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FINAL BASIC ASSESSMENT REPORT

FOR THE

PROPOSED UPGRADING OF THE 66KV NETWORK TO 132KV NETWORK IN THE HOTAZEL, KURUMAN AND KATHU AREA, NORTHERN CAPE PROVINCE

Report No : 13167

Submitted to:

Department of Environmental Affairs
Private Bag X447
Pretoria
0001

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September 2015 13167

environmental affairs
Department:
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Basic assessment report in terms of the Environmental Impact Assessment Regulations, 2010, promulgated in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998), as amended.

Kindly note that:

1. This **basic assessment report** is a standard report that may be required by a competent authority in terms of the EIA Regulations, 2010 and is meant to streamline applications. Please make sure that it is the report used by the particular competent authority for the activity that is being applied for.
2. This report format is current as of **1 August 2014**. It is the responsibility of the applicant to ascertain whether subsequent versions of the form have been published or produced by the competent authority
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7. This report must be handed in at offices of the relevant competent authority as determined by each authority.
8. No faxed or e-mailed reports will be accepted.
9. The signature of the EAP on the report must be an original signature.
10. The report must be compiled by an independent environmental assessment practitioner. Unless protected by law, all information in the report will become public information on receipt by the competent authority. Any interested and affected party should be provided with the information contained in this report on request, during any stage of the application process.
11. A competent authority may require that for specified types of activities in defined situations only parts of this report need to be completed.
12. Should a specialist report or report on a specialised process be submitted at any stage for any part of this application, the terms of reference for such report must also be submitted.

13. Two (2) colour hard copies and one (1) electronic copy of the report must be submitted to the competent authority.
14. Shape files (.shp) for maps must be included in the electronic copy of the report submitted to the competent authority.

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SECTION A: ACTIVITY INFORMATION

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

YES	NO
✓	

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

Note: The Terms of Reference for each Specialist Study that was carried out for the proposed project is included in Appendix J2 of this Final Basic Assessment Report.

1. PROJECT DESCRIPTION

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

1. Project Overview and Rationale

Eskom is proposing to upgrade the existing 66kV network to a 132 kV network between Hotazel and Kuruman, and construct a new section of 132 kV from a substation south of Kuruman to Kathu in the Northern Cape Province. Eskom appointed Zitholele Consulting as the independent Environmental Assessment Practitioner (EAP) to undertake the required Basic Assessment (BA) process and the Water Use License Application (WULA) Process for the above-mentioned proposed project. The proposed project will comprise of the following overarching activities:

1. Upgrade of the existing 66 kV network to a 132 kV network between Hotazel Substation and Valley Substation south of Kuruman. Upgrading will include:
   - Construction of a 132kV Eldoret, Riries, Moffat and Valley substation next to existing 66kV substations;
   - Expansion of the existing Hotazel Substation;
   - Construction of a new Gamohaan substation between Riries substation and existing Mothibistad switching station;
   - Construction of a 132kV Mothibistad substation next to existing Mohibistad switching station;
   - Construction of 132kV power line between Hotazel Substation and Valley Substation.
2. Construction of a new 132 kV power line between the Valley Substation to the newly authorised Sekgame Switching Station, just south of Kathu.
3. Decommission the existing 66kV network between Hotazel and Valley Substations. This will include decommissioning of:
   - Existing 66kV infrastructure at the Hotazel substation;
   - Existing 66kV Eldoret, Riries, Asbes, Moffat and Valley substations;
   - Existing Mothibistad switching station;
   - Existing 66kV wooden pole power lines between Hotazel and Valley substations

The proposed project will facilitate the strengthening of Eskom's distribution network within the area. Furthermore the proposed project will also result in the completion of a circular feed which will ensure a secure supply of electricity in the event where one of the power lines experiences a fault and is out of commission. In addition to strengthening the national grid, the proposed project will also assist with ensuring adequate electricity supply to meet the growing energy demand associated with the planned mining activities in the area as well as planned developments in the local communities of Hotazel, Kuruman and Kathu.

2. Proposed Project Activities

2.1. Construction of 132 kV power line network

Description of project component

The Applicant proposed to replace the existing 66 kV network of power lines from the existing Hotazel Substation to the Valley Substation. Upgrading the existing 66 kV power line will essentially entail decommissioning the existing network and replacing it with a 132 kV power line. The consequential increased voltage that will be carried by the 132 kV power line will result in sufficient capacity required to meet the increased demand for electricity. It is anticipated that a 50 meter wide working area, within the required 31 wide servitude, will be sufficient to allow for the placement of the towers and stringing of the power line. The towers will be placed approximately 200 - 300 meters apart across the entire length of the power line. Approval is sought for a corridor 1 km wide (in the rural areas) and 200 m wide (in the urban area of Kuruman) for the power line to allow for deviations within the approved corridor once a final route has been negotiated with landowners.

The following tower structures are considered for the proposed 132kV power line:

- Suspension tower type 245A;
- Angle strain tower type 245B;
- Angle strain tower type 245C;
- Angle strain tower type 245D;
- Angle strain tower type 245E;
- Single steel pole structure;
- Stayed intermediate angle structure;
- Three pole strain structure
- Single circuit guyed intermediate steel pole; and/or
- Monopole Double Circuit Intermediate suspension structure.

The following factors relating to each of the tower structure types will be taken into account when determining the best practicable environmental option relating to the tower structures:

- Visual Impact;
- Footprint of required working area; and
- Nature (level of intrusiveness/ disturbance to receiving environment) of the construction activities.

The “best practicable environmental option” refers to the option that provides the most benefit or causes the least damage to the environment as a whole at a cost acceptable to society in the long term as well as in the short term.

The following overarching technical considerations in determining the preferred tower structure will be taken into account:

- Costs associated with each of the tower structure types including maintenance costs;
- Susceptibility to common cause failure (e.g. flooding, lightning etc.); and
- Ease of construction in relation to the terrain (e.g. receiving environment).

Environmental Aspects

The activities to be undertaken during the construction and to a lesser degree the operational phase of the power line will interact with the receiving environment. These activities are therefore regarded as environmental aspects. The following activities are associated with the proposed 132 kV power line throughout the project lifecycle:

a) Planning and Design Phase Activities

The following activities will be carried out during the Planning and Design Phase;

- Carrying out the required Environmental Authorisation Process as required by the Environmental Legislation, within which the ambit of this project fall;
- Carrying out required specialist studies in order to gain a holistic understanding of the receiving environment and likely environmental impacts;
- Determining environmentally, socially and technically feasible alternative power line corridors;
- Subsequent to receipt of EA for a particular corridor alternative, talks with the affected landowners will be done by Eskom;
- A route survey and corridor walk-down will be carried out post-authorisation to ensure that all site specific sensitivities are avoided. During this process the exact co-ordinates of the proposed towers will be established; and
- Final design of line and placement of towers.

b) Construction Phase

The following primary activities will be carried out during the Construction Phase:

- Construction camps will be sited in areas where least disturbance to potentially sensitive environments will be caused;
- Where no existing access tracks exist, access tracks will be clearly demarcated. Vegetation within the demarcated access tracks will be removed, if and where necessary, to allow large construction vehicles to gain access the proposed servitude;
- A 31 meter wide servitude is required for the proposed 132 kV power line. Trees and shrubs will be cleared where required along the entire length of the servitude for access, erection of the pylons and stringing of the conductor;
- During construction the route will be surveyed, pegged and the soil nominations undertaken for each of the potential pylon foundations;
- Foundations will be laid for the footings of the pylons. The foundations for the pylons will be excavated followed by the reinforcing thereof and finally the concreting of the foundations. The concrete will have to be transported by concrete cement mixer trucks to the required locations;
- The towers will be erected in stages. After the foundations and footings have been installed the construction team will transport the various steel parts of the towers to the site and start erection of the pylons. This process requires manual labour to layout and assemble the towers on the ground. Mobile cranes are used to lift and erect the towers onto their foundations;
- Following the placement of the towers, the conductors and the earth or shield wire will be strung between the towers. Subsequent to completing the stringing of the power line, the power line will be tested prior to being commissioned; and
- Once all construction activities have been completed the entire working area including construction camps will be rehabilitated. The rehabilitation of the area disturbed during the

construction of the power line will include (*but not limited to*) the following:

- Removing all construction plant, equipment, storage containers, temporary fencing from the working area and site camps (*where applicable*);
- As far as possible all disturbed areas should be shaped to blend in with the surrounding landscape;
- Ensure that no excavated material or stockpiles remain within the working area and that any remaining stockpile material is used for shaping the disturbed areas to blend in with the surrounding landscape;
- Topsoil should be replaced in the same area from where it was removed;
- Following the placement of the topsoil, all areas within the working area should be ripped and / or scarify to facilitate mixing of the upper most soil layers; and
- Alien vegetation monitoring and management should be carried out on an ongoing basis during the operation of the power lines.

c) Operational Phase Activities

During the Operational and Maintenance Phase of the proposed project, Eskom will require access to the servitude to carry out maintenance activities. Maintenance activities may include repairs and replacement of various hardware on the towers and the conductor as well as repairs to the foundations.

d) Decommissioning Phase Activities

The physical removal of the power line infrastructure would entail the reversal of the construction process which would necessitate the following action to be taken:

- A rehabilitation programme would need to be agreed upon with the landowners (if applicable) before being implemented;
- Materials generated by the decommissioning process will be disposed of according to the Waste Management Hierarchy i.e. wherever feasible, materials will be reused, then recycled and lastly disposed of. Materials will be disposed of in a suitable manner, at a suitably disposal licensed facility.

All activities relating to the future decommissioning of the power line infrastructure does not form part of this application and as such would be subject to a separate Environmental Authorisation Process. Decommissioning of the redundant 66kV infrastructure once the 132kV network has become operational is included in this application for environmental authorisation.

Activities that fall within ambit of the NEMA (Requirement for Environmental Authorisation)

Electricity (at a voltage of 132kV) will be conveyed along the proposed power line from the existing Hotazel Substation to the proposed Sekgame Switching Station. Large section of the power line corridor fall outside of built up areas and the urban edges of the towns located along the corridor. The intended transmitting (i.e. conveying) of electricity, location of sections of the power line outside urban area, together with the 132kV voltage of the power line triggers Activity 10(i) of the NEMA Listing Notice 1 (Government Notice No. R.544). Environmental Authorisation is therefore

required for the upgrade of the existing 66kV network to a 132kV network.

2.2. Upgrading of the existing Hotazel, Eldoret, Riries, Moffat and Valley Substations

Description of project component

The upgrading of the existing network of 66kV power lines between the existing Hotazel Substation and proposed Sekgame Switching Station requires the existing substations along the power line corridor to be upgraded to support the increased voltage and additional infrastructure. Upgrading the existing Hotazel substation will require extending the existing footprint (current yard) of the substation. Upgrading of the Eldoret, Riries, Moffat and Valley substations will require the construction of new 132kV substations directly adjacent to the existing 66kV substations. All equipment deemed as redundant will be decommissioned and removed from the substation premises, whereas decommissioning of the 66kV substations will end in the rehabilitation of the 66kV substation footprint.

Environmental Aspects

The activities to be undertaken during the construction and to a lesser degree the operational phases of the power line will interact with the receiving environment. The following activities are associated with the proposed upgrading of the existing 66kV Eldoret, Riries, Moffat and Valley substations throughout the project lifecycle:

a) Planning and Design Phase Activities

The following activities will be carried out during the Planning and Design Phase;

- Carrying out the required Environmental Authorisation Process as required by the Environmental Legislation within which the ambit the project fall;
- Carrying out required specialist studies in order to gain a holistic understanding the receiving environment and likely environmental impacts;
- Determining the infrastructure required within the footprint of the proposed 132kV/22kV substations to support the incoming 132kV power lines; and
- Determining technically feasible alternatives.

b) Construction Phase Activities

The following activities will be carried out during the construction / installation of the infrastructure within the extended footprint of the **existing Eldoret Substation**:

- Installing two 132kV complete feeder bays namely the Hotazel 132kV feeder as well as the Riries 132kV feeder. Each of the feeder bays will comprise of the following:
  - Two 132kV busbar isolators;
  - Two 132kV breakers;
  - Two sets of CT's
  - Two 132kV line isolator with surge arrestor; and
  - Two 132kV terminal support structures.
- Installing two 132kV busbars (two bays) with a bus section breaker. The bus section breaker will consist of the following elements:
  - Two 132kV busbar isolators;

  - Single 132kV breaker;
  - Two sets of 132kV CT's;
- Installing two 132kV VT's on the 132kV busbar;
- Installing two 20MVA 132/22kV complete transformer bays. The two transformer bays will comprise of the following:
  - Two 132kV busbar isolators;
  - Two 132kV breakers;
  - Two sets of 132kV CT's;
  - Two 20MVA 132/22kV;
  - Two 22kV NECRT;
  - Two 22kV MV breakers; and
  - Two 22kV busbar isolators.
- Constructing two transformer plinths with oil catchment area;
- Constructing a complete 22kV transfer bar outside substation;
- Installing a 22kV busbar (making provision for four feeder bays) with back to back isolators;
- Installing two sets of 22kV VT's on the 22kV busbar;
- Installing three 22kV complete feeder bays, namely the Bathlaros feeder, Bendel feeder, Laxey feeder. Each of the feeder bays will consist of one set of busbar isolators, one 22kV breaker with a 22kV surge arrestor and a single 22kV set line isolator;
- Installing four lightning masts. Each of the masts will have an estimate height 14 meters;
- Civil works including erecting a palisade fence with electric fencing and animal proofing, laying yard stone, construction of a control room, placement of signs, turf runway and access road; and
- Installing CCTV cameras.

The following activities will be carried out during the construction / installation of the infrastructure within the new footprint of the **existing Moffat Substation**:

- Installing two 132kV complete feeder bays, namely the Mothibistad 132kV feeder and Valley 132kV feeder. Each of the feeder bays will consist of two 132kV busbar isolators, two 132kV breaker, two sets of 132kV CT's, two 132kV line isolator with surge arrestor and two 132kV terminal support structures;
- Installing a single 132kV busbar (with two bays) with a bus section breaker. The bus section breaker will consist of two 132kV busbar isolators, single 132kV breaker, two sets of 132kV CT's;
- Installing two 132kV VT's on the 132kV busbar;
- Installing a single 20MVA 132/11kV complete transformer bays. The transformer bay will consist of a 132kV busbar isolator, one 132kV breakers, single set 132kV CT's, 1x20MVA 132/11kV, a 11kV NECRT and 11kV MV breaker as well as two 11kV busbar isolators;
- Constructing a new transformer plinth with an oil catchment area;
- Installing a lightning and lighting mast. The masts will have a height of 14 meters;
- Constructing a complete 11kV transfer bar outside the substation;
- Decommissioning the 66kV busbar and all related equipment, move transformers to Kimberley store;
- Decommissioning the 11kV transformer bay;

- Decommissioning the 11kV 5MVAr cap banks and breaker and move to storage;
- Decommissioning two feeder bays and removing the Mothibistad 1 feeder and Mothibistad 2 feeder from site;
- Disconnecting the Mothibistad 1 feeder and Mothibistad 2 feeder from substation; and
- Installing Closed Circuit Television cameras.

The following activities will constitute the strengthening and refurbishment of the Control Plant:

- Installing two impedance feeder protection schemes to protect the Mothibistad-1 and Valley-1 132kV feeders;
- Installing a new bus-section scheme to control the 132kV bus-section breaker;
- Decommissioning one of the existing 66/11kV Transformer and Tap Change protection schemes that will server to protect the new 10MVA transformer;
- Installing two 132kV VT JB's.
- Re-using the existing rural feeder protection schemes to protect the 11kV rural feeders, Asbes-1 and Asbes-2, Kuruman-1 and Kuruman 2;
- Re-using the existing standard AC/DC panel.
- Installing two 1kV VT JB's.
- Pre-commissioning and commissioning of the new protection equipment.
- Installing a standard 19.6" circuit metering panels to accommodate all the statistical meters;
- Pre-commissioning and commissioning of all metering circuits to the new metering panel;
- Pre-commissioning and commissioning of all the relevant AC/DC circuits;
- All controls, alarms and analogs of the new protection equipment to be wired to the RTU, hardwire or serial;
- Pre-commissioning and commissioning of all new control plant equipment; and
- Providing control cabling accordingly.

The footprint of the **existing Riries Substation** will be extended by constructing a new 132kV/22kV substation directly adjacent to the existing 66kV substation. The new 132kV/22kV Riries substation will consist of the following infrastructure:

- Installing two 132kV complete feeder bays namely the Gamohaan 132kV feeder and Eldoret 132kV feeder. Each of the feeders will comprise of the following:
  - Two 132kV breaker;
  - Two 132kV busbar isolators;
  - Two sets of 132kV CT's;
  - Two 132kV line isolator with surge arrestor; and
  - Two 132kV terminal support structures;
- Installing a 132kV busbar with a bus section breaker that will consist of two 132kV busbar isolators, one 132kV breaker and two sets of 132kV CT's;
- Installing two 132kV VT's on the 132kV busbar;
- Installing two 20MVA 132/22kV complete transformer bays. Each of the transformer bay will consist of:
  - two 132kV busbar isolators;
  - two 132kV breakers;
  - two sets of 132kV CT's;

- two 20MVA 132/22kV;
- two 22kV NECRT;
- two 2kV MV breakers; and
- two 22kV busbar isolators.

- Construct two transformer plinths with oil catchment area;
- Construct a complete 22kV transfer bar outside substation;
- Installing a 22kV busbar (provision for 6 feeder bays) with back to back isolators;
- Installing two sets of 22kV VT's on the 22kV busbar;
- Installing four 22kV complete feeder bays;
- Civil works including erecting a palisade fence with electric fencing and animal proofing, laying yard stone, construction of a control room, placement of signs, runway and access road; and
- Installing CCTV cameras.

The following activities, constituting the strengthening and refurbishment of the Control Plant, will be carried out:

- Installing two impedance feeder protection schemes to protect the Gamohaan-1 and Eldoret-1 132kV feeders;
- Installing a new bus-section scheme to control the 132kV bus-section breaker;
- Installing two transformer and tap change protection schemes to protect the new 20MVA transformers, 132/22kV;
- Installing two 132kV VT JB's;
- Installing four rural feeder protection schemes to protect the rural feeders 22kV, Bathlaros-1, Ellendale-1, Dougnor-1 and Marruping-1;
- Install a new Yard Chop-over;
- Install a new standard AC/DC panel;
- Install 2 x new 22kV VT JB's;
- Pre-commissioning and commissioning of the new protection equipment;
- Installing two standard 19", 6 circuit metering panels to accommodate all the statistical meters
- Pre-commission and commission all the metering circuits to the new metering panel;
- Installing an 110V DC system which will include a 20A Cordex charger and 71Ah Nicad battery;
- Pre-commissioning and commissioning all the new DC equipment and relevant AC/DC circuits;
- Installing a D20 RTU required to accommodate the new serial connected protection equipment;
- All controls, alarms and analogs of the new protection equipment to be wired to the RTU, hardwire or serial;
- Pre-commissioning followed by the commissioning of all new control plant equipment; and
- Providing control cabling accordingly.

The **existing Valley Substation** will be upgraded by constructing a new 132kV/22kV substation directly adjacent to the existing 66kV substation. The new 132kV/22kV substation will entail:

- Installing two 132kV complete feeder bays, namely the Welgevonde 132kV feeder and Moffat 132kV feeder. Each of the feeders will consist of the following:
  - Two 132kV busbar isolators,
  - Two 132kV breaker;

  - Two sets of 132kV CT's, two 132kV line isolator with surge arrestor, two 132kV terminal support structures;
- Installing a 132kV busbar with bus section breaker that will comprise of two132kV busbar isolators, a single 132kV breaker and two sets of 132kV CT's;
- Installing two 132kV VT's on the 132kV busbar;
- Installing two 20MVA 132/22kV complete transformer bays. Each transformer bay will comprise of the following:
  - a single 132kV busbar isolators;
  - two 132kV breakers;
  - two sets of 132kV CT's;
  - two 20MVA 132/22kV;
  - two 22kV NECRT;
  - two 22kV MV breakers; and
  - two 22kV busbar isolators.
- Constructing one transformer plinths with an oil catchment area;
- Constructing a complete 22kV transfer bar outside substation;
- Constructing a 22kV busbar with back to back isolators;
- Installing two sets of 22kV VT's on the 22kV busbar;
- Installing three 22kV complete feeder bays, namely the Bosrand feeder, Corheim feeder and Strelley feeder. Each feeder bay will consist of a one set of busbar isolators, single 22kV breaker with 22kV surge arrestor as well as a 22kV set line isolator;
- Installing four lightning and lighting masts, each with a height of 14 meters;
- Complete Civil Works (Palisade fence with electric fencing and animal proofing, yard stone, control room, signs, runway, access road); and
- Install Closed Circuit Television cameras.

The following activities, constituting the strengthening and refurbishment of the Control Plant, will be carried out:

- Install two impedance feeder protection schemes to protect the Welgevonde-1 and Moffat-1 132kV feeders;
- Installing a new Bus-section scheme to control the 132kV bus-section breaker;
- Installing two Transformer and Tap Change protection schemes to protect the new 20MVA transformers;
- Installing two 132kV VT JB's;
- Installing three rural feeder protection schemes (4RF1100) to protect the rural feeders 11kV, Strelley-1, Corheim-1 and Bosrand-1.
- Installing a new Yard Chop-over;
- Installing a new standard AC/DC panel;
- Installing two 11kV VT JB's;
- Pre-commissioning and commissioning of the new protection equipment;
- Installing two standard 19".6 circuit metering panels to accommodate all the statistical meters;
- Pre-commission and commission all the metering circuits to the new metering panel;
- Installing a new 110V DC system;
- Pre-commission and commission all the new DC equipment, relevant AC/DC circuits all new

control plant equipment;
- Install a new D20 RTU as it needs to accommodate the new serial connected protection equipment;
- All controls, alarms and analogs of the new protection equipment to be wired to the RTU, hardwire or serial; and
- Provide control cabling accordingly.

2.3. Upgrading the existing Mothibistad 132/22kV switching station to a substation

Description of project component

It is proposed to construct a substation alongside the existing Mothibistad Switching Station. The existing Mothibistad Switching Station will be decommissioned. The primary difference between a substation and a switching station includes the absence of security fencing and substation infrastructure, among other things, Electricity is transmitted over long distances to different substations in the system. In substations the voltage is decreased by step-down transformers. Furthermore substations are self-contained units which are controlled from the main control centres and are mostly in remote areas. However in the case of switching stations, the voltage of power lines which connect to and from a switching station remains the same. As such switching stations do not have transformers.

Environmental Aspects

The proposed Mothibistad substation will consist of the following:

- Two 132kV complete feeder bays, namely the Gamohaan 132kV feeder and Moffat 132kV feeder. Each of the feeders will consisting of two132kV busbar isolators, two 132kV breaker, two sets of 132kV CT's, two 132kV line isolator with surge arrestor as well as two132kV terminal support;
- Installing a 132kV busbar with a bus section breaker, which will consist of two 132kV busbar isolators, a single 132kV breaker and two sets of 132kV CT's;
- Installing two 132kV VT's on the 132kV busbar;
- Installing two 20MVA 132/22kV complete transformer bays, each consisting of the following:
  - Two132kV busbar isolators;
  - Two132kV breakers;
  - Two sets of 132kV CT's;
  - Two 20MVA 132/22kV;
  - Two22kV NECRT;
  - Two 22kV MV breakers; and
  - Two22kV busbar isolators.
- Constructing two new transformer plinths with oil catchment area;
- Constructing a complete 22kV transfer bar outside substation;
- Installing a 22kV busbar;
- Installing two sets of 22kV VT's on the 22kV busbar;
- Installing eight 22kV complete feeder bays, namely the Magobe feeder, Manyeding feeder, Mothibistad feeder, future Mapoteng feeder, Seoding feeder, future Tsepang feeder, Mothibistad Eldorado feeder (old Moffat Mothibistad 1 feeder) and Mothibistad Wrenchville

feeder (old Moffat Mothibistad 2 feeder). Each feeder bay consist of the following:

- Single set busbar isolators;
- One 22kV breaker with 22kV surge arrestor; and
- One x22kV set line isolators.

- Install four 14m high lightning / lighting masts;
- Complete Civil Works including erecting a palisade fence with electric fencing and animal proofing, yard stone, control room, signs, runway and access road; and
- Installing Closed Circuit Television cameras.

The following activities, constituting to the strengthening and refurbishment of the Control Plant, will be carried out:

- Installing two new Impedance feeder protection schemes to protect the Gamohaan-1 and Moffat-1 132kV feeders;
- Installing a new Bus-section scheme to control the 132kV bus-section breaker;
- Installing two Transformer and Tap Change protection schemes (4TM7100 & 4TC5200) to protect the new 20MVA transformers;
- Installing two 132kV VT JB's;
- Installing eight new rural feeder protection schemes to protect the following rural 22kV feeders: Magobe-1, Manyeding-1, Mothibistad-1, Seoding-1, Tsepang-1 and Eldorado-1, Wrenchville-1, Mapoteng-1;
- Installing a new Yard Chop-over;
- Installing a new standard AC/DC panel;
- Installing two 22kV VT JB's;
- Pre-commissioning and commissioning of the new protection equipment.
- Installing two standard 19".6 circuit metering panels to accommodate all the statistical meters;
- Pre-commission and commission all the metering circuits to the new metering panel;
- Install a new 110V DC system;
- Pre-commission and commission all the new DC equipment and relevant AC/DC circuits;
- Installing a new D20 RTU as it needs to accommodate the new serial connected protection equipment;
- All controls, alarms and analogs of the new protection equipment to be wired to the RTU, hardwire or serial;
- Pre-commission and commission all new control plant equipment; and
- Provide control cabling accordingly.

The following infrastructure will be decommissioned:

- Decommissioning of the 11kV Voltage Regulators;
- Decommissioning of the 11kV Reclosers;
- CPM-Protection Kimberley to remove all relays and material that they will reuse in future for spares; and
- All the decommissioned Control Plant equipment to be transported to the Warehouse Scrap Yard in Kimberley.

2.4. Construction of the Gamohaan 132/22 kV substation

Description of project component

A 132/22kV substation (namely the Gamohaan Substation) will be constructed. The proposed Gamohaan 132/22kV substation will be located roughly between the existing Riries substation and the existing Mothibistad switching station. The coordinates of the area earmarked for the proposed Gamohaan 132/22kV substation is provided in Table 14.

Environmental Aspects

The proposed Gamohaan 132/22kV substation will comprise of the following elements: entail the following:

- Installing two 132kV complete feeder bays, namely the Mothibistad 132kV feeder and Riries 132kV feeder. Each of the feeders will of consist of the following:
  - Two 132kV busbar isolators;
  - Two 132kV breaker;
  - Two sets of 132kV CT's;
  - Two 132kV line isolator with surge arrestor; and
  - Two 132kV terminal support;
- Installing a 132kV busbar with bus section breaker comprising of two 132kV busbar isolators, a single 132kV breaker and two sets of 132kV CT's;
- Installing two 132kV VT's on the 132kV busbar;
- Installing two 20MVA 132/22kV complete transformer bays. Each of the transformer bays will consist of:
  - Two 132kV busbar isolators;
  - Two 132kV breakers;
  - Two sets 132kV CT's;
  - Two 20MVA 132/22kV;
  - Two 22kV NECRT;
  - Two 22kV MV breakers;
  - Two 22kV busbar isolators.
- Constructing two new transformer plinths with oil catchment area;
- Construction of a 22kV transfer bar outside substation;
- Installing 22kV busbar (provision for 8 feeder bays) with back to back isolators;
- Installing two sets 22kV VT's on the 22kV busbar;
- Installing six 22kV complete feeder bays, namely Kuruman feeder, Wandrag feeder, Whitebank feeder, Ntateleng feeder, Seokama feeder and the Retreat Feeder. Each feeder bay consist of will consist:
  - Single set of busbar isolators;
  - One 22kV breaker with 22kV surge arrestor; and
  - One 22kV set line isolators.
- Installing four 14m high lightning / lighting masts;
- Complete Civil Works (Palisade fence with electric fencing and animal proofing, yard stone, control room, signs, runway, access road); and
- Installing Close Circuit Television cameras.

The following activities, constituting to the strengthening and refurbishment of the Control Plant, will be carried out:

- Installing two new impedance feeder protection schemes intended to protect the Mothibistad 1 and Riries 1 132kV feeders.
- Installing a new Bus-section scheme to control the 132kV bus-section breaker;
- Installing two transformer and tap change protection to protect the new 20MVA transformers;
- Installing two 132kV VT JB's;
- Installing six rural feeder protection schemes intended to protect the rural feeders 22kV, namely the Retreat-1, Kathu-1, Wandrag-1, Whitebank-1, Ntateleng-1 and Seokama-1 feeders;
- Installing a new Yard Chop-over;
- Installing a new standard AC/DC panel as well as two 22kV VT JB's;
- Pre-commissioning and commissioning of the new protection equipment;
- Fixing two new standard 19".6 circuit metering panels to accommodate all the statistical meters;
- Pre-commission and commission all the metering circuits to the new metering panel;
- Installing a new 110V DC system;
- Pre-commission and commission all the new DC equipment and relevant AC/DC circuits;
- Installing a new D20 RTU as it need to accommodate the new serial connected protection equipment;
- All controls, alarms and analogs of the new protection equipment to be wired to the RTU, hardwire or serial; and
- Pre-commission and commissioning of all new control plant equipment.

2.5. Construction of the Sekgame switching station

Description of project component

The proposed Sekgame switching station, will be constructed within close proximity to the south of the existing Ferrum substation at Kathu. The proposed Sekgame switching station is largely an extension of the Ferrum substation. It has become close to impossible to get in and out of Ferrum substation with 132kV lines, and as a result the Sekgame switching station is proposed to allow for all the new 132kV feeders to the Ferrum substation.

Environmental Aspects

The proposed Sekgame switching station will entail the following:

- Installing a single 132kV complete feeder bay for the Valley 132kV feeder. The feeder bay will consisting of two 132kV busbar isolators, a 132kV breaker, single set of 132kV CT's as well as a132kV line isolator with surge arrestor); and
- It is anticipated that an Impedance Protection scheme will be installed on this feeder to protect the 132kV Feeder (Valley-1) line. Install a new standard metering panel with standard metering equipment for Statistical metering at this site.

3. Description of the receiving environment

A number of specialist studies were carried out by independent specialists. All specialist studies that were carried out are intended to ensure that a precise and detailed description of the receiving environment associated with the proposed project is included in this Final Basic Assessment Report. **Error! Reference source not found.** below lists the various specialist studies that have been ompleted:

Table 1: Details of Specialist Studies

No.	Specialist Study	Independent Specialist	Relevant Appendix	Relevant BAR Section
1.	Terrestrial Ecology Screening Study for the Proposed 66kV Network Upgrade Project, Kuruman	Golder Associates Africa	Appendix D1	Section 3.1
				Section 3.2
2.	Kuruman Power Line, Northern Cape Province Visual Impact Assessment Report	Newtown Landscape Architects CC	Appendix D3	Section 3.3
3.	Eskom: Proposed 66kV Network Upgrade, Kuruman Area, Northern Cape, Wetland Delineation & Ecological Survey Aquatic Ecological and Impact Survey	Enviross CC	Appendix D2	Section 3.4
4.	The proposed upgrade of the 66kV network in the Kuruman area, Northern Cape Province Heritage Impact Assessment	PGS Heritage	Appendix D4	Section 3.5

3.1. Terrestrial Ecology: Fauna

Mammals

Twenty one mammal species were recorded during the field work carried out by the Ecologist during March 2015. Taking into account the extent of natural habitat across the entire the study area and surrounding landscape, it is probable that the region has a rich and almost intact mammal assemblage.

Figure 1: Small antelope pellets, either Steenbok (Raphicerus campestris) or Common Duiker

(Sylvicapra grimmia)

The mammal species recorded within the study area included Steenbok (see **Error! Reference ource not found.**). A complete list of the mammal species recorded during the field survey is provided in **Error! Reference source not found.**.

Table 2: Mammal species recorded

No.	Common Name	Scientific Name
1.	Steenbok	*Raphicerus campestris*
2.	Kudu	*Tragelaphus strepsiceros*
3.	Aardvark	*Orycteropus afer*
4.	Yellow Mongoose	*Cynictis penicillata*
5.	Striped polecat	*Ictonyx striatus*
6.	Black-backed Jackal	*Canis mesomelas*
7.	Porcupine	*Hystrix africaeaustralis*
8.	Springhare	*Pedetes capensis*
9.	Ground Squirrel	*Xerus inauris*
10.	Hare species	*Lepus sp.*
11.	Sengi species	*Elephantus sp.*
12.	Chacma baboon	*Papio cynocephalus ursinus*

Incidental evidence from local land-users also indicates the presence of predators such as Leopard (*Panthrea pardus*), Caracal (*Caracal caracal*), Brown Hyaena (*Parahyaena brunnea*), Aardwolf (*Proteles cristatus*) and various ungulates, such as Warthog (*Phacochoerus africanus*), Common Duiker (*Sylvicapra grimmia*), Springbok (*Antidorcas marsupialis*), Red Hartebeest (*Alcelaphus buselaphus*) and Gemsbok (*Oryx gazelle*). Unlike the Kudu, it was noted that Springbok, Red Hartebeest and Gemsbok are generally part of actively managed populations and are not free-range.

Furthermore an additional forty (40) mammal species potentially occur within the Study Area, as per the distribution maps presented in Stuart & Stuart (cited by Golder Associates, 2014:22). Of the aforementioned forty (40) mammal species, fourteen (14) are listed under the National Environmental Management: Biodiversity Act 10 of 2004 (NEMBA) or the International Union for Conservation of Nature (IUCN) regional Red List as of conservation importance (refer to Table 3), while several additional species are further listed as either protected or specially protected under the Northern Cape Conservation Act No. 9 of 2009.

Table 3: Red List and protected mammals occurring / potentially occurring in the study area

Scientific Name	Common Name	IUCN – Regional Status	NEMBA TOPS List (2013)	Probability of Occurrence
Atelerix frontalis	Southern African Hedgehog	Near Threatened	-	
Rhinolophus clivosus	Geoffroy's Horseshoe bat	Near Threatened	-	
Miniopterus schreibersii	Schreibers long-fingered Bat	Near Threatened	-	
Manis temminckii	Pangolin	Vulnerable	Vulnerable	
Vulpes chama	Cape Fox	-	Protected	
Tocyon megalotis	Bat-eared Fox	-	Protected	
Mellivora capensis	Honey Badger	Near Threatened	-	
Parahyaena brunnea	Brown Hyaena	-	Protected	Recorded
Felis nigripes	Small-spotted Cat	-	Protected	
Acinonyx jubatus	Cheetah	Vulnerable	Vulnerable	
Panthera pardus	Leopard	-	Protected	Recorded

Orycteropus afer	Aardvark	-	Protected	Recorded
Oryx gazella	Gemsbok	-	Protected	Recorded
Oreotragus	Klipspringer	-	Protected	

Birds

The bird species recorded during passive, opportunistic encounters during the fieldwork conducted for the study are provided in Table 4.

Table 4: Bird species recorded in the study area

Common Name	Scientific Name
African Red-eyed Bulbul	*Pycnonotus nigricans*
African Grey Hornbill	*Tockus nasutus*
Swallow-tailed Bee-eater	*Merops hirundineus*
European Bee-eater	*Merops apiaster*
Lilac-breasted Roller	*Coracias caudatus*
Pearl-spotted Owlet	*Glaucidium perlatum*
Red-eyed Dove	*Streptopelia semitorquata*
Common Scimitarbill	*Rhinopomastus cyanomelas*
Pied Crow	*Corvus albus*
Helmeted guineafowl	*Numida meleagris*
Redcrested Korhaan	*Eupodotis ruficrista*
Blacksmith Plover	*Vanellus armatus*
Fork-tailed Drongo	*Dicrurus adsimilis*
Crimson-breasted Shrike	*Laniarius atrococcineus*
Hadeda Ibis	*Bostrychia hagedash*
Shaft-tailed Whydah	*Vidua regia*
Jackal Buzzard	*Buteo rufofuscus*
Namaqua Sandgrouse	*Pterocles namaqua*
White-backed Mousebird	*Colius*
Kalahari Robin	*Erythropygia paena*
Sparrow-weaver	*Plocepasser mahali*
Melba finch	*Pytilia melba*
Sociable Weaver	*Philetairus socius*
Shaft-tailed Whydah	*Vidua regia*

Raptors are of particular importance in the Northern Cape Province, with 51 species listed for the region. Thirty five (35) of the fifty one (51) species listed for the area are resident species and twenty one (21) are considered common to the area. As a result of habitat loss, a reduction in food supply, and direct and indirect persecution, raptors populations in the province are decreasing. A notable concern viz. the proposed project, is that a number of raptors use electricity pylons for nesting, and are frequently killed by phase-to-phase or phase-to-earth electrocutions (Anderson (cited by Golder Associates, 2014:25)).

Based on the relevant Southern African Bird Atlas Project 2 lists, sixteen (16) bird species of conservation importance potentially occur in the study area (refer to Table 5).

Table 5: Red List and protected birds potentially occurring in the study area

Scientific Name	Common Name	IUCN – Regional Status	NEMBA TOPS List (2013)	Northern Cape – Protected Species (2009)
Aquila rapax	Tawny Eagle	Endangered	-	Specially Protected
Aquila verreauxii	Verreaux's Eagle	Vulnerable	-	Specially Protected

Ardeotis kori	Kori Bustard	Near Threatened	Protected	Protected
Ciconia abdimii	Abdim's Stork	Near Threatened	-	Protected
Ciconia nigra	Black Stork	Vulnerable	-	Specially Protected
Cursorius rufus	Burchell's Courser	Vulnerable	-	Protected
Falco biarmicus	Lanner Falcon	Vulnerable	-	Specially Protected
Gyps africanus	White-backed Vulture	Endangered	Protected	Protected
Neotis ludwigii	Ludwig's Bustard	Endangered	Endangered	Specially Protected
Oxyura maccoa	Maccoa Duck	Near Threatened	-	Protected
Phoenicopterus minor	Lesser Flamingo	Near Threatened	-	Specially Protected
Phoenicopterus ruber	Greater Flamingo	Near Threatened	-	Protected
Polemaetus bellicosus	Martial Eagle	Endangered	Vulnerable	Specially Protected
Rhinoptilus africanus	Double-banded Courser	Near Threatened	-	Protected
Sagittarius serpentarius	Secretarybird	Vulnerable	-	Specially Protected
Threskiornis aethiopicus	African Sacred Ibis	-	Protected	Protected

Herpetofauna

The distribution maps presented in Bates, *et al.* (2014) and indicate that Fifty Eight (58) reptile species have been previously recorded in the region, while Minter *et al*. (2004) and Du Preez & Carruthers (2009) indicate that about 14 amphibians are potentially present. Of these, only two reptiles and one amphibian are of national conservation importance. These are the Horned Adder (*Bitis caudalis*) and Southern African Python (*Python natalensis*), both of which are listed as Protected under NEMBA (2013), and the Giant Bullfrog (*Pyxicephalus adspersus*) which has a regional IUCN Red List status of Near Threatened. A number of other species of both reptiles and amphibian are listed as either protected or specially protected according to the Northern Cape Conservation Act 9 of 2009 (refer to Table 6).

Table 6: Red List and protected reptiles potentially occurring in the study area

Scientific Name	Common Name	IUCN – Regional Status	NEMBA TOPS List (2013)	Northern Cape – Protected Species (2009)
Bitis caudalis	Horned Adder	-	Protected	-
Chamaeleo namaquensis	Namaqua Chameleon	-	-	Specially Protected
Dasypeltis scabra	Rhombic Egg-eater	-	-	Protected
Heliobolus lugubris	Bushveld Lizard	-	-	Protected
Lycophidion capense capense	Cape Wolf Snake	-	-	Protected
Meroles squamulosus	Savanna Lizard	-	-	Protected
Meroles suborbitalis	Spotted Desert Lizard	-	-	Protected
Nucras intertexta	Spotted Sandveld Lizard	-	-	Protected
Pedioplanis namaquensis	Namaqua Sand Lizard	-	-	Protected
Pelomedusa subrufa	Marsh Terrapin	-	-	-
Philothamnus semivariegatus	Spotted Bush Snake	-	-	Protected

Prosymna sundervallii	Sundevall's Shovel-Snout	-	-	Protected
Psammobates oculifer	Serrated Tent Tortoise	-	-	Protected
Pseudaspis cana	Mole Snake	-	-	Protected
Python natalensis	Southern African Python	-	Protected	Specially Protected
Stigmochelys pardalis	Leopard Tortoise	-	-	Protected
Varanus albigularis albigularis	Southern Rock Monitor	-	-	Protected

3.2. Terrestrial Ecology: Flora

Species of Conservation Importance

Four plant species of conservation importance were recorded in the study area during the field survey which includes *Acacia erioloba, Boscia albitrunca* and *Acacia haematoxylon* and the toxic bulb *Boophane disticha.* Each of the aforementioned species of conservation importance are listed as protected according to the National Forest Act 84 of 1998. Both the *Acacia erioloba* and *Boophane disticha* species are listed as "Declining" on the regional IUCN Red List (2009). *Acacia erioloba* is particularly abundant throughout the entire study area, while *Boscia albitrunca* and *Acacia haematoxylon* were most abundant in the vicinity of Hotazel. *Boophane disticha* was only recorded at a few localities in the study area. As per the South African Biodiversity Institute's Plants of Southern Africa database of species recorded in the relevant QDS, an additional three species of conservation importance may potentially occur in the study area (see Table 7).

Table 7: Flora species of conservation importance potentially occurring in the study area

Species	IUCN (2009) – Regional Status	NEMBA TOPS List (2013)	Protected Tree Species (National Forest Act No. 84 of 1998)	Northern Cape – Specially Protected Species (1999)
Acacia erioloba	Declining	-	Protected	-
Cleome conrathii	Near Threatened	-	-	-
Drimia sanguinea	Near Threatened	-	-	-
Boscia albitrunca	-	-	Protected	-
Acacia haematoxylon	-	-	Protected	-
Pelargonium myrrhifolium var. *myrrhifolium*	-	-	-	Specially Protected
Boophane disticha	Declining	-	-	-

Habitat Units

Notwithstanding the inherent variations in vegetation between and within individual farms in the study area, three broad habitat units are recognised for the study area, namely:

- Open and Closed Thicket and Bushland;
- Open and Closed Mountain Shrubland; and
- Riparian Corridor.

A brief description (relating to the characteristics and distribution of the units) for each of the vegetation habitat units listed above are provided in the subsequent document sections.

a) Open and Closed Thicket and Bushland

The Open & Closed Mountain Shrubland habitat unit is found on the rolling hills and slopes of the Kuruman Mountains. These mountains run on a north-west to south-east orientation and dominate the central axis of the study area. Soils tend to be shallow, dark red and brown, and are typically very rocky. Like the Open & Closed Thicket and Bushland habitat unit, this habitat unit has a highly variable structure, grading from relatively open short grassland (see Figure 2) to densely-closed thicket or shrubland, with an average height of about 2.5 to 3m.

Figure 2: Relatively open grassland with scattered woody species

Common woody species in this habitat unit also include *Acacia mellifera*, *Grewia flava* and *Tarchonanthus camphoratus*. Other woody species recorded in this habitat unit include *Acacia erioloba, Acacia hebeclada var. hebeclada, Acacia karroo, Aloe hereroensis, Asparagus spp., Boscia albitrunca, Diospyros austro-africana, Diospyros lycioides, Ehretia rigida, Euclea crispa, Euclea undulata, Elephantorrhiza elephantina, Ficus cordata, Gymnosporia buxifolia, Lantana rugosa, Lebeckia macrantha, Opuntia ficus-indica*, Prosopis glandulosa*, Rhigozum brevispinosum, Rhigozum obovatum, Rhigozum trichotomum, Searsia burchellii, Searsia ciliata and Ziziphus mucronata*.

The herbaceous layer in this habitat unit is generally poorly developed and these areas are probably quickly overgrazed. Grasses recorded include inter alia, *Aristida adscensionis, Aristida congesta var. barbicollis, Aristida congesta var. congesta, Aristida diffusa, Aristida meridionalis, Brachiaria nigropedata, Cenchrus ciliaris, Chrysopogon serrulatus, Digitaria sp., Elionurus muticus, Enneapogon cenchroides, Eragrostis lehmanniana, Eragrostis trichophora, Diheteropogon amplectens Fingerhuthia africana, Cymbopogon sp., Cymbopogon excavatus, Melinis repens, Microchloa caffra,*

Pogonarthria squarrosa, Schmidtia.

b) Open and Closed Mountain Shrubland

The Open and Closed Mountain Shrubland habitat unit is found on the rolling hills and slopes of the Kuruman Mountains. These mountains run on a north-west to south-east orientation and dominate the central axis of the study area. Soils tend to be shallow, dark red and brown, and are typically very rocky. Like the Open and Closed Thicket and Bushland habitat unit, this habitat unit has a highly variable structure, grading from relatively open short grassland to densely-closed thicket or shrubland, with an average height of about 2.5 to 3 meters. Common woody species in this habitat unit also include *Acacia mellifera, Grewia flava and Tarchonanthus camphoratus.*

c) Ephemeral Drainage Lines

Several drainage lines are located in the vicinity of Kuruman. These drainage lines are characterised by an open, flat channel, dominated by short grasses and fringed by tall woody vegetation. The transition from tall drainage corridor woody vegetation to dry terrestrial shrubland is generally abrupt. For the most part the drainage lines appear to be ephemeral, and probably only exhibit surface flow after heavy rains. This notwithstanding, flowing surface water was noted along a short stretch of a well-channelled stream that exits Kuruman to the north.

The creeping grass *Cynodon dactylon* dominates the vegetation of the inner drainage line corridor. In some areas heavy grazing by cattle, goats and sheep have created very short, grazing lawns. Other less abundant herbaceous species recorded in the drainage channel include the grass *Imperata cylindrica* and various *Cyperaceae* species. Woody vegetation forming the woodland fringe includes many of the same species that were noted in adjacent upland areas, such as *Acacia karroo, Acacia hebeclada var. hebeclada, Acacia mellifera, Grewia flava, Rhus lancea, Tarchonanthus camphoratus* and *Ziziphus mucronata*. Drainage lines in residential areas were generally disturbed and often artificially canalised and used for crop growing. Alien invasive vegetation, such as *Melia azedarach* was common along the canalised portions of the natural drainage lines. The ecological integrity of this habitat unit is Moderate, but considering the role drainage lines have in the landscape their conservation importance is High.

3.3. Visual Character of Study Area

Dominant landform and land use features (e.g., hills, rolling plains, valleys and urban areas) of similar physiographic and visual characteristics, typically define landscape character types. The combination of the topographical elements including the mountain range and associated ridge lines / clusters of koppies as well as the dry and wet / semi-wet waterways create a harsh desolate rural landscape degraded by the mining industries around Hotazel and Kathu. During the evening time, the rural sky will be lit up by the mining industries around Hotazel and Kathu as well as by the lights associated with the three towns, the communities as well as those from farmsteads.

Visual Receptors

Visual receptors within the study area will include:

- residents of the towns, communities and farmsteads with associated workers housing;
- recreation facilities and tourist destinations;

- local and tourist travellers within and through the study area, and
- mines, industries and businesses.

Visual receptors with a potentially high sensitivity will include residents of the surrounding towns (e.g. Hotazel, Kuruman and Kathu), various surrounding communities, farmsteads with associated workers housing within the study area as well as the recreational facilities and tourist destinations. Visual receptors with a moderate sensitivity would be travellers moving through the study area, while visual receptors with a low sensitivity, would include employees in the mining and related industries.

3.4. Surface Water

Two wetland types, namely channelled and valley-bottom wetlands, were identified within the proposed development area. The majority of the wetland habitat units have an association with a defined channel and are driven by sediment transport properties which is influenced by erosion factors within the catchment area that deliver sediments to the wetland and aquatic habitats.

Table 8: The hydrogeomorphic wetland types of the regional wetlands associated with the site and the ecological services they provide within the landscape (adapted from Kotze, et al, 2007).

Wetland HGM type	Regulatory benefits potential provided by wetland							
	Flood attenuation		Stream flow regulation	Enhancement of water quality				
	Early wet season	Late wet season		Erosion control	Sediment trapping	Phosphates	Nitrates	Toxicants
Valley bottom – channelled	Medium relevance	Low relevance	Low relevance	High relevance	High relevance	Medium relevance	Medium relevance	Medium relevance

Ecological functionality and ratings

The proposed development has an association with a valley-bottom wetland habitat units that have suffered varying degrees of impacting features due to the association with a diversity of land uses. Ecological integrity and functionality of the associated wetlands tend to remain relatively good. There are, however, some impacting features that are present that include formal roadways, farming activities, urban development and informal expansion of informal and semi-formal residential areas and other various forms of development.

Wetland Index of Habitat Integrity

The Wetland Index of Habitat Integrity scores are presented in Table 9, which places the overall integrity of the wetland complexes associated with the Kuruman River within a D category, which translates to a system that tends toward a largely modified Present Ecological State (PES) rating. This shows a wetland system that has lost components of functionality and has been transformed from natural conditions, but has retained fundamental functionality. The vegetation within the wetland unit remains relatively good. The hydrological and geomorphological aspects have been impacted to an extent by the pipelines and roadways that intersect it as well as catchment management and landscaping features both within and outside of the wetland units.

Table 9: Results from the WETLAND-IHI for the wetlands within the survey area

Site	Vegetation	Hydrology	Geomorphology	Water quality	Overall PES
Kuruman Wetlands	50.1%	44.0%	63.8%	61.0%	52.2%
	D	D	C	C/D	D

Various survey sites along the Kuruman River were surveyed to ascertain the overall ecological integrity of the wetland complex associated with the river. The Wetland Index of Habitat Integrity scores therefore represent an average and a collective evaluation of the wetland complex. The major drivers of ecological change of this system within the survey area are urbanisation, which has seen much of the upper reaches of the watercourse being channelled for effective urban storm water management, and water quality impacts associated with the commercial and industrial sector. The peri-urban area sees agriculture within the seasonal and temporary zones, which has led to habitat transformation, sedimentation within the wetland zones, and contamination of the watercourse through agro-chemicals. Exotic vegetation encroachment is common throughout the wetland zones within the urban and peri-urban areas.

The Moffat-Valley wetland is a poorly-developed valley-bottom wetland that is utilised for grazing of livestock. The Wetland Index of Habitat Integrity could not be applied to this unit as it is a temporary wetland that is not connected to a watercourse, but is rather driven by surface water runoff and impoundment from various landscaping features and topography. This wetland unit is utilised for grazing of livestock and therefore some transformation of the vegetation has taken place. Small impoundments also occur locally within the unit that influences the hydrology and geomorphological characteristics of the unit. The unit remains functional, however, and therefore should be regarded as ecologically sensitive.

Ecological Importance-Sensitivity

The Ecological Importance Sensitivity (EIS) was undertaken according to the methods outlined in WET-EcoServices (Kotze, et al, 2007). After application of the methods in WET-Eco Services, the wetland associated with the Moffat-Valley route (Alternative 2) averaged out at 1.43 out of a possible 4, and the collective analysis of the wetlands associated with the Kuruman River averaged out at 1.72 (out of a possible four).

Table 10: The results of the WET-Eco Services

Wetland functional feature	Moffat-Valley wetland	Kuruman River wetlands	
Flood attenuation	1.4	1.9	
Stream flow regulation	1.7	2.7	
Sediment trapping	1.9	2.7	
Phosphate trapping	2.3	2.2	
Nitrate removal	2.3	2.5	
Toxicant removal	2.2	2.6	
Erosion control	2.0	1.8	
Carbon storage	1.0	1.7	
Maintenance of biodiversity	1.6	1.4	
Water supply for human use	1.1	2.3	
Natural resources	0.6	1.8	
Cultivated foods	0.2	1.0	
Cultural significance	0.0	0.0	
Tourism and recreation	0.0	0.3	
Education and research	1.3	1.3	
Runoff intensity from the wetland unit's catchment	1.0	2.25	
Alteration of sediment regime	2.0	0	
Alteration of nutrient/toxicant regime	1.0	1.0	

Level of threat	3.0	3.0	
Levels of opportunity	2.0	2.0	
Overall ecological services rating	***1.43***	***1.72***	

These values translate to wetland systems that are currently supplying a Moderate (C) ecological service. The threat level to both of the habitat units, due to the current land use, remains moderate (scored 3 out of 4), but the levels of opportunity, which could be interpreted as the degree to which the wetland habitat units could perform these services, also scored at 2 out of 4 (Table 10).

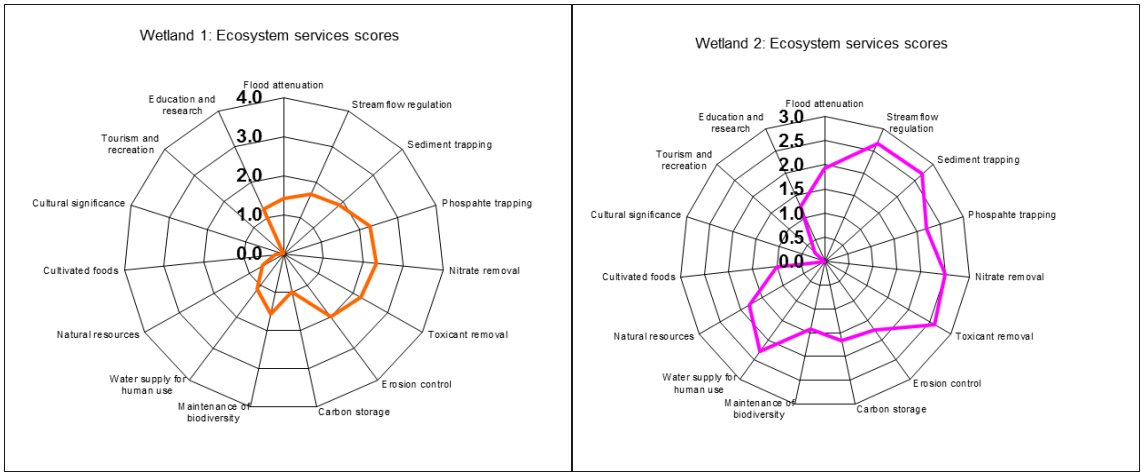

Figure 3: Scoring of the various aspects of ecological services provided for by the wetland habitat units present within the survey area. Moffat-Valley wetland (left); Kuruman wetlands (right)

The various input features and how they scored for both wetland units are presented in Figure 3. This shows which features (services) that are performed by the wetlands are currently scoring the highest, and which ones are ranked lower. It can be seen that the factors including the dependency on the resources offered by the wetlands to the surrounding communities are rated low. The Moffat-Valley wetland is limited in extent and therefore the functionality of the wetland is comparatively limited. Basic wetland ecological functionality has been retained for the wetland unit, but the unit offers little services to communities, offers limited resources and does not maintain a high biodiversity. The Kuruman wetlands offer a greater variety of goods and services. As can be seen from the figure, the basic wetland functionality is relatively good, with stream flow regulation, toxicant removal and water supply being rated amongst the most valued services. Cultural significance, tourism and recreation and education, similarly to the Moffat-Valley wetland unit, remain low.

3.5. Heritage and Paleontological Resources

The findings of previous archaeological surveys and studies have shown rocky outcrops, riverbanks, foot of koppies and confluence to be prime localities for heritage finds. Information provided by aerial photography of the study area have signalled the following areas / aspects along the proposed power line corridor that may be sensitive from a heritage resources perspective:

- Farmsteads: Most of the farmsteads found within the study area date from the mid to late 1800's and are of great historical and significance;
- Structures: Numerous structures and the outlines of man mad structures have been identified and

rated as possible sensitive heritage resources from the aerial survey. Some of the early settler farmsteads have been abandoned for close to 100 years and only the remnants of the walling, middens and paddocks remain; and

- Ridges: A large proportion of the ridges, koppies and mountains have been identified in the study area and are associated with human settlement and activity. Stonewalling from herders, rock engravings and knapping sites associated with Later Stone Age manufacturing technology is known to occur in these areas.

Key findings and observations that were made during the field work carried out during March 2015 included:

- Identifying two (2) cemeteries (refer to Figure 4);
- Identifying nine (9) historic farmsteads;
- Two (2) historic asbestos mines were identified; and
- Identifying a sacred / religious site, a Provincial Monument and a memorial site (refer to Figure 4).

Figure 4: Identified Memorial & Cemetery

Details pertaining the sites of heritage significance are provided in Table 12. The location (coordinates) as well as the corridor alternative along which the heritage site is found is also shown in Table 12.

Palaeontology

An analysis of the SAHRIS paleontological sensitivity map (Figure 5) indicates that 70% of the study area is under lain by paleontological sensitive geology. Interpreting this data according to the SAHRIS guidelines **(**Table 10) indicates that a field assessment and protocol for finds will be required for large sections of the alternative alignments. *It is recommended that a full Paleontological Impact Assessment (PIA) be initiated during the pre-construction phase when the heritage walk down of the final alignment will be done.*

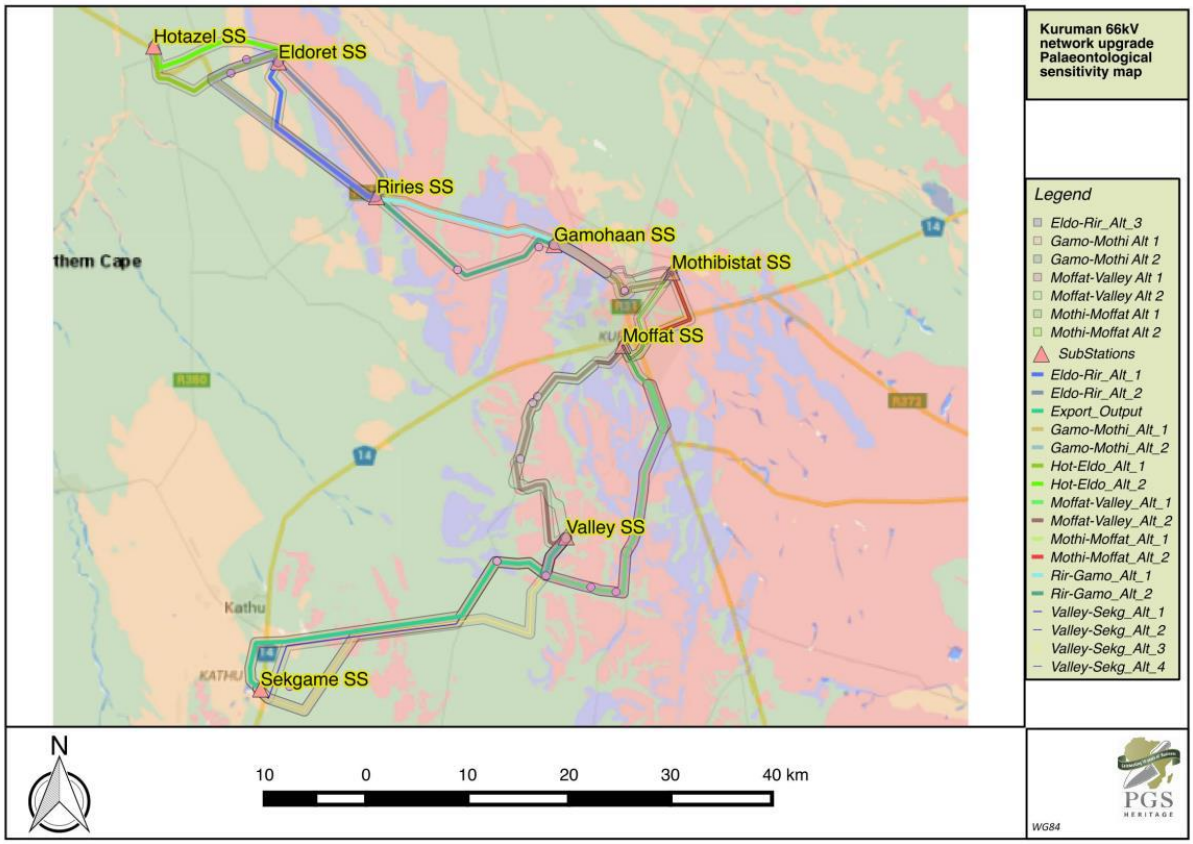

Figure 5: Paleontological sensitivity map for the project area

Table 11: Interpretation table for paleontological sensitivity

COLOUR	SENSITIVITY	REQUIRED ACTION
RED	VERY HIGH	field assessment and protocol for finds is required
ORANGE/ YELLOW	HIGH	desktop study is required and based on the outcome of the desktop study, a field assessment is likely
GREEN	MODERATE	desktop study is required
BLUE	LOW	no paleontological studies are required however a protocol for finds is required
GREY	INSIGNIFICANT/ ZERO	no paleontological studies are required
WHITE/ CLEAR	UNKNOWN	these areas will require a minimum of a desktop study. As more information comes to light, SAHRA will continue to populate the map.

If during the initial survey sites of cultural significance is discovered, it will be necessary to develop a management plan for the preservation, documentation or destruction of such a site. Such a program must include an archaeological/paleontological monitoring programme, timeframe and agreed upon schedule of actions between the company and the archaeologist.

The definition of an archaeological/paleontological monitoring programme is a formal program of observation and investigation conducted during any operation carried out for non-archaeological

reasons. This will be within a specified area or site on land, inter-tidal zone or underwater, where there is a possibility that archaeological deposits may be disturbed or destroyed. The programme will result in the preparation of a report and ordered archive.

The purpose of an archaeological/paleontological monitoring programme is:

- To allow, within the resources available, the preservation by record of archaeological/paleontological deposits, the presence and nature of which could not be established (or established with sufficient accuracy) in advance of development or other potentially disruptive works.
- To provide an opportunity, if needed, for the watching archaeologist to signal to all interested parties, before the destruction of the material in question, that an archaeological/paleontological find has been made for which the resources allocated to the watching brief itself are not sufficient to support treatment to a satisfactory and proper standard.
- A monitoring is not intended to reduce the requirement for excavation or preservation of known or inferred deposits, and it is intended to guide, not replace, any requirement for contingent excavation or preservation of possible deposits.
- The objective of the monitoring is to establish and make available information about the archaeological resource existing on a site.

3.6. Climate and Rainfall

Rainfall

Broad scale meteoric data was obtained from the Council for Scientific and Industrial Research as well as information contained in the existing Eskom CSP site EIA. It should be noted that this was not a detailed study, but merely a desktop assessment as input into the other detailed studies. The study area is located in the north western portion of South Africa. This area receives very variable late summer rainfall between February and April. The study area receives between 70 – 200mm of precipitation annually.

Temperature

The study area is located in one of the warmer parts of the country where the mean maximum and minimum temperatures range from 40.6ºC in summer to -3.7ºC in winter. The mean annual temperature is 17,4ºC.

Wind

For the entire study area there is very low wind flow and no main wind direction. Whirl winds (dust devils) are common on hot summer days.

3.7. Geology

Methodology and Data Sources

The geological analysis was undertaken through the desktop evaluation using a Geographic Information System and relevant data sources.

Regional Description

The greater part of the study area is underlain by an Iron Formation. A small area within the extent of the study area is underlain by Diamctite and Dolomite. Of the six types of asbestiform minerals found in South Africa, three, namely crocidolite, amosite and chrysotile were mined and milled on a large commercial scale. Crocidolite occurs predominantly as laterally continuous cross-fibre seams, and ranges in thickness from 3 mm to 150 mm. These seams lie parallel to the banding in the banded iron formation host and, although laterally continuous over many metres, normally have lenticular terminations. Crocidolite deposits are found within the area between the Riries Substation and Gamohaan Substation, as well as between the Moffat Substation and Valley Substation.

3.8. Socio-Economic Character

The Ga-Segonyana Local Municipality span a geographical land-area of 4,492km^2 and a population density of 20.8 persons per km^2. Mining and agriculture remain the core economic activities in the municipal area, and attract a lot of job-seekers – especially from the Joe Morolong municipal area. There is a constant increase in the population, which cause severe pressure on infrastructure and the service capacity of the Municipality. More than 78% of the population's first language is Setswana, followed by Afrikaans at 13%.

Table 12: Details of identified heritage sites

Type	Longitude	Latitude	Description	Applicable Corridor Alternative
Historic - farmstead	27.22961	-23.03555	An old farmstead with its associated structures was identified at this location. The farmstead was recently renovated and is currently being occupied. The owner of the farm, Mr. Dawid Venter, thinks that the structure dates from the 1940's.	Hotazel-Eldo Alt 1
Historic ruin - farmstead	27.68625	-23.39576	An old farmstead was identified at this location. The farmstead was constructed with bricks and cement and had a pitched corrugated iron roof. The structure was abandoned and the age of this building is not known.	Moffat-Valley Alt 2
Historic - farmstead	27.67616	-23.35092	An old farmstead with its associated structures was identified at this location. The farmstead was brick-built and has a pitched corrugated iron roof. The house has metal door and window frames and external water and electrical systems were added to the original house. The associated storeroom and dam were stone-built.	Moffat-Valley Alt 2 Valley-Sekg Alt 3
Historic - farmstead	27.57266	-23.32545	An old farmstead was identified at this location. The farmstead has a sandstone built foundation with brick walls built on top of the foundations. The house was renovated and is currently being occupied	Valley-Sekg Alt 3
Historic - farmstead	27.52261	-23.33739	An old farmstead with its associated structures was identified at this location. The farmstead was brick-built and has a pitched corrugated iron roof. The house has metal door and window frames and external water and electrical systems were added to the original house. The house was renovated and forms part of the Corheim Guest Farm.	Moffat-Valley Alt 2
Historic - farmstead	27.76857	-23.08091	An old farmstead with its associated structures was identified at this location. The farmstead was brick-built and has a pitched corrugated iron roof. The house has metal door and window frames and external water and electrical systems were added to the original house. The house was recently renovated and is currently being occupied.	Valley-Sekg Alt 1
Historic - farmstead	27.77443	-23.09437	An old farmstead with its associated structures was identified at this location. The farmstead was brick-built and has a pitched corrugated iron roof. The house has metal door and window frames and external water and electrical systems were added to the original house. The house is currently being occupied by farm workers.	Outside alternative buffer.
Historic - farmstead	27.66325	-23.30186	An old farmstead with its associated structures was identified at this location. The farmstead was brick-built and has a pitched corrugated iron roof. The house has metal door and window frames and external water and electrical systems were added to the original house.	Valley-Sekg Alt 1 Valley-Sekg Alt 4

Type	Longitude	Latitude	Description	Applicable Corridor Alternative
Sacred / Religious site	27.38431	-23.34377	A large overhang with evidence of religious activities was identified at this location. Several areas with the ashes of fires were identified as well as areas where candles were placed as well. The site is visited frequently and the area under the overhang is disturbed. Recent historic graffiti is visible on sections of the overhang wall, while feint rock art figures are discernible. Further investigation could possibly indicate the presence of a stone age site and/or rock art on the overhang walls.	Rir-Gamo Alt 2
Historic – Mission	27.42334	-23.42936	The Moffat Mission Station was identified at this location. The gates to the Mission Station were locked as renovation work was going on during the time of the investigation. The extent of the missionary could not be determined as access was not possible. The mission station is a declared Provincial Monument.	Gamo-Mothi Alt 1
Historic – Asbestos mine	27.40452	-23.26232	The infrastructure and remains of the old Wandrag Asbestos Mine were identified at this location. The infrastructure included several houses, offices, a labour compound and storerooms. The staff accommodation is still in use and the houses are being occupied. The labour compound and several other structures are not being used and are in a derelict state.	Rir-Gamo Alt 2
Historic - Asbestos mine	27.69054	-23.42094	The remains and some of the infrastructure of the old Bosrand Asbestos Mine were identified at this location. Several mine dumps were situated next to the road and some derelict structures were situated on the other side of the road.	Moffat-Valley Alt 2

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

Listed activity as described in GN R.544, 545 and 546		Description of project activity
1.	**GN R.544, 18 June 2010, Item 10(i):** *The construction of facilities or infrastructure for the transmission and distribution of electricity (i) Outside urban areas or industrial complexes with a capacity of more than 33 but less than 275 kV.*	The proposed project will comprise of the following overarching elements: • Infrastructure required for the distribution of electricity ~ *Upgrade of the existing 66kV network to a 132kV network, which will necessitate decommissioning the existing 66kV network;* • Infrastructure required for the transmission of electricity ~ *upgrading the 132kV substation at the current site and decommissioning the 66kV Eldoret, Riries, Moffat and Valley Substations. The existing Mothibistad Switching Station and Asbes Substation will be decommissioned;* • Infrastructure required for the transmission of electricity ~ *Upgrading of the existing Mothibistad 132/22kV switching station to a substation* • Infrastructure required for the transmission of electricity ~ Construction of the Gamohaan 132/22kV Substation; and • Infrastructure required for the transmission of electricity ~ Construction of the Sekgame Switching Station. The larger part of the power line corridor extends through areas that are situated outside the urban edge of surrounding towns and built-up areas.
2.	**GN R.544, 18 June 2010 Item 11(xi):** *The construction of infrastructure or structures covering 50 m^2 or more, within a watercourse or within 32 meters of a watercourse.*	The proposed corridor alternatives will either fall within the delineated buffer or extend through a watercourse at the Kuruman River near Kuruman Owing to technical considerations it may not be feasible to string the power line across a distance that will allow the pylons to be placed outside the extent of the watercourse crossing listed above. Furthermore the base of the pylon structure will cover >50 square meters, thereby exceeding the threshold that is defined in activity 11(xi) of Listing Notice 1.

Listed activity as described in GN R.544, 545 and 546		Description of project activity
3.	GN R.544, 18 June 2010 Item 18(i): *The infilling or depositing of any material of more than 5m^3 into, or the dredging, excavation, removal, or moving of soils, sand, shells, shell grit, pebbles or rock of more than 5 m^3 from a watercourse.*	The construction activities associated with the upgrading and construction of the 132kV network may necessitate placing the pylons within the extent of a watercourse, especially non-perennial watercourses which is abundant within the identified corridor alternatives. This activity will thus trigger the infilling and excavation of soil (in excess of 5m^3 from the watercourses). Placement and micro-siting of pylons within the preferred corridor alternative will first and foremost avoid placement within a draining line, however since detailed design and survey of the power line route has not been done to date, the possibility exist that construction activity may accor within a non-perennial drainage line. Also refer to point 2 of this table.
4.	GN R546 18 June 2010 Item 14(a)(i): *The clearance of an area of 5 hectare or more of vegetation where 75% or more of the vegetative cover constitutes indigenous vegetation.*	The clearing of vegetation within the working area along the power line corridor will extend over a distance in excess of a 150 kilometres. Taking into account the width of the working area within the corridor as well as the total distance of the power line, the clearing of vegetation within this area will exceed the 5 hectare threshold. The findings of the Ecology Specialist Study indicated that the species found within the study area largely comprises of vegetation species that are indigenous to the area.

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) Site alternatives

Alternative 1 (preferred alternative)		
Description	Lat (DDMMSS)	Long (DDMMSS)
Alternative 2		
Description	Lat (DDMMSS)	Long (DDMMSS)
Alternative 3		
Description	Lat (DDMMSS)	Long (DDMMSS)

In the case of linear activities:

1. <u>Proposed corridor alternatives</u>

A number of corridor alternatives between each of the substations were determined, based on the outcomes of consultation with Interested and Affected Parties, technical considerations and a preliminary screening of the receiving environment. The approach concerning the corridor

alternatives also allowed for the various specialist studies that were carried out to document a site specific account of the receiving environment (relating the various environmental elements) as opposed to providing a generic overview of the large study area.

Table 13: Naming of Route Alternatives

No.	Corridor Alternative	Naming of alternatives between substations
1.	Hotazel Substation to Eldoret Substation	– Hot-Eldo Alt 1 – Hot-Eldo Alt 2
2.	Eldoret Substation to Riries Substation	– Eldo-Rir Alt 1 – Eldo-Rir Alt 2 – Eldo-Rir Alt 3
3.	Riries Substation to Gamohaan Substation	– Rir-Gamo Alt 1 – Rir-Gamo Alt 2
4.	Gamohaan Substation to Mothibistad Substation	– Gamo-Mothi Alt 1 – Gamo-Mothi Alt 2
5.	Mothibistad Substation to Moffat Substation	– Mothi-Moffat Alt 1 – Mothi-Moffat Alt 2
6.	Moffat Substation to Valley Substation	– Moffat-Valley Alt 1 – Moffat-Valley Alt 2
7.	Valley Substation to Sekgame Substation	– Valley-Sekg Alt 1 – Valley-Sekg Alt 2 – Valley-Sekg Alt 3 – Valley-Sekg Alt 4

Furthermore this approach allowed for a better understanding of the receiving environment to be gained and greater flexibility to determine a preferred corridor alignment that is likely to have the least cumulative impact on the receiving environment. The alignment of the preferred corridor alternative is therefore an amalgamation of various corridor alternatives considered and assessed between the substations, based on the sensitivity of the receiving environment and significance of potential impacts. Details relating to the location and distance covered by the power line corridor alternatives are provided in Table 14 below.

Table 14: Location of power line corridor alternatives

132 kV Power Line Corridor Alternative		Coordinates		Distance
		Starting Point	End Point	
Corridor Alternatives: Hotazel Substation to Eldoret Substation				
1.	Hotazel-Eldoret Alternative 1	22°57'30.36" E 27°12'19.89" S	23°04'59.22" E 27°13'10.01" S	16.24 km
2.	Hotazel-Eldoret Alternative 2	22°57'30.36" E 27°12'19.89" S	23°04'59.22" E 27°13'10.01" S	15.56 km
Corridor Alternatives: Eldoret Substation to Riries Substation				
3.	Eldoret-Riries Alternative 1	23°04' 59.22" E 27°13'10.01" S	23°10'52.75" E 27°20'22.05" S	18.47 km
4.	Eldoret-Riries Alternative 2	23°04'59.22" E 27°13'10.01" S	23°10'52.75" E 27°20'22.05" S	16.56 km
5.	Eldoret-Riries Alternative 3	23°04'59.22" E 27°13'10.01" S	23°10'52.75" E 27°20'22.05" S	27.15 km
Corridor Alternatives: Riries Substation to Gamohaan Substation				
6.	Riries-Gamohaan Alternative 1	23°10'52.75" E 27°20'22.05" S	23°21'31.98" E 27°22'55.45" S	18.64 km
7.	Riries-Gamohaan Alternative 2	23°10'52.75" E 27°20'22.05" S	23°21'31.98" E 27°22'55.45" S	21.14 km
Corridor Alternatives: Gamohaan Substation to Mothibistad Substation				
8.	Gamohaan-Mothibistad Alternative 1	23°21'31.98" E 27°22'55.45" S	23°28'36.23" E 27°24'23.81" S	14.35 km
9.	Gamohaan-Mothibistad Alternative 2	23°21'31.98" E 27°22'55.45" S	23°28'36.23" E 27°24'23.81" S	13.51 km
Corridor Alternatives: Mothibistad Substation to Moffat Substation				
10.	Mothibistad-Moffat Alternative 1	23°28'36.23" E 27°24'23.81" S	23°25'39.73" E 27°28'18.26" S	10. 91 km
11.	Mothibistad-Moffat Alternative 2	23°28'36.23" E 27°24'23.81" S	23°25'39.73" E 27°28'18.26" S	12.99 km
Corridor Alternatives: Moffat Substation to Valley Substation				
12.	Moffat-Valley Alternative 1	23°25'39.73" E 27°28'18.26" S	23°22'15.99" E 27°38'30.30" S	40.39 km
13.	Moffat-Valley Alternative 2	23°25'39.73" E 27°28'18.26" S	23°22'15.99" E 27°38'30.30" S	28.95 km
Corridor Alternatives: Valley Substation to Sekgame Switching Station				
14.	Valley-Sekgame Alternative 1	23°22'15.99" E 27°38'30.30" S	23°03'55.19" E 27°46'35.74" S	39.60 km
15.	Valley-Sekgame Alternative 2	23°22'15.99" E 27°38'30.30" S	23°03'55.19" E 27°46'35.74" S	40.59 km
16.	Valley-Sekgame Alternative 3	23°22'15.99" E 27°38'30.30" S	23°03'55.19" E 27°46'35.74" S	42.39 km
17.	Valley-Sekgame Alternative 4	23°22'15.99" E 27°38'30.30" S	23°03'55.19" E 27°46'35.74" S	40.94 km

2. Comparative Assessment of identified alternatives

The assessment of the preferred alternative corridors between the individual substations include consideration and assessment of key impact groups identified for this project. These impacts groups may contain a number of inter-related impacts that is considered cumulatively to distinguish a preferred alternative with least environmental sensitivity. The impact groups include:

- **Access**: Refer to availability and proximity of existing roads to the corridor alternatives that can be utilised during maintenance. More access via existing roads means less disturbance to the receiving environment through the establishment of new access roads.
- **Ease of construction and maintenance**: Refer to the how easy construction material can be transported to site, ease of construction and the ease of navigating the terrain during maintenance and emergency events. Therefore more rugged and mountainous terrain with unmaintained informal roads will be more difficult to navigate with increasing travelling time as opposed to flat terrain with established and maintained roads. Infrastructure in rugged terrain could therefore affect capital costs of construction and operation and reduce response times during emergency event, such as fires and power outages on the section of power line.
- **Social Impact**: Refer to potential impact on land owners and surrounding communities and takes into account land owner preference and right to property.
- **Visual Impact**: Refer to cumulative visual impact assessed by the visual specialist resulting in the assessment of impact significance and identification of preferred alternatives. Although specialist recommendations and preference is considered strongly, significance of the impact compared between corridor alternatives is also considered, i.e. if two corridor alternatives are both considered to have a low sensitivity to the identified impacts the use of any one of the two corridors are considered feasible.
- **Heritage Impact**: Refer to cumulative heritage impact assessed by the heritage specialist resulting in the assessment of impact significance and identification of preferred alternatives. Although specialist recommendations and preference is considered strongly, significance of the impact compared between corridor alternatives is also considered, i.e. if two corridor alternatives are both considered to have a low sensitivity to the identified impacts the use of any one of the two corridors are considered feasible.
- **Wetland and Aquatic Ecology Impacts**: Refer to cumulative wetland and aquatic impact assessed by the wetland specialist resulting in the assessment of impact significance and identification of preferred alternatives. Although specialist recommendations and preference is considered strongly, significance of the impact compared between corridor alternatives is also considered, i.e. if two corridor alternatives are both considered to have a low sensitivity to the identified impacts the use of any one of the two corridors are considered feasible.
- **Terrestrial Ecology Impact**: Refer to cumulative ecological impact assessed by the terrestrial ecologist resulting in the assessment of impact significance and identification of preferred alternatives. Although specialist recommendations and preference is considered strongly, significance of the impact compared between corridor alternatives is also considered, i.e. if two corridor alternatives are both considered to have a low sensitivity to the identified impacts the use of any one of the two corridors are considered feasible.

The assessment of the preferred alternative was therefore informed by following:

- Considerations and recommendations made by specialists in their assessment reports
- Consultation with I&APs and land owners
- Consideration of technical and operational requirements of the proposed network upgrade

In order to identify the preferred corridor alternative between each of the identified substations, the impact groups described above have been considered in a matrix prepared to select the least sensitive and feasible alternatives. When considering the impacts described above, a score was given to each alternative in relation to the size of the impact along that corridor.

The scoring method assigned the lowest impact of all the alternatives a score of 1 point. Remaining alternatives were rated in terms of undesirability by adding two points in order to ensure a clear distinction between more desirable and undesirable corridors. Thus the scoring was done in the following manner:

- Lowest impact of the alternatives = 1 point;
- Second lowest (or highest) impact of the alternatives, considering 2 alternatives = 3 points;
- Third lowest (or highest) impact of the alternatives, considering 3 alternatives = 5 points;
- Fourth lowest (or highest) impact of the alternatives, considering 4 alternatives = 7 points;

Where impact significance associated with different corridor alternatives were equal, they both were assigned the same points. The lowest scores in the table reflect the least environmental sensitivity and therefore the preferred alternatives for each of the corridor sections. In order to ensure that the comparison is consistent, the ratings are given assuming successful implementation of all mitigation measures proposed in this study.

3. Recommendation of Preferred Corridor Alternatives

Hotazel substation to Eldoret substation

The visual specialist has concluded that during the construction phase the visual impact significance of the two alternative corridors are equal, However during the operational phase Alternative 1 has a high visual impact significance resulting in the recommendation of Alternative 2 is the preferred alternative for this section. This is largely based on the finding that Alternative 2 has a greater distance along service corridors, lesser distance through ‘virgin land’ and has no residential unit incidence.

The terrestrial ecologist concluded that both corridor alternatives traverse through areas with the same bird sensitivity scores, but that Alternative 2 is just under a kilometre shorter than Alternative 1, therefore the impact is expected to be very similar. The specialist has however identified Alternative 2 as the preferred alternative due to the slightly shorter distance over which it spans. Considering the similar nature and significance of the impacts on terrestrial ecology it is argued that any one of the two alternatives can be considered a preferred alternative.

The Wetland delineation and aquatic assessment study gave no preference to either of the two alternatives and either alternative could serve as a preferred alternative.

The heritage study identified two heritage sites along Alternative 1, but still assigned the use of this corridor as “favourable”. The use of this corridor was therefore not excluded.

Strong opposition against the use of Eldoret–Riries Alternative 1 and 2 was recorded from the land owner affected by these two alternatives. He suggested a third alternative be added (Eldoret–Riries Alternative 3) which will minimise fragmentation of his properties while aligning with Hotazel-Eldoret Alternative 1. This alignment would reduce visual and terrestrial ecology impacts in the corridor while a single access road could be used for the two parallel lines. When this alignment of the corridor alternatives is considered it may even reduce the anticipated visual impact of Hotazel-Eldoret Alternative 1, considering the preferred alternative for the Eldoret-Riries section has emerged as Alternative 3, hence the slightly reduced score of 2 for the visual impact of Hotazel-Eldoret Alternative 1.

Hotazel-Eldoret Alternative 1 is therefore recommended as the preferred corridor alternative for this section.

Eldoret substation to Riries substation

The visual assessment concluded that due to Alternative 2 being aligned for its entire length along an existing power line it is therefore recommended as the preferred alternative for this segment. None of the alternatives occur along sensitive landscape types, whereas Alternative 1 and 3 runs almost the same distance through virgin land.

The terrestrial ecology assessment concluded that the Eldoret-Riries corridor alternatives all traverse through areas with the same bird sensitivity scores. Eldoret-Riries Alternative 2 is located in the hilly, natural vegetation to the north of the R31 arterial road and is therefore **not** a preferred option. Eldoret-Riries Alternative 1 and Alt 3 are both aligned to the R31 arterial road for much of their length, but due to Alternative 1 being slightly shorter it was preferred as the preferred alternative by the specialist. Alternative 3 however is also still considered feasible due to the very similar ecological sensitivities of the two alternatives.

The wetland delineation and aquatic assessment gave no preference to either of the two alternatives and either alternative could serve as a preferred alternative. The heritage study identified two heritage sites along Alternative 1, but still assigned the use of this corridor as “favourable”. The use of this corridor was therefore not excluded.

The main differentiator between the different corridor alternatives are the alignment to the R31, which makes construction, operational, maintenance and emergency response activities much less time and cost intensive. Strong opposition against the use of Eldoret–Riries Alternative 1 and 2 was also recorded from the land owner affected by these two alternatives resulting in the recommendation to consider Alternative 3 as an additional corridor alternative.

Considering all the aspects discussed above, Eldoret-Riries Alternative 3 is recommended as the preferred alternative for this section.

Riries substation to Gamohaan substation

The visual assessment concluded that Riries–Gamohaan Alternative 1 is the preferred alternative for this section as it runs for its entire length along a road and passes on the opposite side of the road along the Maheana community.

The terrestrial ecology assessment also recommended Alternative 1 as the preferred alternative as it is closely aligned to the R31 whereas Alternative 2 runs through mountainous area.

The wetland delineation and aquatic assessment recommended Riries-Gamohaan Alternative 1, while the heritage assessment identified heritage structures along Alternative 2 and thus recommended Alternative 1 as the preferred corridor alternative.

The main differentiator between the different corridor alternatives are the alignment to the R31, which makes construction, operational, maintenance and emergency response activities much less time and cost intensive.

Riries-Gamohaan Alternative 1 is therefore recommended as the preferred corridor alternative for this section.

Gamohaan substation to Mothibistad substation

The visual assessment identified Alternative 1 as the preferred alternative for this section as it has a shorter total distance and a shorter distance through 'virgin land', and passes adjacent to the residential area of Kuruman.

The terrestrial ecology assessment concluded that Alternative 2 traverses through the 622 scoring pentad for a longer distance than Alternative 1. Gamohaan-Mothibistad Alternative 1 is situated in less sensitive terrestrial habitat and was therefore recommended as the preferred alternative.

Both alternatives were found to have potential impacts on the wetland and aquatic system of the Kuruman River, west of Kuruman. The potential significance of the activities on the wetland and aquatic systems in the study area is considered low to moderate if mitigation measures are successfully implemented. The wetland specialist however recommended Alternative 2 as the preferred alternative since this alternative result in smaller area coverage in sensitive wetland and aquatic habitats. This is reflected in the comparative assessment scoring below.

The heritage assessment identified heritage structures, i.e. the Moffat Mission Station, along Alternative 2 and thus recommended Alternative 1 as the preferred corridor alternative.

Strong opposition against the use of Gamohaan-Mothibistad Alternative 2 was recorded from stakeholders and land owners located at the Kuruman River crossing and local high school in the proximity of the corridor alternative. Subsequent to consideration of the specialist recommendations and opposing comments it was concluded that Alternative 1 be recommended as the preferred alternative.

Gamohaan-Mothibistad Alternative 1 is recommended as the preferred corridor alternative

for this section.

Mothibistad substation to Moffat substation

The visual assessment identified Alternative 1 is the preferred alternative for this segment as it runs along an existing power line for its entire length. Even though it passes 100m and 200m from guest lodges, these are already exposed to the negative visual impact from the existing power line.

The terrestrial ecology assessment concluded that corridor alternatives traverse through areas with the same bird sensitivity scores. Alternative 1 closely aligned with an existing road and was recommended as the preferred corridor alternative.

The wetland delineation and aquatic assessment recommended Alternative 1 as the preferred corridor alternative as a smaller area of wetland habitat is traversed. The wetland with buffer should be able to be spanned by the power line.

The heritage study identified no heritage sites along either of the alternative corridors. Therefore either of the corridors could be considered feasible and preferred corridor alternative.

Alternative 1 is mostly aligned with the R31, which makes construction, operational, maintenance and emergency response activities much less time and cost intensive, compared to Alternative 2.

Mothibistad-Moffat Alternative 1 is recommended as the preferred corridor alternative for this section.

Moffat substation to Valley substation

Even though Alternative 1 has more incidences with residential units and a greater total distance it is the preferred alternative of the two corridor alternatives from a visual perspective. Most of the residential units are already exposed to the negative visual impact of the existing power line. Alternative 1 has the greater distance along existing power lines and the lesser distance through 'virgin lands' and sensitive landscapes.

The terrestrial ecology assessment concluded that Alternative 2 traverses through a pentad with a higher bird sensitivity score (622) than Alternative 1. Accordingly, Moffat–Valley Alternative 1 was recommended as the preferred corridor alternative.

Both the corridor alternatives is expected to have an ecologically insignificant impact on the wetland habitat within the corridors. Alternative 1 is recommended by the specialist.

The heritage study identified three heritage sites along Alternative 1, but still assigned the use of this corridor as "favourable". The use of this corridor was therefore not excluded.

Strong opposition against the use of Moffat-Valley Alternative 2 was recorded from land owners located along the corridor alternative. Subsequent to consideration of the specialist recommendations and opposing comments it was concluded that Alternative 1 be recommended as

the preferred alternative.

Moffat-Valley Alternative 1 is recommended as the preferred corridor alternative for this section.

Valley substation to Sekgame substation

The visual assessment concluded that Alternative 4 it the preferred alternative even though it has the third longest total distance of the four alternatives

The terrestrial ecology assessment concluded that Alternative 4 is more direct and aligned to existing disturbance corridors in the form of farm roads. Alternative 4 was therefore recommended as the preferred corridor alternative.

The wetland delineation and aquatic assessment found that the impact rating given to Alternatives 1, 3 and 4 are exactly the same thus reflecting the same low sensitivity of these alternatives on the receiving environment. Although the specialist has recommended Alternative 1 as the preferred alternative, Alternative 3 or Alternative 4 could also be considered as a result of the low impact significance.

The heritage study identified three heritage sites along Alternative 1, but still assigned the use of this corridor as “favourable”. The use of this corridor was therefore not excluded.

Strong opposition against the use of Valley-Sekgame Alternative 1 and 2 was recorded from stakeholders and land owners located at the Bestwood Farm an smallholdings where a number of distribution and transmission lines are already located to tie into Ferrum substation.

Valley-Sekgame Alternative 4 is recommended as the preferred corridor alternative for this section.

In conclusion and as per Table 15 below, the preferred corridor alternative (highlighted in green in the Overall Sensitivity Score) is:

- Hotazel-Eldoret Alternative 1
- Eldoret-Riries Alternative 3
- Riries-Gamohaan Alternative 1
- Gamohaan-Mothibistad Alternative 1
- Mothibistad-Moffat Alternative 1
- Moffat-Valley Alternative 1
- Valley-Sekgame Alternative 4

The second corridor alternative (highlighted in orange in the Overall Sensitivity Score) is:

- Hotazel-Eldoret Alternative 2
- Eldoret-Riries Alternative 1
- Riries-Gamohaan Alternative 2
- Gamohaan-Mothibistad Alternative 2

- Mothibistad-Moffat Alternative 2
- Moffat-Valley Alternative 2
- Valley-Sekgame Alternative 2

Table 15: Comparative assessment of corridor alternatives per section

Environmental Element / Corridor Alternatives	Access	Ease of construction, maintenance	Social	Visual	Heritage	Wetlands, Aquatic	Terrestrial Ecology	Overall sensitivity Score
Hotazel SS to Eldoret SS								
Hotazel-Eldoret Alternative 1	3	1	1	2	1	1	1	**10**
Hotazel-Eldoret Alternative 2	1	3	3	1	1	1	1	**11**
Eldoret SS to Riries SS								
Eldoret-Riries Alternative 1	3	3	3	5	1	1	1	**17**
Eldoret-Riries Alternative 2	5	5	5	1	1	1	3	**21**
Eldoret-Riries Alternative 3	1	1	1	3	1	1	1	**9**
Riries SS to Gamohaan SS								
Riries-Gamohaan Alternative 1	1	1	1	1	1	1	1	**7**
Riries-Gamohaan Alternative 2	3	3	1	3	3	3	3	**19**
Gamohaan SS to Mothibistad SS								
Gamohaan-Mothibistad Alternative 1	1	1	1	1	1	3	1	**9**
Gamohaan-Mothibistad Alternative 2	3	3	3	3	3	1	3	**19**
Mothibistad SS to Moffat SS								
Mothibistad-Moffat Alternative 1	1	1	1	1	1	1	1	**7**
Mothibistad-Moffat Alternative 2	3	1	1	3	1	3	3	**15**
Moffat SS to Valley SS								
Moffat -Valley Alternative 1	1	1	1	1	1	1	1	**7**
Moffat -Valley Alternative 2	3	3	3	3	3	3	3	**21**
Valley SS to Sekgame Switching station								
Valley-Sekgame Alternative 1	3	5	7	3	3	1	3	**25**
Valley-Sekgame Alternative 2	1	3	7	5	1	3	3	**23**
Valley-Sekgame Alternative 3	7	7	3	7	3	1	3	**31**
Valley-Sekgame Alternative 4	5	1	1	1	1	1	1	**11**

The location of the proposed Gamohaan substation and Sekgame switching station study areas was strategically chosen to be in close proximity to the Asbes and Ferrum substations respectively. A larger area of approximately 50 ha (1000m x 500m) was identified within which the proposed substation site could be microsited once the corridor walkdowns has been completed. The proposed study areas for the Gamohaan substation and Sekgame switching station is provided in Table 16 below.

Table 16: Location of proposed Substation & Switching Station study area

Proposed Substation	Corner Coordinates		Footprint
	Longitude	Latitude	
Gamohaan Substation	23°22'50.04"E	27°23'23.09"S	1000 m x 500 m
	23°22'04.10"E	27°23'01.60"S	
	23°21'32.05"E	27°23'05.62"S	
	23°21'36.80"E	27°23'05.49"S	
Sekgame Switching Station	23°03'51. 95"E	27°46'31.57"S	1000 m x 500 m
	23°04'00.60"E	27°46'34.95"S	
	23°04'00.77"E	27°46'31.48"S	
	23°03'51.83"E	27°46'35.10"S	

NOTE: Subsequent to the finalisation of the Final Basic Assessment Report, environmental authorization (EA) (NEAS Ref: DEA/EIA/0000019/2015, DEA Ref: 14/12/16/3/3/1/1409) for Listed Activities associated with the Construction of 132kv Distribution Lines From Ferrum Substation to the Proposed New Sekgame Switching Station as Part of Sekgame Electricity Distribution Infrastructure within Gamagara Municipality in the Northern Cape Province was granted by the Department of Environmental Affairs.

The location of the authorised switching station was reported as 27°46'33.14"S and 23° 3'55.96"E and is shown in Figure 6 which was included in the BAR submitted with the EIA application to the DEA (Refer to Appendix J3).

No further assessment of the Sekgame switching station or position is therefore undertaken in the BAR.

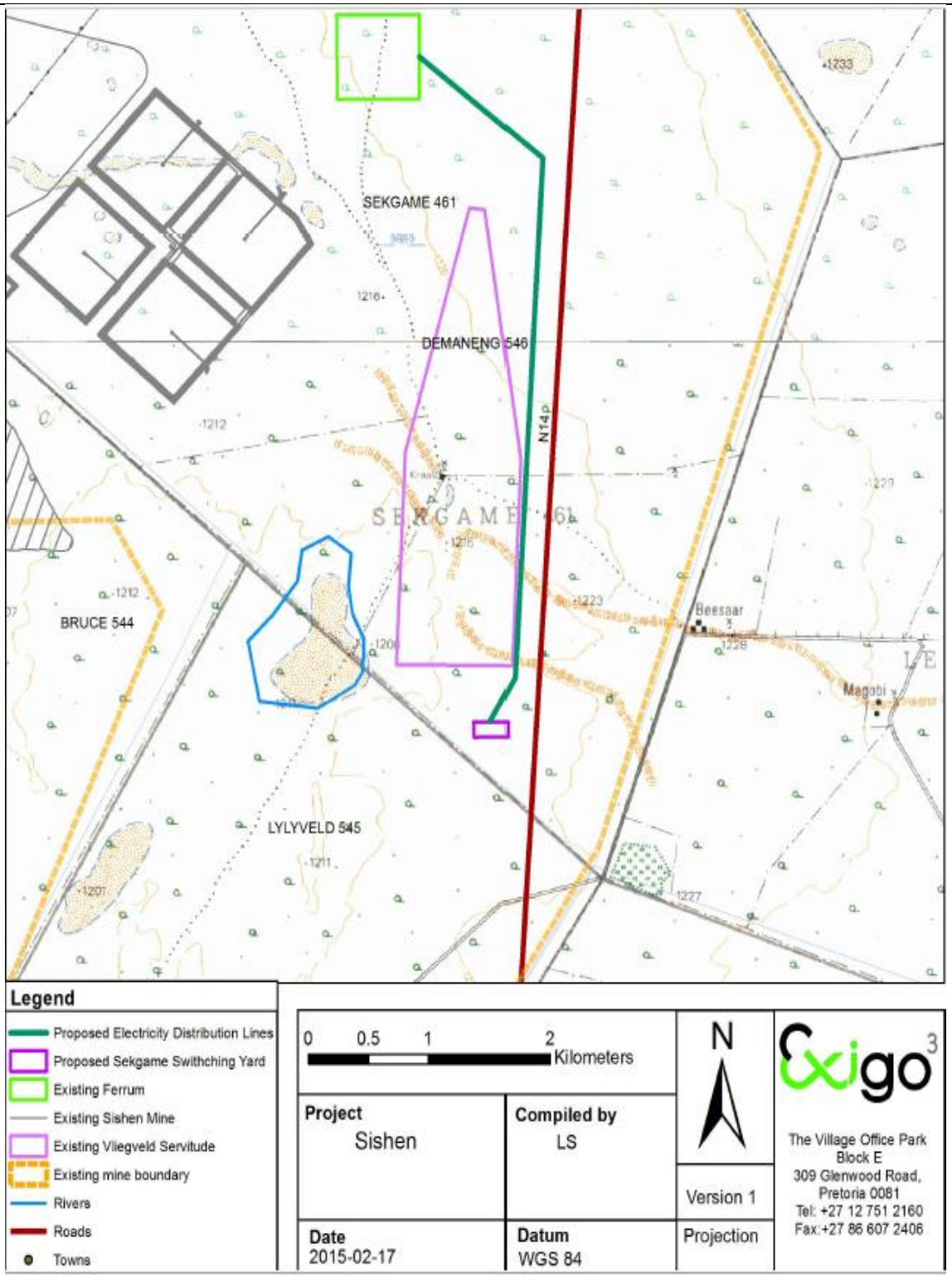

Figure 6: Authorised location of the Sekgame Switching Station south of Ferrum substation

Alternative: Hotazel Substation to Sekgame Switching Station (Preferred)	**Latitude (S):**	**Longitude (E):**
Alternative S1 (preferred): **Hotazel-Eldoret Alternative 1**		
• Starting point of the activity	27°13'10.010"S	23°4'59.220"E
• Middle/Additional point of the activity	27°14'23.368"S	23°0'28.102"E
• End point of the activity	27°20'22.046"S	23°10'52.752"E
Alternative S1 (preferred): **Eldoret-Riries Alternative 3**		
• Starting point of the activity	27°13'10.010"S	23°04'59.220"E
• Middle/Additional point of the activity	27°16'07.710"S	23°04'01.152"E
• End point of the activity	27°20'22.046"S	23°10'52.752"E
Alternative S1 (preferred): **Riries-Gamohaan Alternative 1**		
• Starting point of the activity	27°20'22.046"S	23°10'52.752"E
• Middle/Additional point of the activity	27°21'41.470"S	23°16'15.355"E
• End point of the activity	27°22'55.449"S	23°21'31.984"E
Alternative S1 (preferred): **Gamohaan-Mothibistad Alternative 1**		
• Starting point of the activity	27°22'55.449"S	23°21'31.984"E
• Middle/Additional point of the activity	27°24'38.670"S	23°26'06.720"E
• End point of the activity	27°24'23.815"S	23°28'36.227"E
Alternative S1 (preferred): **Mothibistad-Moffat Alternative 1**		
• Starting point of the activity	27°24'23.815"S	23°28'36.227"E
• Middle/Additional point of the activity	27°28'06.090"S	23°26'56.100"E
• End point of the activity	27°28'18.264"S	23°25'39.734"E
Alternative S1 (preferred): **Moffat-Valley Alternative 1**		
• Starting point of the activity	27°28'18.264"S	23°25'39.734"E
• Middle/Additional point of the activity	27°32'36.080"S	23°28'15.280"E
• End point of the activity	27°38'30.303"S	23°22'15.995"E
Alternative S1 (preferred): **Valley-Sekgame Alternative 4**		
• Starting point of the activity	27°38'30.303"S	23°22'15.995"E
• Middle/Additional point of the activity	27°43'17.738"S	23°13'15.738"E
• End point of the activity	27°46'35.744"S	23°03'55.194"E

Alternative 2		
Alternative: Hotazel Substation to Sekgame Switching Station	**Latitude (S):**	**Longitude (E):**
Alternative S2: **Hotazel-Eldoret Alternative 2**		
• Starting point of the activity	27°12'19.891"S	22°57'30.361"E
• Middle/Additional point of the activity	27°12'10.904"S	23°01'21.745"E
• End point of the activity	27°13'10.010"S	23°04'59.220"E
Alternative S2: **Eldoret-Riries Alternative 1**		
• Starting point of the activity	27°13'10.010"S	23°04'59.220"E
• Middle/Additional point of the activity	27°17'57.228"S	23°06'49.062"E
• End point of the activity	27°20'22.046"S	23°10'52.752"E
Alternative S2: **Riries-Gamohaan Alternative 2**		
• Starting point of the activity	27°20'22.046"S	23°10'52.752"E
• Middle/Additional point of the activity	27°24'35.085"S	23°16'13.985"E
• End point of the activity	27°22'55.449"S	23°21'31.984"E
Alternative S2: **Gamohaan-Mothibistad Alternative 2**		
• Starting point of the activity	27°22'55.449"S	23°21'31.984"E
• Middle/Additional point of the activity	27°25'13.920"S	23°26'06.280"E
• End point of the activity	27°24'23.815"S	23°28'36.227"E
Alternative S2: **Mothibistad-Moffat Alternative 2**		
• Starting point of the activity	27°24'23.815"S	23°28'36.227"E
• Middle/Additional point of the activity	27°26'55.800"S	23°29'42.460"E
• End point of the activity	27°28'18.264"S	23°25'39.734"E
Alternative S2: **Moffat-Valley Corridor Alternative 2**		
• Starting point of the activity	27°28'18.264"S	23°25'39.734"E
• Middle/Additional point of the activity	27°35'40.180"S	23°19'11.970"E
• End point of the activity	27°38'30.303"S	23°22'15.995"E
Alternative S2: **Valley-Sekgame Alternative 2**		
• Starting point of the activity	27°38'30.303"S	23°22’15.995"E
• Middle/Additional point of the activity	27°43'21.170"S	23°11'57.570"E
• End point of the activity	27°46'35.744"S	23°03'55.194"E

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.

The coordinates for each 250 meter interval along the entire length of each of the alternative corridors are included in Appendix J1 of this document.

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.

b) Lay-out alternatives – Corridor Alignment Alternatives

Note: A number of corridor alternatives between each of the substations were determined, based on the outcomes of consultation with Interested and Affected Parties, technical considerations and a preliminary screening of the receiving environment. The approach concerning the corridor alternatives also allowed for the various specialist studies that were carried out to document a site specific account of the receiving environment (relating the various environmental elements) as opposed to providing a generic overview of the large study area.

Furthermore this approach allowed for a better understanding of the receiving environment to be gained and greater flexibility to determine a preferred corridor alignment that is likely to have the least impact on the receiving environment. The alignment of the preferred corridor alternative is therefore an amalgamation of various sections between the substations, based on the sensitivity of the receiving environment and significance of potential impacts.

a) Proposed Gamohaan Substation

The proposed Gamohaan Substation that will cover an area of 1000 m x 500 m. The area earmarked for the proposed Gomohaan Substation is located along and to the south of the R31, approximately 10.5km south-west of Kuruman. The earmarked area is located along a main road and thus with in a service corridor and being seen against the back drop of the mountain when travelling both north- and southbound along the R31 as well as from residences and roads from the nearby Maruping and Mamoratwe communities.

c) Technology alternatives

Alternative 1 – Overhead Power Lines (Preferred)
It is proposed to construct 132kV overhead (above ground) electricity transmission lines (i.e. power lines) along entire length of the corridor, extending from the Hotazel Substation to the Sekgame Switching Station.

Alternative 2 – Underground Cabling
Although the possibility of utilising underground cabling was considered, the underground cabling of high voltage power lines over long distances is not considered a feasible or environmentally practicable alternative for the following reasons:

- Underground cabling will incur significantly higher installation and maintenance costs;
- It is more difficult and takes longer to isolate and repair faults on underground cables;
- There is increased potential for faulting at the transition point from underground cable to overhead power line;
- Underground cables require a larger area to be cleared and disturbed during construction or maintenance and hence have a bigger environmental disturbance footprint; and
- Underground cabling requires the disturbance of a greater area when it comes to agriculture and other compatible land uses as the entire servitude becomes available for use as opposed to just the area around the towers.

Note: A number of factors are taken into consideration when determining whether to opt for underground cabling or overhead power lines. The table below (see Table 17) provides a summary of the key considerations which are taken into account by Eskom when deciding on whether to use overhead power lines or underground cabling.

Table 17: Comparative Analysis of Underground Cabling and Overhead Power Lines

Comparative Analysis		
Aspect	**Underground Cabling**	**Overhead Power Line**
Disturbed Area	A working area of approximately 15m wide is required to allow adequate space for: • Excavating material from the trench (approximately 1 – 2m deep); • Stockpiling of excavated soil; and • Accommodating a service road and movement of vehicles during the Construction Phase.	• The surface area covered by the tower base will require a working area of approximately insert surface area (40mx40m); • An area of 12m^2 will be excavated to place and secure the self-supporting steel structures.
Vegetation Clearing	Vegetation along the entire length of the cable will be removed.	• Vegetation will only be cleared at the specific tower locations, estimated to be placed every 350m in relatively flat areas; and • In areas where the access to the servitude can be easily gained vegetation within the demarcated access tracks will be cleared. Where the power line extends across steep and inaccessible terrain alternative means of constructing access tracks will be used.
Rehabilitation	Active rehabilitation (e.g. management of alien and invasive species) of the disturbed area will be required throughout the Operational Phase.	Owing to the limited disturbance of and vegetation clearing required for placing the towers, the area to be rehabilitated may be reduced.

Technical Implications	• The use of copper and insulation increases the cost associated with underground cabling; • Subject to the site specific soil conditions, the costs associated with the trenching required for placing underground cabling is high; • Cables require additional infrastructure in the form of a "Sealing end substation" that is used as an interface between cable and overhead lines; and • Cables have a longer repair time due to fault finding and trenching to repair the fault.	• Shorter repair time for overhead power lines as opposed to the repair time required for under cables; • No additional infrastructure required; and • Excavations will only be required at the locations of the towers along the route alignment, thereby reducing the costs associated with excavating foundations.	
Soil	Large volumes of spoil will be generated by trenching.	• Excavated topsoil will be used for rehabilitation of the disturbed area; and • Minimal soil is generated by the excavations done for placing the towers.	

Alternative 3

d) Other alternatives (e.g. scheduling, demand, input, scale and design alternatives)

Alternative 1 (preferred alternative)
No alternatives in addition to the site and layout alternatives described in the preceding sections have been identified and considered.
Alternative 2
No alternatives in addition to the site and layout alternatives described in the preceding sections have been identified and considered.
Alternative 3
No alternatives in addition to the site and layout alternatives described in the preceding sections have been identified and considered.

e) No-go alternative

The 'No-Go' alternative refers to not implementing any of the proposed project activities described in this report. The option of not proceeding with the proposed project has been considered as an project alternative. Owing to the nature of and elements that make up the proposed project, it is considered unfeasible to implement any element of the proposed project which do not trigger a listed activity in isolation of the activities that do required Environmental Authorisation. Taking the aforementioned into account implementing the no-go option on most of the project activities that require Environmental Authorisation would result in the implementation of the 'No-Project' option. The advantages and disadvantages of implementing the proposed project are indicated in Table 18.

Table 18: Advantages and disadvantages of the proposed project and 'No-go' alternative

Alternative	Advantages	Disadvantages
Proposed project	• Strengthening Eskom's distribution network within the area; • Provision of a radial feed which will ensure a secure supply of electricity in the event where one of the power lines is out of commission; • Potential employment opportunities may be generated during the Construction Phase; • Contribution to economy of surrounding communities through permanent and temporary employment opportunities; and • Ensuring adequate electricity supply to meet the growing energy demand associated with the planned mining activities in the area as well as planned developments in the local community; and • Electrification of rural communities	• All impacts on the receiving environment that likely to result during the Construction and Operational Phases of the proposed project may transpire; • Temporary increase in nuisance impacts to the receiving communities (such as noise, dust, etc.); and • Loss of alternative land use options along the approved proposed corridor.
'No-go' alternative	• All impacts on the receiving environment that likely to result during the Construction and Operational Phases of the proposed project will not transpire.	• No radial feed and an unsecure electricity supply, in the event where one of the power lines experience a fault; • Increasing electricity demand cannot be met with current network in the area; and • All capital investment made during the Planning Phase will be lost.

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):

Alternative:	**Size of the activity:**
Alternative A1[1] (preferred activity alternative)	m^2
Alternative A2 (if any)	m^2
Alternative A3 (if any)	m^2

or, for linear activities:

Alternative:	**Length of the activity:**
Alternative A1 (preferred activity alternative)	156.51 kilometres
Alternative A2 (if any)	±155 kilometres

[1] "Alternative A.." refer to activity, process, technology or other alternatives.

Alternative A3 (if any)	m

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

Alternative:	**~~Size of the site~~/servitude:**
Alternative A1 (preferred activity alternative)	31 m x 156 510 m = 4 851 810 m^2 = 485.18 ha
Alternative A2 (if any)	31 m 155 000 m = 4 805 000 m^2 = 480.50 ha
Alternative A3 (if any)	m^2

4. SITE ACCESS

a) Hotazel Substation

Does ready access to the site exist?	YES ✓	NO

b) Eldoret Substation (±13 km East of Hotazel)

Does ready access to the site exist?	YES ✓	NO

c) Riries substation (±16.5 km Southeast of Eldoret substation)

Does ready access to the site exist?	YES ✓	NO

d) Gamohaan Substation

Does ready access to the site exist?	YES	NO ✓
If NO, what is the distance over which a new access road will be built	The distance will be determined based on the corridor route approved by the Competent Authority.	

e) Mothibistad substation

Does ready access to the site exist?	YES ✓	NO

f) Moffat substation

Does ready access to the site exist?	YES ✓	NO

g) Valley substation

Does ready access to the site exist?	YES ✓	NO

h) Sekgame Switching station

Does ready access to the site exist?	YES	NO ✓

If NO, what is the distance over which a new access road will be built	The distance will be determined based on the corridor route approved by the Competent Authority.

Describe the type of access road planned:

Access is required during both the construction and operation / maintenance phases of the power line and substations life cycle. Where possible, existing access roads and tracks will be used to gain access to construction sites and the servitude. Access roads will enable the transportation of construction material as well as construction teams to the site and facilitate maintenance activities once the power line has been constructed. Typically for the construction of power lines, access is generally created by repetitive passes of the construction vehicles along the servitude and along the same tracks to create a rough driveable track. The required temporary access routes will not exceed a width of 6 m and does therefore not trigger Listed Activity 22(ii) of Government Notice R.544 (Listing Notice 1).

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.

Note: The exact location and distance of the required access road will be determined based on the corridor route approved by the Competent Authority.

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).

A Locality Map which illustrates the information listed above is included in Appendix A1 of this document.

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 Locality Map which illustrates the information listed above is included in Appendix A1 of this document.

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.

A Sensitivity Map which shows the information listed above is included in Appendix A2 of this document.

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.

Due to the large extent of the proposed development area, photos which are representative of the receiving area as well as the existing substations are included in Appendix B of this report.

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.

Illustrations of typical distribution tower structures are included in Appendix C of this Final Basic Assessment Report.

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	NO ✓	Please explain
Existing land use is largely agricultural, residential, however a servitude of 31m will be negotiated with landowners and rezoned to the appropriate zoning.			
2. Will the activity be in line with the following?			
(a) Provincial Spatial Development Framework (PSDF)	YES ✓	NO	Please explain
Portions of the proposed development of these power lines is located within the proposed Industrial Development Zone (IDZ) demarcated in the Provincial SDF surrounding the areas between Hotazel and Kuruman. The project is in line with the PSDF to improve access to reliable, sustainable and affordable energy services with the objective to realise sustainable economic growth and development.			
(b) Urban edge / Edge of Built environment for the area	YES ✓	NO ✓	Please explain
The proposed development is situated within the Provincial IDZ surrounding the areas between Hotazel and Kuruman. The following substations and associated power lines fall outside the urban edge: • Hotazel • Eldoret • Riries • Gamohaan • Valley and • Proposed Sekgame Switching Station. The following substations and associated power lines fall within the urban edge: • Moffat Substation falls within the Kuruman Urban Edge; and • Mothibistad Substation may fall within or just outside the Urban Edge of Mothibistad town.			

(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	NO ✓	Please explain
The proposed development of these power lines is located within the proposed Industrial Development Zone demarcated in the Municipal SDF surrounding the areas between Hotazel and Kuruman. The project is in line with the objective of establishing sustainable settlements by improvement of a small town's structure and functioning (e.g. investment in market support, provision of water and electricity, development of housing and new industrial areas) (Northern Cape PSDF: Policy & Strategy Report, 2012). The proposed development will not compromise the integrity of the existing approved and credible municipal IDP and SDF, but will also facilitate the regulating and strengthening of the current unstable network. Furthermore the proposed project will also ensure that electricity is available for the planned mining operations in the development area.			
(d) Approved Structure Plan of the Municipality	YES ✓	NO	Please explain
The project is also located within the Municipal SDF and is in line with the 3-Year Capital Investment Programme for infrastructure related projects, i.e. electricity, roads, water and sanitation.			
(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?)	YES	NO ✓	Please explain
Because there is no exiting Environmental Management Framework, there is no certainty that the project would compromise the integrity of the existing environmental management priorities for the area at this stage.			
(f) Any other Plans (e.g. Guide Plan)	YES	NO ✓	Please explain
No other plans were considered.			
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)?	YES ✓	NO	Please explain
The project falls within IDP and SDF 5 year plan. It is anticipated that construction is proposed within the next 2 – 5 year window.			

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.)	YES ✓	NO	Please explain
This project is a national priority. The electricity needs to be optimally distributed and transmitted from generation plants in order to meet the electricity demand and to reduce the loss of electricity in the system. The proposed development will also facilitate the regulating and strengthening of the current unstable network. Furthermore the proposed project will also ensure that electricity is available for the planned mining operations in the development area.			
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 I.)	YES ✓	NO	Please explain
The power lines do not need any municipal services other than access roads to substations and tower positions for maintenance of the power line; and the site is easily accessible via existing roads. The Proponent will be responsible for the design and construction of required access roads. The Municipality was approached during the Public Participation Process with regards to whether there is adequate capacity, but no response has been received to date.			
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 I.)	YES ✓	NO	Please explain
This project is an infrastructure upgrade project for Eskom and is in line with the 3-Year Capital Investment Programme for infrastructure related projects, i.e. electricity, roads, water and sanitation.			
7. Is this project part of a national programme to address an issue of national concern or importance?	YES ✓	NO	Please explain
This project is a national priority. The proposed development will facilitate the regulating and strengthening of the current unstable network. Furthermore the proposed project will also ensure that electricity is available for the planned mining operations in the development area. Electricity shortage and growing demand for electricity is a national concern and priority.			
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 ✓	NO	Please explain
The locations of the power lines are suitable in regards to the existing substations. Sections of lines will be within the existing corridor. Footprints will be kept to a minimum. At this stage, no relocations are required.			

9. Is the development the best practicable environmental option for this land/site?	YES ✓	NO	Please explain
The location of the power lines has taken many factors into account, and the most preferred location alternative has been recommended.			
10. Will the benefits of the proposed land use/development outweigh the negative impacts of it?	YES ✓	NO	Please explain
The power line is required for the distribution of electricity from the Hotazel and Kuruman area to the Kathu area. This in turn will serve to strengthen the supply of electricity in the area. The proposed project will also ensure that electricity is available for the planned mining operations in the development area. For this reason and the economic benefits with this project it can be said that the positive impacts will outweigh the negative impacts.			
11. Will the proposed land use/development set a precedent for similar activities in the area (local municipality)?	YES	NO ✓	Please explain
The proposed project has been already planned for and previously implemented in other areas.			
12. Will any person's rights be negatively affected by the proposed activity/ies?	YES	NO ✓	Please explain
The aim of the Public Participation Process is to identify key issues of concern to the public, addressing public perceptions, the provision of local expertise and knowledge, and the identification of possible alternatives/options to address any issues of concern.			
13. Will the proposed activity/ies compromise the "urban edge" as defined by the local municipality?	YES	NO ✓	Please explain
Most of the substations have an already existing footprint which may be slightly expanded on the sides, but will not affect the urban edge of their surrounding areas.			
14. Will the proposed activity/ies contribute to any of the 17 Strategic Integrated Projects (SIPS)?	YES	NO ✓	Please explain
The proposed project activities will not contribute to the SIPs.			
15. What will the benefits be to society in general and to the local communities?			Please explain
The construction of the 132 kV power lines will have the following benefits locally and nationally: • The electricity can be distributed to local and national sub-stations for electricity supply; • Job creation and opportunities; and • Economic benefits to the local communities and industries.			

16. Any other need and desirability considerations related to the proposed activity?	Please explain

The following project motivations are relevant:

- The demand for electricity locally and nationally in South Africa to maintain current development growth rate;
- The proposed project will facilitate the strengthening Eskom's distribution network within the area;
- The proposed project will also result in the construction of a radial feed which will ensure a secure supply in the event where one of the power lines experiences a fault; and
- In addition to strengthening the national grid, the proposed project will also assist with ensuring adequate electricity supply to meet the growing energy demand associated with the planned mining activities in the area as well as planned developments in the local community.

17. How does the project fit into the National Development Plan for 2030?	Please explain

The project will contribute to the Economic Infrastructure Objective that "the proportion of people with access to the electricity grid should rise to at least 90 percent by 2030, with non-grid options available for the rest. It also forms part of stepping up investments in energy-efficiency.

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

All information that is provided in this report has been structured to provide the Competent Authority with a holistic view of the impacts that may transpire throughout the project lifecycle in relation to the project activities. Consequently this will allow the Competent Authority to make an informed decision concerning granting Environmental Authorisation for the proposed project. Furthermore a comprehensive Public Participation Process was carried out allowing Interested and Affected Parties adequate and appropriate opportunity to raise their comments concerning the proposed project.

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

All impacts that are likely to result from the implementation of the project activities on the social and natural environment have been taken into account. A comprehensive Public Participation Process was carried out allowing Interested and Affected Parties adequate and appropriate opportunity to raise their comments concerning the proposed project. The principals outlined in Section 2 of NEMA pertain specifically to the promotion of development in South Africa for the interest of the people in a sustainable manner. The principals outlined in Section 2 of NEMA have been outlined in the proposed project, as follows:

- The primary objective of the project is to contribute to the provision of stable electricity supply to the Hotazel, Kuruman and Kathu areas of the Northern Cape Province. The provision of a stable electricity supply with spare capacity will encourage future development in the area and will potentially improve the economic situation through job creation.
- The social, economic and environmental impacts have been identified and rated by the EAP with the assistance of numerous specialists.
- The environmental impact of power lines is well understood and the tower structures selected for this development have been chosen to reduce visual impacts, impacts on cultivated land and impact on avifauna.
- A heritage survey, surface water and wetlands assessment as well as an ecological and avifauna studies were also undertaken as part of the basic assessment process and recommendations have been made by all the specialists for inclusion in the EMPr.
- Eight alternative corridors were identified and assessed as part of the Basic Assessment and a single preferred corridor was found to be more environmentally suitable than the others based on the conclusions of the specialists' studies and ranking the significance of each aspect identified by the relevant specialist.
- The Environmental Basic Assessment was advertised and members of the public were given the opportunity to register as I&AP as described in Section C: Public Participation.
- Most of the negative impacts associated with the project will occur during the construction phase. Where negative impacts are unavoidable they will be mitigated according to stipulations in the EMPr. Those impacts that can be addressed during the design phase have been identified and the mitigations recommended will form part of the design. The impacts of the proposed power line on and sensitive areas will be reduced by on site placement of towers to avoid placing them in sensitive areas. Bird diversion designs will be implemented on towers and on the conductor to prevent/reduce bird electrocutions and bird strikes.
- Recommendations and mitigations presented in the EMPr will reduce the disturbance to ecosystems and the loss of biodiversity. Where negative impacts are unavoidable, strict management and rehabilitation is recommended to minimise the potential negative impacts. The use of potentially polluting substances will be managed according to requirements in the EMPr. The EMPr will hold the developer responsible for any unnecessary negative impacts of the development on the environment.
- The EMPr will include a rehabilitation plan and the cost to of rehabilitation required due to pollution or unnecessary environment degradation resulting from the activity will be the responsibility of the developer.

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
Acts				
1.	The Constitution of the Republic of South Africa (Act 106 of 1998)	Section 24 of the Constitution of the Republic of South Africa provides for a comprehensive environmental right.	The Judiciary	1996
2.	National Environmental Management Act 107 of 1998 (NEMA) and subsequent amendments to the Act.	The NEMA (as amended) is regarded as South Africa's environmental framework legislation which provides for environmental management.	• National Department of Environmental Affairs and Tourism; or • Provincial Department responsible for environmental affairs.	1998
3.	NEMA Environmental Impact Assessment (EIA) Regulations 2010 (published in Government Notice No. R.543)	The Basic Assessment Process for the proposed project was carried out in accordance with the Regulations 21 - 23 of the NEMA EIA Regulations 2010.	• National Department of Environmental Affairs and Tourism; or • Provincial Department responsible for environmental affairs.	2010
4.	NEMA Listing Notice 1: List of activities and Competent Authorities identified in terms of Sections 24(2) and 24D (published in Government Notice No. R.544)	The proposed project activities trigger activities which are listed in Listing Notice 1. Environmental Authorisation is therefore required before these activities may be implemented.	• National Department of Environmental Affairs and Tourism; or • Provincial Department responsible for environmental affairs.	2010
5.	NEMA Amendments to the EIA Regulations Listing Notice 1 of 2010 (published in Government Notice No. R.922)	All amendments that have been made to the NEMA Listing Notice 1 was taken into account in determining which listed activities are triggered by the proposed project activities.	• National Department of Environmental Affairs and Tourism; or • Provincial Department responsible for environmental affairs.	2013

Title of legislation, policy or guideline		Applicability to the project	Administering authority	Date
6.	NEMA Listing Notice 3: List of activities and Competent Authorities identified in terms of Sections 24(2) and 24D (published in Government Notice No. R.546)	The proposed project activities trigger activities which are listed in Listing Notice 1. Taking the aforementioned into account Environmental Authorisation (EA) is therefore required before these activities may be implemented.	• National Department of Environmental Affairs and Tourism; or • Provincial Department responsible for environmental affairs.	2010
7.	National Water Act 36 of 1998 (NWA)	At certain points along the proposed corridor, the power line (e.g. pylons) structure may be placed within the extent of a watercourse. Placing the pylons within the extent of a watercourse is will trigger Section 21(c) and (i) of the NWA. All Water Uses which are listed in Section 21 of the NWA may not proceed without a Water Use License granted by the Department of Water and Sanitation.	Department of Water and Sanitation	1998
8.	National Forest Act 84 of 1998 (NFA)	From the Terrestrial Ecology Study, there are some protected trees in the study area which need to conform to the NFA.	Department of Agriculture, Forestry and Fisheries	1998

Title of legislation, policy or guideline		Applicability to the project	Administering authority	Date
9.	National Environmental Management Waste Act 59 of 2008 (as amended) (NEMWA)	All requirements / provision concerning waste producing activities and the handling of waste, as provided in the NEMWA and the regulations thereunder must be conformed to.	• National Department of Environmental Affairs and Tourism; for all matters relating to hazardous waste; or • Provincial Department responsible for environmental affairs for all matters relating to general waste.	2008
10.	NEMWA National Norms and Standards for the Remediation of Contaminated Land and Soil Quality (Government Notice No. 331, 2 May 2014).	It is believed that the corridor section between the Valley and Sekgame Substations extends across areas that were previously mined for asbestos and derelict asbestos mines. Owing to the hazardous nature of asbestos, the remediation of any asbestos contaminated areas must be done in accordance with the NEMWA National Norms and Standards for the Remediation of Contaminated Land and Soil Quality (Government Notice No. 331, 2 May 2014).	• National Department of Environmental Affairs and Tourism; for all matters relating to hazardous waste; or • Provincial Department responsible for environmental affairs for all matters relating to general waste.	2014

Title of legislation, policy or guideline		Applicability to the project	Administering authority	Date
11.	National Environmental Management: Biodiversity Act 10 of 2004	The National Environmental Management: Biodiversity Act 10 of 2004 is aimed at providing for the management and conservation of South Africa's biodiversity within the framework of the NEMA. All reasonable measures will be taken to ensure the conservation of the biodiversity within the approved corridor alternative.	National and Provincial Department of Environmental Affairs	2004
12.	National Heritage Resources Act 25 of 1999	The findings of the Heritage Impact Study indicated that the Rir-Gamo Alternative 2 (*section between the Riries and Gamohaan Substations*) extends across a site that is considered to be of heritage and archaeological value. As such the provisions in the NHRA relating to the protection and management of heritage resources applies to the proposed project.	The South African Heritage Resources Agency	1999
13.	National Veld and Forest Fires Act 101 of 1998	The National Veld and Forest Fires Act 101 of 1998 provides for a variety of institutions, methods and practices for achieving the purpose. All methods and mitigation measures aimed at preventing or controlling veldfires must be aligned with the veldfire prevention provisions provided in the National Veld and Forest Fires Act 101 of 1998.	Department of Agriculture, Forestry and Fisheries	1998

Title of legislation, policy or guideline		Applicability to the project	Administering authority	Date
14.	Electricity Regulations Act 4 of 2006	The primary objectives of the implementation of the proposed project includes the following: • Improve the reliability of the network and create capacity for new customers in the greater Kuruman area; • Facilitate the regulating and strengthening of the current unstable network; and • Ensure that electricity is available for the planned mining operations in the development area. The primary objectives of the proposed project are aligned with the objectives of the Electricity Regulations Act 4 of 2006, in particular with reference to Section 2(a) of the act which reads "*achieve the efficient, effective, sustainable and orderly development and operation of electricity supply infrastructure in South Africa*".	National Energy Regulator	2006

Title of legislation, policy or guideline		Applicability to the project	Administering authority	Date
15.	National Energy Act 34 of 2008	The primary objectives of the implementation of the proposed project includes the following: • Improve the reliability of the network and create capacity for new customers in the greater Kuruman area; • Facilitate the regulating and strengthening of the current unstable network; and • Ensure that electricity is available for the planned mining operations in the development area. The primary objectives of the proposed project are aligned with the objectives of the National Energy Act 34 of 2008, in particular with reference to the following objectives of the Act: • Section 2(a): ensure uninterrupted supply of energy to the Republic; and • Section 2(c): facilitate effective management of energy demand and its conservation;	South African National Energy Development Institute.	2008
16.	Promotion of Access to Information Act 2 of 2000 (PAIA)	As per the NEMA EIA Regulations as well as the principles / objectives of the PAIA, the Basic Assessment Report as well as all supporting documentation (e.g. specialist studies) will be made available to the public.	National Department of Environmental Affairs	2000

Title of legislation, policy or guideline		Applicability to the project	Administering authority	Date
17.	Northern Cape Nature Conservation Act 9 of 2009	A number of mammal species recorded during the field work carried out for the Terrestrial Ecology Study are listed as either protected or specially protected under the Northern Cape Conservation Act 9 of 2009.	Provincial Department responsible for environmental affairs.	2009
18.	Occupational Health and Safety Act 85 of 1993	The Occupational Health and Safety (OHS) Act 85 of 1993 is primarily intended to provide for the health and safety of persons at work and for the health and safety of persons in connection with the activities of persons at work. All work that is carried out for the implementation of the project activities as well as during each phase of the project lifecycle should be carried out in accordance with the provisions of the OHS Act.	• National Department of Labour; or • Provincial Department of Labour.	1993
19.	Occupational Health and Safety Act 85 of 1993 Asbestos Regulations, 2001	It is believed that the corridor section between the Valley and Sekgame Substations extends across areas that were previously mined for asbestos and derelict asbestos mines. Accordingly the OHS Act Asbestos Regulations 2001 must be conformed with for any activity that may potentially expose any person to asbestos dust.	• National Department of Labour; or • Provincial Department of Labour.	2001
20.	Ga-Segonyana Local Municipality Integrated Development Plan	The Integrated Development Plan is intended to be the principal strategic planning instrument which guides planning and development, and informs budgeting and management decisions in the local authority over a five-year period.	Ga-Segonyana Local Municipality	2013/2014 Financial Year

Title of legislation, policy or guideline		Applicability to the project	Administering authority	Date
	Guidelines			
21.	Integrated Environmental Management Guideline Series (Guideline 5) Companion to the EIA Regulations 2010 published in Government Notice 805 (10 October 2012)	The aim of the guideline is to provide a detailed considerations of the practical implementation of the NEMA EIA Regulations 2010. The guideline also provides guidance and clarity on the EA Process to be followed and interpretation of the listed activities. The guideline was used as a reference document to the applicability of the NEMA EIA Regulations 2010 on the proposed project.	• National Department of Environmental Affairs and Tourism; or • Provincial Department responsible for environmental affairs.	2012
22.	Integrated Environmental Management Guideline Series (Guideline 7) Public Participation in the EIA Process published in Government Notice 805 (10 October 2012)	The guideline is intended to provide information on the benefits of public participation, the minimum legal requirements for the Public Participation Process (PPP), the steps of the PPP, guidelines for planning a PPP and a description of the roles and responsibilities of the various role-players. The guideline was referred to, to facilitate an adequate understanding of the execution of the PPP.	• National Department of Environmental Affairs and Tourism; or • Provincial Department responsible for environmental affairs.	2012
23.	Guide Asbestos Regulations 2001	The Guide to the Asbestos Regulation 2001 was referred to, to gain an understanding of the application of the Asbestos Regulations relating to the control and prevention of exposure to asbestos.	Department of Labour	2001

Title of legislation, policy or guideline		Applicability to the project	Administering authority	Date
24.	Criteria for determining Alternatives in Environmental Impact Assessment, Integrated Environmental Management, Information Series 11, Department of Environmental Affairs and Tourism	The guideline was referred to, to ensure that all key criteria for determining project alternatives have been taken into account in the BA Process for the proposed project.	• National Department of Environmental Affairs and Tourism; or • Provincial Department responsible for environmental affairs.	2004
25.	Environmental Management Plans, Integrated Environmental Management, Information Series 12, Department of Environmental Affairs and Tourism	The guideline aims to provide a generic introductory information source on the purpose, objectives and content of Environmental Management Plans.	• National Department of Environmental Affairs and Tourism; or • Provincial Department responsible for environmental affairs.	2004
	Municipal By-Laws			
26.	Applicable by-laws of the Ga-Segonyana Local Municipality. At the time of preparing this report no municipal by-laws were available. However in the event where any municipal by-laws are promulgated subsequent to the submission of this report, these must be adhered to throughout the Construction and Operational Phases of the proposed project.	A by-law is considered as piece of legislation that is specific to the municipal area of jurisdiction. By-laws are intended to regulate the affairs and the services it provides within the municipal boundaries. A by-law is passed by the Council of a municipality.	Ga-Segonyana Local Municipality	N/A

12. WASTE, EFFLUENT, EMISSION AND NOISE MANAGEMENT

a) Solid waste management

Will the activity produce solid construction waste during the construction/initiation phase?	YES	
If YES, what estimated quantity will be produced per month?	364.24 m³	
The estimated volume of solid waste that will be generated during the Construction Phase will be provided in the final Basic Assessment Report.		

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

Waste generated during the construction phase will be collected in designated areas, in facilities designed to safely store the waste. Waste separation for reuse and recycling will take place. Once sufficient volumes of waste have been collected, or once a month, whichever occurs first, the waste will be transported to the nearest suitably licensed/acceptable solid waste disposal facility waste facility. Receipts / waybills will be obtained from the facility for record purposes.

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

A registered general landfill site.

Will the activity produce solid waste during its operational phase?	YES	NO ✓
If YES, what estimated quantity will be produced per month?	0 m³	

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

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

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

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.

Can any part of the solid waste be classified as hazardous in terms of the NEM:WA?	YES	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?	YES	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?	YES	NO ✓
If YES, what estimated quantity will be produced per month?		0 m^3
Will the activity produce any effluent that will be treated and/or disposed of on site?	YES	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?	YES	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:

Not applicable to the proposed project.

c) Emissions into the atmosphere

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

The release of gaseous pollutants (e.g. sulphur dioxide) from vehicle exhausts and construction equipment are anticipated during the Construction Phase. All bare surfaces, especially during vegetation and site clearing will be prone to dust generation.

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 ✓

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

Describe the noise in terms of type and level:

During the Construction Phase the most significant sources of noise will include the movement of construction vehicles as well as the operation of equipment. The aforementioned sources of noise will result in increased noise levels and alter the ambient noise levels. All local municipal by-laws regulating the permissible noise levels within particular areas and certain hours of the day will be adhered to. All noise generated throughout the project lifecycle of the proposed project will conform to the provisions concerning the control of noise as well as the national standards included in the National Environmental Management Air Quality Act (39 of 2004).

13. WATER USE

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

	The activity will not use water.

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:	0 litres
Does the activity require a water use authorisation (general authorisation or water use license) from the Department of Water Affairs?	YES ✓

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

Note: The proposed corridor routes crosses a number of watercourses thereby triggering Section 21(c) and (i) of the National Water Act 36 of 1998. All Water Uses that are listed in Section 21 of the NWA may not proceed without a Water Use License. Accordingly a Water Use License Application Process will be carried out, as these Water Uses may not proceed without a Water Use License. The Water Use License Application however constitutes a separate process from the Basic Assessment Process.

14. ENERGY EFFICIENCY

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

Eskom Distribution encompass the substations and feeder lines that take power from the high voltage transmission grid and progressively steps down the voltage, to a lower voltage level, thus delivering electric energy from the high voltage transmission grid to consumers. Along the way, some of the energy supplied is lost due to the resistance of the wires and equipment that the electricity passes through. Most of this energy is converted to heat. Most of the equipment will be newly installed for the proposed project which will assist the substations to run efficiently and decreasing possible energy losses.

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

Not applicable to the proposed project.

SECTION B: SITE/AREA/PROPERTY DESCRIPTION

Important notes:

1. 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): [ ]

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

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

YES	NO
✓	

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.

Property description/physical address:

Province	Northern Cape	
District Municipality	John Taolo Gaetsewe District Municipality	
Local Municipality	• Ga-Segonyana Local Municipality • Joe Morolong Local Municipality • Gamagara Local Municipality	
Ward Number(s)	• Ga-Segonyana Local Municipality – Wards 3, 5, 9, 10 and Ward 12 • Joe Morolong Local Municipality – Ward 2 • Gamagara Local Municipality – Ward 5	
Farm name and number	Refer to Appendix J of this report.	
Portion number	Refer to Appendix J of this report.	
SG Code	Refer to Appendix J of this report.	

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.

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

- Agricultural
- Rural
- Residential
- Industrial
- Open space

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.

Is a change of land-use or a consent use application required?	YES ✓	NO

1. GRADIENT OF THE SITE

Indicate the general gradient of the site.

Alternative S1:

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

Alternative S2 (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

Alternative S3 (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

2. LOCATION IN LANDSCAPE

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

2.1 Ridgeline		2.4 Closed valley		2.7 Undulating plain / low hills	
2.2 Plateau		2.5 Open valley		2.8 Dune	
2.3 Side slope of hill/mountain		2.6 Plain	✓	2.9 Seafront	
2.10 At sea					

3. GROUNDWATER, SOIL AND GEOLOGICAL STABILITY OF THE SITE

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

	Alternative S1:		**Alternative S2 (if any):**		**Alternative S3 (if any):**	
Shallow water table (less than 1.5m deep)	YES	NO ✓	YES	NO ✓	YES	NO
Dolomite, sinkhole or doline areas	YES	NO ✓	YES	NO ✓	YES	NO
Seasonally wet soils (often close to water bodies)	YES ✓	NO	YES ✓	NO	YES	NO
Unstable rocky slopes or steep slopes with loose soil	YES	NO ✓	YES	NO ✓	YES	NO
Dispersive soils (soils that dissolve in water)	YES	NO ✓	YES	NO ✓	YES	NO
Soils with high clay content (clay fraction more than 40%)	YES ✓	NO	YES ✓	NO	YES	NO
Any other unstable soil or geological feature	YES	NO ✓	YES	NO ✓	YES	NO

An area sensitive to erosion	YES ✓	NO	YES ✓	NO	YES	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.

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

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

As part of the surface water study two aquatic sites were chosen to represent the aquatic ecological integrity of the Kuruman River, which was the only watercourse with permanent water and therefore able to support an aquatic species community. The river is fed from an underground spring that formed the basis of the town's establishment. The associated watercourse runs in a northerly direction through the town. Urban development has meant that limited riparian zones occur within these upper areas, making for a defined channel. Where riparian zones remain open, exotic vegetation encroachment and invasion is prominent, which degrades the overall present ecological state of the system. The system is largely representative of a channelled wetland system, but enough aquatic habitat existed to allow for analysis of the watercourse. The Moffat-Valley wetland is a poorly-developed valley-bottom wetland that is utilised for grazing of livestock.

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✓	Dam or reservoir	Polo fields
Low density residential✓	Hospital/medical centre✓	Filling station [H]
Medium density residential✓	School✓	Landfill or waste treatment site
High density residential	Tertiary education facility	Plantation
Informal residential[A]✓	Church	Agriculture✓
Retail commercial & warehousing✓	Old age home	River, stream or wetland✓
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]✓	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✓
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? Specify and explain:

The servitude for the power lines may cross the railway line near the Hotazel area.

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:

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:

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

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

Key findings and observations that were made during the field work carried out during March 2015 included:

- Identifying two (2) cemeteries;
- Identifying nine (9) historic farmsteads;
- Two (2) historic asbestos mines were identified; and
- Identifying a sacred / religious site, a Provincial Monument and a memorial site.

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:

Please refer to Table 12: Details of identified heritage sites.

Will any building or structure older than 60 years be affected in any way?	YES ✓	NO
Is it necessary to apply for a permit in terms of the National Heritage Resources Act, 1999 (Act 25 of 1999)?	YES	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:

Ga-Segonyana Local Municipality: A total of 19 940 persons are employed, 10 154 are unemployed, and 3 895 are classified discouraged work-seekers.
Joe Morolong Local Municipality: A total of 7828 persons are employed, 4912 are unemployed, and 6200 are classified discouraged work-seekers.
Gamagara Local Municipality: A total of 16058 persons are employed, 3453 are unemployed, and 873 are classified discouraged work-seekers.

Economic profile of local municipality:

Ga-Segonyana Local Municipality: Ga-Segonyana Municipality is a former cross-boundary municipality with areas in the Northern Cape and North West. The municipal jurisdiction consists of 33 residential areas within a radius of approximately 80 km in and around Kuruman, and has approximately 75 000 residents. The municipality's economy is mainly based on the surrounding mining and agricultural activities.
Joe Morolong Local Municipality: The Joe Morolong Local Municipality was established in 2000 and serves 15 wards, most of which are rural. Although unemployment is high, the municipality has great potential for developers, especially those interested in ecotourism and conservation.
Gamagara Local Municipality: Gamagara Local Municipality comprises an area of 2 619 square kilometers, and is located in the north-eastern sector of the Northern Cape on the N14 between Upington and Vryburg. It is approximately 200km north-east of Upington and 280km north-west of Kimberley.
The municipal area of Gamagara consists of five towns: Kathu, Shesheng, Dibeng, Dingleton, and Olifantshoek, a large farming area and a considerable mining area. Kathu is the largest town within the municipality and is also the administrative center of the Gamagara Local Municipality. Olifantshoek is the second largest town and is located near the Gamagara River to the north-west of Kathu. Dingleton is the smallest of the five towns and is located in the centre of the mining activities directly south of Kathu. The single largest factor that has guided the development of the Gamagara area is the iron ore mine at Sishen. Not only does the mine provide jobs to thousands of people, but it was also the reason for the establishment of the town of Kathu.

Level of education:

Ga-Segonyana Local Municipality: According to Census 2011, Ga-Segonyana Municipality has a total population of 93 651 of which 87,0% are black African, 7,6% are coloured, 4,6% are white, and 0,4% are Indian/Asian. Other groups make up 0,4% of the population.
Of those aged 20 years and older, 4,9% completed primary school, 34,3% completed secondary school, 23,7% completed Grade 12, 10,0% have some form of higher education and only 9,7 %

have no schooling.

Joe Morolong Local Municipality: According to the 2011 Census, Joe Morolong Local Municipality has a total population of 89 530 people. The majority of the population in the municipality are black African (96,4%), 2,0% are coloured, with the other population groups making up the remaining 1,6%.

Of those aged 20 years and older, 5,2% have completed primary school, 27,8% have some secondary education, 13,4% have completed matric and 4,1% have some form of higher education. Of the mentioned age group, 22,9% have no form of schooling.

Gamagara Local Municipality: There are 89,5% of the people who attended primary school, with a further 24,9% attaining matric and only 3,6% with higher education.

b) Socio-economic value of the activity

What is the expected capital value of the activity on completion?	R 718,441,568.00	
What is the expected yearly income that will be generated by or as a result of the activity?	R Not available	
Will the activity contribute to service infrastructure?	YES ✓	NO
Is the activity a public amenity?	YES	NO ✓
How many new employment opportunities will be created in the development and construction phase of the activity/ies?	Not known at this stage	
What is the expected value of the employment opportunities during the development and construction phase?	R Not known at this stage	
What percentage of this will accrue to previously disadvantaged individuals?	% Not known at this stage	
How many permanent new employment opportunities will be created during the operational phase of the activity?	Not known at this stage	
What is the expected current value of the employment opportunities during the first 10 years?	R Not known at this stage	
What percentage of this will accrue to previously disadvantaged individuals?	% Not known at this stage	

Note: The Socio-Economic Value of the proposed project is currently being determined and can only be provided in the Final Basic Assessment Report.

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)	The majority of the study area comprises natural, relatively undisturbed vegetation that provides habitat for a rich a potentially rich assemblage of fauna and flora.

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 practises, presence of quarries, grazing, harvesting regimes etc).
Natural	90%	The study area is located in the savanna biome and comprises elements of five vegetation types, as delineated by Mucina & Rutherford (2006); namely Kuruman Thornveld, Kuruman Mountain Bushveld and Kathu Bushveld. The majority of the study area comprises natural, relatively undisturbed vegetation that provides habitat for a rich a potentially rich assemblage of fauna and flora. A prominent feature in the region is the Kuruman Mountain chain, which runs on a north-west to south-east axis through the study area. Refer to Appendix D1.
Near Natural (includes areas with low to moderate level of alien invasive plants)	5%	Several listed alien invasive plants were recorded during the field survey. Although scattered alien plants were occasionally noted in natural, undisturbed areas, most were recorded in close proximity to habitation or at sites of noticeable anthropogenic disturbance.
Degraded (includes areas heavily invaded by alien plants)	0%	
Transformed (includes cultivation, dams, urban, plantation, roads, etc)	5%	About 5 % of the Natural Habitat has been disturbed by the towns, and various other residential settlements as well as the occasional mines.

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 unchanneled wetlands, flats, seeps pans, and artificial wetlands)			Estuary		Coastline	
	Endangered							
	Vulnerable							
	Least Threatened ✓	YES ✓	NO	UNSURE	YES	NO ✓	YES	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)

Please refer to Section 1 (Description of the environment) of this report.

SECTION C: PUBLIC PARTICIPATION

1. ADVERTISEMENT AND NOTICE

Publication name	Kathu Gazette	
Date published	Friday, 18 April 2015	
Site notice position	**Latitude**	**Longitude**
	The coordinates are included in Appendix E1-Site Notice of this report.	
Date placed	October/November 2014 and Updated (with DEA Ref No.) February 2015.	

Include proof of the placement of the relevant advertisements and notices 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.

- The English Background Information Document (BID) was translated into Afrikaans and Summarized into Setswana;
- Consultation Meetings with Tribal Authorities – included an interpreter;
- Documents for public review and comment were made available in hard copy at public places and also made available electronically on Zitholele's website;
- BA process notices at public places (October 2014 & February 2015);
- BID distributed (February 2015: by e-mail, by hand, public places, at meetings and Zitholele's website)
- Updated BID distributed (May 2015: by e-mail, by hand, at meetings and Zitholele's website);
- First site notice erected October 2014 (without DEA reference number);
- Second site notice erected in February 2015 (inclusive of DEA reference number); and
- Although the Regulated timeframe for I&APs to register on a project as an I&AP is 30 calendar days, Zitholele has extended the registration period up to the date of the availability of the DBAR. Although the comment period for the DBAR is 30-calender days as per the Regulations, registrations and comments will be accepted up to FBAR submission to the DEA.

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 or e-mail address)
Please refer to Appendix E2 of this document.		

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 (Zitholele's transmittal slips); and/or
- any other proof as agreed upon by the competent authority.

3. ISSUES RAISED BY INTERESTED AND AFFECTED PARTIES

Summary of main issues raised by I&APs	Summary of response from EAP
Concerns raised regarding relocation Community members enquired that should they be relocated, will they received compensation	It was determined that relocation is not associated with this project as it follows an existing servitude. The identification of the route alternatives also considered the presence of communities and households strongly and was avoided as far as possible.
Project time frames, i.e. start of construction phase	It is envisaged that construction will commence late next year (2016) or perhaps towards the earlier half of 2017.
Proposed Corridor Alternatives 1 and 3 will have detrimental effect on the small holdings – economically unviable	During the consultation process the EAP has been made aware of the space constraints along this section of the Corridor Alternatives. The space constraints and possible negative economic impact have been considered during the assessment process and confirmed that these Corridor Alternatives are not unfeasible.
Advantages of proposed project in terms of job opportunities	Job creation and opportunities are not part of the BA Scope of Work. Eskom goes out on open tender to employ suitable contractors to carry out the construction. The project will be advertised on the Eskom website (www.eskom.co.za) and contractors are invited to tender. The awarded contractor is required to employ local unskilled labourers for non-specialized work.
Provision of electricity to communities close to substations	The purpose of this project is to upgrade the existing power lines and improve the substations for a better and stronger electricity supply. Electricity will not be able to be drawn directly from the 132kV power line.
Compensation for servitudes traversing tribal land	This is a negotiation process between Eskom and the registered landowners. It is believed that Eskom will, at risk, undertake the landowners' negotiations and compensation process before the DEA issue an authorisation. There will be compensation where the power line traverses property and the payment will be a once off amount.
Will there be any power cuts during the construction phase.	The current planning is that the 132kV line be constructed alongside the existing 66kV line, and once the 132kV line is completed and switched on, only then will the 66kV line be decommissioned. Therefore no power cuts are expected.

4. COMMENTS AND RESPONSE REPORT

The practitioner must record all comments received from I&APs and respond to each comment before the Final 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.

5. AUTHORITY PARTICIPATION

Authorities and organs of state identified as key stakeholders:

Authority/Organ of State	Contact person (Title, Name and Surname)	Tel No	Fax No	e-mail	Postal address
Department of Water & Sanitation (Northern Cape	Ms Mpumi Mogongwa	053 836 7606	086 650 9646	lefleurd@dwa.gov.za	Department of Water and Sanitation Private Bag X6101 Kimberly 8300
Department of Mineral Resources	Mrs Raisibe Sekepane	053 830 1719	053 832 8593	raisibe.sekepane@dmr.,gov.za	Department of Mineral Resources Private Bag X 6093 KIMBERLEY 8300
Department of Agriculture, Forestry and Fisheries (NSA Regulations)	Ms Jacoline Mans	054 338 5909	-	jacolinema@daff.gov.za	Department of Agriculture, Forestry & Fisheries P O Box 2782 Upington 8800
Department of Agriculture, Forestry and Fisheries (Agriculture)	Ms Mashudu Constance Marubini	012 319 7619	-	mashuduma@daff.gov.za	Department of Agriculture, Forestry & Fisheries Private Bag X120 Pretoria 0001
John Taolo Gaetsewe District Municipality	Mrs Molemoeng Bokgwathile	053 712 1001	086 504 9651	Jtg053@gmail.com	John Taolo Gaetswe District Municipality P.O. Box 1480 Kuruman 8460
Ga-Segonyana Local Municipality	Mr Edward Gaeatlhose Mtefang	053 712 9300	053 712 3581	mtefang@ga-segonyana.gov.za	Ga-Segonyana Local Municipality Private Bag X1522 Kuruman 8460
Joe Morolong Local Municipality	Mr Tshepo Bloom	053 773 9338	053 773 9350	bloomt@joemorolong.gov.za	Joe Morolong Local Municipality Private Bag X117 Mothibistad 8474
Tsantsabane Local Municipality	Mr Heinrich Mathobela	053 313 7300	053 313 1602	mm@tsantsabane.gov.za	Tsantsabane Local Municipality Private Bag X3005 Postmasburg 8420
Gamagara Local Municipality	Mr Clement Itumeleng	053 723 6000	053 723 2021	clementi@gamagara.co.za	Gamagara Local Muncipality P O Box 1001 Kathu 8446
Department of Public Works, Roads and Transport	Mr Kholekile Nogwili	053 839 2109	053 839 2290	tmbetha@mcpg.gov.za	Department of Public Works, Roads and Transport P O Box 3132 Kimberly 8300
Department of Environment & Nature Conservation	Mr BD Fisher	053 807 7303	086 555 0804	twessels@ncpg.gov.za	Department of Environment & Nature Conservation Private Bag X6102 Kimberly 8300

Authority/Organ of State	Contact person (Title, Name and Surname)	Tel No	Fax No	e-mail	Postal address
Department of Agriculture, Land Reform and Rural Development Northern Cape	Mr Olebogeng Gaobonegwe	053 830 4056		omgaobonegwe@rurlaldevelopment.gov.za	Department of Agriculture, Land Reform and Rural Development (Northern Cape) Private Bag X5007 Kimberly 8301
Department of Land Claims Commission	Ms Ruwayda Baulackey	053 807 5700		ruwayda.baulackey@drdlr.gov.za	Land Claims Commission Chief Land Claims Commissioner P O Box 2458 Kimberley 8300
Civil Aviation Authority	Ms Liezel Stroh	011 545 1232	011 545 1451	strohl@caa.co.za	Civial Avaiation Authority Private Bag X73 Halfway House 1685
South African National Roads Agency	Ms Victoria Bota	012 844 8000 / 012 426 6200	012 844 8200 / 012 348 1512	botav@nra.co.za/oliverj@nra.co.za	South African National Roads Agency PO Box 415 Pretoria 0001
South African Heritage Resource Agency	Ms Loudine Philips	051 4010 4750	086 401 0431	mbatha.npz@sacr.fs.gov.za	Free Sate Provincial Heritage Resources Authority (FSHRA) Private Bag X20606 Bloemfontein 9300
The list of Organs of State (Distribution List) has been included as Appendix E4					

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.

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.

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.

Impact Assessment Methodology

The impacts will be ranked according to the methodology described below. Where possible, mitigation measures will be provided to manage impacts. In order to ensure uniformity, a standard impact assessment methodology will be utilised so that a wide range of impacts can be compared with each other. The impact assessment methodology makes provision for the assessment of impacts against the following criteria, as discussed below.

a) Nature of the impact

Each impact should be described in terms of the features and qualities of the impact. A detailed description of the impact will allow for contextualisation of the assessment.

b) Extent of the impact

Extent intends to assess the footprint of the impact. The larger the footprint, the higher the impact rating will be. The table below provides the descriptors and criteria for assessment.

Table 19: Criteria for the assessment of the extent of the impact.

Extent Descriptor	Definition	Rating
Site	Impact footprint remains within the boundary of the site.	1
Local	Impact footprint extends beyond the boundary of the site to the adjacent surrounding areas.	2
Regional	Impact footprint includes the greater surrounds and may include an entire municipal or provincial jurisdiction.	3
National	The scale of the impact is applicable to the Republic of South Africa.	4
Global	The impact has global implications	5

c) Duration of the impact

The duration of the impact is the period of time that the impact will manifest on the receiving environment. Importantly, the concept of reversibility is reflected in the duration rating. The longer the impact endures, the less likely it is to be reversible. See Table 20 for the criteria for rating duration of impacts.

Table 20: Criteria for the rating of the duration of an impact.

Duration Descriptor	Definition	Rating
Construction / Decommissioning phase only	The impact endures for only as long as the construction or the decommissioning period of the project activity. This implies that the impact is fully reversible.	1
Short term	The impact continues to manifest for a period of between 3 and 5 years beyond construction or decommissioning. The impact is still reversible.	2
Medium term	The impact continues between 6 and 15 years beyond the construction or decommissioning phase. The impact is still reversible with relevant and applicable mitigation and management actions.	3
Long term	The impact continues for a period in excess of 15 years beyond construction or decommissioning. The impact is only reversible with considerable effort in implementation of rigorous mitigation actions.	4
Permanent	The impact will continue indefinitely and is not reversible.	5

d) Potential intensity of the impact

The concept of the potential intensity of an impact is the acknowledgement at the outset of the project of the potential significance of the impact on the receiving environment. For example, SO2 emissions have the potential to result in significant adverse human health effects, and this potential intensity must be accommodated within the significance rating. The importance of the potential intensity must be emphasised within the rating methodology to indicate that, for an adverse impact to human health, even a limited extent and duration will still yield a significant impact.

Within potential intensity, the concept of irreplaceable loss is taken into account. Irreplaceable loss may relate to losses of entire faunal or floral species at an extent greater than regional, or the permanent loss of significant environmental resources. Potential intensity provides a measure for comparing significance across different specialist assessments. This is possible by aligning specialist ratings with the potential intensity rating provided here. This allows for better integration of specialist studies into the environmental impact assessment. See Table 21 and Table 22 below.

Table 21: Criteria for impact rating of potential intensity of a negative impact.

Potential Intensity Descriptor	Definition of negative impact	Rating
High	Significant impact to human health linked to mortality/loss of a species/endemic habitat.	16
Moderate-High	Significant impact to faunal or floral populations/loss of livelihoods/individual economic loss.	8
Moderate	Reduction in environmental quality/loss of habitat/loss of heritage/loss of welfare amenity	4
Moderate-Low	Nuisance impact	2
Low	Negative change with no associated consequences.	1

Table 22: Criteria for the impact rating of potential intensity of a positive impact.

Potential Intensity Descriptor	Definition of positive impact	Rating
Moderate-High	Net improvement in human welfare	8
Moderate	Improved environmental quality/improved individual livelihoods.	4
Moderate-Low	Economic development	2
Low	Positive change with no other consequences.	1

It must be noted that there is no HIGH rating for positive impacts under potential intensity, as it must

be understood that no positive spinoff of an activity can possibly raise a similar significance rating to a negative impact that affects human health or causes the irreplaceable loss of a species.

e) Likelihood of the impact

This is the likelihood of the impact potential intensity manifesting. This is not the likelihood of the activity occurring. If an impact is unlikely to manifest then the likelihood rating will reduce the overall significance. Table 23 provides the rating methodology for likelihood.

The rating for likelihood is provided in fractions in order to provide an indication of percentage probability, although it is noted that mathematical connotation cannot be implied to numbers utilised for ratings.

Table 23: Criteria for the rating of the likelihood of the impact occurring

Likelihood Descriptor	Definition	Rating
Improbable	The possibility of the impact occurring is negligible and only under exceptional circumstances.	0.1
Unlikely	The possibility of the impact occurring is low with a less than 10% chance of occurring. The impact has not occurred before.	0.2
Probable	The impact has a 10% to 40% chance of occurring. Only likely to happen once in every 3 years or more.	0.5
Highly Probable	It is most likely that the impact will occur and there is a 41% to 75% chance of occurrence.	0.75
Definite	More than a 75% chance of occurrence. The impact will occur regularly.	1

f) Cumulative Impacts

Cumulative impact are reflected in the in the potential intensity of the rating system. In order to assess any impact on the environment, cumulative impacts must be considered in order to determine an accurate significance. Impacts cannot be assessed in isolation. An integrated approach requires that cumulative impacts be included in the assessment of individual impacts.

The nature of the impact should be described in such a way as to detail the potential cumulative impact of the activity.

g) Significance Assessment

The significance assessment assigns numbers to rate impacts in order to provide a more quantitative description of impacts for purposes of decision making. Significance is an expression of the risk of damage to the environment, should the proposed activity be authorised.

To allow for impacts to be described in a quantitative manner in addition to the qualitative description given above, a rating scale of between 1 and 5 was used for each of the assessment criteria. Thus the total value of the impact is described as the function of significance, which takes cognisance of extent, duration, potential intensity and likelihood.

Impact Significance = (extent + duration + potential intensity) x likelihood

Table 24 provides the resulting significance rating of the impact as defined by the equation as above.

Table 24: Significance rating formulas.

Score	Rating	Implications for Decision-making
< 3	Low	Project can be authorised with low risk of environmental degradation
3 - 9	Moderate	Project can be authorised but with conditions and routine inspections. Mitigation measures must be implemented.
10 - 20	High	Project can be authorised but with strict conditions and high levels of compliance and enforcement. Monitoring and mitigation are essential.
21 - 26	Fatally Flawed	Project cannot be authorised

h) Notation of Impacts

In order to make the report easier to read the following notation format is used to highlight the various components of the assessment:

- Extent- in *italics*
- Duration – in <u>underline</u>
- Potential intensity – IN CAPITALS
- Likelihood - in **bold**

Please note that the impact rating system may change slightly to accommodate ease of use. However, the basic principle of the rating system will remain the same.

1. PRE-CONSTRUCTION PHASE

PLANNING AND DESIGN / PRE-CONSTRUCTION PHASE
The activities that are carried out during the Pre-Construction Phase including the Basic Assessment Process, Specialist Studies and Technical Considerations did not culminate in any impacts on the receiving environment.

2. CONSTRUCTION PHASE

CONSTRUCTION PHASE			
Activity	**Impact summary**	**Significance**	**Proposed mitigation**
Hotazel Substation to Eldoret Substation Alternative 2			
a) Environmental Aspect (Project Activity): Construction activities associated with the assembly of transmission towers between the existing Hotazel and Eldoret Substations. **b)** Environmental Attribute: Presence of heritage sites along the alignment of the corridor alternative. **c)** Nature of Impact: The nature of the activities to be carried out during construction of the transmission towers including clearing of vegetation within the working area and excavations may damage underlying or concealed heritage resources.	***Direct impacts:*** Damage or destruction of heritage resources.	**Low**	• Alter the power line alignment to allow for a 20 meter buffer around heritage sites. Adjust the development layout and demarcate site with at least a 20-meter buffer. A 100 meter buffer should be applied in the case of memorial sites. No construction activities will be permitted within the buffer area. • The relocation of any graves must be preceded by conducting the required process stipulated in Section 34 of the National Heritage Resources Act, accordingly obtaining authorisation from the South African Heritage Resources Agency.
	Indirect impacts: None	**Low**	
	Cumulative impacts: None	**Low**	
a) Environmental Aspect (Project Activity): Construction activities associated with the assembly of transmission towers between the existing Hotazel and Eldoret Substations. **b)** Environmental Attribute: The construction of the transmission towers as well as stringing the conductors between towers will result in a change in the change in the existing character and quality of the landscape. A large portion of the alignment of the corridor (Alternative 2) between the Hotazel Substation and Eldoret Substation lies adjacent to the existing service corridors.	***Direct impacts:*** Adverse impact on visual receptors and visual resources.	**Moderate**	• The extent of areas of disturbance must be confined to the smallest possible area during the construction phase. • Retain as much as possible of the existing vegetation along the substation footprint as possible. • Dust suppression techniques should be implemented at all times. • Rehabilitate / restore exposed areas as soon as possible after construction activities are complete. • Only indigenous vegetation should be used for rehabilitation / landscaping
	Indirect impacts: Change in atmosphere, landscape character and sense of place.	**Moderate**	
	Cumulative impacts: The presence of the 132kV substation will continue to exert a 'nuisance' to the existing visual environment. Decommissioning activities would result in a moderate significance for the visual impact on the existing and cumulative conditions.	**Moderate**	

CONSTRUCTION PHASE			
Activity	**Impact summary**	**Significance**	**Proposed mitigation**
Consequently and in relation to the alignment of Hotazel Substation to Eldoret Substation Alternative 1, the alignment of the second corridor alternative extends across a shorter distance of "virgin" land and has no residential unit incidence. **c)** Nature of Impact: Construction of the proposed power line will result in a change in the composition of available views due to changes to the landscape.			purposes. • Security lighting should only be used where absolutely necessary and carefully directed. • The negative impact of night lighting, glare and spotlight effects, can be mitigated using the following methods: • Install light fixtures that provide precisely directed illumination to reduce light "spillage" beyond the immediate surrounds of the project. • Avoid using bright, white colour lights where possible. Preferably use lights emitting a yellow light which travels less that white coloured lights. • Avoid high pole top security lighting where possible.
a) Environmental Aspect (Project Activity): Construction activities associated with the assembly of transmission towers between the existing Hotazel and Eldoret Substations. **b)** Environmental Attribute: To gain access along the power line routes and to facilitate construction, vegetation will need to be cleared. During the operational phase vegetation under the constructed power line will also need to be maintained to provide access for vehicles for maintenance activities. **c)** Nature of Impact: Vegetation clearing will result in habitat disturbance and fragmentation. In natural, undisturbed areas	***Direct impacts:*** Loss of vegetation, habitat fragmentation and disturbance. ***Indirect impacts:*** Reduction in local species diversity. ***Cumulative impacts:*** Reduction in local species diversity.	**Moderate** **Moderate** **Moderate**	• Vegetation clearing should be restricted to the proposed power line corridors and substation sites only, with no unnecessary clearing permitted outside of these areas. • Where proposed power line corridors lie adjacent to existing linear infrastructure (e.g. power lines and roads) these new corridors should be as closely aligned to the existing corridors. • The width of the power line corridors where vegetation is actively maintained during the operational phase must be kept to an absolute minimum that permits safe operation of the power line. • Wherever possible, the proposed power line corridors should positioned to avoid the clearing of plant species of

CONSTRUCTION PHASE			
Activity	**Impact summary**	**Significance**	**Proposed mitigation**
the resulting habitat disturbance and fragmentation will be an ecological impact of concern. Plant species of conservation importance, such as *Acacia erioloba*, *Boscia albitrunca* and *Acacia haematoxylon* that occur within the proposed power line footprints may need to be cleared during the Construction Phase. Conversely in areas already disturbed by anthropogenic activities, such as around towns / settlements and immediately adjacent to major roads or existing power line servitudes, the resulting habitat disturbance and fragmentation will not be ecological impact of major concern. It must be noted that the corridor route proposed between the Hotazel Substation to Eldoret Substation Alternative 2 is more closely aligned to the transformed Hotazel area, consequently limiting additional habitat fragmentation to the south of the town.			conservation importance, most notably large *Acacia erioloba* trees. • If clearing of plant species of conservation importance is unavoidable, a removal permit from the relevant authority must be obtained.
a) Environmental Aspect (Project Activity): Construction activities associated with the assembly of transmission towers between the existing Hotazel and Eldoret Substations. **b)** Environmental Attribute: Savannah areas in South Africa provide habitat for a rich assemblage of fauna. In natural areas fauna species can be killed or injured during the construction and operational phases of development projects. **c)** Nature of Impact: Common causes of death	***Direct impacts:*** Killing or injuring of fauna within development footprint. ***Indirect impacts: -*** ***Cumulative impacts: -***	**Moderate**	• An Environmental Control Officer or trained individual should be available during the construction phase to manage any wildlife-human interactions. • A low speed limit should be enforced on site to reduce wildlife-collisions. • Employees and contractors should be made aware of the presence of, and rules regarding fauna and the prohibition of hunting through suitable induction training. • No clearing of large Social Weaver nests

CONSTRUCTION PHASE			
Activity	**Impact summary**	**Significance**	**Proposed mitigation**
and injury include: • Electrocution and collision of birds on power lines. The electrocution and collision of raptors and large Bustards and Cranes on power lines as being a major form of direct persecution of birds in the Northern Cape. Smaller capacity power lines (11kV to 132 kV) are particularly lethal for raptor electrocutions. Direct death/injury during vegetation clearing and earth works - particularly reptiles and nesting birds; • Vehicle–wildlife collisions – reptiles and highly mobile mammals crossing roads are susceptible to fast moving vehicles; and • Hunting and snaring by construction workers.			should be permitted. • Power lines should be designed to be 'raptor friendly'. Devices/designs that could be considered include staggered insulators, raptor-protectors and/or perch deterrents. The Endangered Wildlife Trust's Birds of Prey Programme should be consulted in this regard.
a) Environmental Aspect (Project Activity): Construction activities associated with the assembly of transmission towers between the existing Hotazel and Eldoret Substations. **b)** Environmental Attribute: The corridor alignment proposed between the Hotazel Substation to Eldoret Substation Alternative 2, crosses three non-perennial watercourses. **c)** Nature of Impact: Destruction of aquatic habitat to accommodate towers and overhead power lines.	***Direct impacts:*** Destruction of aquatic habitat to accommodate towers and overhead power lines. ***Indirect impacts:*** Reduction in aquatic biodiversity ***Cumulative impacts: -***	**Moderate**	• Aquatic and wetland features within the survey area can be completely avoided if tower footprints, cable spanning, and footprints of the substations are carefully planned. Service roads and other construction supporting services can also utilise existing roadways, bridges and access points without the need to establish impacting servitudes through wetlands and watercourses. • Careful planning so that all infrastructure footprints avoid surface water habitat units within the survey area will negate this impact; • If this is found to be unavoidable, then the

CONSTRUCTION PHASE			
Activity	**Impact summary**	**Significance**	**Proposed mitigation**
			size of the impacting footprint must be reduced as far as possible, indiscriminate habitat destruction must be avoided, use of existing roads and access points must be used as far as possible; and • Correct site reinstatement and vegetation rehabilitation must be implemented within impacted areas following completion of the construction phase.
a) Environmental Aspect (Project Activity): Construction activities associated with the assembly of transmission towers between the existing Hotazel and Eldoret Substations. **b)** Environmental Attribute: The corridor alignment proposed between the Hotazel Substation to Eldoret Substation Alternative 2, crosses three non-perennial watercourses. The exact positioning of the towers can only be made subsequent to a decision being taken by the Competent Authority to grant the authorisation in respect of a particular power line corridor. **c)** Nature of Impact: Impacts on riparian vegetation leading to decrease in runoff filtration.	***Direct impacts:*** Impacts on riparian vegetation leading to decrease in runoff filtration. ***Indirect impacts:*** Impact on local biodiversity due to riparian vegetation loss. ***Cumulative impacts: -***	**Moderate**	• Indiscriminate destruction of riparian habitat should be avoided.
a) Environmental Aspect (Project Activity): Construction activities associated with the assembly of transmission towers between the existing Hotazel and Eldoret Substations. **b)** Environmental Attribute: The corridor alignment proposed between the Hotazel	***Direct impacts:*** Increased rate of erosion and entry of sediment into the general aquatic ecosystem. ***Indirect impacts:*** Erosion of stockpiled topsoil and disturbance of soils due to vegetation stripping leading to erosion and	**Moderate**	• Erosion must be strictly controlled through the utilization of silt traps, silt fencing, Gabions within areas of steeper topography and in close proximity to wetlands and/or watercourses; and • Topsoil stockpiles should be protected

CONSTRUCTION PHASE			
Activity	**Impact summary**	**Significance**	**Proposed mitigation**
Substation to Eldoret Substation Alternative 2, crosses three non-perennial watercourses. **c)** Nature of Impact: Soil stripping, soil compaction and vegetation removal will increase rates of erosion and entry of sediment into the general aquatic ecosystem. Furthermore erosion of stockpiled topsoil and disturbance of soils due to vegetation stripping leading to erosion and habitat inundation.	habitat inundation. ***Cumulative impacts: -***		from erosion through the utilization of silt traps, silt fencing, gabions, etc.
Eldoret Substation to Riries Substation Alternative 2			
a) Environmental Aspect (Project Activity): Construction activities associated with the assembly of transmission towers between the existing Eldoret and Riries Substations. **b)** Environmental Attribute: Presence of heritage sites along the alignment of the corridor alternative. **c)** Nature of Impact: The nature of the activities to be carried out during construction of the transmission towers including clearing of vegetation within the working area and excavations may damage underlying or concealed heritage resources.	***Direct impacts:*** Damage or destruction of concealed heritage resources. ***Indirect impacts:*** - ***Cumulative impacts:*** -	**Low**	• If any graves, artefacts or heritage site is discovered on the site during construction, all work will cease in the area affected and the Contractor will immediately inform the ECO and provincial heritage resource agency. • Should any heritage resources be exposed during excavation or be found on site, a registered heritage specialist must be called to site for inspection. • Under no circumstances may any heritage material be destroyed or removed from site. • In the event where any remains is found on site that is potentially human remains, the South African Police Service should also be contacted.
a) Environmental Aspect (Project Activity): Construction activities associated with the	***Direct impacts:*** Adverse impact on visual receptors and visual resources.	**Moderate**	• The extent of areas of disturbance must be confined to the smallest possible area

CONSTRUCTION PHASE			
Activity	**Impact summary**	**Significance**	**Proposed mitigation**
assembly of transmission towers between the existing Eldoret and Riries Substations. **b)** Environmental Attribute: The construction of the transmission towers as well as stringing the conductors between towers will result in a change in the existing character and quality of the landscape. The corridor alignment for Alternative 2 runs for its entire length along an existing power line. One residential unit is located approximately 370 meters from the edge of the corridor. **c)** Nature of Impact: Construction of the proposed power line will result in a change in the composition of available views due to changes to the landscape.	***Indirect impacts:*** Change in atmosphere, landscape character and sense of place.	**Moderate**	during the construction phase. • Retain as much as possible of the existing vegetation along the substation footprint as possible. • Dust suppression techniques should be implemented at all times. • Rehabilitate / restore exposed areas as soon as possible after construction activities are complete. • Only indigenous vegetation should be used for rehabilitation / landscaping purposes. • Security lighting should only be used where absolutely necessary and carefully directed. • The negative impact of night lighting, glare and spotlight effects, can be mitigated using the following methods: • Install light fixtures that provide precisely directed illumination to reduce light "spillage" beyond the immediate surrounds of the project. • Avoid using bright, white colour lights where possible. Preferably use lights emitting a yellow light which travels less that white coloured lights. • Light public movement areas (pathways and roads) with low level 'bollard' type lights and avoid post top lighting. Avoid high pole top security lighting where possible.
	Cumulative impacts: The presence of the 132kV substation will continue to exert a 'nuisance' to the existing visual environment. Decommissioning activities would result in a moderate significance for the visual impact on the existing and cumulative conditions.	**High**	
a) Environmental Aspect (Project Activity):	***Direct impacts:*** Loss of vegetation within	**High**	• Vegetation clearing should be restricted to

CONSTRUCTION PHASE			
Activity	**Impact summary**	**Significance**	**Proposed mitigation**
Construction activities associated with the assembly of transmission towers between the existing Eldoret and Riries Substations. **b)** Environmental Attribute: To gain access along the power line routes and to facilitate construction, vegetation will need to be cleared. During the operational phase vegetation under the constructed power line will also need to be maintained to provide access for vehicles for maintenance activities. **c)** Nature of Impact: Vegetation clearing will result in habitat disturbance and fragmentation. In natural, undisturbed areas the resulting habitat disturbance and fragmentation will be an ecological impact of concern. Plant species of conservation importance, such as *Acacia erioloba*, Boscia albitrunca and Acacia haematoxylon that occur within the proposed power line footprints may need to be cleared during the Construction Phase. Conversely in areas already disturbed by anthropogenic activities, such as around towns / settlements and immediately adjacent to major roads or existing power line servitudes, the resulting habitat disturbance and fragmentation will not be ecological impact of major concern. The corridor route proposed between the Eldoret Substation and Riries Substation Alternative 2 passes through relatively undisturbed habitat.	construction footprint.		the proposed power line corridors and substation sites only, with no unnecessary clearing permitted outside of these areas. • Where proposed power line corridors lie adjacent to existing linear infrastructure (e.g. power lines and roads) these new corridors should be as closely aligned to the existing corridors. • The width of the power line corridors where vegetation is actively maintained during the operational phase must be kept to an absolute minimum that permits safe operation of the power line. • Wherever possible, the proposed power line corridors should positioned to avoid the clearing of plant species of conservation importance, most notably large *Acacia erioloba* trees. • If clearing of plant species of conservation importance is unavoidable, a removal permit from the relevant authority must be obtained.
	Indirect impacts: Vegetation clearing can facilitate / contribute to conditions conducive to erosion.	**Moderate**	
	Cumulative impacts: Reduction in local species diversity.	**Moderate**	

CONSTRUCTION PHASE			
Activity	**Impact summary**	**Significance**	**Proposed mitigation**
a) Environmental Aspect (Project Activity): Construction activities associated with the assembly of transmission towers between the existing Eldoret and Riries Substations. **b)** Environmental Attribute: Savannah areas in South Africa provide habitat for a rich assemblage of fauna. In natural areas fauna species can be killed or injured during the construction and operational phases of development projects. **c)** Nature of Impact: Common causes of death and injury include: • Electrocution and collision of birds on power lines. The electrocution and collision of raptors and large Bustards and Cranes on power lines as being a major form of direct persecution of birds in the Northern Cape. Smaller capacity power lines (11kV to 132 kV) are particularly lethal for raptor electrocutions. Direct death/injury during vegetation clearing and earth works - particularly reptiles and nesting birds; • Vehicle–wildlife collisions – reptiles and highly mobile mammals crossing roads are susceptible to fast moving vehicles; and • Hunting and snaring by construction workers.	***Direct impacts:*** Killing or injuring of fauna within development footprint. ***Indirect impacts: -*** ***Cumulative impacts: -***	**Moderate**	• An Environmental Control Officer or trained individual should be available during the construction phase to manage any wildlife-human interactions. • A low speed limit should be enforced on site to reduce wildlife-collisions. • Employees and contractors should be made aware of the presence of, and rules regarding fauna and the prohibition of hunting through suitable induction training. • No clearing of large Social Weaver nests should be permitted. • Power lines should be designed to be 'raptor friendly'. Devices/designs that could be considered include staggered insulators, raptor-protectors and/or perch deterrents. The Endangered Wildlife Trust's Birds of Prey Programme should be consulted in this regard.
a) Environmental Aspect (Project Activity): Construction activities associated with the	***Direct impacts:*** Destruction of aquatic habitat to accommodate towers and overhead power lines.	**Moderate**	• Aquatic and wetland features within the survey area can be completely avoided if

CONSTRUCTION PHASE			
Activity	**Impact summary**	**Significance**	**Proposed mitigation**
assembly of transmission towers between the existing Hotazel and Eldoret Substations. **b)** Environmental Attribute: The corridor alignment proposed between the Eldoret and Riries Substations Alternative 2, crosses a number of non-perennial watercourses. **c)** Nature of Impact: Destruction of aquatic habitat to accommodate towers and overhead power lines.	***Indirect impacts: -***	**Moderate**	tower footprints, cable spanning, and footprints of the substations are carefully planned. Service roads and other construction supporting services can also utilise existing roadways, bridges and access points without the need to establish impacting servitudes through wetlands and watercourses. • Careful planning so that all infrastructure footprints avoid surface water habitat units within the survey area will negate this impact; • If this is found to be unavoidable, then the size of the impacting footprint must be reduced as far as possible, indiscriminate habitat destruction must be avoided, use of existing roads and access points must be used as far as possible; and • Correct site reinstatement and vegetation rehabilitation must be implemented within impacted areas following completion of the construction phase.
	Cumulative impacts: -		
a) Environmental Aspect (Project Activity): Construction activities associated with the assembly of transmission towers between the existing Hotazel and Eldoret Substations. **b)** Environmental Attribute: The corridor alignment proposed between the Eldoret Substation and Riries Substation Alternative 2, crosses a number of non-perennial watercourses. The exact positioning of the towers can only be made subsequent to a decision being taken by the Competent	***Direct impacts:*** Impacts on riparian vegetation leading to decrease in runoff filtration.	**Moderate**	• Indiscriminate destruction of riparian habitat should be avoided.
	Indirect impacts: Impact on local biodiversity due to riparian vegetation loss.	**Moderate**	
	Cumulative impacts: -	-	

CONSTRUCTION PHASE			
Activity	**Impact summary**	**Significance**	**Proposed mitigation**
Authority to grant the authorisation in respect of a particular power line corridor. **c)** Nature of Impact: Impacts on riparian vegetation leading to decrease in runoff filtration.			
a) Environmental Aspect (Project Activity): Construction activities associated with the assembly of transmission towers between the existing Eldoret and Riries Substations. **b)** Environmental Attribute: The corridor alignment proposed between the Eldoret and Riries Substations Alternative 2, crosses a number of non-perennial watercourses. **c)** Nature of Impact: Soil stripping, soil compaction and vegetation removal will increase rates of erosion and entry of sediment into the general aquatic ecosystem. Furthermore erosion of stockpiled topsoil and disturbance of soils due to vegetation stripping leading to erosion and habitat inundation.	***Direct impacts:*** Increased rate of erosion and entry of sediment into the general aquatic ecosystem.	**Moderate**	• Erosion must be strictly controlled through the utilization of silt traps, silt fencing, Gabions within areas of steeper topography and in close proximity to wetlands and/or watercourses; and • Topsoil stockpiles should be protected from erosion through the utilization of silt traps, silt fencing, gabions, etc.
	Indirect impacts: Erosion of stockpiled topsoil and disturbance of soils due to vegetation stripping leading to erosion and habitat inundation.	**Moderate**	
	Cumulative impacts: -		
Riries Substation to Gamohaan Substation Alternative 1			
a) Environmental Aspect (Project Activity): Construction activities associated with the assembly of transmission towers between the existing Riries and Gamohaan Substations. **b)** Environmental Attribute: Presence of	***Direct impacts:*** Damage or destruction of heritage resources.	**Moderate**	• Alter the power line alignment to allow for a 20 meter buffer around heritage sites. Adjust the development layout and demarcate site with at least a 20-meter buffer. A 100 meter buffer should be applied in the case of memorial sites. No construction activities will be permitted
	Indirect impacts: -		
	Cumulative impacts: -		

CONSTRUCTION PHASE			
Activity	**Impact summary**	**Significance**	**Proposed mitigation**
heritage sites along the alignment of the corridor alternative. **c)** Nature of Impact: The nature of the activities to be carried out during construction of the transmission towers including clearing of vegetation within the working area and excavations may damage underlying or concealed heritage resources.			within the buffer area. • The relocation of any graves must be preceded by conducting the required process stipulated in Section 34 of the National Heritage Resources Act, accordingly obtaining authorisation from the South African Heritage Resources Agency.
a) Environmental Aspect (Project Activity): Construction activities associated with the assembly of transmission towers between the existing Riries and Gamohaan Substations. **b)** Environmental Attribute: The construction of the transmission towers as well as stringing the conductors between towers will result in a change in the change in the existing character and quality of the landscape. A large portion of the route of the corridor (Alternative 1) between the Riries and Gamohaan Substations follows the alignment of road R31 and passes on the opposite side of the road along the Maheana community. **c)** Nature of Impact: Construction of the proposed power line will result in a change in the composition of available views due to changes to the landscape.	***Direct impacts:*** The power line will constitute a visual obstruction / impact in addition to the existing road.	**Moderate**	• The extent of areas of disturbance must be confined to the smallest possible area during the construction phase. • Retain as much as possible of the existing vegetation along the substation footprint as possible. • Dust suppression techniques should be implemented at all times. • Rehabilitate / restore exposed areas as soon as possible after construction activities are complete. • Only indigenous vegetation should be used for rehabilitation / landscaping purposes. • Security lighting should only be used where absolutely necessary and carefully directed. • The negative impact of night lighting, glare and spotlight effects, can be mitigated using the following methods: • Install light fixtures that provide precisely directed illumination to reduce light "spillage" beyond the immediate surrounds of the project.
	Indirect impacts: -		
	Cumulative impacts: The addition of the power line along the existing road will contribute to existing visual impact on the surrounding landscape.	**Moderate**	

CONSTRUCTION PHASE			
Activity	**Impact summary**	**Significance**	**Proposed mitigation**
			• Avoid using bright, white colour lights where possible. Preferably use lights emitting a yellow light which travels less that white coloured lights. • Light public movement areas (pathways and roads) with low level 'bollard' type lights and avoid post top lighting. • Avoid high pole top security lighting where possible.
a) Environmental Aspect (Project Activity): Construction activities associated with the assembly of transmission towers between the existing Riries and Gamohaan Substations. **b)** Environmental Attribute: To gain access along the power line routes and to facilitate construction, vegetation will need to be cleared. During the operational phase vegetation under the constructed power line will also need to be maintained to provide access for vehicles for maintenance activities. **c)** Nature of Impact: Vegetation clearing will result in habitat disturbance and fragmentation. In natural, undisturbed areas the resulting habitat disturbance and fragmentation will be an ecological impact of concern. Plant species of conservation importance, such as *Acacia erioloba*, *Boscia albitrunca* and *Acacia haematoxylon* that occur within the proposed power line footprints may need to be cleared during the Construction Phase. Conversely in areas	***Direct impacts:*** Loss of vegetation, habitat fragmentation and disturbance.	**Moderate**	• Vegetation clearing should be restricted to the proposed power line corridors and substation sites only, with no unnecessary clearing permitted outside of these areas. • Where proposed power line corridors lie adjacent to existing linear infrastructure (e.g. power lines and roads) these new corridors should be as closely aligned to the existing corridors. • The width of the power line corridors where vegetation is actively maintained during the operational phase must be kept to an absolute minimum that permits safe operation of the power line. • Wherever possible, the proposed power line corridors should positioned to avoid the clearing of plant species of conservation importance, most notably large *Acacia erioloba* trees. • If clearing of plant species of conservation importance is unavoidable, a removal permit from the relevant authority must be obtained.
	Indirect impacts: Reduction in local species diversity.	**Moderate**	
	Cumulative impacts: Reduction in local species diversity.	**Moderate**	

CONSTRUCTION PHASE			
Activity	**Impact summary**	**Significance**	**Proposed mitigation**
already disturbed by anthropogenic activities, such as around towns / settlements and immediately adjacent to major roads or existing power line servitudes, the resulting habitat disturbance and fragmentation will not be ecological impact of major concern. The corridor route is closely aligned with the R31 road.			
a) Environmental Aspect (Project Activity): Construction activities associated with the assembly of transmission towers between the existing Riries and Gamohaan Substations. **b)** Environmental Attribute: Savannah areas in South Africa provide habitat for a rich assemblage of fauna. In natural areas fauna species can be killed or injured during the construction and operational phases of development projects. **c)** Nature of Impact: Common causes of death and injury include: • Electrocution and collision of birds on power lines. The electrocution and collision of raptors and large Bustards and Cranes on power lines as being a major form of direct persecution of birds in the Northern Cape. Smaller capacity power lines (11kV to 132 kV) are particularly lethal for raptor electrocutions. Direct death/injury during vegetation clearing and earth works - particularly reptiles and nesting birds;	***Direct impacts:*** Killing or injuring of fauna within development footprint. ***Indirect impacts: -*** ***Cumulative impacts: -***	**Moderate**	• An Environmental Control Officer or trained individual should be available during the construction phase to manage any wildlife-human interactions. • A low speed limit should be enforced on site to reduce wildlife-collisions. • Employees and contractors should be made aware of the presence of, and rules regarding fauna and the prohibition of hunting through suitable induction training. • No clearing of large Social Weaver nests should be permitted. • Power lines should be designed to be 'raptor friendly'. Devices/designs that could be considered include staggered insulators, raptor-protectors and/or perch deterrents. The Endangered Wildlife Trust's Birds of Prey Programme should be consulted in this regard.

CONSTRUCTION PHASE			
Activity	**Impact summary**	**Significance**	**Proposed mitigation**
• Vehicle–wildlife collisions – reptiles and highly mobile mammals crossing roads are susceptible to fast moving vehicles; and • Hunting and snaring by construction workers.			
a) Environmental Aspect (Project Activity): Construction activities associated with the assembly of transmission towers between the existing Riries and Gamohaan Substations. **b)** Environmental Attribute: The corridor alignment proposed between the Riries Substation to Gamohaan Substation Alternative 1, crosses a number of non-perennial watercourses. **c)** Nature of Impact: Destruction of aquatic habitat to accommodate towers and overhead power lines.	***Direct impacts:*** Destruction of aquatic habitat to accommodate towers and overhead power lines. ***Indirect impacts: -*** ***Cumulative impacts: -***	**High**	• Aquatic and wetland features within the survey area can be completely avoided if tower footprints, cable spanning, and footprints of the substations are carefully planned. Service roads and other construction supporting services can also utilise existing roadways, bridges and access points without the need to establish impacting servitudes through wetlands and watercourses. • Careful planning so that all infrastructure footprints avoid surface water habitat units within the survey area will negate this impact; • If this is found to be unavoidable, then the size of the impacting footprint must be reduced as far as possible, indiscriminate habitat destruction must be avoided, use of existing roads and access points must be used as far as possible; and • Correct site reinstatement and vegetation rehabilitation must be implemented within impacted areas following completion of the construction phase.
a) Environmental Aspect (Project Activity): Construction activities associated with the	***Direct impacts:*** Impacts on riparian vegetation leading to decrease in runoff filtration.	**Moderate**	• Indiscriminate destruction of riparian habitat should be avoided.

CONSTRUCTION PHASE			
Activity	**Impact summary**	**Significance**	**Proposed mitigation**
assembly of transmission towers between the existing Riries and Gamohaan Substations. **b)** Environmental Attribute: The corridor alignment proposed between the Riries Substation to Gamohaan Substation Alternative 1, crosses a number of non-perennial watercourses. The exact positioning of the towers can only be made subsequent to a decision being taken by the Competent Authority to grant the authorisation in respect of a particular power line corridor. **c)** Nature of Impact: Impacts on riparian vegetation leading to decrease in runoff filtration.	***Indirect impacts:*** Impact on local biodiversity due to riparian vegetation loss. ***Cumulative impacts: -***	**Moderate**	
a) Environmental Aspect (Project Activity): Construction activities associated with the assembly of transmission towers between the existing Riries and Gamohaan Substations. **b)** Environmental Attribute: The corridor alignment proposed between the Riries Substation to Gamohaan Substation Alternative 1, crosses a number of non-perennial watercourses. **c)** Nature of Impact: Soil stripping, soil compaction and vegetation removal will increase rates of erosion and entry of sediment into the general aquatic ecosystem. Furthermore erosion of	***Direct impacts:*** Increased rate of erosion and entry of sediment into the general aquatic ecosystem. ***Indirect impacts:*** Erosion of stockpiled topsoil and disturbance of soils due to vegetation stripping leading to erosion and habitat inundation. ***Cumulative impacts: -***	**Moderate** **Moderate**	• Erosion must be strictly controlled through the utilization of silt traps, silt fencing, Gabions within areas of steeper topography and in close proximity to wetlands and/or watercourses; and • Topsoil stockpiles should be protected from erosion through the utilization of silt traps, silt fencing, gabions, etc.

CONSTRUCTION PHASE			
Activity	**Impact summary**	**Significance**	**Proposed mitigation**
stockpiled topsoil and disturbance of soils due to vegetation stripping leading to erosion and habitat inundation.			
Gamohaan Substation to Mothibistad Substation Alternative 2			
a) Environmental Aspect (Project Activity): Construction activities associated with the assembly of transmission towers between the existing Gamohaan Substation to Mothibistad Substation. **b)** Environmental Attribute: Presence of heritage sites along the alignment of the corridor alternative. **c)** Nature of Impact: The nature of the activities to be carried out during construction of the transmission towers including clearing of vegetation within the working area and excavations may damage underlying or concealed heritage resources.	***Direct impacts:*** Damage or destruction of heritage resources. ***Indirect impacts:*** - ***Cumulative impacts:*** -	**Moderate**	• Alter the power line alignment to allow for a 20 meter buffer around heritage sites. Adjust the development layout and demarcate site with at least a 20-meter buffer. A 100 meter buffer should be applied in the case of memorial sites. No construction activities will be permitted within the buffer area. • The relocation of any graves must be preceded by conducting the required process stipulated in Section 34 of the National Heritage Resources Act, accordingly obtaining authorisation from the South African Heritage Resources Agency.
a) Environmental Aspect (Project Activity): Construction activities associated with the assembly of transmission towers between the existing Riries and Gamohaan Substations. **b)** Environmental Attribute: The construction of the transmission towers as well as stringing the conductors between towers will result in a change in the change in the existing character and quality of the landscape. Alternative 2 extends across a shorter total distance, shorter distance through 'virgin land' and passes adjacent the residential area of Kuruman in comparison with Alternative 1. Furthermore much of this route	***Direct impacts:*** The power line will constitute a visual obstruction / impact. ***Indirect impacts:*** - ***Cumulative impacts:*** -	**Moderate**	• The extent of areas of disturbance must be confined to the smallest possible area during the construction phase. • Retain as much as possible of the existing vegetation along the substation footprint as possible. • Dust suppression techniques should be implemented at all times. • Rehabilitate / restore exposed areas as soon as possible after construction activities are complete. • Only indigenous vegetation should be used for rehabilitation / landscaping purposes.

CONSTRUCTION PHASE			
Activity	**Impact summary**	**Significance**	**Proposed mitigation**
is aligned with the R31 arterial road corridor and the drainage line crossing is shorter than that proposed for Gamo-Mothi Alt 2. **c)** Nature of Impact: Construction of the proposed power line will result in a change in the composition of available views due to changes to the landscape.			• Security lighting should only be used where absolutely necessary and carefully directed. • The negative impact of night lighting, glare and spotlight effects, can be mitigated using the following methods: • Install light fixtures that provide precisely directed illumination to reduce light "spillage" beyond the immediate surrounds of the project. • Avoid using bright, white colour lights where possible. Preferably use lights emitting a yellow light which travels less that white coloured lights. • Light public movement areas (pathways and roads) with low level 'bollard' type lights and avoid post top lighting. • Avoid high pole top security lighting where possible.
a) Environmental Aspect (Project Activity): Construction activities associated with the assembly of transmission towers between the existing Gamohaan and Mothibistad Substations. **b)** Environmental Attribute: To gain access along the power line routes and to facilitate construction, vegetation will need to be cleared. During the operational phase vegetation under the constructed power line will also need to be maintained to provide access for vehicles for maintenance activities.	***Direct impacts:*** Loss of vegetation, habitat fragmentation and disturbance.	**Moderate**	• Vegetation clearing should be restricted to the proposed power line corridors and substation sites only, with no unnecessary clearing permitted outside of these areas. • Where proposed power line corridors lie adjacent to existing linear infrastructure (e.g. power lines and roads) these new corridors should be as closely aligned to the existing corridors. • The width of the power line corridors where vegetation is actively maintained during the operational phase must be kept to an absolute minimum that permits safe operation of the power line.
	Indirect impacts: Reduction in local species diversity.	**Moderate**	
	Cumulative impacts: Reduction in local species diversity.	**Moderate**	

CONSTRUCTION PHASE			
Activity	**Impact summary**	**Significance**	**Proposed mitigation**
c) Nature of Impact: Vegetation clearing will result in habitat disturbance and fragmentation. In natural, undisturbed areas the resulting habitat disturbance and fragmentation will be an ecological impact of concern. Plant species of conservation importance, such as *Acacia erioloba*, *Boscia albitrunca* and *Acacia haematoxylon* that occur within the proposed power line footprints may need to be cleared during the Construction Phase. Conversely in areas already disturbed by anthropogenic activities, such as around towns / settlements and immediately adjacent to major roads or existing power line servitudes, the resulting habitat disturbance and fragmentation will not be ecological impact of major concern.			• Wherever possible, the proposed power line corridors should positioned to avoid the clearing of plant species of conservation importance, most notably large *Acacia erioloba* trees. • If clearing of plant species of conservation importance is unavoidable, a removal permit from the relevant authority must be obtained.
d) Environmental Aspect (Project Activity): Construction activities associated with the assembly of transmission towers between the existing Gamohaan and Mothibistad Substations. **e)** Environmental Attribute: Savannah areas in South Africa provide habitat for a rich assemblage of fauna. In natural areas fauna species can be killed or injured during the construction and operational phases of development projects. **f)** Nature of Impact: Common causes of death and injury include: • Electrocution and collision of birds on	***Direct impacts:*** Killing or injuring of fauna within development footprint. ***Indirect impacts: -*** ***Cumulative impacts: -***	**Moderate**	• An Environmental Control Officer or trained individual should be available during the construction phase to manage any wildlife-human interactions. • A low speed limit should be enforced on site to reduce wildlife-collisions. • Employees and contractors should be made aware of the presence of, and rules regarding fauna and the prohibition of hunting through suitable induction training. • No clearing of large Social Weaver nests should be permitted. • Power lines should be designed to be 'raptor friendly'. Devices/designs that

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Activity	**Impact summary**	**Significance**	**Proposed mitigation**
power lines. The electrocution and collision of raptors and large Bustards and Cranes on power lines as being a major form of direct persecution of birds in the Northern Cape. Smaller capacity power lines (11kV to 132 kV) are particularly lethal for raptor electrocutions. Direct death/injury during vegetation clearing and earth works - particularly reptiles and nesting birds; • Vehicle–wildlife collisions – reptiles and highly mobile mammals crossing roads are susceptible to fast moving vehicles; and • Hunting and snaring by construction workers.			could be considered include staggered insulators, raptor-protectors and/or perch deterrents. The Endangered Wildlife Trust's Birds of Prey Programme should be consulted in this regard.
a) Environmental Aspect (Project Activity): Construction activities associated with the assembly of transmission towers between the existing Gamohaan and Mothbistat Substations. **b)** Environmental Attribute: The corridor alignment proposed between the Gamohaan and Mothbistat Substations Alternative 2, crosses a wetland. **c)** Nature of Impact: Destruction of aquatic habitat to accommodate towers and overhead power lines. The construction phase of the infrastructure requires the establishment of servitude roadways, excavations for foundations, on-site concrete work and tower construction.	***Direct impacts:*** Destruction of aquatic habitat to accommodate towers and overhead power lines. Placement of the towers within the extent of a wetland will alter the characteristics of the wetland (i.e. watercourse). ***Indirect impacts: -*** ***Cumulative impacts: -***	**High**	• Aquatic and wetland features within the survey area can be completely avoided if tower footprints, cable spanning, and footprints of the substations are carefully planned. Service roads and other construction supporting services can also utilise existing roadways, bridges and access points without the need to establish impacting servitudes through wetlands and watercourses. • Careful planning so that all infrastructure footprints avoid surface water habitat units within the survey area will negate this impact; • If this is found to be unavoidable, then the size of the impacting footprint must be reduced as far as possible, indiscriminate habitat destruction must be avoided, use

CONSTRUCTION PHASE			
Activity	**Impact summary**	**Significance**	**Proposed mitigation**
Setting the overhead line will also require the use of a servitude long the length of the line route. This all requires the obvious disturbance of soils, removal of vegetation and other disturbance features. If these activities take place within any wetland habitats, or within areas that will disturb watercourses or riparian zones, then direct habitat destruction impacts occur. Outside of the wetland and watercourse areas, disturbance of soils may also induce soil erosion that can impact on the wetlands and watercourses within the nearby vicinity.			of existing roads and access points must be used as far as possible; • Correct site reinstatement and vegetation rehabilitation must be implemented within impacted areas following completion of the construction phase.
a) Environmental Aspect (Project Activity): Construction activities associated with the assembly of transmission towers between the existing Gamohaan and Mothibistad Substations. **b)** Environmental Attribute: The corridor alignment proposed between the Gamohaan and Mothibistad Substations Alternative 2, crosses a wetland. **a)** Nature of Impact: Impacts on riparian vegetation leading to decrease in runoff filtration.	***Direct impacts:*** Impacts on riparian vegetation leading to decrease in runoff infiltration. ***Indirect impacts:*** Impact on local biodiversity due to riparian vegetation loss. ***Cumulative impacts: -***	**High** **Medium?**	• Indiscriminate destruction of riparian habitat should be avoided.
a) Environmental Aspect (Project Activity): Construction activities associated with the assembly of transmission towers between the existing Gamohaan and Mothibistad Substations.	***Direct impacts***: Increased rate of erosion and entry of sediment into the general aquatic ecosystem. ***Indirect impacts:*** Erosion of stockpiled topsoil and disturbance of soils due to vegetation stripping leading to erosion and habitat inundation.	**High**	• Erosion must be strictly controlled through the utilization of silt traps, silt fencing, Gabions within areas of steeper topography and in close proximity to wetlands and/or watercourses; and • Topsoil stockpiles should be protected

CONSTRUCTION PHASE			
Activity	**Impact summary**	**Significance**	**Proposed mitigation**
b) Environmental Attribute: The corridor alignment proposed between the Gamohaan and Mothbistat Substations Alternative 2, crosses a wetland. **a)** Nature of Impact: Soil stripping, soil compaction and vegetation removal will increase rates of erosion and entry of sediment into the general aquatic ecosystem. Furthermore erosion of stockpiled topsoil and disturbance of soils due to vegetation stripping leading to erosion and habitat inundation.	***Cumulative impacts: -***		from erosion through the utilization of silt traps, silt fencing, gabions, etc.
Mothibistad Substation to Moffat Substation Alternative 1			
a) Environmental Aspect (Project Activity): Construction activities associated with the assembly of transmission towers between the existing Mothibistad Substation to Moffat Substation (Alternative 1). **b)** Environmental Attribute: Presence of heritage sites along the alignment of the corridor alternative. **c)** Nature of Impact: The nature of the activities to be carried out during construction of the transmission towers including clearing of vegetation within the working area and excavations may damage underlying or concealed heritage resources. ***It must be noted that no Heritage Resources were found along this corridor alternative section during the fieldwork that was carried out by the Heritage Specialist.***	***Direct impacts:*** Damage or destruction of heritage resources.	**Low**	• If any graves, artefacts or heritage site is discovered on the site during construction, all work will cease in the area affected and the Contractor will immediately inform the ECO and provincial heritage resource agency. • Should any heritage resources be exposed during excavation or be found on site, a registered heritage specialist must be called to site for inspection. • Under no circumstances may any heritage material be destroyed or removed from site. • In the event where any remains is found on site that is potentially human remains, the South African Police Service should also be contacted.
	Indirect impacts: -		
	Cumulative impacts: -		
	Direct impacts: The power line will constitute a visual obstruction / impact.	**Moderate**	• Construction activities to as far as possible be restricted to day-time to

CONSTRUCTION PHASE			
Activity	**Impact summary**	**Significance**	**Proposed mitigation**
a) Environmental Aspect (Project Activity): Construction activities associated with the assembly of transmission towers between the existing Mothibistad and Moffat Substations Alternative 1. **b)** Environmental Attribute: The construction of the transmission towers as well as stringing the conductors between towers will result in a change in the change in the existing character and quality of the landscape. The corridor alignment between the Mothibistad and Moffat Substations (Alternative 1) runs along an existing power line for its entire length. Even though it passes 100 meters and 200 meters from guest lodges, these are already exposed to the negative visual impact from the existing power line. **c)** Nature of Impact: Construction of the proposed power line will result in a change in the composition of available views due to changes to the landscape.	***Indirect impacts:*** - ***Cumulative impacts:*** -		reduce visual pollution caused by lighting. • The extent of areas of disturbance must be confined to the smallest possible area during the construction phase. • Retain as much as possible of the existing vegetation along the substation footprint as possible. • Dust suppression techniques should be implemented at all times. • Rehabilitate / restore exposed areas as soon as possible after construction activities are complete. • Only indigenous vegetation should be used for rehabilitation / landscaping purposes. • Security lighting should only be used where absolutely necessary and carefully directed. • The negative impact of night lighting, glare and spotlight effects, can be mitigated using the following methods: • Install light fixtures that provide precisely directed illumination to reduce light "spillage" beyond the immediate surrounds of the project. • Avoid using bright, white colour lights where possible. Preferably use lights emitting a yellow light which travels less that white coloured lights. • Light public movement areas (pathways and roads) with low level 'bollard' type

CONSTRUCTION PHASE			
Activity	**Impact summary**	**Significance**	**Proposed mitigation**
			lights and avoid post top lighting. • Avoid high pole top security lighting where possible.
a) Environmental Aspect (Project Activity): Construction activities associated with the assembly of transmission towers between the existing Mothibistad and Moffat Substations. **b)** Environmental Attribute: To gain access along the power line routes and to facilitate construction, vegetation will need to be cleared. During the operational phase vegetation under the constructed power line will also need to be maintained to provide access for vehicles for maintenance activities. **c)** Nature of Impact: Vegetation clearing will result in habitat disturbance and fragmentation. In natural, undisturbed areas the resulting habitat disturbance and fragmentation will be an ecological impact of concern. Plant species of conservation importance, such as *Acacia erioloba, Boscia albitrunca* and *Acacia haematoxylon* that occur within the proposed power line footprints may need to be cleared during the Construction Phase. Conversely in areas already disturbed by anthropogenic activities, such as around towns / settlements and immediately adjacent to major roads or existing power line servitudes, the resulting habitat disturbance and fragmentation will not be ecological	***Direct impacts:*** Loss of vegetation, habitat fragmentation and disturbance.	**High**	• Vegetation clearing should be restricted to the proposed power line corridors and substation sites only, with no unnecessary clearing permitted outside of these areas. • Where proposed power line corridors lie adjacent to existing linear infrastructure (e.g. power lines and roads) these new corridors should be as closely aligned to the existing corridors. • The width of the power line corridors where vegetation is actively maintained during the operational phase must be kept to an absolute minimum that permits safe operation of the power line. • Wherever possible, the proposed power line corridors should positioned to avoid the clearing of plant species of conservation importance, most notably large *Acacia erioloba* trees. • If clearing of plant species of conservation importance is unavoidable, a removal permit from the relevant authority must be obtained.
	Indirect impacts: Reduction in local species diversity.	**Moderate**	
	Cumulative impacts: Reduction in local species diversity.	**Moderate**	

CONSTRUCTION PHASE			
Activity	**Impact summary**	**Significance**	**Proposed mitigation**
impact of major concern. ***Both alternatives for the corridor alignment Mothibistad Substation to Moffat Substation are centred in the disturbed footprint of the Kuruman town and surrounding residential areas. Alternative 1 is however more direct and closely aligned with Buitekant Street.***			
g) Environmental Aspect (Project Activity): Construction activities associated with the assembly of transmission towers between the existing Mothibistad and Moffat Substations. **h)** Environmental Attribute: Savannah areas in South Africa provide habitat for a rich assemblage of fauna. In natural areas fauna species can be killed or injured during the construction and operational phases of development projects. **i)** Nature of Impact: Common causes of death and injury include: • Electrocution and collision of birds on power lines. The electrocution and collision of raptors and large Bustards and Cranes on power lines as being a major form of direct persecution of birds in the Northern Cape. Smaller capacity power lines (11kV to 132 kV) are particularly lethal for raptor electrocutions. Direct death/injury during vegetation clearing and earth works - particularly reptiles and nesting birds;	***Direct impacts:*** Killing or injuring of fauna within development footprint. ***Indirect impacts:*** - ***Cumulative impacts:*** -	**Moderate**	• An Environmental Control Officer or trained individual should be available during the construction phase to manage any wildlife-human interactions. • A low speed limit should be enforced on site to reduce wildlife-collisions. • Employees and contractors should be made aware of the presence of, and rules regarding fauna and the prohibition of hunting through suitable induction training. • No clearing of large Social Weaver nests should be permitted. • Power lines should be designed to be 'raptor friendly'. Devices/designs that could be considered include staggered insulators, raptor-protectors and/or perch deterrents. The Endangered Wildlife Trust's Birds of Prey Programme should be consulted in this regard.

CONSTRUCTION PHASE			
Activity	**Impact summary**	**Significance**	**Proposed mitigation**
• Vehicle–wildlife collisions – reptiles and highly mobile mammals crossing roads are susceptible to fast moving vehicles; and • Hunting and snaring by construction workers.			
a) Environmental Aspect (Project Activity): Construction activities associated with the assembly of transmission towers between the existing Mothbistat and Moffat Substations. **b)** Environmental Attribute: The corridor alignment proposed between the Mothbistat and Moffat Substations Alternative 1, crosses a wetland as well as a non-perennial stream. **c)** Nature of Impact: Destruction of aquatic habitat to accommodate towers and overhead power lines. The construction phase of the infrastructure requires the establishment of servitude roadways, excavations for foundations, on-site concrete work and tower construction. Setting the overhead line will also require the use of servitude a long the length of the line route. This all requires the obvious disturbance of soils, removal of vegetation and other disturbance features. If these activities take place within any wetland habitats, or within areas that will disturb watercourses or riparian zones, then direct habitat destruction impacts occur. Outside of the wetland and watercourse areas, disturbance of soils may	***Direct impacts:*** Destruction of aquatic habitat to accommodate towers and overhead power lines. Placement of the towers within the extent of a wetland will alter the characteristics of the wetland (i.e. watercourse). ***Indirect impacts:*** - ***Cumulative impacts:*** -	**High**	• Aquatic and wetland features within the survey area can be completely avoided if tower footprints, cable spanning, and footprints of the substations are carefully planned. Service roads and other construction supporting services can also utilise existing roadways, bridges and access points without the need to establish impacting servitudes through wetlands and watercourses. • Careful planning so that all infrastructure footprints avoid surface water habitat units within the survey area will negate this impact; • If this is found to be unavoidable, then the size of the impacting footprint must be reduced as far as possible, indiscriminate habitat destruction must be avoided, use of existing roads and access points must be used as far as possible; and • Correct site reinstatement and vegetation rehabilitation must be implemented within impacted areas following completion of the construction phase.

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Activity	**Impact summary**	**Significance**	**Proposed mitigation**
also induce soil erosion that can impact on the wetlands and watercourses within the nearby vicinity.			
a) Environmental Aspect (Project Activity): Construction activities associated with the assembly of transmission towers between the existing Mothibistad and Moffat Substations. **b)** Environmental Attribute: The corridor alignment proposed between the Mothbistat and Moffat Substations Alternative 1, crosses a wetland as well as a non-perennial stream. **c)** Nature of Impact: Impacts on riparian vegetation leading to decrease in runoff filtration.	***Direct impacts:*** Impacts on riparian vegetation leading to decrease in runoff filtration.	**Moderate**	• Indiscriminate destruction of riparian habitat should be avoided.
	Indirect impacts: Impact on local biodiversity due to riparian vegetation loss.	**Moderate**	
	Cumulative impacts: -		
a) Environmental Aspect (Project Activity): Construction activities associated with the assembly of transmission towers between the existing Mothibistad and Moffat Substations. **b)** Environmental Attribute: The corridor alignment proposed between the Mothibistad and Moffat Substations Alternative 1, crosses a wetland as well as a non-perennial stream. **c)** Nature of Impact: Soil stripping, soil compaction and vegetation removal will increase rates of erosion and entry of sediment into the general aquatic ecosystem. Furthermore erosion of	***Direct impacts:*** Increased rate of erosion and entry of sediment into the general aquatic ecosystem.	**Moderate**	• Erosion must be strictly controlled through the utilization of silt traps, silt fencing, Gabions within areas of steeper topography and in close proximity to wetlands and/or watercourses; and • Topsoil stockpiles should be protected from erosion through the utilization of silt traps, silt fencing, gabions, etc.
	Indirect impacts: Erosion of stockpiled topsoil and disturbance of soils due to vegetation stripping leading to erosion and habitat inundation.	**Moderate**	
	Cumulative impacts: -		

CONSTRUCTION PHASE			
Activity	**Impact summary**	**Significance**	**Proposed mitigation**
stockpiled topsoil and disturbance of soils due to vegetation stripping leading to erosion and habitat inundation.			
Moffat Substation to Valley Substation Alternative 1			
a) Environmental Aspect (Project Activity): Construction activities associated with the assembly of transmission towers between the existing Moffat Substation and Valley Substation (Alternative 1). **b)** Environmental Attribute: Presence of heritage sites along the alignment of the corridor alternative. **c)** Nature of Impact: The nature of the activities to be carried out during construction of the transmission towers including clearing of vegetation within the working area and excavations may damage underlying or concealed heritage resources. ***It must be noted that no Heritage Resources were found along this corridor alternative section during the fieldwork that was carried out by the Heritage Specialist.***	***Direct impacts:*** Damage or destruction of heritage resources. ***Indirect impacts:*** - ***Cumulative impacts:*** -	**Low**	• If any graves, artefacts or heritage site is discovered on the site during construction, all work will cease in the area affected and the Contractor will immediately inform the ECO and provincial heritage resource agency. • Should any heritage resources be exposed during excavation or be found on site, a registered heritage specialist must be called to site for inspection. • Under no circumstances may any heritage material be destroyed or removed from site. • In the event where any remains be found on site that is potentially human remains, the South African Police Service should also be contacted.
a) Environmental Aspect (Project Activity): Construction activities associated with the assembly of transmission towers between the existing Moffat and Valley Substations Alternative 1. **b)** Environmental Attribute: The construction of the transmission towers as well as stringing the conductors between towers will result in a change in the change in the existing character and quality of the landscape. Although the corridor alignment between the	***Direct impacts:*** The power line will constitute a visual obstruction / impact. ***Indirect impacts:*** - ***Cumulative impacts:*** -	**Moderate**	• Construction activities to as far as possible be restricted to day-time to reduce visual pollution caused by lighting. • The extent of areas of disturbance must be confined to the smallest possible area during the construction phase. • Retain as much as possible of the existing vegetation along the substation footprint as possible. • Dust suppression techniques should be

CONSTRUCTION PHASE			
Activity	**Impact summary**	**Significance**	**Proposed mitigation**
Moffat and Valley Substations (Alternative 1) has more incidences with residential units and a greater total distance it is the preferred alternative of the two. Most of the residential units are already exposed to the negative visual impact of the existing power line. Alternative 1 has the greater distance along existing power lines and the lesser distance through 'virgin lands' and sensitive landscapes. **c)** Nature of Impact: Construction of the proposed power line will result in a change in the composition of available views due to changes to the landscape.			implemented at all times. • Rehabilitate / restore exposed areas as soon as possible after construction activities are complete. • Only indigenous vegetation should be used for rehabilitation / landscaping purposes. • Security lighting should only be used where absolutely necessary and carefully directed. • The negative impact of night lighting, glare and spotlight effects, can be mitigated using the following methods: • Install light fixtures that provide precisely directed illumination to reduce light "spillage" beyond the immediate surrounds of the project. • Avoid using bright, white colour lights where possible. Preferably use lights emitting a yellow light which travels less that white coloured lights. • Light public movement areas (pathways and roads) with low level 'bollard' type lights and avoid post top lighting. • Avoid high pole top security lighting where possible.
d) Environmental Aspect (Project Activity): Construction activities associated with the assembly of transmission towers between the existing Moffat and Valley Substations.	***Direct impacts:*** Loss of vegetation, habitat fragmentation and disturbance.	**Moderate**	• Vegetation clearing should be restricted to the proposed power line corridors and substation sites only, with no unnecessary clearing permitted outside of these areas. • Where proposed power line corridors lie adjacent to existing linear infrastructure
	Indirect impacts: Reduction in local species diversity.	**Moderate**	
	Cumulative impacts:		

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Activity	**Impact summary**	**Significance**	**Proposed mitigation**
e) Environmental Attribute: To gain access along the power line routes and to facilitate construction, vegetation will need to be cleared. During the operational phase vegetation under the constructed power line will also need to be maintained to provide access for vehicles for maintenance activities. **f)** Nature of Impact: Vegetation clearing will result in habitat disturbance and fragmentation. In natural, undisturbed areas the resulting habitat disturbance and fragmentation will be an ecological impact of concern. Plant species of conservation importance, such as *Acacia erioloba, Boscia albitrunca* and *Acacia haematoxylon* that occur within the proposed power line footprints may need to be cleared during the Construction Phase. Conversely in areas already disturbed by anthropogenic activities, such as around towns / settlements and immediately adjacent to major roads or existing power line servitudes, the resulting habitat disturbance and fragmentation will not be ecological impact of major concern.			(e.g. power lines and roads) these new corridors should be as closely aligned to the existing corridors. • The width of the power line corridors where vegetation is actively maintained during the operational phase must be kept to an absolute minimum that permits safe operation of the power line. • Wherever possible, the proposed power line corridors should positioned to avoid the clearing of plant species of conservation importance, most notably large *Acacia erioloba* trees. • If clearing of plant species of conservation importance is unavoidable, a removal permit from the relevant authority must be obtained.
j) Environmental Aspect (Project Activity): Construction activities associated with the assembly of transmission towers between the existing Moffat and Valley Substations Alternative 1. **k)** Environmental Attribute: Savannah areas in South Africa provide habitat for a rich assemblage of fauna. In natural areas fauna	***Direct impacts:*** Killing or injuring of fauna within development footprint. ***Indirect impacts: -*** ***Cumulative impacts: -***	**Moderate**	• An Environmental Control Officer or trained individual should be available during the construction phase to manage any wildlife-human interactions. • A low speed limit should be enforced on site to reduce wildlife-collisions. • Employees and contractors should be made aware of the presence of, and rules regarding fauna and the prohibition of

CONSTRUCTION PHASE			
Activity	**Impact summary**	**Significance**	**Proposed mitigation**
species can be killed or injured during the construction and operational phases of development projects. **I)** Nature of Impact: Common causes of death and injury include: • Electrocution and collision of birds on power lines. The electrocution and collision of raptors and large Bustards and Cranes on power lines as being a major form of direct persecution of birds in the Northern Cape. Smaller capacity power lines (11kV to 132 kV) are particularly lethal for raptor electrocutions. Direct death/injury during vegetation clearing and earth works - particularly reptiles and nesting birds; • Vehicle–wildlife collisions – reptiles and highly mobile mammals crossing roads are susceptible to fast moving vehicles; and • Hunting and snaring by construction workers.			hunting through suitable induction training. • No clearing of large Social Weaver nests should be permitted. • Power lines should be designed to be 'raptor friendly'. Devices/designs that could be considered include staggered insulators, raptor-protectors and/or perch deterrents. The Endangered Wildlife Trust's Birds of Prey Programme should be consulted in this regard.
a) Environmental Aspect (Project Activity): Construction activities associated with the assembly of transmission towers between the existing Moffat and Valley Substations Alternative 1. **b)** Environmental Attribute: The corridor alignment proposed between the Moffat and Valley Substations Alternative 1, crosses a number of non-perennial watercourses. The exact positioning of the towers can only be	***Direct impacts:*** Destruction of aquatic habitat to accommodate towers and overhead power lines.	**Moderate**	• Aquatic and wetland features within the survey area can be completely avoided if tower footprints, cable spanning, and footprints of the substations are carefully planned. Service roads and other construction supporting services can also utilise existing roadways, bridges and access points without the need to establish impacting servitudes through wetlands and watercourses.
	Indirect impacts: Contamination of surface water features leading to loss of sensitive biota.	**Moderate**	
	Cumulative impacts: An increase in density of overhead power lines will increase the cumulative impact to watercourses.	**Moderate**	

CONSTRUCTION PHASE			
Activity	**Impact summary**	**Significance**	**Proposed mitigation**
made subsequent to a decision being taken by the Competent Authority to grant the authorisation in respect of a particular power line corridor. **c)** Nature of Impact: Impacts on riparian vegetation leading to decrease in runoff filtration.			• Careful planning so that all infrastructure footprints avoid surface water habitat units within the survey area will negate this impact; • If this is found to be unavoidable, then the size of the impacting footprint must be reduced as far as possible, indiscriminate habitat destruction must be avoided, use of existing roads and access points must be used as far as possible; and • Correct site reinstatement and vegetation rehabilitation must be implemented within impacted areas following completion of the construction phase.
Valley Substation to Sekgame Switching Station Alternative 4			
a) Environmental Aspect (Project Activity): Construction activities associated with the assembly of transmission towers between the existing Valley Substation and proposed Sekgame Switching Station. **b)** Environmental Attribute: Presence of a historical structure along the alignment of the corridor alternative. **c)** Nature of Impact: An old farmstead with its associated structures was identified along the Valley-Sekgame Alternative 4 corridor alignment. The farmstead was brick-built and has a pitched corrugated iron roof. The house has metal door and window frames and external water and electrical systems were added to the original house.	***Direct impacts:*** Damage or destruction of heritage structure. ***Indirect impacts:*** - ***Cumulative impacts:*** -	**High**	• Alter the power line alignment to allow for a 20 meter buffer around heritage sites. Adjust the development layout and demarcate site with at least a 20-meter buffer. A 100 meter buffer should be applied in the case of memorial sites. No construction activities will be permitted within the buffer area. • The relocation of any graves must be preceded by conducting the required process stipulated in Section 34 of the National Heritage Resources Act, accordingly obtaining authorisation from the South African Heritage Resources Agency.
a) Environmental Aspect (Project Activity): Construction activities associated with the	***Direct impacts:*** The power line will constitute a visual obstruction / impact.	**Moderate**	• Dust suppression techniques should be

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Activity	**Impact summary**	**Significance**	**Proposed mitigation**
assembly of transmission towers between the existing Valley Substation and Sekgame Switching Station Alternative 4. **b)** Environmental Attribute: The construction of the transmission towers as well as stringing the conductors between towers will result in a change in the change in the existing character and quality of the landscape. A large section of the corridor alignment follows / runs alongside the Luhatla Military Area boundary fence and existing road. **c)** Nature of Impact: Construction of the proposed power line will result in a change in the composition of available views due to changes to the landscape.	***Indirect impacts:*** -		implemented at all times. • Rehabilitate / restore exposed areas as soon as possible after construction activities are complete. • Only indigenous vegetation should be used for rehabilitation / landscaping purposes. • Security lighting should only be used where absolutely necessary and carefully directed. • The negative impact of night lighting, glare and spotlight effects, can be mitigated using the following methods: • Install light fixtures that provide precisely directed illumination to reduce light "spillage" beyond the immediate surrounds of the project. • Avoid using bright, white colour lights where possible. Preferably use lights emitting a yellow light which travels less that white coloured lights. • Light public movement areas (pathways and roads) with low level 'bollard' type lights and avoid post top lighting. • Avoid high pole top security lighting where possible.
	Cumulative impacts: -		
a) Environmental Aspect (Project Activity): Construction activities associated with the assembly of transmission towers between the Valley Substation and Sekgame Switching Station Alternative 4. **b)** Environmental Attribute: To gain access	***Direct impacts:*** Loss of vegetation within construction footprint.	**Moderate**	• Vegetation clearing should be restricted to the proposed power line corridors and substation sites only, with no unnecessary clearing permitted outside of these areas. • Where proposed power line corridors lie adjacent to existing linear infrastructure
	Indirect impacts: Vegetation clearing can facilitate / contribute to conditions conducive to erosion.	**Moderate**	
	Cumulative impacts: Reduction in local	**Moderate**	

CONSTRUCTION PHASE			
Activity	**Impact summary**	**Significance**	**Proposed mitigation**
along the power line routes and to facilitate construction, vegetation will need to be cleared. During the operational phase vegetation under the constructed power line will also need to be maintained to provide access for vehicles for maintenance activities. **c)** Nature of Impact: Vegetation clearing will result in habitat disturbance and fragmentation. In natural, undisturbed areas the resulting habitat disturbance and fragmentation will be an ecological impact of concern. Plant species of conservation importance, such as *Acacia erioloba*, Boscia albitrunca and Acacia haematoxylon that occur within the proposed power line footprints may need to be cleared during the Construction Phase. Conversely in areas already disturbed by anthropogenic activities, such as around towns / settlements and immediately adjacent to major roads or existing power line servitudes, the resulting habitat disturbance and fragmentation will not be ecological impact of major concern.	species diversity.		(e.g. power lines and roads) these new corridors should be as closely aligned to the existing corridors. • The width of the power line corridors where vegetation is actively maintained during the operational phase must be kept to an absolute minimum that permits safe operation of the power line. • Wherever possible, the proposed power line corridors should positioned to avoid the clearing of plant species of conservation importance, most notably large *Acacia erioloba* trees. • If clearing of plant species of conservation importance is unavoidable, a removal permit from the relevant authority must be obtained.
a) Environmental Aspect (Project Activity): Construction activities associated with the assembly of transmission towers between the Valley Substation and Sekgame Switching Station. **b)** Environmental Attribute: Savannah areas in South Africa provide habitat for a rich assemblage of fauna. In natural areas fauna	***Direct impacts:*** Killing or injuring of fauna within development footprint. ***Indirect impacts:*** - ***Cumulative impacts:*** -	Moderate	• An Environmental Control Officer or trained individual should be available during the construction phase to manage any wildlife-human interactions. • A low speed limit should be enforced on site to reduce wildlife-collisions. • Employees and contractors should be made aware of the presence of, and rules

CONSTRUCTION PHASE			
Activity	**Impact summary**	**Significance**	**Proposed mitigation**
species can be killed or injured during the construction and operational phases of development projects. **c)** Nature of Impact: Common causes of death and injury include: • Electrocution and collision of birds on power lines. The electrocution and collision of raptors and large Bustards and Cranes on power lines as being a major form of direct persecution of birds in the Northern Cape. Smaller capacity power lines (11kV to 132 kV) are particularly lethal for raptor electrocutions. Direct death/injury during vegetation clearing and earth works - particularly reptiles and nesting birds; • Vehicle–wildlife collisions – reptiles and highly mobile mammals crossing roads are susceptible to fast moving vehicles; and Hunting and snaring by construction workers.			regarding fauna and the prohibition of hunting through suitable induction training. • No clearing of large Social Weaver nests should be permitted. • Power lines should be designed to be 'raptor friendly'. Devices/designs that could be considered include staggered insulators, raptor-protectors and/or perch deterrents. The Endangered Wildlife Trust's Birds of Prey Programme should be consulted in this regard.

CONSTRUCTION PHASE			
Activity	**Impact Summary**	**Significance**	**Proposed Mitigation**
Riries Substation to Gamohaan Substation Alternative 2			
a) Environmental Aspect (Project Activity): Construction activities associated with the assembly of transmission towers between the existing Riries and Gamohaan Substations.	***Direct impacts:*** Damage or destruction to religious site.	**High**	• A consultation process with local spiritual and religious groupings will be required to consult on the possible impacts and consequences of construction activities on the site and intangible heritage. The
	Indirect impacts: -		
	Cumulative impacts: -		

CONSTRUCTION PHASE			
Activity	**Impact Summary**	**Significance**	**Proposed Mitigation**
b) Environmental Attribute: A large overhang with evidence of religious activities was identified at this location. Several areas with the ashes of fires were identified as well as areas where candles were placed as well. The site is visited frequently and the area under the overhang is disturbed. Recent historic graffiti is visible on sections of the overhang wall, while feint rock art figures are discernible. **c)** Nature of Impact: Disturbance of sacred / religious site by the activities to be carried out during construction of the transmission towers including clearing of vegetation within the working area and excavations.			aforementioned consultation can be integrated in the PPP process followed for the BA Process. • Positioning of the final route alignment so as to bypass the sacred / religious site.
a) Environmental Aspect (Project Activity): Construction activities associated with the assembly of transmission towers between the existing Riries and Gamohaan Substations. **b)** Environmental Attribute: The infrastructure and remains of the old Wandrag Asbestos Mine were identified along the corridor alignment between the Riries Substation and Gamohaan Substation Alternative 2 this location. The infrastructure included several houses, offices, a labour compound and storerooms. The staff accommodation is still in use and the houses are being occupied. The labour compound and several other structures are not being used and are in a derelict state. **c)** Nature of Impact: Disturbance of sacred / religious site by the activities to be carried out during construction of the transmission	***Direct impacts:*** Exposure to airborne asbestos fibres from abandoned and un-rehabilitated asbestos mines and randomly discarded asbestos fibre dumps. The inhalation of asbestos fires adversely affects the respiratory system. ***Indirect impacts:***- ***Cumulative impacts:*** -	**High** - -	• In the event where the applicant opts to align the power line route so that it extends through the derelict asbestos mine the following legislation must be conformed to: ○ All applicable provisions, relating to the potential exposure of any person to asbestos dust, stipulated in the OHS Act Asbestos Regulations 2001 must be conformed to; and ○ The remediation of any asbestos contaminated areas must be done in accordance with the NEMWA National Norms and Standards for the Remediation of Contaminated Land and Soil Quality (Government Notice No. 331, 2 May 2014).

CONSTRUCTION PHASE			
Activity	**Impact Summary**	**Significance**	**Proposed Mitigation**
towers including clearing of vegetation within the working area and excavations. Asbestos waste has a potential to pollute the environment and pose a health risk to human health.			○ It is however strongly recommended that the power line alignment within the corridor be set out to avoid / bypass the Wandrag Asbestos Mine.
a) Environmental Aspect (Project Activity): Construction activities associated with the assembly of transmission towers between the existing Riries and Gamohaan Substations. **b)** Environmental Attribute: The construction of the transmission towers as well as stringing the conductors between towers will result in a change in the change in the existing character and quality of the landscape. The alignment of the corridor (Alternative 2) between the Riries Substation to Gamohaan Substation extends through undisturbed / virgin land as well as sensitive landscapes for a distance of 9.8 kilometres and 6.5 kilometres respectively. **c)** Nature of Impact: Construction of the proposed power line will result in a change in the composition of available views due to changes to the landscape.	***Direct impacts:*** Adverse impact on visual receptors and visual resources. ***Indirect impacts:*** Change in atmosphere, landscape character and sense of place. ***Cumulative impacts:*** -	**High** **High**	• The extent of areas of disturbance must be confined to the smallest possible area during the construction phase. • Retain as much as possible of the existing vegetation along the substation footprint as possible. • Dust suppression techniques should be implemented at all times. • Rehabilitate / restore exposed areas as soon as possible after construction activities are complete. • Only indigenous vegetation should be used for rehabilitation / landscaping purposes. • Security lighting should only be used where absolutely necessary and carefully directed. • The negative impact of night lighting, glare and spotlight effects, can be mitigated using the following methods: • Install light fixtures that provide precisely directed illumination to reduce light "spillage" beyond the immediate surrounds of the project. • Avoid using bright, white colour lights

CONSTRUCTION PHASE			
Activity	**Impact Summary**	**Significance**	**Proposed Mitigation**
			where possible. Preferably use lights emitting a yellow light which travels less that white coloured lights. • Light public movement areas (pathways and roads) with low level 'bollard' type lights and avoid post top lighting. • Avoid high pole top security lighting where possible.
a) Environmental Aspect (Project Activity): Construction activities associated with the assembly of transmission towers between the existing Riries and Gamohaan Substations. **b)** Environmental Attribute: To gain access along the power line routes and to facilitate construction, vegetation will need to be cleared. During the operational phase vegetation under the constructed power line will also need to be maintained to provide access for vehicles for maintenance activities. **c)** Nature of Impact: Vegetation clearing will result in habitat disturbance and fragmentation. In natural, undisturbed areas the resulting habitat disturbance and fragmentation will be an ecological impact of concern. Plant species of conservation importance, such as *Acacia erioloba*, *Boscia albitrunca* and *Acacia haematoxylon* that occur within the proposed power line footprints may need to be cleared during the	***Direct impacts:*** Loss of vegetation, habitat fragmentation and disturbance.	**High**	• Vegetation clearing should be restricted to the proposed power line corridors and substation sites only, with no unnecessary clearing permitted outside of these areas. • Where proposed power line corridors lie adjacent to existing linear infrastructure (e.g. power lines and roads) these new corridors should be as closely aligned to the existing corridors. • The width of the power line corridors where vegetation is actively maintained during the operational phase must be kept to an absolute minimum that permits safe operation of the power line. • Wherever possible, the proposed power line corridors should positioned to avoid the clearing of plant species of conservation importance, most notably large *Acacia erioloba* trees. • If clearing of plant species of conservation importance is unavoidable, a removal permit from the relevant authority must be obtained.
	Indirect impacts: Reduction in local species diversity.	**Moderate**	
	Cumulative impacts: Reduction in local species diversity.	**High**	

CONSTRUCTION PHASE			
Activity	**Impact Summary**	**Significance**	**Proposed Mitigation**
Construction Phase. Conversely in areas already disturbed by anthropogenic activities, such as around towns / settlements and immediately adjacent to major roads or existing power line servitudes, the resulting habitat disturbance and fragmentation will not be ecological impact of major concern.			
a) Environmental Aspect (Project Activity): Construction activities associated with the assembly of transmission towers between the existing Riries and Gamohaan Substations. **b)** Environmental Attribute: Savannah areas in South Africa provide habitat for a rich assemblage of fauna. In natural areas fauna species can be killed or injured during the construction and operational phases of development projects. **c)** Nature of Impact: Common causes of death and injury include: • Electrocution and collision of birds on power lines. The electrocution and collision of raptors and large Bustards and Cranes on power lines as being a major form of direct persecution of birds in the Northern Cape. Smaller capacity power lines (11kV to 132 kV) are	***Direct impacts:*** Killing or injuring of fauna within development footprint. ***Indirect impacts: -*** ***Cumulative impacts: -***	**High**	• An Environmental Control Officer or trained individual should be available during the construction phase to manage any wildlife-human interactions. • A low speed limit should be enforced on site to reduce wildlife-collisions. • Employees and contractors should be made aware of the presence of, and rules regarding fauna and the prohibition of hunting through suitable induction training. • No clearing of large Social Weaver nests should be permitted. • Power lines should be designed to be 'raptor friendly'. Devices/designs that could be considered include staggered insulators, raptor-protectors and/or perch deterrents. The Endangered Wildlife Trust's Birds of Prey Programme should be consulted in this regard.

CONSTRUCTION PHASE			
Activity	**Impact Summary**	**Significance**	**Proposed Mitigation**
particularly lethal for raptor electrocutions. Direct death/injury during vegetation clearing and earth works - particularly reptiles and nesting birds; • Vehicle–wildlife collisions – reptiles and highly mobile mammals crossing roads are susceptible to fast moving vehicles; and • Hunting and snaring by construction workers.			
d) Environmental Aspect (Project Activity): Construction activities associated with the assembly of transmission towers between the existing Riries and Gamohaan Substations. **e)** Environmental Attribute: The corridor alignment proposed between the Riries Substation and Gamohaan Substation Alternative 2, crosses a number of non-perennial watercourses. The exact positioning of the towers can only be made subsequent to a decision being taken by the Competent Authority to grant the authorisation in respect of a particular power line corridor. **f)** Nature of Impact: Impacts on riparian vegetation leading to decrease in runoff filtration.	***Direct impacts:*** Destruction of aquatic habitat to accommodate towers and overhead power lines.	**Moderate**	• Careful planning so that all infrastructure footprints avoid surface water habitat units within the survey area will negate this impact; • If this is found to be unavoidable, then the size of the impacting footprint must be reduced as far as possible, indiscriminate habitat destruction must be avoided, use of existing roads and access points must be used as far as possible; • Correct site reinstatement and vegetation rehabilitation must be implemented within impacted areas following completion of the construction phase. • Fuel storage should be done within designated areas only, which are properly bunded to contain any potential fuel leaks. Construction vehicles should be properly serviced in order to avoid fluid leaks. Proper sewerage
	Indirect impacts: Contamination of surface water features leading to loss of sensitive biota.	**Low**	
	Cumulative impacts: An increase in density of overhead power lines will increase the cumulative impact to watercourses.	**Low**	

CONSTRUCTION PHASE			
Activity	**Impact Summary**	**Significance**	**Proposed Mitigation**
			management should be implemented in order to avoid contamination of the surface waters through untreated sewerage. • Formal watercourse crossings must be structurally sound to withstand expected flooding regimes of the aquatic system. Adequate culvert capacity must be provided to ensure effects of increased water velocity through the culverts due to restrictions must be provided. This would typically lead to erosion of the watercourse. • No changes in water levels between the upstream and downstream sides of the crossing point should be implemented to ensure migratory freedom of aquatic biota.
a) Environmental Aspect (Project Activity): Construction activities associated with the assembly of transmission towers between the existing Riries and Gamohaan Substations. **b)** Environmental Attribute: The corridor alignment proposed between the Riries and Gamohaan Substations Alternative 2, crosses a number of non-perennial watercourses. **c)** Nature of Impact: Soil stripping, soil compaction and vegetation removal will increase rates of erosion and entry of	***Direct impacts:*** Increased rates of erosion and entry of sediment into the general aquatic ecosystem.	**Low**	• Erosion must be strictly controlled through the utilization of silt traps, silt fencing, gabions, etc. within areas of steeper topography and in close proximity to wetlands and/or watercourses.
	Indirect impacts: Erosion of stockpiled topsoil & disturbance of soils due to vegetation stripping leading to erosion and habitat inundation.	**Low**	
	Cumulative impacts: -	**-**	

CONSTRUCTION PHASE			
Activity	**Impact Summary**	**Significance**	**Proposed Mitigation**
sediment into the general aquatic ecosystem. Furthermore erosion of stockpiled topsoil and disturbance of soils due to vegetation stripping leading to erosion and habitat inundation.			
Valley Substation to Sekgame Substation Alternative 1			
a) Environmental Aspect (Project Activity): Construction activities associated with the assembly of transmission towers between the existing Valley Substation and proposed Sekgame Switching Station. **b)** Environmental Attribute: Presence of a historical structure along the alignment of the corridor alternative. **a)** Nature of Impact: Old farmsteads and its associated structures was identified along the Valley-Sekgame Alternative1 corridor alignment. The farmstead was brick-built and has a pitched corrugated iron roof. The house has metal door and window frames and external water and electrical systems were added to the original house.	***Direct impacts:*** Damage or destruction of heritage structure. ***Indirect impacts:*** - ***Cumulative impacts:*** -	**High**	• Alter the power line alignment to allow for a 20 meter buffer around heritage sites. Adjust the development layout and demarcate site with at least a 20-meter buffer. A 100 meter buffer should be applied in the case of memorial sites. No construction activities will be permitted within the buffer area. • The relocation of any graves must be preceded by conducting the required process stipulated in Section 34 of the National Heritage Resources Act, accordingly obtaining authorisation from the South African Heritage Resources Agency.
a) Environmental Aspect (Project Activity): Construction activities associated with the assembly of transmission towers between the existing Valley Substation and proposed Sekgame Switching Station. **b)** Environmental Attribute: The construction of	***Direct impacts:*** The power line will constitute a visual obstruction / impact. ***Indirect impacts:*** - ***Cumulative impacts:*** -	**Low**	• Dust suppression techniques should be implemented at all times. • Rehabilitate / restore exposed areas as soon as possible after construction activities are complete. • Only indigenous vegetation should be

CONSTRUCTION PHASE			
Activity	**Impact Summary**	**Significance**	**Proposed Mitigation**
the transmission towers as well as stringing the conductors between towers will result in a change in the change in the existing character and quality of the landscape. The presence of the 132kV power lines and substations will continue to exert a 'nuisance' to the existing visual environment as well as the people residing in the surrounding Kathu area. **c)** Nature of Impact: Construction of the proposed power line will result in a change in the composition of available views due to changes to the landscape.			used for rehabilitation / landscaping purposes. • Security lighting should only be used where absolutely necessary and carefully directed. • The negative impact of night lighting, glare and spotlight effects, can be mitigated using the following methods: • Install light fixtures that provide precisely directed illumination to reduce light "spillage" beyond the immediate surrounds of the project. • Avoid using bright, white colour lights where possible. Preferably use lights emitting a yellow light which travels less that white coloured lights. • Light public movement areas (pathways and roads) with low level 'bollard' type lights and avoid post top lighting. • Avoid high pole top security lighting where possible.
a) Environmental Aspect (Project Activity): Construction activities associated with the assembly of transmission towers between the existing Valley Substation and proposed Sekgame Switching Station. **b)** Environmental Attribute: To gain access along the power line routes and to facilitate construction, vegetation will need to be cleared. During the operational phase	***Direct impacts:*** Loss of vegetation within construction footprint. ***Indirect impacts:*** Vegetation clearing can facilitate / contribute to conditions conducive to erosion. ***Cumulative impacts:*** Reduction in local species diversity.	**Moderate** **Moderate** **Moderate**	• Vegetation clearing should be restricted to the proposed power line corridors and substation sites only, with no unnecessary clearing permitted outside of these areas. • Where proposed power line corridors lie adjacent to existing linear infrastructure (e.g. power lines and roads) these new corridors should be as closely aligned to

CONSTRUCTION PHASE			
Activity	**Impact Summary**	**Significance**	**Proposed Mitigation**
vegetation under the constructed power line will also need to be maintained to provide access for vehicles for maintenance activities. **c)** Nature of Impact: Vegetation clearing will result in habitat disturbance and fragmentation. In natural, undisturbed areas the resulting habitat disturbance and fragmentation will be an ecological impact of concern. Plant species of conservation importance, such as *Acacia erioloba*, Boscia albitrunca and Acacia haematoxylon that occur within the proposed power line footprints may need to be cleared during the Construction Phase. Conversely in areas already disturbed by anthropogenic activities, such as around towns / settlements and immediately adjacent to major roads or existing power line servitudes, the resulting habitat disturbance and fragmentation will not be ecological impact of major concern.			the existing corridors. • The width of the power line corridors where vegetation is actively maintained during the operational phase must be kept to an absolute minimum that permits safe operation of the power line. • Wherever possible, the proposed power line corridors should positioned to avoid the clearing of plant species of conservation importance, most notably large *Acacia erioloba* trees. • If clearing of plant species of conservation importance is unavoidable, a removal permit from the relevant authority must be obtained.
a) Environmental Aspect (Project Activity): Construction activities associated with the	***Direct impacts:*** Killing or injuring of fauna within development footprint.	Moderate	• An Environmental Control Officer or trained individual should be available

CONSTRUCTION PHASE			
Activity	**Impact Summary**	**Significance**	**Proposed Mitigation**
assembly of transmission towers between the existing Valley Substation and proposed Sekgame Switching Station. **b)** Environmental Attribute: Savannah areas in South Africa provide habitat for a rich assemblage of fauna. In natural areas fauna species can be killed or injured during the construction and operational phases of development projects. **c)** Nature of Impact: Common causes of death and injury include: • Electrocution and collision of birds on power lines. The electrocution and collision of raptors and large Bustards and Cranes on power lines as being a major form of direct persecution of birds in the Northern Cape. Smaller capacity power lines (11kV to 132 kV) are particularly lethal for raptor electrocutions. Direct death/injury during vegetation clearing and earth works - particularly reptiles and nesting birds; • Vehicle–wildlife collisions – reptiles and highly mobile mammals crossing roads are susceptible to fast moving vehicles; and Hunting and snaring by construction workers.	***Indirect impacts:*** - ***Cumulative impacts:***-		during the construction phase to manage any wildlife-human interactions. • A low speed limit should be enforced on site to reduce wildlife-collisions. • Employees and contractors should be made aware of the presence of, and rules regarding fauna and the prohibition of hunting through suitable induction training. • No clearing of large Social Weaver nests should be permitted. • Power lines should be designed to be 'raptor friendly'. Devices/designs that could be considered include staggered insulators, raptor-protectors and/or perch deterrents. The Endangered Wildlife Trust's Birds of Prey Programme should be consulted in this regard.
Valley Substation to Sekgame Substation Alternative 2			
a) Environmental Aspect (Project Activity):	***Direct impacts:*** The power line will	**Low**	• Dust suppression techniques should be

CONSTRUCTION PHASE			
Activity	**Impact Summary**	**Significance**	**Proposed Mitigation**
Construction activities associated with the assembly of transmission towers between the existing Valley Substation and proposed Sekgame Switching Station. **b)** Environmental Attribute: The construction of the transmission towers as well as stringing the conductors between towers will result in a change in the change in the existing character and quality of the landscape. The presence of the 132kV power lines and substations will continue to exert a 'nuisance' to the existing visual environment as well as the people residing in the surrounding Kathu area. **c)** Nature of Impact: Construction of the proposed power line will result in a change in the composition of available views due to changes to the landscape.	constitute a visual obstruction / impact. ***Indirect impacts:*** None ***Cumulative impacts:*** None		implemented at all times. • Rehabilitate / restore exposed areas as soon as possible after construction activities are complete. • Only indigenous vegetation should be used for rehabilitation / landscaping purposes. • Security lighting should only be used where absolutely necessary and carefully directed. • The negative impact of night lighting, glare and spotlight effects, can be mitigated using the following methods: • Install light fixtures that provide precisely directed illumination to reduce light "spillage" beyond the immediate surrounds of the project. • Avoid using bright, white colour lights where possible. Preferably use lights emitting a yellow light which travels less that white coloured lights. • Light public movement areas (pathways and roads) with low level 'bollard' type lights and avoid post top lighting. • Avoid high pole top security lighting where possible.
a) Environmental Aspect (Project Activity): Construction activities associated with the assembly of transmission towers between the existing Valley Substation and	***Direct impacts:*** Loss of vegetation within construction footprint. ***Indirect impacts:*** Vegetation	**Moderate** **Moderate**	• Vegetation clearing should be restricted to the proposed power line corridors and substation sites only, with no unnecessary clearing permitted outside

CONSTRUCTION PHASE			
Activity	**Impact Summary**	**Significance**	**Proposed Mitigation**
proposed Sekgame Switching Station.	clearing can facilitate / contribute to conditions conducive to erosion.		of these areas.
b) Environmental Attribute: To gain access along the power line routes and to facilitate construction, vegetation will need to be cleared. During the operational phase vegetation under the constructed power line will also need to be maintained to provide access for vehicles for maintenance activities. **c)** Nature of Impact: Vegetation clearing will result in habitat disturbance and fragmentation. In natural, undisturbed areas the resulting habitat disturbance and fragmentation will be an ecological impact of concern. Plant species of conservation importance, such as *Acacia erioloba*, Boscia albitrunca and Acacia haematoxylon that occur within the proposed power line footprints may need to be cleared during the Construction Phase. Conversely in areas already disturbed by anthropogenic activities, such as around towns / settlements and immediately adjacent to major roads or existing power line servitudes, the resulting habitat disturbance and fragmentation will not be ecological impact of major concern.	***Cumulative impacts:*** Reduction in local species diversity.	**Moderate**	• Where proposed power line corridors lie adjacent to existing linear infrastructure (e.g. power lines and roads) these new corridors should be as closely aligned to the existing corridors. • The width of the power line corridors where vegetation is actively maintained during the operational phase must be kept to an absolute minimum that permits safe operation of the power line. • Wherever possible, the proposed power line corridors should positioned to avoid the clearing of plant species of conservation importance, most notably large *Acacia erioloba* trees. • If clearing of plant species of conservation importance is unavoidable, a removal permit from the relevant authority must be obtained.
a) Environmental Aspect (Project Activity): Construction activities associated with the assembly of transmission towers between	***Direct impacts:*** Killing or injuring of fauna within development footprint.	Moderate	• An Environmental Control Officer or trained individual should be available during the construction phase to manage
	Indirect impacts: -		

CONSTRUCTION PHASE			
Activity	**Impact Summary**	**Significance**	**Proposed Mitigation**
the existing Valley Substation and proposed Sekgame Switching Station. **b)** Environmental Attribute: Savannah areas in South Africa provide habitat for a rich assemblage of fauna. In natural areas fauna species can be killed or injured during the construction and operational phases of development projects. **c)** Nature of Impact: Common causes of death and injury include: • Electrocution and collision of birds on power lines. The electrocution and collision of raptors and large Bustards and Cranes on power lines as being a major form of direct persecution of birds in the Northern Cape. Smaller capacity power lines (11kV to 132 kV) are particularly lethal for raptor electrocutions. Direct death/injury during vegetation clearing and earth works - particularly reptiles and nesting birds; • Vehicle–wildlife collisions – reptiles and highly mobile mammals crossing roads are susceptible to fast moving vehicles; and Hunting and snaring by construction workers.	***Cumulative impacts:*** -		any wildlife-human interactions. • A low speed limit should be enforced on site to reduce wildlife-collisions. • Employees and contractors should be made aware of the presence of, and rules regarding fauna and the prohibition of hunting through suitable induction training. • No clearing of large Social Weaver nests should be permitted. • Power lines should be designed to be 'raptor friendly'. Devices/designs that could be considered include staggered insulators, raptor-protectors and/or perch deterrents. The Endangered Wildlife Trust's Birds of Prey Programme should be consulted in this regard.
d) Environmental Aspect (Project Activity): Construction activities associated with the assembly of transmission towers between the existing Valley Substation and proposed	***Direct impacts:*** Destruction of aquatic habitat to accommodate towers and overhead power lines. Placement of the towers within the extent of a wetland will alter the characteristics of	**High**	• Aquatic and wetland features within the survey area can be completely avoided if tower footprints, cable spanning, and footprints of the substations are carefully

CONSTRUCTION PHASE			
Activity	**Impact Summary**	**Significance**	**Proposed Mitigation**
Sekgame Switching Station. **a)** Environmental Attribute: The corridor alignment proposed between the Valley Substation and proposed Sekgame Switching Station crosses a wetland as well as a non-perennial stream. **b)** Nature of Impact: Destruction of aquatic habitat to accommodate towers and overhead power lines. The construction phase of the infrastructure requires the establishment of servitude roadways, excavations for foundations, on-site concrete work and tower construction. Setting the overhead line will also require the use of a servitude long the length of the line route. This all requires the obvious disturbance of soils, removal of vegetation and other disturbance features. If these activities take place within any wetland habitats, or within areas that will disturb watercourses or riparian zones, then direct habitat destruction impacts occur. Outside of the wetland and watercourse areas, disturbance of soils may also induce soil erosion that can impact on the wetlands and watercourses within the nearby vicinity.	the wetland (i.e. watercourse). ***Indirect impacts:*** - ***Cumulative impacts:*** -		planned. Service roads and other construction supporting services can also utilise existing roadways, bridges and access points without the need to establish impacting servitudes through wetlands and watercourses. • Careful planning so that all infrastructure footprints avoid surface water habitat units within the survey area will negate this impact; • If this is found to be unavoidable, then the size of the impacting footprint must be reduced as far as possible, indiscriminate habitat destruction must be avoided, use of existing roads and access points must be used as far as possible; and • Correct site reinstatement and vegetation rehabilitation must be implemented within impacted areas following completion of the construction phase.
a) Environmental Aspect (Project Activity): Construction activities associated with the assembly of transmission towers between the existing Valley Substation and proposed	***Direct impacts:*** Impacts on riparian vegetation leading to decrease in runoff filtration. ***Indirect impacts:*** Impact on local biodiversity due to riparian vegetation	**Moderate** **Moderate**	• Indiscriminate destruction of riparian habitat should be avoided.

CONSTRUCTION PHASE			
Activity	**Impact Summary**	**Significance**	**Proposed Mitigation**
Sekgame Switching Station. **a)** Environmental Attribute: The corridor alignment proposed between the existing Valley Substation and proposed Sekgame Substations Alternative 2, crosses a wetland as well as a non-perennial stream. **b)** Nature of Impact: Impacts on riparian vegetation leading to decrease in runoff filtration.	loss. ***Cumulative impacts: -***		
a) Environmental Aspect (Project Activity): Construction activities associated with the assembly of transmission towers between the existing Valley Substation and proposed Sekgame Switching Station. **b)** Environmental Attribute: The corridor alignment proposed between the existing Valley Substation and proposed Sekgame Substations Alternative 2, crosses a wetland as well as a non-perennial stream. **b)** Nature of Impact: Soil stripping, soil compaction and vegetation removal will increase rates of erosion and entry of sediment into the general aquatic ecosystem. Furthermore erosion of stockpiled topsoil and disturbance of soils due to vegetation stripping leading to erosion and habitat inundation.	***Direct impacts**:* Increased rate of erosion and entry of sediment into the general aquatic ecosystem. ***Indirect impacts:*** - ***Cumulative impacts:*** -	**Moderate**	• Erosion must be strictly controlled through the utilization of silt traps, silt fencing, Gabions within areas of steeper topography and in close proximity to wetlands and/or watercourses; and • Topsoil stockpiles should be protected from erosion through the utilization of silt traps, silt fencing, gabions, etc.
Valley Substation to Sekgame Substation Alternative 3			

CONSTRUCTION PHASE			
Activity	**Impact Summary**	**Significance**	**Proposed Mitigation**
d) Environmental Aspect (Project Activity): Construction activities associated with the assembly of transmission towers between the existing Valley Substation and proposed Sekgame Switching Station. **e)** Environmental Attribute: Presence of a historical structure along the alignment of the corridor alternative. **d)** Nature of Impact: An old farmstead with its associated structures was identified along the Valley-Sekgame Alternative 3 corridor alignment. The farmstead has a sandstone built foundation with brick walls built on top of the foundations. The house was renovated and is currently being occupied	***Direct impacts:*** Damage or destruction of heritage structure. ***Indirect impacts:*** - ***Cumulative impacts:*** -	**High**	• Alter the power line alignment to allow for a 20 meter buffer around heritage sites. Adjust the development layout and demarcate site with at least a 20-meter buffer. A 100 meter buffer should be applied in the case of memorial sites. No construction activities will be permitted within the buffer area. • The relocation of any graves must be preceded by conducting the required process stipulated in Section 34 of the National Heritage Resources Act, accordingly obtaining authorisation from the South African Heritage Resources Agency.
a) Environmental Aspect (Project Activity): Construction activities associated with the assembly of transmission towers between the existing Valley Substation and proposed Sekgame Switching Station. **b)** Environmental Attribute: The construction of the transmission towers as well as stringing the conductors between towers will result in a change in the change in the existing character and quality of the landscape. The presence of the 132kV power lines and substations will continue to exert a 'nuisance' to the existing visual environment as well as the people residing in the	***Direct impacts:*** The power line will constitute a visual obstruction / impact. ***Indirect impacts:*** - ***Cumulative impacts:*** -	**Low**	• Dust suppression techniques should be implemented at all times. • Rehabilitate / restore exposed areas as soon as possible after construction activities are complete. • Only indigenous vegetation should be used for rehabilitation / landscaping purposes. • Security lighting should only be used where absolutely necessary and carefully directed. • The negative impact of night lighting, glare and spotlight effects, can be mitigated using the following methods:

CONSTRUCTION PHASE			
Activity	**Impact Summary**	**Significance**	**Proposed Mitigation**
surrounding Kathu area. **c)** Nature of Impact: Construction of the proposed power line will result in a change in the composition of available views due to changes to the landscape.			• Install light fixtures that provide precisely directed illumination to reduce light "spillage" beyond the immediate surrounds of the project. • Avoid using bright, white colour lights where possible. Preferably use lights emitting a yellow light which travels less that white coloured lights. • Light public movement areas (pathways and roads) with low level 'bollard' type lights and avoid post top lighting. • Avoid high pole top security lighting where possible.
a) Environmental Aspect (Project Activity): Construction activities associated with the assembly of transmission towers between the existing Valley Substation and proposed Sekgame Switching Station.	***Direct impacts:*** Loss of vegetation within construction footprint.	**Moderate**	• Vegetation clearing should be restricted to the proposed power line corridors and substation sites only, with no unnecessary clearing permitted outside of these areas.
	Indirect impacts: Vegetation clearing can facilitate / contribute to conditions conducive to erosion.	**Moderate**	
e) Environmental Attribute: To gain access along the power line routes and to facilitate construction, vegetation will need to be cleared. During the operational phase vegetation under the constructed power line will also need to be maintained to provide access for vehicles for maintenance activities. **f)** Nature of Impact: Vegetation clearing will result in habitat disturbance and fragmentation. In natural, undisturbed areas the resulting habitat disturbance and	***Cumulative impacts:*** Reduction in local species diversity.	**Moderate**	• Where proposed power line corridors lie adjacent to existing linear infrastructure (e.g. power lines and roads) these new corridors should be as closely aligned to the existing corridors. • The width of the power line corridors where vegetation is actively maintained during the operational phase must be kept to an absolute minimum that permits safe operation of the power line. • Wherever possible, the proposed power

CONSTRUCTION PHASE			
Activity	**Impact Summary**	**Significance**	**Proposed Mitigation**
fragmentation will be an ecological impact of concern. Plant species of conservation importance, such as *Acacia erioloba*, Boscia albitrunca and Acacia haematoxylon that occur within the proposed power line footprints may need to be cleared during the Construction Phase. Conversely in areas already disturbed by anthropogenic activities, such as around towns / settlements and immediately adjacent to major roads or existing power line servitudes, the resulting habitat disturbance and fragmentation will not be ecological impact of major concern.			line corridors should positioned to avoid the clearing of plant species of conservation importance, most notably large *Acacia erioloba* trees. • If clearing of plant species of conservation importance is unavoidable, a removal permit from the relevant authority must be obtained.
a) Environmental Aspect (Project Activity): Construction activities associated with the assembly of transmission towers between the existing Valley Substation and proposed Sekgame Switching Station. **b)** Environmental Attribute: Savannah areas in South Africa provide habitat for a rich assemblage of fauna. In natural areas fauna species can be killed or injured during the construction and operational phases of development projects. **c)** Nature of Impact: Common causes of death and injury include: • Electrocution and collision of birds on power lines. The electrocution and collision of raptors and large Bustards	***Direct impacts:*** Killing or injuring of fauna within development footprint. ***Indirect impacts:*** - ***Cumulative impacts:*** -	Moderate	• An Environmental Control Officer or trained individual should be available during the construction phase to manage any wildlife-human interactions. • A low speed limit should be enforced on site to reduce wildlife-collisions. • Employees and contractors should be made aware of the presence of, and rules regarding fauna and the prohibition of hunting through suitable induction training. • No clearing of large Social Weaver nests should be permitted. • Power lines should be designed to be 'raptor friendly'. Devices/designs that could be considered include staggered insulators, raptor-protectors and/or perch deterrents. The Endangered Wildlife

CONSTRUCTION PHASE			
Activity	**Impact Summary**	**Significance**	**Proposed Mitigation**
and Cranes on power lines as being a major form of direct persecution of birds in the Northern Cape. Smaller capacity power lines (11kV to 132 kV) are particularly lethal for raptor electrocutions. Direct death/injury during vegetation clearing and earth works - particularly reptiles and nesting birds; • Vehicle–wildlife collisions – reptiles and highly mobile mammals crossing roads are susceptible to fast moving vehicles; and Hunting and snaring by construction workers.			Trust's Birds of Prey Programme should be consulted in this regard.
Moffat Substation– Valley Substation Alternative 2			
a) Environmental Aspect (Project Activity): Construction activities associated with the assembly of transmission towers between the existing Moffat Substation and Valley Substation Station. **b)** Environmental Attribute: Presence of a historical structure along the alignment of the corridor alternative. **c)** Nature of Impact: A small informal cemetery was identified at the Valley-Sekgame Alternative 2 corridor alignment. The cemetery has two graves with formal dressings and headstones. The graves date from 1919 and 1936. A monument was identified at this location	***Direct impacts:*** Damage or destruction of heritage structure. ***Indirect impacts:*** - ***Cumulative impacts:*** -	**High**	• Alter the power line alignment to allow for a 20 meter buffer around heritage sites. Adjust the development layout and demarcate site with at least a 20-meter buffer. A 100 meter buffer should be applied in the case of memorial sites. No construction activities will be permitted within the buffer area. • The relocation of any graves must be preceded by conducting the required process stipulated in Section 34 of the National Heritage Resources Act, accordingly obtaining authorisation from the South African Heritage Resources Agency.

CONSTRUCTION PHASE			
Activity	**Impact Summary**	**Significance**	**Proposed Mitigation**
from1929. An old farmstead was identified at this location. The farmstead was constructed with bricks and cement and had a pitched corrugated iron roof. The structure was abandoned and the age of this building is not known. The remains and some of the infrastructure of the old Bosrand Asbestos Mine were identified at this location. Several mine dumps were situated next to the road and some derelict structures were situated on the other side of the road.			
a) Environmental Aspect (Project Activity): Construction activities associated with the assembly of transmission towers between the existing Moffat Substation and Valley Substation Station. **b)** Environmental Attribute: The construction of the transmission towers as well as stringing the conductors between towers will result in a change in the change in the existing character and quality of the landscape. The presence of the 132kV power lines and substations will continue to exert a 'nuisance' to the existing visual environment. **c)** Nature of Impact: Construction of the proposed power line will result in a change	***Direct impacts:*** The power line will constitute a visual obstruction / impact. ***Indirect impacts:*** - ***Cumulative impacts:*** -	**Low**	• Dust suppression techniques should be implemented at all times. • Rehabilitate / restore exposed areas as soon as possible after construction activities are complete. • Only indigenous vegetation should be used for rehabilitation / landscaping purposes. • Security lighting should only be used where absolutely necessary and carefully directed. • The negative impact of night lighting, glare and spotlight effects, can be mitigated using the following methods: • Install light fixtures that provide precisely directed illumination to reduce light

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Activity	**Impact Summary**	**Significance**	**Proposed Mitigation**
in the composition of available views due to changes to the landscape.			"spillage" beyond the immediate surrounds of the project. • Avoid using bright, white colour lights where possible. Preferably use lights emitting a yellow light which travels less that white coloured lights. • Light public movement areas (pathways and roads) with low level 'bollard' type lights and avoid post top lighting. • Avoid high pole top security lighting where possible.
a) Environmental Aspect (Project Activity): Construction activities associated with the assembly of transmission towers between the existing Moffat Substation and Valley Substation Station. **b)** Environmental Attribute: Savannah areas in South Africa provide habitat for a rich assemblage of fauna. In natural areas fauna species can be killed or injured during the construction and operational phases of development projects. **c)** Nature of Impact: Common causes of death and injury include:	***Direct impacts:*** Killing or injuring of fauna within development footprint. ***Indirect impacts:*** -	Moderate	• An Environmental Control Officer or trained individual should be available during the construction phase to manage any wildlife-human interactions. • A low speed limit should be enforced on site to reduce wildlife-collisions. • Employees and contractors should be made aware of the presence of, and rules regarding fauna and the prohibition of hunting through suitable induction training. • No clearing of large Social Weaver nests should be permitted. • Power lines should be designed to be

CONSTRUCTION PHASE			
Activity	**Impact Summary**	**Significance**	**Proposed Mitigation**
• Electrocution and collision of birds on power lines. The electrocution and collision of raptors and large Bustards and Cranes on power lines as being a major form of direct persecution of birds in the Northern Cape. Smaller capacity power lines (11kV to 132 kV) are particularly lethal for raptor electrocutions. Direct death/injury during vegetation clearing and earth works - particularly reptiles and nesting birds; • Vehicle–wildlife collisions – reptiles and highly mobile mammals crossing roads are susceptible to fast moving vehicles; and hunting and snaring by construction workers.	***Cumulative impacts:*** -		'raptor friendly'. Devices/designs that could be considered include staggered insulators, raptor-protectors and/or perch deterrents. The Endangered Wildlife Trust's Birds of Prey Programme should be consulted in this regard.
a) Environmental Aspect (Project Activity): Construction activities associated with the assembly of transmission towers between the existing Moffat Substation and Valley Substation Station. **g)** Environmental Attribute: To gain access along the power line routes and to facilitate construction, vegetation will need to be cleared. During the operational phase vegetation under the constructed power line will also need to be maintained to provide access for vehicles for maintenance activities. **h)** Nature of Impact: Vegetation clearing will result in habitat disturbance and	***Direct impacts:*** Loss of vegetation within construction footprint.	**Moderate**	• Vegetation clearing should be restricted to the proposed power line corridors and substation sites only, with no unnecessary clearing permitted outside of these areas. • Where proposed power line corridors lie adjacent to existing linear infrastructure (e.g. power lines and roads) these new corridors should be as closely aligned to the existing corridors. • The width of the power line corridors where vegetation is actively maintained during the operational phase must be kept to an absolute minimum that permits
	Indirect impacts: Vegetation clearing can facilitate / contribute to conditions conducive to erosion.	**Moderate**	
	Cumulative impacts: Reduction in local species diversity.	**Moderate**	
	Indirect impacts: -		
	Cumulative impacts: -		

CONSTRUCTION PHASE			
Activity	**Impact Summary**	**Significance**	**Proposed Mitigation**
fragmentation. In natural, undisturbed areas the resulting habitat disturbance and fragmentation will be an ecological impact of concern. Plant species of conservation importance, such as *Acacia erioloba*, Boscia albitrunca and Acacia haematoxylon that occur within the proposed power line footprints may need to be cleared during the Construction Phase. Conversely in areas already disturbed by anthropogenic activities, such as around towns / settlements and immediately adjacent to major roads or existing power line servitudes, the resulting habitat disturbance and fragmentation will not be ecological impact of major concern.			safe operation of the power line. • Wherever possible, the proposed power line corridors should positioned to avoid the clearing of plant species of conservation importance, most notably large *Acacia erioloba* trees. • If clearing of plant species of conservation importance is unavoidable, a removal permit from the relevant authority must be obtained.
Mothibistad Substation– Moffat Substation Alternative 2			
a) Environmental Aspect (Project Activity): Construction activities associated with the assembly of transmission towers between the proposed Mothibistad Substation and existing Moffat Switching Station. **b)** Environmental Attribute: The construction of the transmission towers as well as stringing the conductors between towers will result in a change in the change in the existing character and quality of the landscape. The presence of the 132kV power lines and substations will continue to exert a 'nuisance' to the existing visual	***Direct impacts:*** The power line will constitute a visual obstruction / impact. ***Indirect impacts:*** - ***Cumulative impacts:*** -	**Low**	• Dust suppression techniques should be implemented at all times. • Rehabilitate / restore exposed areas as soon as possible after construction activities are complete. • Only indigenous vegetation should be used for rehabilitation / landscaping purposes. • Security lighting should only be used where absolutely necessary and carefully directed. • The negative impact of night lighting, glare and spotlight effects, can be

CONSTRUCTION PHASE			
Activity	**Impact Summary**	**Significance**	**Proposed Mitigation**
environment. **c)** Nature of Impact: Construction of the proposed power line will result in a change in the composition of available views due to changes to the landscape.			mitigated using the following methods: • Install light fixtures that provide precisely directed illumination to reduce light "spillage" beyond the immediate surrounds of the project. • Avoid using bright, white colour lights where possible. Preferably use lights emitting a yellow light which travels less that white coloured lights. • Light public movement areas (pathways and roads) with low level 'bollard' type lights and avoid post top lighting. • Avoid high pole top security lighting where possible.
a) Environmental Aspect (Project Activity): Construction activities associated with the assembly of transmission towers between the proposed Mothibistad Substation and existing Moffat Switching Station. **b)** Environmental Attribute: To gain access along the power line routes and to facilitate construction, vegetation will need to be cleared. During the operational phase vegetation under the constructed power line will also need to be maintained to provide access for vehicles for maintenance activities. **c)** Nature of Impact: Vegetation clearing will result in habitat disturbance and fragmentation. In natural, undisturbed areas	***Direct impacts:*** Loss of vegetation within construction footprint.	**Moderate**	• Vegetation clearing should be restricted to the proposed power line corridors and substation sites only, with no unnecessary clearing permitted outside of these areas. • Where proposed power line corridors lie adjacent to existing linear infrastructure (e.g. power lines and roads) these new corridors should be as closely aligned to the existing corridors. • The width of the power line corridors where vegetation is actively maintained during the operational phase must be kept to an absolute minimum that permits safe operation of the power line.
	Indirect impacts: Vegetation clearing can facilitate / contribute to conditions conducive to erosion.	**Moderate**	
	Cumulative impacts: Reduction in local species diversity.	**Moderate**	

CONSTRUCTION PHASE			
Activity	**Impact Summary**	**Significance**	**Proposed Mitigation**
the resulting habitat disturbance and fragmentation will be an ecological impact of concern. Plant species of conservation importance, such as *Acacia erioloba*, Boscia albitrunca and Acacia haematoxylon that occur within the proposed power line footprints may need to be cleared during the Construction Phase. Conversely in areas already disturbed by anthropogenic activities, such as around towns / settlements and immediately adjacent to major roads or existing power line servitudes, the resulting habitat disturbance and fragmentation will not be ecological impact of major concern.			• Wherever possible, the proposed power line corridors should positioned to avoid the clearing of plant species of conservation importance, most notably large *Acacia erioloba* trees. • If clearing of plant species of conservation importance is unavoidable, a removal permit from the relevant authority must be obtained.
a) Environmental Aspect (Project Activity): Construction activities associated with the assembly of transmission towers between the proposed Mothibistad Substation and existing Moffat Switching Station. **b)** Environmental Attribute: Savannah areas in South Africa provide habitat for a rich assemblage of fauna. In natural areas fauna species can be killed or injured during the construction and operational phases of development projects. **c)** Nature of Impact: Common causes of death and injury include: • Electrocution and collision of birds on power lines. The electrocution and	***Direct impacts:*** Killing or injuring of fauna within development footprint. ***Indirect impacts:*** - ***Cumulative impacts:*** -	Moderate	• An Environmental Control Officer or trained individual should be available during the construction phase to manage any wildlife-human interactions. • A low speed limit should be enforced on site to reduce wildlife-collisions. • Employees and contractors should be made aware of the presence of, and rules regarding fauna and the prohibition of hunting through suitable induction training. • No clearing of large Social Weaver nests should be permitted. • Power lines should be designed to be 'raptor friendly'. Devices/designs that could be considered include staggered insulators, raptor-protectors and/or perch

CONSTRUCTION PHASE			
Activity	**Impact Summary**	**Significance**	**Proposed Mitigation**
collision of raptors and large Bustards and Cranes on power lines as being a major form of direct persecution of birds in the Northern Cape. Smaller capacity power lines (11kV to 132 kV) are particularly lethal for raptor electrocutions. Direct death/injury during vegetation clearing and earth works - particularly reptiles and nesting birds; • Vehicle–wildlife collisions – reptiles and highly mobile mammals crossing roads are susceptible to fast moving vehicles; and Hunting and snaring by construction workers.			deterrents. The Endangered Wildlife Trust's Birds of Prey Programme should be consulted in this regard.
c) Environmental Aspect (Project Activity): Construction activities associated with the assembly of transmission towers between the proposed Mothbistat and existing Moffat Substations. **d)** Environmental Attribute: The corridor alignment proposed between the Mothbistat and existing Moffat Substations Alternative 2, crosses a wetland as well as a non-perennial stream. **e)** Nature of Impact: Destruction of aquatic habitat to accommodate towers and overhead power lines. The construction phase of the infrastructure requires the establishment of servitude roadways, excavations for foundations, on-site concrete work and tower construction. Setting the	***Direct impacts:*** Destruction of aquatic habitat to accommodate towers and overhead power lines. Placement of the towers within the extent of a wetland will alter the characteristics of the wetland (i.e. watercourse). ***Indirect impacts:*** - ***Cumulative impacts:*** -	**High**	• Aquatic and wetland features within the survey area can be completely avoided if tower footprints, cable spanning, and footprints of the substations are carefully planned. Service roads and other construction supporting services can also utilise existing roadways, bridges and access points without the need to establish impacting servitudes through wetlands and watercourses. • Careful planning so that all infrastructure footprints avoid surface water habitat units within the survey area will negate this impact; • If this is found to be unavoidable, then the size of the impacting footprint must be reduced as far as possible,

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Activity	**Impact Summary**	**Significance**	**Proposed Mitigation**
overhead line will also require the use of a servitude long the length of the line route. This all requires the obvious disturbance of soils, removal of vegetation and other disturbance features. If these activities take place within any wetland habitats, or within areas that will disturb watercourses or riparian zones, then direct habitat destruction impacts occur. Outside of the wetland and watercourse areas, disturbance of soils may also induce soil erosion that can impact on the wetlands and watercourses within the nearby vicinity.			indiscriminate habitat destruction must be avoided, use of existing roads and access points must be used as far as possible; and • Correct site reinstatement and vegetation rehabilitation must be implemented within impacted areas following completion of the construction phase.
c) Environmental Aspect (Project Activity): Construction activities associated with the assembly of transmission towers between the existing Mothibistad and Moffat Substations. **f)** Environmental Attribute: The corridor alignment proposed between the Mothbistat and existing Moffat Substations Alternative 2, crosses a wetland as well as a non-perennial stream. **d)** Nature of Impact: Impacts on riparian vegetation leading to decrease in runoff filtration.	***Direct impacts:*** Impacts on riparian vegetation leading to decrease in runoff filtration. ***Indirect impacts:*** Impact on local biodiversity due to riparian vegetation loss. ***Cumulative impacts: -***	**Moderate** **Moderate**	• Indiscriminate destruction of riparian habitat should be avoided.
c) Environmental Aspect (Project Activity): Construction activities associated with the assembly of transmission towers between	***Direct impacts***: Increased rate of erosion and entry of sediment into the general aquatic ecosystem.	**Moderate**	• Erosion must be strictly controlled through the utilization of silt traps, silt fencing, Gabions within areas of steeper

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Activity	**Impact Summary**	**Significance**	**Proposed Mitigation**
the existing Mothibistad and Moffat Substations. **g)** Environmental Attribute: The corridor alignment proposed between the Mothbistat and existing Moffat Substations Alternative 2, crosses a wetland as well as a non-perennial stream. **d)** Nature of Impact: Soil stripping, soil compaction and vegetation removal will increase rates of erosion and entry of sediment into the general aquatic ecosystem. Furthermore erosion of stockpiled topsoil and disturbance of soils due to vegetation stripping leading to erosion and habitat inundation.	***Indirect impacts:*** None ***Cumulative impacts:*** None		topography and in close proximity to wetlands and/or watercourses; and • Topsoil stockpiles should be protected from erosion through the utilization of silt traps, silt fencing, gabions, etc.

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Activity	**Impact Summary**	**Significance**	**Proposed Mitigation**
Gamohaan Substation to Mothibistad Alternative 1			
d) Environmental Aspect (Project Activity): Construction activities associated with the assembly of transmission towers between the existing Gamohaan and Mothibistad Substations. **e)** Environmental Attribute: All vegetation at proposed substation sites and where pylons will be erected will also be cleared to facilitate construction. Woody vegetation	***Direct impacts:*** Vegetation clearing may cause habitat disturbance and fragmentation. ***Indirect impacts:*** None ***Cumulative impacts:*** Decrease in local species diversity and extent.	**High** - **High**	• The clearing of vegetation at proposed substation sites and at pylon footprints should be keep to a minimum necessary for construction. No unnecessary clearing should be permitted outside of these areas. • Where proposed power line corridors lie adjacent to existing linear infrastructure/disturbances (e.g. power lines and roads) these new corridors

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Activity	**Impact Summary**	**Significance**	**Proposed Mitigation**
may need to be cleared during construction to provide vehicle access to portions of the existing power line servitudes for decommissioning activities and proposed power line servitudes for construction activities. During the operational phase woody vegetation under the new power lines will also need to be cleared to mitigate arcing risks. **f)** Nature of Impact: Vegetation clearing may cause habitat disturbance and fragmentation as follows: • In natural, undisturbed areas vegetation clearing will result in habitat loss, disturbance (alteration), and fragmentation. These impacts will be an ecological impact of concern; and • In areas already disturbed by anthropogenic activities, such as around towns/settlements and immediately adjacent to major roads or existing power line servitudes, the resulting habitat loss, disturbance and fragmentation will not be ecological impact of major concern; and • It is likely that plant species of conservation importance, such as *Acacia erioloba*, *Boscia albitrunca* and *Acacia haematoxylon* that occur within the proposed power line servitude will need			should be as closely aligned to the existing corridors. • The width of the power line corridors where woody vegetation is actively maintained during the operational phase must be kept to an absolute minimum that permits safe operation of the power line. • The power line servitudes within each of the preferred corridors should be aligned to avoid sensitive ecological features. A walk down of each preferred power line corridor, prior to servitude finalisation, thus needs to be undertaken by an ecological specialist to identify sensitive ecological features and to guide the alignment the actual power line servitude to avoid these features. Sensitive ecological features may inter alia include: o Large protected tree specimens; o Prominent protected tree patches, specifically Acacia erioloba woodland patches; o Raptor nests and large Sociable Weaver nests; o If clearing of plant species of conservation importance is unavoidable, a removal permit from

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Activity	**Impact Summary**	**Significance**	**Proposed Mitigation**
to be cleared to prevent arcing.			the relevant authority must be obtained. For species listed under the provinces ordinances, the relevant authority is the Northern Cape Department of Environment and Nature Conservation. For protected trees, the National Department of Agriculture, Forestry and Fisheries is the relevant authority. For regional Red List species and those listed under NEMBA the National Department of Environmental Affairs is the relevant authority. • An ECO needs to be appointed during construction to oversee the recommendations provided by the ecological specialist following the corridor walk down regarding, inter alia, power line alignment in relation to sensitive features and obtaining removal/relocation permits.
a) Environmental Aspect (Project Activity): Construction activities associated with the assembly of transmission towers between the existing Gamohaan and Mothibistad Substations. **b)** Environmental Attribute: The corridor routes that are proposed between the Gamohaan and Mothibistad substations are considered	***Direct impacts:*** Killing or injuring of fauna. ***Indirect impacts:*** - ***Cumulative impacts:*** -	**High** **-**	• An ECO or trained individual should be available during the construction phase to manage any wildlife-human interactions. • A low speed limit should be enforced on site to reduce wildlife-collisions. • Employees and contractors should be made aware of the presence of, and

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Activity	**Impact Summary**	**Significance**	**Proposed Mitigation**
as being similar from an Ecological perspective and are both closely aligned to R31 arterial road for much of their length. Both routes also traverse through pentads containing the same bird sensitivity scores. The Gamo-Mothi Alternative 2 corridor however, traverses through the 622 scoring pentad for longer than stretch as opposed to Gamo-Mothi Alternative 1. **c)** Nature of impact: Savannah areas in South Africa provide habitat for a rich assemblage of fauna. In natural areas fauna species can be killed or injured during the construction and operational phases of development projects. Common causes of death and injury include: • Electrocution and collision of birds on power lines – Anderson (2000) highlights the electrocution and collision of raptors and large Bustards and Cranes on power lines as being a major form of direct impact on birds in the Northern Cape. Smaller capacity power lines, such as those proposed to be developed, (11kV to 132 kV) have been reported to be particularly lethal for raptor electrocutions (Endangered Wildlife Trust); • Direct death / injury during woody vegetation clearing and earth works - particularly reptiles and nesting birds (e.g. Sociable Weaver *Philetairus*			rules regarding fauna and the prohibition of hunting through suitable induction training. • No clearing of large Sociable Weaver nests or raptor nests should be permitted. New power lines should be aligned to avoid the clearing of trees containing Sociable Weaver and raptor nests. • Power lines should be designed to be 'raptor friendly' Devices/designs that could be considered include staggered insulators, raptor-protectors and/or perch deterrents. The Endangered Wildife Trust's (EWT) Birds of Prey Programme should be consulted in this regard. • Periodic monitoring along operational power lines should be undertaken by an ornithologist to ensure that raptor friendly devices installed on power lines are effectives.

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Activity	**Impact Summary**	**Significance**	**Proposed Mitigation**
socius); and • Hunting and snaring by construction workers.			
a) Environmental Aspect (Project Activity): Construction activities associated with the assembly of transmission towers between the existing Gamohaan and Mothibistad Substations. **b)** Environmental Attribute: The Moffat Mission Station was identified along the corridor route. The mission station is a declared Provincial Monument. **c)** Nature of impact: Damage or destruction of heritage site.	***Direct impacts:*** Damage or destruction of heritage site. ***Indirect impacts:*** - ***Cumulative impacts:*** -	**High**	• Amendment of power line route alignment to bypass the Moffat Mission Station; • monitoring the site during construction if any construction is to take place closer than 200 meters from the site; and • A buffer of at least 500 meters must be kept from the monument. This distance can however be negotiated with the Provincial Heritage Authority – Heritage Northern Cape.
a) Environmental Aspect (Project Activity): Construction activities associated with the assembly of transmission towers between the existing Gamohaan and Mothibistad Substations. **b)** Environmental Attribute: The corridor alignment between the Gamohaan and Mothibistad Substations extends through the residential area of Kuruman. **c)** Nature of impact: The power line will constitute a visual intrusion to surrounding landscape.	***Direct impacts:*** The power line will constitute a visual intrusion to surrounding landscape. ***Indirect impacts:*** - ***Cumulative impacts:*** -	**Moderate**	• The extent of areas of disturbance must be confined to the smallest possible area during the construction phase. • Retain as much as possible of the existing vegetation along the substation footprint as possible. • Dust suppression techniques should be implemented at all times. • Rehabilitate / restore exposed areas as soon as possible after construction activities are complete.

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Activity	**Impact Summary**	**Significance**	**Proposed Mitigation**
d) Environmental Aspect (Project Activity): Construction activities associated with the assembly of transmission towers between the existing Gamohaan and Mothbistat Substations. **e)** Environmental Attribute: The corridor alignment proposed between the Gamohaan and Mothbistat Substations Alternative 1, crosses a wetland. **f)** Nature of Impact: Destruction of aquatic habitat to accommodate towers and overhead power lines. The construction phase of the infrastructure requires the establishment of servitude roadways, excavations for foundations, on-site concrete work and tower construction. Setting the overhead line will also require the use of a servitude long the length of the line route. This all requires the obvious disturbance of soils, removal of vegetation and other disturbance features. If these activities take place within any wetland habitats, or within areas that will disturb watercourses or riparian zones, then direct habitat destruction impacts occur. Outside of the wetland and watercourse areas, disturbance of soils may also induce soil erosion that can impact on the wetlands and watercourses within the nearby vicinity.	***Direct impacts:*** Destruction of aquatic habitat to accommodate towers and overhead power lines. Placement of the towers within the extent of a wetland will alter the characteristics of the wetland (i.e. watercourse). ***Indirect impacts: -*** ***Cumulative impacts: -***	**High**	• Aquatic and wetland features within the survey area can be completely avoided if tower footprints, cable spanning, and footprints of the substations are carefully planned. Service roads and other construction supporting services can also utilise existing roadways, bridges and access points without the need to establish impacting servitudes through wetlands and watercourses. • Careful planning so that all infrastructure footprints avoid surface water habitat units within the survey area will negate this impact; • If this is found to be unavoidable, then the size of the impacting footprint must be reduced as far as possible, indiscriminate habitat destruction must be avoided, use of existing roads and access points must be used as far as possible; • Correct site reinstatement and vegetation rehabilitation must be implemented within impacted areas following completion of the construction phase.
c) Environmental Aspect (Project Activity): Construction activities associated with the	***Direct impacts:*** Impacts on riparian vegetation leading to decrease in	**High**	• Indiscriminate destruction of riparian

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Activity	**Impact Summary**	**Significance**	**Proposed Mitigation**
assembly of transmission towers between the existing Gamohaan and Mothibistad Substations. **d)** Environmental Attribute: The corridor alignment proposed between the Gamohaan and Mothbistat Substations Alternative 1, crosses a wetland. **e)** Nature of Impact: Impacts on riparian vegetation leading to decrease in runoff filtration.	runoff filtration. ***Indirect impacts:*** Impact on local biodiversity due to riparian vegetation loss. ***Cumulative impacts: -***		habitat should be avoided.
c) Environmental Aspect (Project Activity): Construction activities associated with the assembly of transmission towers between the existing Gamohaan and Mothibistad Substations. **d)** Environmental Attribute: The corridor alignment proposed between the Gamohaan and Mothbistat Substations Alternative 1, crosses a wetland. **b)** Nature of Impact: Soil stripping, soil compaction and vegetation removal will increase rates of erosion and entry of sediment into the general aquatic ecosystem. Furthermore erosion of stockpiled topsoil and disturbance of soils due to vegetation stripping leading to erosion and habitat inundation.	***Direct impacts:*** Increased rate of erosion and entry of sediment into the general aquatic ecosystem. ***Indirect impacts:*** Erosion of stockpiled topsoil and disturbance of soils due to vegetation stripping leading to erosion and habitat inundation. ***Cumulative impacts: -***	**High**	• Erosion must be strictly controlled through the utilization of silt traps, silt fencing, Gabions within areas of steeper topography and in close proximity to wetlands and/or watercourses; and • Topsoil stockpiles should be protected from erosion through the utilization of silt traps, silt fencing, gabions, etc.
Eldoret Substation to Riries Substation Alternative 1			
d) Environmental Aspect (Project Activity):	***Direct impacts:*** Damage or	**Low**	• Alter the power line alignment to allow for

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Activity	**Impact Summary**	**Significance**	**Proposed Mitigation**
Construction activities associated with the assembly of transmission towers between the existing Eldoret and Riries Substations. **e)** Environmental Attribute: Presence of heritage sites along the alignment of the corridor alternative. **f)** Nature of Impact: The nature of the activities to be carried out during construction of the transmission towers including clearing of vegetation within the working area and excavations may damage underlying or concealed heritage resources. One cemetery and a site of was identified within the corridor alignment between the Eldoret and Riries Substations Alternative 1.	destruction of heritage resources. ***Indirect impacts:*** - ***Cumulative impacts***: -		a 20 meter buffer around heritage sites. Adjust the development layout and demarcate site with at least a 20-meter buffer. A 100 meter buffer should be applied in the case of memorial sites. No construction activities will be permitted within the buffer area. • The relocation of any graves must be preceded by conducting the required process stipulated in Section 34 of the National Heritage Resources Act, accordingly obtaining authorisation from the South African Heritage Resources Agency.
g) Environmental Aspect (Project Activity): Construction activities associated with the assembly of transmission towers between the existing Eldoret and Riries Substations. **h)** Environmental Attribute: All vegetation at proposed substation sites and where pylons will be erected will also be cleared to facilitate construction. Woody vegetation may need to be cleared during construction to provide vehicle access to portions of the existing power line servitudes for decommissioning activities and proposed power line servitudes for construction activities. During the operational phase woody vegetation under the new power lines	***Direct impacts:*** Vegetation clearing may cause habitat disturbance and fragmentation. ***Indirect impacts:*** - ***Cumulative impacts:*** Decrease in local species diversity and extent.	**High**	• The clearing of vegetation at proposed substation sites and at pylon footprints should be keep to a minimum necessary for construction. No unnecessary clearing should be permitted outside of these areas. • Where proposed power line corridors lie adjacent to existing linear infrastructure/disturbances (e.g. power lines and roads) these new corridors should be as closely aligned to the existing corridors. • The width of the power line corridors where woody vegetation is actively maintained during the operational

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Activity	**Impact Summary**	**Significance**	**Proposed Mitigation**
will also need to be cleared to mitigate arcing risks. **i)** Nature of Impact: Vegetation clearing may cause habitat disturbance and fragmentation as follows: • In natural, undisturbed areas vegetation clearing will result in habitat loss, disturbance (alteration), and fragmentation. These impacts will be an ecological impact of concern; and • In areas already disturbed by anthropogenic activities, such as around towns/settlements and immediately adjacent to major roads or existing power line servitudes, the resulting habitat loss, disturbance and fragmentation will not be ecological impact of major concern; and • It is likely that plant species of conservation importance, such as *Acacia erioloba*, *Boscia albitrunca* and *Acacia haematoxylon* that occur within the proposed power line servitude will need to be cleared to prevent arcing.			phase must be kept to an absolute minimum that permits safe operation of the power line. • The power line servitudes within each of the preferred corridors should be aligned to avoid sensitive ecological features. A walk down of each preferred power line corridor, prior to servitude finalisation, thus needs to be undertaken by an ecological specialist to identify sensitive ecological features and to guide the alignment the actual power line servitude to avoid these features. Sensitive ecological features may inter alia include: o Large protected tree specimens; o Prominent protected tree patches, specifically *Acacia erioloba* woodland patches; o Raptor nests and large Sociable Weaver nests; o If clearing of plant species of conservation importance is unavoidable, a removal permit from the relevant authority must be obtained. For species listed under the provinces ordinances, the relevant authority is the Northern Cape Department of Environment

CONSTRUCTION PHASE			
Activity	**Impact Summary**	**Significance**	**Proposed Mitigation**
			and Nature Conservation. For protected trees, the National Department of Agriculture, Forestry and Fisheries is the relevant authority. For regional Red List species and those listed under NEMBA the National Department of Environmental Affairs is the relevant authority. o An ECO needs to be appointed during construction to oversee the recommendations provided by the ecological specialist following the corridor walk down regarding, inter alia, power line alignment in relation to sensitive features and obtaining removal/relocation permits.
a) Environmental Aspect (Project Activity): Construction activities associated with the assembly of transmission towers between the existing Eldoret and Riries Substations. **b)** Environmental Attribute: The corridor routes that are proposed between the Gamohaan and Mothibistad substations are considered as being similar from an Ecological perspective and are both closely aligned to R31 arterial road for much of their length. Both routes also traverse through pentads containing the same bird sensitivity scores. The Gamo-Mothi Alternative 2 corridor	***Direct impacts:*** Killing or injuring of fauna. ***Indirect impacts:*** - ***Cumulative impacts: -***	**High**	• An ECO or trained individual should be available during the construction phase to manage any wildlife-human interactions. • A low speed limit should be enforced on site to reduce wildlife-collisions. • Employees and contractors should be made aware of the presence of, and rules regarding fauna and the prohibition of hunting through suitable induction training. • No clearing of large Sociable Weaver

CONSTRUCTION PHASE			
Activity	**Impact Summary**	**Significance**	**Proposed Mitigation**
however, traverses through the 622 scoring pentad for longer than stretch as opposed to Gamo-Mothi Alternative 1. **c)** Nature of impact: Savannah areas in South Africa provide habitat for a rich assemblage of fauna. In natural areas fauna species can be killed or injured during the construction and operational phases of development projects. Common causes of death and injury include: • Electrocution and collision of birds on power lines – Anderson (2000) highlights the electrocution and collision of raptors and large Bustards and Cranes on power lines as being a major form of direct impact on birds in the Northern Cape. Smaller capacity power lines, such as those proposed to be developed, (11kV to 132 kV) have been reported to be particularly lethal for raptor electrocutions (Endangered Wildlife Trust); • Direct death / injury during woody vegetation clearing and earth works - particularly reptiles and nesting birds (e.g. Sociable Weaver *Philetairus socius*); and • Hunting and snaring by construction workers.			nests or raptor nests should be permitted. New power lines should be aligned to avoid the clearing of trees containing Sociable Weaver and raptor nests. • Power lines should be designed to be 'raptor friendly' Devices/designs that could be considered include staggered insulators, raptor-protectors and/or perch deterrents. The Endangered Wildife Trust's (EWT) Birds of Prey Programme should be consulted in this regard. • Periodic monitoring along operational power lines should be undertaken by an ornithologist to ensure that raptor friendly devices installed on power lines are effectives.

3. OPERTATIONAL PHASE

OPERATIONAL PHASE			
Activity	**Impact summary**	**Significance**	**Proposed mitigation**
Fires: Ignition of veld due to conductor failure or flash overs.	***Direct impacts:*** Ignition of veld due to conductor failure or flash overs.	**Moderate**	Regular line inspections to ensure the integrity of the line.
	Indirect impacts: -	-	
	Cumulative impacts: -	-	
Avifauna: Electrocution of avifauna and collisions with the conductor.	***Direct impacts:*** Electrocution of avifauna and collisions with the conductor.	**High**	• Ensure that all these bird diversion structures remain in working order at all times. Bird diverter and bird guard placement may improve the electrocution and collision percentage. • Eskom to ensure that the vegetation clearance and line maintenance occurs as per Eskom Policies; • The width of the power-line servitude where vegetation is actively maintained during the operational phase must be kept at an absolute minimum that permits safe operation of the power line, as per Eskom's Vegetation Management and Maintenance within Eskom Land, Servitudes and Rights of Way Standard (240-70172585); • Ensure that as much natural vegetation as possible is retained within the corridor once the servitude is cleared to ensure visual screening; and • Institute erosion prevention measures.
	Indirect impacts: -	-	
	Cumulative impacts: -	-	
Servitude Management: Poor management on Eskom servitude gates exposes landowners to illegal trespassers and provides access to criminals and creates a poaching risk.	***Direct impacts:*** Poor management on Eskom servitude gates exposes landowners to illegal trespassers and provides access to criminals and creates a poaching risk.	**Moderate**	Eskom to ensure that the access maintenance servitude gates and locks occurs as per Eskom Policies. Suggest cooperating with landowner to maintain security.
	Indirect impacts: -	-	
	Cumulative impacts: -	-	
Provision of electricity: Faulting causing Loss	***Direct impacts:*** Faulting causing	**High**	The implementation of the proposed project

OPERATIONAL PHASE			
Activity	**Impact summary**	**Significance**	**Proposed mitigation**
of stable electricity supply i.e. outages which impacts negatively on businesses hospitals, schools etc.	loss of stable electricity supply i.e. outages which impacts negatively on businesses hospitals, schools etc.		will contribute to ensuring a stable supply of electricity in the project area.
	Indirect impacts: -	-	
	Cumulative impacts: -	-	

4. DECOMISSIONING PHASE

DECOMMISSIONING PHASE			
Activity	**Impact summary**	**Significance**	**Proposed mitigation**
Decommissioning of the redundant 66kV infrastructure once the 132kV network has become operational	***Direct impacts:*** -	-	The physical removal of the power line infrastructure would entail the reversal of the construction process which would necessitate the following actions to be taken: • A rehabilitation programme would need to be agreed upon with the landowners (if applicable) before being implemented; • Materials generated by the decommissioning process will be disposed of according to the Waste Management Hierarchy i.e. wherever feasible, materials will be reused, then recycled and lastly disposed of. Materials will be disposed of in a suitable manner, at a suitably disposal licensed facility. The general impacts associated with the decommissioning phase are addressed in the EMPr. All activities relating to the future decommissioning of the power line infrastructure does not form part of this application and as such would be subject to a separate Environmental Authorisation Process.
	Indirect impacts: -	-	
	Cumulative impacts: -	-	

5. NO-GO OPTION

NO-GO OPTION			
The 'No-Go' alternative refers to not implementing any of the proposed mining and related activities described in this report he option of not proceeding with the proposed project has been considered as an project alternative. Owing to the nature of and elements that make up the proposed project, it is considered unfeasible to implement any element of the proposed project which do not trigger a listed activity in isolation of the activities that do required Environmental Authorisation. Taking the aforementioned into account implementing the no-go option on most of the project activities that require Environmental Authorisation would result in the implementation of the 'No-Project' option.	***Direct impacts:*** • All impacts on the receiving environment that likely to result during the Construction and Operational Phases of the proposed project will not transpire. • No radial feed and an unsecure electricity supply, in the event where one of the power lines experience a fault; • Increasing electricity demand cannot be met with current network in the area; and • All capital investment made during the Planning Phase will be lost.		
	Indirect impacts: None		
	Cumulative impacts: None		

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

6. 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 A (preferred alternative) – Corridor Alternative 1

The significance of the impacts that are associated with the corridor alignment for the preferred alternative can be mitigated to reduce the impact significance to an acceptable level.

Alternative B – Corridor Alternative 2

The significance and nature of the impacts that are associated with the second corridor alignment are considered as less acceptable in comparison with that of the preferred alternative.

Alternative C

No-go alternative (compulsory)

Owing to the nature of and elements that make up the proposed project, it is considered unfeasible to implement the No-Go option. Electricity demand and stability is critical in the development of the local, regional and national economy. Electricity provision to households without electricity is also a priority of government. A stable electricity supply to these households an must be provided to meet basic human needs and aid in poverty alleviation. Lastly, the preferred alternative described above does not come with an unacceptable environmental cost which would result in the only feasible alternative being the No-Go option, and can be mitigated to within acceptable levels. The advantages and disadvantages of implementing the proposed project are indicated in Table 18.

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 ✓	NO

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).

Not Applicable

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.

Careful consideration has been given to all environmental impacts, specific to the various corridor alternative section, that are likely to emanate throughout the project lifecycle. Furthermore the preferred alternative proposed in this report, is regarded as the Best Practicable Environmental Option. It is imperative that all mitigations provided in the Basic Assessment Report as well as the Environmental Management Programme be strictly adhered to.

Authorisation of the Preferred Alternative as described in Section 2 of this BAR is recommended by the EAP (Refer to Figure 7). The Preferred Alternative is consist of the following corridor sections:

1. Hotazel-Eldoret Alternative 1
2. Eldoret-Riries Alternative 3
3. Riries-Gamohaan Alternative 1
4. Gamohaan-Mothibistad Alternative 1
5. Mothibistad-Moffat Alternative 1
6. Moffat-Valley Alternative 1
7. Valley-Sekgame Alternative 4

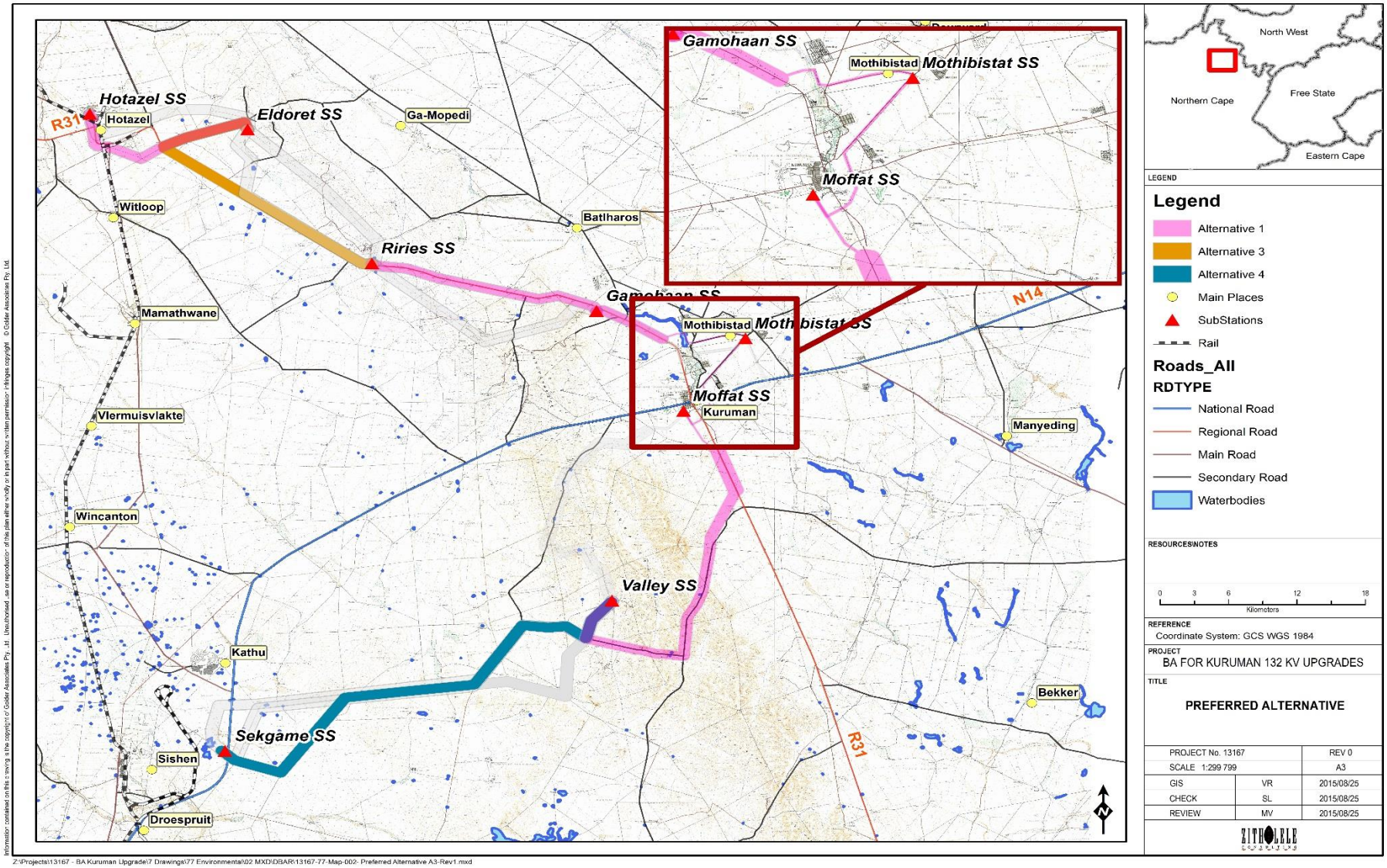

Figure 7: Preferred Alternative for the Proposed Project

Is an EMPr attached?

YES	NO
✓	

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.

Dr Mathys Vosloo
NAME OF EAP

_____ _____

SIGNATURE OF EAP DATE

SECTION F: APPENDICES

The following appendices must be attached:

Appendix A: Maps

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: Additional Information

APPENDIX A: MAPS

Appendix A1: Locality Map

Appendix A2: Sensitivity Map

Appendix A3: Municipal Boundary Map

Appendix A4: Geology Map

Appendix A5: Vegetation Map

Appendix A6: Vegetation Conservation Status Map

Appendix A7: Infrastructure Map

Appendix A8: All Alternatives Map

Appendix A9: Preferred Alternative Map

Appendix A1: Locality Map

Appendix A2: Sensitivity Map

Appendix A3: Municipal Boundary Map

Appendix A4: Geology Map

Appendix A5: Vegetation Map

Appendix A6: Vegetation Conservation Status Map

Appendix A7: Infrastructure Map

Appendix A8: Combined Alternatives Map

Appendix A9: Preferred Alternative Map

APPENDIX B: SITE PHOTOGRAPHS

APPENDIX C: FACILITY ILLUSTRATIONS

APPENDIX D: SPECIALIST STUDY REPORTS

Appendix D1: Terrestrial Ecology Study

Appendix D2: Visual Impact Study

Appendix D3: Wetland Delineation & Aquatic Study

Appendix D4: Heritage Impact Study

Appendix D5: Floodline Investigation Study

Appendix D1: Terrestrial Ecology Study

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Appendix D4: Heritage Impact Study

Appendix D5: Floodline Investigation Study

APPENDIX E: PUBLIC PARTICIPATION

Appendix E1: Advertisement & Site Notice

Appendix E2: Proof of Written Notice

Appendix E3: Comments & Response Report

Appendix E4: List of Commenting Authorities

Appendix E5: Interested and Affected Parties Database

Appendix E6: Meetings

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APPENDIX F: IMPACT ASSESSMENT

APPENDIX G: ENVIRONMENTAL MANAGEMENT PROGRAMME

APPENDIX H: DETAILS OF EAP AND DECLARATION OF INTEREST

APPENDIX I: DETAILS OF SPECIALIST AND DECLARATION OF INTEREST

APPENDIX J: OTHER

Appendix J1: 250 Meter Interval Coordinates

Appendix J2: Specialists Terms of Reference

Appendix J3: Sekgame Switching Station Environmental Authorisation

Appendix J1: 250 Meter Interval Coordinates

Appendix J2: Specialists Terms of Reference

Appendix J3: Sekgame Switching Station Environmental Authorisation