"> ▪ Construction workers are only allowed within the demarcated RoW ▪ No hazardous materials are to be stored or brought into the sensitive areas.
Indirect impacts:			
	Collision and electrocution impacts to avi-fauna	Medium cumulative effect	<ul style="list-style-type: none"> ▪ Preventing Avi-fauna Collisions with Power lines – During the construction phase, it is critical that the stretches of power lines that are within any of the wetlands, riparian habitats or associated buffer zones are fitted with flight deviators or bird anti-collision devices (whichever is more appropriate) to prevent impacts to avi-fauna. The fitment of the devices or deviators must take place on the ground before stringing the power lines takes place. Sufficient insulation must also be fitted to the towers structures in the wetlands, watercourses or associated buffer zones to prevent electrocution. ▪ Finally, more bird friendly tower structures as per Eskom’s designs can be

Activity	Impact summary	Significance	Proposed mitigation
			considered to further mitigate collision and electrocution impacts.
	Cumulative impacts:		
	Degradation and removal of wetland and riparian habitat soils and vegetation	High cumulative effect	<ul style="list-style-type: none"> ▪ Obtaining Relevant Authorisations and Licenses ▪ Preventing Physical Degradation of Wetlands ▪ Limiting Removal and Preserving Excavated Soils ▪ Preventing Pollution Impacts ▪ Protection of Stockpiled Soils ▪ Limiting use of Construction Vehicles ▪ Rehabilitation of RoW areas
	Erosion, increased storm water run-off and increased sedimentation impacting on wetlands, riparian habitats and the associated buffer zones	High cumulative Impact	<ul style="list-style-type: none"> ▪ Preventing Increased Run-off and Sedimentation Impacts ▪ Adequate structures must be in place (temporary or permanent where necessary) to deal with run-off and sediment volumes. The use of silt fencing and/or sandbags or hessian “sausage” nets can be used to prevent erosion in susceptible construction areas. All impacted areas must be adequately sloped to prevent the onset of erosion. These erosion measures must be on hand during the construction phase.
Floodlines	Direct impacts:		
	<ul style="list-style-type: none"> ▪ See surface water impacts above 		
	Indirect impacts:		
	<ul style="list-style-type: none"> ▪ See surface water impacts above 		
	Cumulative impacts:		
	<ul style="list-style-type: none"> ▪ See surface water impacts above 		
Agricultural	Direct impacts:		

Activity	Impact summary	Significance	Proposed mitigation
Potential & Soils	Loss of agricultural land and / or production as a result of the proposed construction of the 132kV power lines	Low negative impact	<ul style="list-style-type: none"> ▪ Interact with impacted landowners. The negotiation phase should form part of the final survey / line route selection. ▪ Employ a low impact routing to avoid / skirt high value agricultural land (e.g. irrigated areas) and important agricultural infrastructure. ▪ The utilisation of optimal tower designs can further reduce the potential impacts. ▪ Attempt to place towers on the edge of existing agricultural areas and span active agricultural fields as far as possible. Following existing roads and utilising the edge of road servitudes is highly recommended due to the existing impacts associated with these areas. ▪ Ensure adequate compensation is paid to land owners where necessary. ▪ Employ erosion control: <ul style="list-style-type: none"> ○ Clearing activities should be kept to a minimum. ○ In the unlikely event that heavy rains are expected, activities should be put on hold to reduce the risk of erosion. ○ If additional earthworks are required, any steep or large embankments that are expected to be exposed during the 'rainy' months should be armoured with fascine like structures. ▪ If earth works are required then storm water control and wind screening should be undertaken to prevent soil erosion.
	Indirect impacts:		
	None identified.		
	Cumulative impacts:		
Negligible cumulative impacts.			
Heritage	Direct impacts:		
	Damage to graves	High negative impact	<ul style="list-style-type: none"> ▪ The burial site should be indicated on the EIA sensitivity map. The site

Activity	Impact summary	Significance	Proposed mitigation
			should be exhumed and re-interred by a specialist grave relocation company.
	Indirect impacts:		
	None identified.		
	Cumulative impacts:		
	Negligible cumulative impacts.		
Visual	Direct impacts:		
	Large construction vehicles and equipment during the construction phase may change the visual character of the study area and expose sensitive receptors to visual impacts associated with the construction phase.	Low negative impact	<ul style="list-style-type: none"> ▪ Carefully plan to reduce the construction period. ▪ Locate construction camp and storage areas in zones of low visibility i.e. behind tall trees or in lower lying areas. ▪ Minimise vegetation clearing and rehabilitate cleared areas as soon as possible. ▪ Maintain a neat construction site by removing rubble and waste materials regularly. ▪ Make use of existing gravel access roads where possible.
	Indirect impacts:		
	Change to the visual character of the surrounding area and visual impact on sensitive visual receptors that may perceive the power	Medium negative impact	<ul style="list-style-type: none"> ▪ Align the power line as far away from sensitive receptor locations as possible. ▪ Align the power line to run parallel to existing power lines and/or infrastructure. ▪ Avoid crossing areas of higher elevation, especially ridges, koppies or hills. ▪ Avoid areas of natural wooded vegetation where possible.

Activity	Impact summary	Significance	Proposed mitigation
	line to be an unwelcome intrusion.		
	Cumulative impacts:		
	Medium cumulative impacts.		
Socio-economic	Direct impacts:		
	The estimated total impact on employment is 111 jobs, of which 53 jobs are direct, 31 jobs are indirect and 27 jobs are induced. (Heilbron – Tweefort)	Low positive impact	<ul style="list-style-type: none"> ▪ The positive impact on employment can be increased through the use of labour intensive methods and by placing emphasis on local job creation. Implementation of this measure will increase the intensity of the impact on employment.
	The estimated total impact on employment is 94 jobs, of which 58 jobs are direct, 19 jobs are indirect and 17 jobs are induced. (Tweefort to Frankfort)	Low positive impact	
The estimated total impact on employment is 77 jobs, of which 51 jobs are direct, 13 jobs are indirect and 12 jobs are induced. (Frankfort to Winfield)	Low positive impact		

Activity	Impact summary	Significance	Proposed mitigation
	The estimated total impact on employment is 86 jobs, of which 58 jobs are direct, 15 jobs are indirect and 13 jobs are induced. (Winfield to Villiers)	Low positive impact	
Indirect impacts:			
	The estimated total impact on production is R69.88 million, of which R33.85 million is direct, R20.94 million is indirect and R15.10 million is induced. (Heilbron – Tweefort)	Low positive impact	<ul style="list-style-type: none"> ▪ The positive impact on production can be increased by prioritising the domestic (preferably local) production of goods and services. Implementation of this measure will increase the intensity of the impact on production
	The estimated total impact on GDP is R26.56 million, of which R18.01 million is direct, R8.96 million is indirect and R6.87 million is induced. (Heilbron – Tweefort)	Low positive impact	<ul style="list-style-type: none"> ▪ There are no known measures that may be undertaken to increase the impact on GDP of constructing Section 1 of the power line.
	The estimated total impact on household	Low positive impact	<ul style="list-style-type: none"> ▪ The positive impact on employment can be increased through the use of labour intensive methods and by placing emphasis on local job creation.

Activity	Impact summary	Significance	Proposed mitigation
	income is R12.83 million, of which R5.28 million is direct, R4.48 million is indirect and R3.07 million is induced. (Heilbron – Tweefort)		Implementation of this measure will increase the intensity of the impact on household income.
	The estimated total impact on production is R42.61 million, of which R20.66 million is direct, R12.75 million is indirect and R9.20 million is induced. (Tweefort to Frankfort)	Low positive impact	<ul style="list-style-type: none"> ▪ The positive impact on production can be increased by prioritising the domestic (preferably local) production of goods and services. Implementation of this measure will increase the intensity of the impact on production.
	The estimated total impact on GDP is R16.19 million, of which R10.99 million is direct, R5.46 million is indirect and R4.19 million is induced. (Tweefort to Frankfort)	Low positive impact	<ul style="list-style-type: none"> ▪ There are no known measures that may be undertaken to increase the impact on GDP of constructing Section 1 of the power line.
	The estimated total impact on household income is R7.82	Low positive impact	<ul style="list-style-type: none"> ▪ The positive impact on employment can be increased through the use of labour intensive methods and by placing emphasis on local job creation. Implementation of this measure will increase the intensity of the impact on

Activity	Impact summary	Significance	Proposed mitigation
	million, of which R3.22million is direct, R2.73 million is indirect and R1.87 million is induced. . (Tweefort to Frankfort)		household income.
	The estimated total impact on production is R30.00 million, of which R14.63 million is direct, R8.90 million is indirect and R6.47 million is induced. (Frankfort to Winfield)	Low positive impact	<ul style="list-style-type: none"> ▪ The positive impact on production can be increased by prioritising the domestic (preferably local) production of goods and services. Implementation of this measure will increase the intensity of the impact on production.
	The estimated total impact on GDP is R11.39 million, of which R7.78 million is direct, R3.80 million is indirect and R2.94 million is induced. (Frankfort to Winfield)	Low positive impact	<ul style="list-style-type: none"> ▪ There are no known measures that may be undertaken to increase the impact on GDP of constructing Section 1 of the power line.
	The estimated total impact on household income is R5.49 million, of which R2.28 million is direct, R1.90	Low positive impact	<ul style="list-style-type: none"> ▪ The positive impact on employment can be increased through the use of labour intensive methods and by placing emphasis on local job creation. Implementation of this measure will increase the intensity of the impact on household income.

Activity	Impact summary	Significance	Proposed mitigation
	million is indirect and R1.31 million is induced. (Frankfort to Winfield)		
	The estimated total impact on production is R33.68 million, of which R16.41 million is direct, R10.00 million is indirect and R7.27 million is induced. (Winfield to Villiers)	Low positive impact	<ul style="list-style-type: none"> ▪ The positive impact on production can be increased by prioritising the domestic (preferably local) production of goods and services. Implementation of this measure will increase the intensity of the impact on production.
	The estimated total impact on GDP is R12.78 million, of which R8.73 million is direct, R4.27 million is indirect and R3.30 million is induced. (Winfield to Villiers)	Low positive impact	<ul style="list-style-type: none"> ▪ There are no known measures that may be undertaken to increase the impact on GDP of constructing Section 1 of the power line.
	The estimated total impact on household income is R6.17 million, of which R2.56 million is direct, R2.13 million is indirect and	Low positive impact	<ul style="list-style-type: none"> ▪ The positive impact on employment can be increased through the use of labour intensive methods and by placing emphasis on local job creation. Implementation of this measure will increase the intensity of the impact on household income.

Activity	Impact summary	Significance	Proposed mitigation
	R1.48 million is induced. (Winfield to Villiers)		
	Cumulative impacts:		
	Negligible cumulative impacts.		
No-go option			
	Direct impacts:		
	At present, there are transformation impacts near urbanised areas and agricultural areas. Additionally, erosion impacts to several wetlands and watercourses are clearly evident. Cattle grazing and trampling impacts are pervasive across the study area.		
	Indirect impacts:		
	Road construction on the R34 can be expected to be contributing somewhat to run-off and sedimentation impacts on surface water resources.		
	Cumulative impacts:		
	None anticipated.		

A complete impact assessment in terms of Regulation 22(2)(i) of GN R.543 must be included as Appendix F.

Due to the generic nature of the study area and the fact that the routes run in close proximity to each other (overlapping in part) for portions of the alignments, potential impacts were applicable to all the proposed alternative corridors. As such, the impacts of the development as a whole is summarised in the table above. This is also included in **Appendix F**.

1. Environmental Impact Statement

Taking the assessment of potential impacts into account, please provide an environmental impact statement that summarises the impact that the proposed activity and its alternatives may have on the environment after the management and mitigation of impacts have been taken into account, with specific reference to types of impact, duration of impacts, likelihood of potential impacts actually occurring and the significance of impacts.

Alternative 1C

Biodiversity	<ul style="list-style-type: none"> ▪ Even though this alternative will follow an existing transmission power line, this existing line was established long enough ago to enable full rehabilitation of the impacted grasslands associated with it. This is also one of the very few impacting features within these grassland areas, besides isolated agriculture. ▪ Overall conservation of faunal and floral features relies on conservation of the habitat holistically. The greatest overall impact to the habitat units holistically will occur if construction occurs along this alternative. It is true that construction along this alternative will result in the least impacts to avifaunal species from collision impacts, but this aspect can be mitigated for along Alternative 1B.
Surface Water	<ul style="list-style-type: none"> ▪ There are a total of nineteen (19) surface water resources that can be found along Alternative 1C. These consist of ten (10) unchannelled valley bottom wetlands, seven (7) channelled valley bottom wetlands and two (2) artificial wetlands. Twelve (12) of the wetlands will need to be spanned of which the width at the widest point of three (3) wetlands exceed the spanning distance of the proposed power lines. These include three channelled valley bottom wetlands. ▪ Even with strategic positioning of the proposed power line routes, two wetlands are highly likely to have towers placed within the wetlands. Due to this impact and in consideration of the relatively unimpacted land, Alternative 1C is not preferred.
Floodlines	<ul style="list-style-type: none"> ▪ Must cross a wide flood line, and must route past an elongated flood line.
Agricultural Potential and Soils	<ul style="list-style-type: none"> ▪ Route crosses dry land cultivation and grazing land. Does not follow an existing road.
Visual	<ul style="list-style-type: none"> ▪ The entire route is aligned parallel to an existing 88kV power line. ▪ According to the visual impact analysis there are fewer zones of high visual impact along this alignment alternative.
Heritage	<ul style="list-style-type: none"> ▪ Sub-surface sites could still be intact
Socio-economic	<ul style="list-style-type: none"> ▪ The proposed route travels through existing farms and thus will have a negative, albeit small, impact on agricultural production.

Alternative 1D

Biodiversity	<ul style="list-style-type: none"> ▪ Moves through similar habitat units subject to similar drivers and pressures.
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Surface Water	<ul style="list-style-type: none"> Alternative 1D contains the same surface water resources as described for Alternative 1C. However, there are several additional wetlands located in the corridor for Alternative 1D up to the point where it enters the Proposed Southern Tweefort Rural Substation (Substation Alternative 2). These include seven (7) unchannelled valley bottom wetlands, one (1) depression wetland and one (1) artificial wetland. It is possible for all these wetlands to be avoided with strategic placement of the power lines around the wetlands. However, due to impacts described above for Alternative 1C in addition to possible indirect impacts this alternative is not preferred.
Floodlines	<ul style="list-style-type: none"> Must cross a wide flood line, and must route past an elongated flood line.
Agricultural Potential and Soils	<ul style="list-style-type: none"> Route crosses dry land maize fields and grazing land but is longer than the Alternative than 1F.
Visual	<ul style="list-style-type: none"> Most of the route is aligned parallel to an existing 88kV power line. A portion of the southern leg of this alternative runs parallel to an existing secondary road, but the remainder of the alternative cuts across agricultural land. According to the visual impact analysis there are relatively few zones of high visual impact along this alignment alternative.
Heritage	<ul style="list-style-type: none"> No sites identified.
Socio-economic	<ul style="list-style-type: none"> The proposed route travels through existing farms and thus will have a negative, albeit small, impact on agricultural production.

Alternative 1E

Biodiversity	<ul style="list-style-type: none"> Moves through similar habitat units subject to similar drivers and pressures.
Surface Water	<ul style="list-style-type: none"> There are a total of thirty two (32) surface water resources that can be found in Alternative 1E. These consist of twenty one (21) unchannelled valley bottom wetlands, four (4) channelled valley bottom wetlands, one (1) floodplain wetland, nine (9) artificial wetlands and two (2) depression wetlands. Of these wetlands eight (8) will need to be spanned of which three (3) exceed the spanning length of the proposed power lines at the widest points. These include two unchannelled valley bottom wetlands and one unchannelled valley bottom wetland. Despite the higher number of wetlands present, most can be avoided by routing the proposed power line around the wetlands. Additionally, should the proposed power line route adjacent to the existing road (R34), only one wetland is likely to need to have a tower placed in it. This alternative is also already impacted on by the R34. Due to the relative less impact by comparison to Alternative 1C and 1D, Alternative 1B is considered favourable since impacts can still be anticipated for potentially more surface water resources than the other alternatives.
Floodlines	<ul style="list-style-type: none"> No major floodline impacts.
Agricultural	<ul style="list-style-type: none"> Route crosses dry land maize fields and grazing land but follows the road

Potential and Soils	which is associated existing impacts.
Visual	<ul style="list-style-type: none"> ▪ Most of route is aligned parallel to the R34. ▪ The alternative is aligned parallel to other linear infrastructure for part of the route. These include existing power lines and telephone poles. ▪ According to the visual impact analysis there are more zones of high visual impact along this alignment alternative.
Heritage	<ul style="list-style-type: none"> ▪ R34 road works possibly already disturbed any sub-surface sites.
Socio-economic	<ul style="list-style-type: none"> ▪ The proposed route travels through existing farms and thus will have a negative, albeit small, impact on agricultural production.

Alternative 1F

Biodiversity	<ul style="list-style-type: none"> ▪ A high level of existing infrastructure development that runs parallel and in association with this proposed alternative means that this route suffers presently from the greatest amount of ecological impacts. The significance to constructing a new line along this route will therefore be the lowest in terms of ecological degradation as a result of the construction activities and the presence of an overhead power line along this route.
Surface Water	<ul style="list-style-type: none"> ▪ Alternative 1F contains the same surface water resources as described for Alternative 1E up until the point of deviation from the R34 to where the Proposed Southern Tweefort Rural Substation (Substation Alternative 2) is to be located. As such, there are fewer surface water resources that will be affected in Alternative 1E. This is the preferred alternative.
Floodlines	<ul style="list-style-type: none"> ▪ No major flood line impacts. More direct and shorter route than 1E.
Agricultural Potential and Soils	<ul style="list-style-type: none"> ▪ Route crosses low value grazing land and is shorter than Alternative 1D.
Visual	<ul style="list-style-type: none"> ▪ The entire route is aligned parallel to the R34. ▪ The alternative is aligned parallel to other linear infrastructure for part of the route. These include existing power lines and telephone poles. ▪ According to the visual impact analysis there are more zones of high visual impact along this alignment alternative.
Heritage	<ul style="list-style-type: none"> ▪ No sites identified.
Socio-economic	<ul style="list-style-type: none"> ▪ The impact on agricultural output will be minimised by constructing along the R34 rather than through existing farms.

Alternative 2C

Biodiversity	<ul style="list-style-type: none"> ▪ Even though this alternative will follow an existing transmission power line, this existing line was established long enough ago to enable full rehabilitation of the impacted grasslands associated with it. This is also one of the very few impacting features within these grassland areas, besides isolated agriculture. ▪ Overall conservation of faunal and floral features relies on conservation of the habitat holistically. The greatest overall impact to the habitat units holistically will occur if construction occurs along this alternative. It is true that construction along this alternative will result in the least impacts to
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	<p>avifaunal species from collision impacts, but this aspect can be mitigated for along Alternative 1B.</p>
Surface Water	<ul style="list-style-type: none"> ▪ There are a total of eighteen (18) surface water resources that can be found in Alternative 2C. These consist of three (3) unchannelled valley bottom wetlands, six (6) channelled valley bottom wetlands, one (1) artificial wetland, six (6) floodplain wetlands and two (2) riparian habitats (both of the same system – Wilge River). Six (6) of the wetlands will need to be spanned. All can easily be spanned but are on relatively unimpacted land. ▪ It must also be noted that this alternative contains the most floodplain wetlands in the corridor. With strategic positioning of the proposed power line routes however, the floodplain wetlands can be avoided. Alternative 2A is therefore considered the favourable.
Floodlines	<ul style="list-style-type: none"> ▪ Must cross a wide flood line, and route past an elongated floodline.
Agricultural Potential and Soils	<ul style="list-style-type: none"> ▪ Route could impact on high value agricultural land (pivot irrigation).
Visual	<ul style="list-style-type: none"> ▪ The entire route is aligned parallel to an existing 88kV power line. ▪ According to the visual impact analysis there are fewer zones of high visual impact along this alignment alternative.
Heritage	<ul style="list-style-type: none"> ▪ Unidentified sites could still occur in this unmodified environment.
Socio-economic	<ul style="list-style-type: none"> ▪ The impact on Namahadi village will be severe requiring the relocation of many homes and businesses.

Alternative 2D

Biodiversity	<ul style="list-style-type: none"> ▪ Moves through similar habitat units subject to similar drivers and pressures.
Surface Water	<ul style="list-style-type: none"> ▪ Alternative 2D contains the same surface water resources as described for Alternative 2C except for the section that deviates from near to the Proposed Northern Tweefort Rural Substation (Substation Alternative 1) to the Proposed Southern Rural Substation (Substation Alternative 2). For this section of the alternative there are seven (7) unchannelled valley bottom wetlands, one (1) depression wetland and one (1) artificial wetland. It is possible for all these wetlands to be avoided with strategic placement of the power lines around the wetlands. Additionally, given that the Proposed Southern Rural Substation (Substation Alternative 2) was selected as the preferred substation alternative (see Error! eference source not found.) and that there are relatively fewer surface water resources to potentially be affected by the proposed development by comparison to Alternatives 2E and 2F (see below), this alternative is the preferred option.
Floodlines	<ul style="list-style-type: none"> ▪ Must cross a wide flood line, and route past an elongated floodline.
Agricultural Potential and Soils	<ul style="list-style-type: none"> ▪ Route crosses dry land cultivation and grazing land but follows the road for most of its route, which are associated existing impacts.
Visual	<ul style="list-style-type: none"> ▪ Most of the route is aligned parallel to an existing 88kV power line.

	<ul style="list-style-type: none"> ▪ A portion of the southern leg of this alternative runs parallel to an existing secondary road, but the remainder of the alternative cuts across agricultural land. ▪ According to the visual impact analysis there are relatively few zones of high visual impact along this alignment alternative.
Heritage	<ul style="list-style-type: none"> ▪ No sites were identified.
Socio-economic	<ul style="list-style-type: none"> ▪ The impact on Namahadi village will be severe requiring the relocation of many homes and businesses.

Alternative 2E

Biodiversity	<ul style="list-style-type: none"> ▪ A high level of existing infrastructure development that runs parallel and in association with this proposed alternative means that this route suffers presently from the greatest amount of ecological impacts. The significance to constructing a new line along this route will therefore be the lowest in terms of ecological degradation as a result of the construction activities and the presence of an overhead power line along this route.
Surface Water	<ul style="list-style-type: none"> ▪ Alternative 2E contains the same amount of surface water resources as described for Alternative 2F up until the point of deviation from the R34 to where the Proposed Southern Tweefort Rural Substation (Substation Alternative 2) is to be located. For this section of the proposed power line, there is one channelled valley bottom wetland that falls within the corridor at two points before it spans the entire width of the corridor and will need to be spanned by the proposed power lines. There is also one unchannelled valley bottom wetland that can be found within the corridor. As this alternative contains the most surface water resources it is considered to be not preferred.
Floodlines	<ul style="list-style-type: none"> ▪ Must route past an elongated flood line. More direct route than 2F. Ties into the Southern Substation Alternative 2.
Agricultural Potential and Soils	<ul style="list-style-type: none"> ▪ Route crosses dry land maize fields and grazing land but follows the road which is associated existing impacts.
Visual	<ul style="list-style-type: none"> ▪ The entire route is aligned parallel to the R34. ▪ The alternative is aligned parallel to other linear infrastructure for part of the route. These include existing power lines and telephone poles. ▪ According to the visual impact analysis there are more zones of high visual impact along this alignment alternative.
Heritage	<ul style="list-style-type: none"> ▪ Modification of the environment due to the R34 construction.
Socio-economic	<ul style="list-style-type: none"> ▪ The impact on agricultural output will be minimised by constructing along the R34 rather than through existing farms.

Alternative 2F

Biodiversity	<ul style="list-style-type: none"> ▪ Moves through similar habitat units subject to similar drivers and pressures.
Surface Water	<ul style="list-style-type: none"> ▪ There are a total of thirty (36) surface water resources that can be found in Alternative 2F. These consist of thirteen (13) unchannelled valley

	<p>bottom wetlands, five (5) channelled valley bottom wetlands, three (3) floodplain wetlands, nine (9) depression wetlands, five (5) artificial wetlands and one riparian habitat (Wilge River). Seven (7) of the wetlands will need to be spanned of which the width at the widest point of two wetlands (channelled valley bottom wetlands) exceed the spanning distance of the proposed power lines.</p> <ul style="list-style-type: none"> ▪ With strategic positioning of the proposed power line routes, only one wetland will need to have a tower or towers placed within the wetland. However, due to this impact and in consideration of the conservation value of the wetland, Alternative 2F is not preferred.
Floodlines	<ul style="list-style-type: none"> ▪ Must route past an elongated floodline.
Agricultural Potential and Soils	<ul style="list-style-type: none"> ▪ Route crosses dry land cultivation and grazing land. Only follows existing roads for a short distance.
Visual	<ul style="list-style-type: none"> ▪ Most of route is aligned parallel to the R34. ▪ The alternative is aligned parallel to other linear infrastructure for part of the route. These include existing power lines and telephone poles. ▪ According to the visual impact analysis there are more zones of high visual impact along this alignment alternative.
Heritage	<ul style="list-style-type: none"> ▪ No sites were identified.
Socio-economic	<ul style="list-style-type: none"> ▪ The proposed route travels through existing farms and thus will have a negative, albeit small, impact on agricultural production.

Alternative 3A

Biodiversity	<ul style="list-style-type: none"> ▪ Even though this alternative will follow an existing transmission power line, this existing line was established long enough ago to enable full rehabilitation of the impacted grasslands associated with it. This is also one of the very few impacting features within these grassland areas, besides isolated agriculture. ▪ Overall conservation of faunal and floral features relies on conservation of the habitat holistically. The greatest overall impact to the habitat units holistically will occur if construction occurs along this alternative. It is true that construction along this alternative will result in the least impacts to avifaunal species from collision impacts, but this aspect can be mitigated for along Alternative 3B.
Surface Water	<ul style="list-style-type: none"> ▪ There are a total of 8 surface water resources that can be found in Alternative 3A. These consist of three (3) unchannelled valley bottom wetlands, two (2) channelled valley bottom wetlands, two (2) depression wetlands and one (1) artificial wetland. Two (2) of the channelled valley bottom wetlands will need to be spanned. None have a width at the widest point that exceeds the spanning distance of the proposed power lines and can therefore be spanned. ▪ Most wetlands can avoid impact with strategic positioning of the proposed power line route away or around the surface water resources. Where spanning needs to take place this must be done at the narrower points

	<p>outside the wetlands so as not to place any towers in the wetlands. However, it must be considered that the land is relatively unimpacted where the proposed power lines is to cross one of the two channelled valley bottom wetlands thereby potentially having a high impact. At the other wetland that courses through the Namahadi settlement, space is constricted and towers may need to be placed inside the wetland. Due to these factors, Alternative 3A is not preferred.</p>
Floodlines	<ul style="list-style-type: none"> ▪ Must route past two elongated flood line systems wedged between township areas.
Agricultural Potential and Soils	<ul style="list-style-type: none"> ▪ Route crosses dry land cultivation and grazing land. Does not follow an existing road for portions of the route.
Visual	<ul style="list-style-type: none"> ▪ The entire route is aligned parallel to an existing 88kV power line and parallel to a portion of the R26. ▪ According to the visual impact analysis there are almost no zones of high visual impact along this alignment alternative.
Heritage	<ul style="list-style-type: none"> ▪ Large burial sites found at burial site 2 will make pylon placement difficult. Burial site 1 also lies within this corridor.
Socio-economic	<ul style="list-style-type: none"> ▪ The impact on Namahadi village will be severe requiring the relocation of many homes and businesses.

Alternative 3B

Biodiversity	<ul style="list-style-type: none"> ▪ A high level of existing infrastructure development that runs parallel and in association with this proposed alternative means that this route suffers presently from the greatest amount of ecological impacts. The significance to constructing a new line along this route will therefore be the lowest in terms of ecological degradation as a result of the construction activities and the presence of an overhead power line along this route.
Surface Water	<ul style="list-style-type: none"> ▪ There are a total of 4 surface water resources that can be found in Alternative 3B. These consist of two (2) unchannelled valley bottom wetlands, one (1) artificial wetland and one (1) depression wetland. The one (1) unchannelled valley bottom wetland will need to be spanned of which this can be easily achieved at the narrow point along the R26. All other wetlands can be avoided with the strategic placement of the proposed power lines away and outside of the wetlands. Preferred placement alongside the R34 will decrease the chance of significant impact due to presence of existing infrastructure and the associated impacts. Due to these factors, Alternative 3B is the preferred alternative.
Floodlines	<ul style="list-style-type: none"> ▪ No major flood line impacts.
Agricultural Potential and Soils	<ul style="list-style-type: none"> ▪ Route crosses dry land maize fields and grazing land but follows the road which is associated existing impacts.
Visual	<ul style="list-style-type: none"> ▪ The entire route is aligned parallel to the R26. ▪ The alternative is aligned parallel to other linear infrastructure for part of the route. These include existing power lines and telephone poles.

	<ul style="list-style-type: none"> According to the visual impact analysis there are almost no zones of high visual impact along this alignment alternative.
Heritage	<ul style="list-style-type: none"> This alignment will avoid the cemetery site.
Socio-economic	<ul style="list-style-type: none"> The impact on existing farms, businesses and residential areas will be relatively insignificant.

Alternative 4A

Biodiversity	<ul style="list-style-type: none"> Even though this alternative will follow an existing transmission power line, this existing line was established long enough ago to enable full rehabilitation of the impacted grasslands associated with it. This is also one of the very few impacting features within these grassland areas, besides isolated agriculture. Overall conservation of faunal and floral features relies on conservation of the habitat holistically. The greatest overall impact to the habitat units holistically will occur if construction occurs along this alternative. It is true that construction along this alternative will result in the least impacts to avifaunal species from collision impacts, but this aspect can be mitigated for along Alternative 4B.
Surface Water	<ul style="list-style-type: none"> There are a total of twelve (12) surface water resources that can be found in Alternative 4A. These consist of five (5) unchannelled valley bottom wetlands, one (1) channelled valley bottom wetlands two (2) depression wetlands, three (3) artificial wetlands and one (1) riparian habitat. Of these surface water resources, three (3) of the wetlands will need to be spanned. These include two (2) channelled valley bottom wetlands and one (1) unchannelled valley bottom wetland. Only the one channelled valley bottom wetland has a width wider than the spanning length of the proposed power lines and will therefore most likely require the placement of a tower or several towers within the wetland. It is also important to note that the prevailing land is relatively unimpacted and used primarily for grazing land. Due to these factors, Alternative 4A is not preferred.
Floodlines	<ul style="list-style-type: none"> Must route past an extensive elongated flood line system.
Agricultural Potential and Soils	<ul style="list-style-type: none"> Route generally crosses grazing land rather than cultivation.
Visual	<ul style="list-style-type: none"> The entire route is aligned parallel to an existing 88kV power line. According to the visual impact analysis there are some zones of high visual impact along this alignment alternative, largely due to the number of farmsteads located in close proximity to the alternative.
Heritage	<ul style="list-style-type: none"> Highly modified environment.
Socio-economic	<ul style="list-style-type: none"> The proposed route travels through existing farms and thus will have a negative, albeit small, impact on agricultural production.

Alternative 4B

Biodiversity	<ul style="list-style-type: none"> A high level of existing infrastructure development that runs parallel and in association with this proposed alternative means that this route suffers
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	presently form the greatest amount of ecological impacts. The significance to constructing a new line along this route will therefore be the lowest in terms of ecological degradation as a result of the construction activities and the presence of an overhead power line along this route.
Surface Water	<ul style="list-style-type: none"> ▪ There are a total of twelve (12) surface water resources that can be found in Alternative 4A. These consist of four (4) unchannelled valley bottom wetlands, two (2) channelled valley bottom wetlands four (4) depression wetlands, one (1) artificial wetland and one (1) riparian habitat. ▪ Of these surface water resources, three (3) of the wetlands will need to be spanned. The wetlands include two (2) unchannelled valley bottom wetlands and one (1) channelled valley bottom wetland. All of these wetlands do not exceed the spanning length of the proposed power line and can therefore be spanned. The prevailing landscape in this alternative is used primarily for agricultural production (mainly maize) and contains existing roads (R26 and existing gravel roads from Windfield Rural Substation) where the proposed power line can route without much impact on surface water resources. Due to these factors, Alternative 4B is preferred.
Floodlines	<ul style="list-style-type: none"> ▪ No major flood line impacts.
Agricultural Potential and Soils	<ul style="list-style-type: none"> ▪ Route influences more cultivated land than the Alternative Route even though this Alternative follows an existing road.
Visual	<ul style="list-style-type: none"> ▪ The entire route is aligned parallel to the R26. ▪ The alternative is aligned parallel to other linear infrastructure for part of the route. These include existing power lines and telephone poles. ▪ According to the visual impact analysis there are some zones of high visual impact along this alignment alternative.
Heritage	<ul style="list-style-type: none"> ▪ Highly modified environment.
Socio-economic	<ul style="list-style-type: none"> ▪ The impact on agricultural output will be minimised by constructing along the R26 rather than through existing farms.

Substation Alternative 1

Biodiversity	<ul style="list-style-type: none"> ▪ Closely coupled to existing infrastructure of equal magnitude and therefore the area has already been subject to transformation and degradation of a similar nature to what is being proposed. ▪ A large network of existing overhead power lines also already exist and therefore the significance of further site disturbances will be minimal. Impacts of collision impacts with avifauna will also be minimal due to the existing established network of overhead lines.
Surface Water	<ul style="list-style-type: none"> ▪ No surface water resources were identified directly at the Proposed Northern Tweefort Rural Substation site. However, there are two (2) unchannelled valley bottom wetlands in relatively close proximity (<200m) for the substation site. Indirect impacts on these wetlands may result

	during the construction phase. This alternative is therefore considered favourable due to the possibility of impact on the wetlands.
Floodlines	<ul style="list-style-type: none"> The proposed substation site is not affected by any water course of flood line.
Agricultural Potential and Soils	<ul style="list-style-type: none"> Substation site influences unimproved grazing land.
Visual	<ul style="list-style-type: none"> This alternative is located in close proximity to the existing Tweefort Rural Substation. According to the visual impact analysis this alternative lies in a moderate visual impact zone.
Heritage	<ul style="list-style-type: none"> Closer to possible heritage sensitive areas.
Socio-economic	<ul style="list-style-type: none"> The northern location is not preferred as it will require the construction of power lines through existing farms and thus have a negative, albeit small, impact on agricultural production. However, in the event that the northern substation site is selected it is recommended that power line routes 1E and 2F are selected in order to minimise the impact on existing farms and the Namahadi village.

Substation Alternative 2

Biodiversity	<ul style="list-style-type: none"> Will impact within an area of natural grassland that also has an association with a wetland habitat unit. Occurs within close proximity to a major roadway and within an area that has already suffered considerable transformation and degradation.
Surface Water	<ul style="list-style-type: none"> No surface water resources were identified directly at the Proposed Southern Tweefort Rural Substation site. Additionally, the closest surface water resources are located some distance (>400m) for the proposed substation site. This alternative is therefore considered preferred due to the lesser likelihood of impacts on surface water resources in the broader area.
Floodlines	<ul style="list-style-type: none"> The proposed substation site is not affected by any water course of flood line.
Agricultural Potential and Soils	<ul style="list-style-type: none"> Substation site influences unimproved grazing land.
Visual	<ul style="list-style-type: none"> This alternative is located approximately 100m from the R34, in a largely rural-pastoral setting. According to the visual impact analysis this alternative lies in a high visual impact zone largely due to the presence of farmsteads in the vicinity of this site.
Heritage	<ul style="list-style-type: none"> Area is more modified than Alternative 1, next to R34.
Socio-economic	<ul style="list-style-type: none"> The impact on agricultural output will be minimised by constructing the substation along R34 as it will eliminate the need to build power lines through existing farms. However, in the event that the northern substation site is selected it is recommended that power line routes 1E and 2F are selected in order to minimise the impact on existing farms and the

No-go alternative (compulsory)

The “no-go” alternative assumes that the proposed activity does not go-ahead, implying a continuation of the current situation or the status quo. The “no-go” or “no-action” alternative is regarded as a type of alternative that provides the means to compare the impacts of project alternatives with the scenario of a project not going ahead. In evaluating the “no-go” alternative it is important to take into account the implications of foregoing the benefits of the proposed project.

In the case of this project, the no go alternative would result in no 132kV power line being constructed. The absence of the new 132kV power line would mean that the reliability of the network in the greater Frankfort area would not be improved. In addition capacity to supply electricity to new customers would not be created. This may have negative implications and may hinder further development in the study area, which will in turn have a negative impact on economic growth.

Although the impacts identified, such as visual impacts, would not occur if the project was not to proceed, the socio economic benefit of the proposed project should not be overlooked. The No-Go alternative has thus been eliminated due to the fact that the identified environmental impacts can be suitably mitigated and that by not building the project, the socio-economic benefits would be lost.

Based on the findings of all the specialist studies, a composite environmental sensitivity map was generated to highlight sensitive areas and inform the selection of a preferred power line corridor alternative route and preferred alternative substation location. This is shown in **Figure 8**.

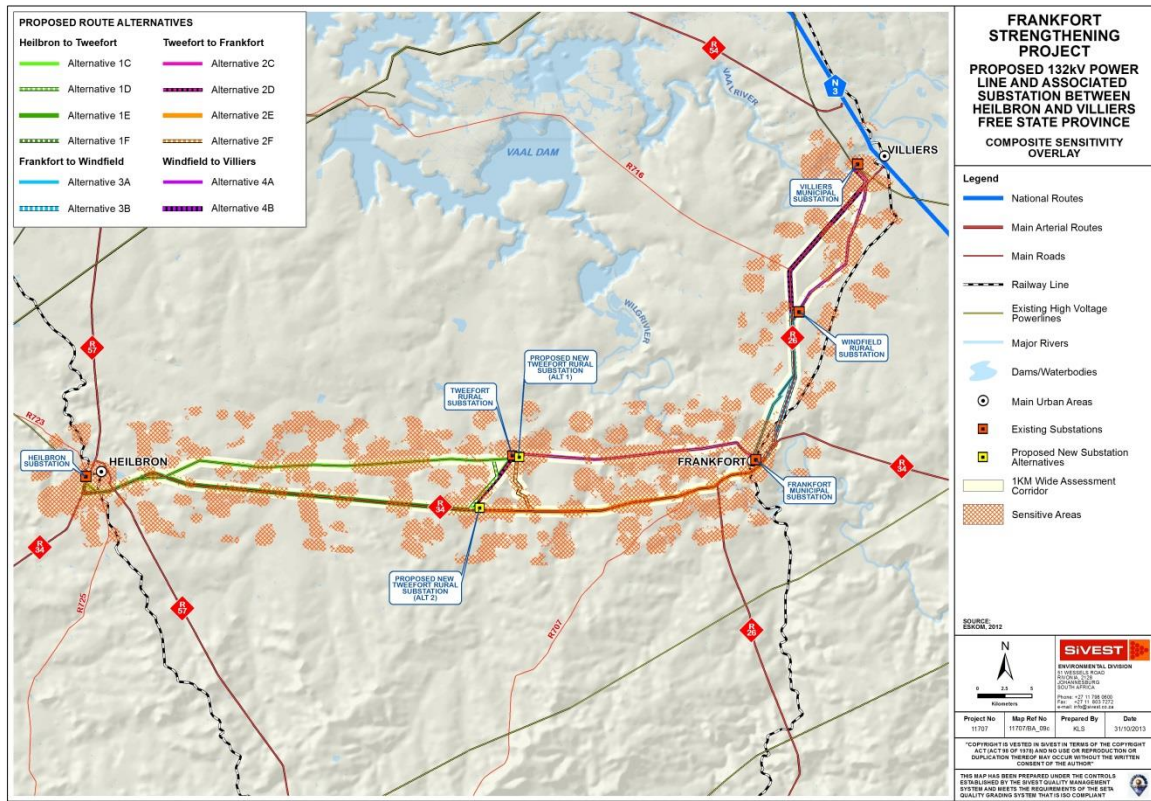


Figure 8: Composite Environmental Sensitivity Map

Accordingly, the following power line alternatives are recommended and preferred:

- **Alternative 1F**
- **Alternative 2E**
- **Alternative 3B**
- **Alternative 4B**

The following substation alternatives are recommended and preferred:

- **Alternative 2 – Proposed Southern Tweefort Substation.**

The preferred route alignment, according to the specialist findings, is indicated in **Figure 9**.

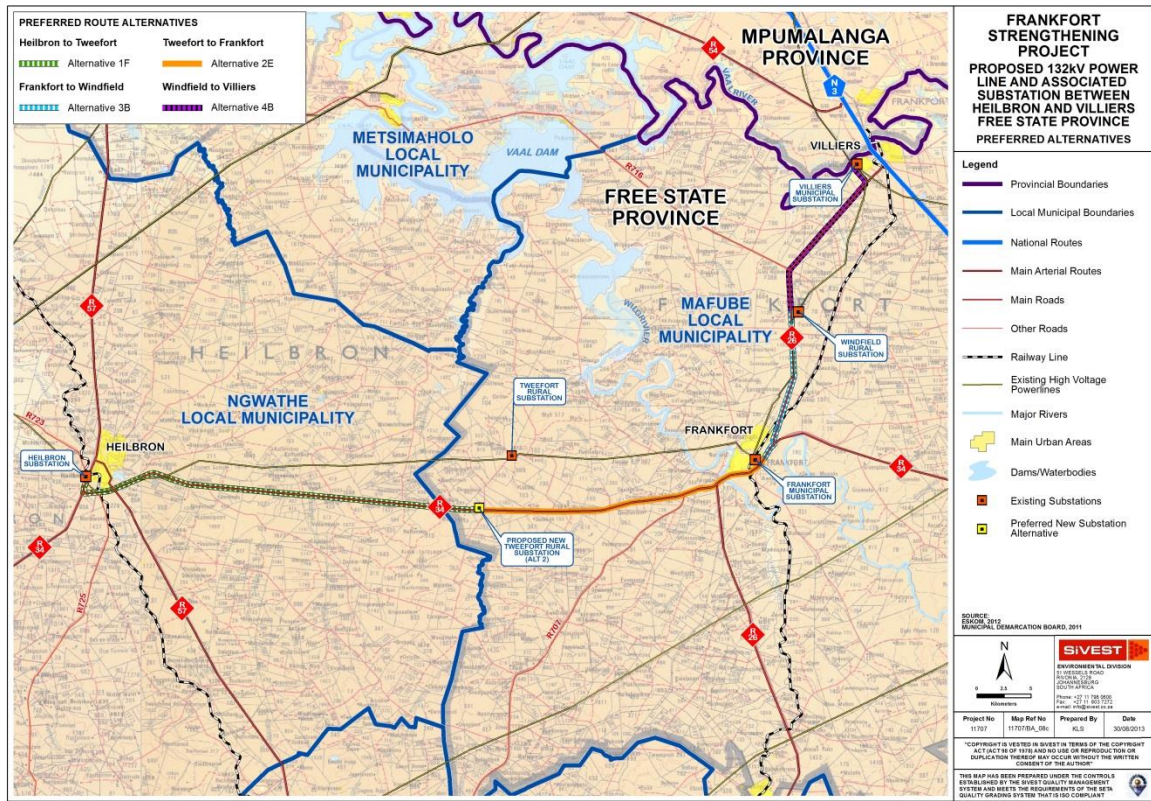


Figure 9: Preferred Power Line Corridor and Substation Site

SECTION E: RECOMMENDATION OF PRACTITIONER

Is the information contained in this report and the documentation attached hereto sufficient to make a decision in respect of the activity applied for (in the view of the environmental assessment practitioner)?

YES ✓

If "NO", indicate the aspects that should be assessed further as part of a Scoping and EIA process before a decision can be made (list the aspects that require further assessment).

If "YES", please list any recommended conditions, including mitigation measures that should be considered for inclusion in any authorisation that may be granted by the competent authority in respect of the application.

Recommendations of the Biodiversity Specialist

- Impacts on biodiversity and habitat conservation can be successfully mitigated
- A walk through survey of the proposed alternative should be undertaken once a set route has been established.
- Marking all of the sections of the lines that pass through migratory routes.
- Towers should be fitted with perching aversion fixtures.
- A holistic habitat conservation approach should be adopted.

Recommendations of the Surface water Specialist

- A final wetland walk-down study is to be conducted once the final power line route has been planned.
- Present Ecological Status (PES) and Environmental Importance and Sensitivity (EISC) assessments should also be undertaken where relevant for the wetlands that fall directly within the power line route. A risk assessment should accompany this analysis.

Recommendations of the Agricultural Potential and Soils Specialist

- It is recommended that careful routing of the power line and tower placement should be considered to mitigate potential impacts.
- Tower placement should be on the edge of existing agricultural areas and span active agricultural fields as far as possible.

Recommendations of the Heritage Specialist

- The first burial site should preferably not be traversed. The township access road could be used as an alternative to avoid the burial sites. It is suggested that the second alternative 3B to the south be utilized.
- The second burial site could easily be avoided through specific pylon placement. The choice of alternative 3B will avoid the large cemetery site.
- Two burial sites are located within the study corridors. It is possible that further sites might be found in the corridors that have not been identified by the initial study. It is further recommended

that the chosen alternative undergoes a walk-down evaluation on the final pylon placement choice.

Recommendations of the Visual Specialist

- Align the power line as far away from sensitive receptor locations as possible.
- Align the power line to run parallel to existing power lines of equal or greater magnitude, where possible.
- Avoid crossing areas of higher elevation, especially ridges, koppies or hills where possible.
- Avoid areas of natural wooded vegetation where possible.

Recommendations of the Socio-economic

- The socio-economic impact analysis indicates that construction of the proposed power line and substation will have a positive impact. This impact may be maximised through the employment of local workers and implementation along a preferred route.

Recommendations of the Floodline Specialist

- Flood lines should serve only as a guideline to Eskom in the selection of the routing and the siting of towers. A demarcated 1:100 year flood line does not mean that a tower cannot be sited in the delineated area. But it does mean that if such a siting is intended, then a WULA will have to be applied for, and the engineering of the tower will need to take into account flood protection.

General Recommendations of the EAP

- All mitigation measures recommended by the various specialists should be strictly implemented where applicable to the preferred selected power line and substation location alternatives.
- Final EMPr should be approved by DEA prior to construction.

Is an EMPr attached?

YES ✓

The EMPr must be attached as Appendix G.

The details of the EAP who compiled the BAR and the expertise of the EAP to perform the Basic Assessment process must be included as Appendix H.

If any specialist reports were used during the compilation of this BAR, please attach the declaration of interest for each specialist in Appendix I.

Any other information relevant to this application and not previously included must be attached in Appendix J.

The EMPr is included in **Appendix G**.

Details of the EAP who compiled the BAR are included in **Appendix H**.

The declaration of interest for each specialist is included in **Appendix I**.

Other information that is relevant to this application is included in **Appendix J**. This includes the following:

- Competent Authority Consultation (**Appendix J1**)
- A3 Maps (**Appendix J2**)
- Co-ordinate Spreadsheet (**Appendix J3**)
- Property Description Spreadsheet (**Appendix J4**)
- Electric and Magnetic Fields (EMF) Report (**Appendix J5**)
- Photos of Construction of Similar Projects (**Appendix J6**)

Shaun Taylor

NAME OF EAP



SIGNATURE OF EAP

7 November 2013

DATE

SECTION F: APPENDIXES

The following appendixes must be attached:

Appendix A: Site Plans

Appendix B: Photographs

Appendix C: Facility illustration(s)

Appendix D: Specialist reports (including terms of reference)

Appendix E: Public Participation

Appendix F: Impact Assessment

Appendix G: Environmental Management Programme (EMPr)

Appendix H: Details of EAP and expertise

Appendix I: Specialist's declaration of interest

Appendix J: Other Additional Information

REFERENCES

- Integrated Development Plan Mafube Local Municipality 2007-2012.
- Integrated Development Plan: Fezile Dabi District Municipality 2012-2017.
- Provincial and Local Government conference: A Summary of the Infrastructure Plan, 2012
- Provincial and Local Government Conference: A Summary of the Infrastructure Plan. Friday, 13 April 2012. Presidential Infrastructure Coordinating Commission.
- National Development Plan, 2011.