



**PROPOSED ESKOM TSHIPI E BORWA SUBSTATION AND
ASSOCIATED 132 KV LOOP-IN/LOOP-OUT FERRUM-
TSHIPI E BORWA POWER LINE, NEAR HOTAZEL,
NORTHERN CAPE PROVINCE**

FINAL BASIC ASSESSMENT REPORT

DEA Reference No.: 14/12/16/3/3/1/1510

February 2016

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environmental affairs

Department:
Environmental Affairs
REPUBLIC OF SOUTH AFRICA

(For official use only)

File Reference Number:

Application Number:

Date Received:

Basic assessment report in terms of the Environmental Impact Assessment Regulations, 2014, 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, 2014 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 **08 December 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
3. The report must be typed within the spaces provided in the form. The size of the spaces provided is not necessarily indicative of the amount of information to be provided. The report is in the form of a table that can extend itself as each space is filled with typing.
4. Where applicable **tick** the boxes that are applicable in the report.
5. An incomplete report may be returned to the applicant for revision.
6. The use of "not applicable" in the report must be done with circumspection because if it is used in respect of material information that is required by the competent authority for assessing the application, it may result in the rejection of the application as provided for in the regulations.
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.
11. 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.
12. A competent authority may require that for specified types of activities in defined situations only parts of this report need to be completed.
13. 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.
14. Two (2) colour hard copies and one (1) electronic copy of the report must be submitted to the competent authority.
15. Shape files (.shp) for maps must be included in the electronic copy of the report submitted to the competent authority.

DOCUMENT CONTROL

Date	03 February 2016
Project	Proposed Eskom Tshipi e Borwa Substation and associated 132 kV Loop-In/Loop-Out Ferrum-Tshipi e Borwa power line, near Hotazel, Northern Cape Province
Document Title	Final Basic Assessment Report for Decision
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ABREVIATIONS

BAR	Basic Assessment Report
DEA	Department of Environmental Affairs
DoE	Department of Energy
EAP	Environmental Assessment Practitioner
EMPr	Environmental Management Programme
EIA	Environmental Impact Assessment
ERA	Electricity Regulation Act (No. 4 of 2006)
GN	Government Notice
Ha	Hectares
HIA	Heritage Impact Assessment
I&AP's	Interested and Affected Parties
IPP	Independent Power Producer
MW	Megawatts
NEMA	National Environmental Management Act (No. 107 of 1998) (as amended)
NHRA	National Heritage Resources Act (No. 25 of 1999)
NWA	National Water Act (No 36 of 1998)
SAHRA	South African Heritage Resources Agency
SDF	Spatial Development Framework

TABLE OF CONTENTS:

SECTION A: ACTIVITY INFORMATION	11
SECTION B: SITE DESCRIPTION	33
SECTION D: IMPACT ASSESSMENT	46
SECTION E. RECOMMENDATION OF PRACTITIONER	92
SECTION F: APPENDICES	95

Appendices:

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

DETAILS OF THE ENVIRONMENTAL ASSESSMENT PRACTITIONER (EAP)

Environmental Assessment Practitioner (EAP):	Envirolution Consulting (Pty) Ltd		
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EAP Qualifications	BSc (Hons)		

Details of the EAP's expertise to carry out Basic Assessment procedures

Envirolution Consulting (Pty) Ltd was contracted by Eskom Holdings SOC Ltd as the independent environmental consultant to undertake the Environmental Basic Assessment process for the proposed project. Envirolution Consulting Pty Ltd is not a subsidiary of or affiliated to Eskom. Furthermore, Envirolution Consulting does not have any interests in secondary developments that may arise out of the authorisation of the proposed project.

Envirolution Consulting is a specialist environmental consulting company providing holistic environmental management services, including environmental impact assessments and planning to ensure compliance with environmental legislation and evaluate the risk of development; and the development and implementation of environmental management tools. Envirolution Consulting benefits from the pooled resources, diverse skills and experience in the environmental field held by its team.

We offer solutions to environmental issues that are key during our clients' planning and decision-making processes

The Envirolution Consulting team have considerable experience in environmental impact assessments and environmental management, and have been actively involved in undertaking environmental studies, for a wide variety of projects throughout South Africa, including those associated with linear developments.

The EAPs from Envirolution Consulting who are responsible for this project are (refer to **Appendix I** for CVs):

- Gesam Govender – The principle environmental assessment practitioner (EAP) for Envirolution Consulting is a registered Professional Natural Scientist and holds an Honours Degree in Botany. He has over 15 years of experience within the field of environmental management. His key focus is on strategic environmental assessment and advice; management and co-ordination of environmental projects, which includes integration of environmental studies and environmental processes into larger engineering-based projects and ensuring compliance to legislation and guidelines; compliance reporting; the identification of environmental management solutions and mitigation/risk minimising measures; and strategy and guideline development. He is currently responsible for the project management of EIAs for several diverse projects

across the country. He is registered with the South African Council for Natural Scientific Professions (No: 400049/12)

- Ms. Tara Lockwood the responsible EAP and principle author of this Basic Assessment Report holds a BSc. Honours degree from the University of Cape. She has 3 years of experience consulting in the environmental field. Her key focus is on strategic environmental assessment and advice; management and co-ordination of environmental projects, which includes integration of environmental studies and environmental processes into larger engineering-based projects and ensuring compliance to legislation and guidelines; environmental auditing and compliance reporting; the identification of environmental management solution and mitigation/risk minimising measures; environmental auditing, monitoring and reporting compliance. Tara has been a project scientist for various EIA's in South Africa and Southern Africa. Tara is currently a Project Manager and Environmental Consultant at Envirolution Consulting Pty Ltd.

BASIC ASSESSMENT REPORT FOR REVIEW

This Basic Assessment Report has been prepared by Envirolution Consulting in order to assess the potential environmental impacts associated with the proposed activities. This process is being undertaken in support of an application for Environmental Authorisation in terms of the National Environmental Management Act (NEMA, Act 107 of 1998).

Members of the public, local communities and stakeholders were invited to comment on the Draft Basic Assessment Report. The 30-day period for public review of the Draft Basic Assessment report was from the **03 November to 04 December 2015**. A second copy of the Draft Basic Assessment report was submitted to the Department of Environmental Affairs due to the originals being misplaced within the DEA offices (refer to Appendix E4 (c)). The review period for the DEA comments was from the **03 December 2015 to 24 January 2016**. Comments received during this period and throughout the process were included in this Final Basic Assessment Report.

Table 1: Legal requirements in terms of the EIA Regulations

EIA REGULATIONS 2014 GNR 982: Appendix 1, Item 2: CONTENT OF THE BASIC ASSESSMENT REPORT	Cross-reference in this BAR
a.) details of— (i) the EAP who prepared the report; and (ii) the expertise of the EAP to carry out scoping procedures; including a curriculum vitae	In FBAR pg 6-7
b.) the location of the activity, including: (i) the 21 digit Surveyor General code of each cadastral land parcel; (ii) where available, the physical address and farm name; (iii) where the required information in items (i) and (ii) is not available, the co-ordinates of the boundary of the property or properties;	Section B pg 33
(c) a plan which locates the proposed activity or activities applied for as well as associated structures and infrastructure at an appropriate scale; or if it is: (i) a linear activity, a description and co-ordinates of the corridor in which the proposed activity or activities is to be undertaken; or (ii) on land where the property has not been defined, the co-ordinates within which the proposed activity is to be undertaken;	Section A pg 11 and 15
(d) a description of the scope of the proposed activity, including – (i) all listed and specified activities triggered and being applied for; and (ii) a description of the activities to be undertaken including associated structures and infrastructure;	Section A (b) pg 14
(e) a description of the policy and legislative context within which the development is proposed, including- (i) an identification of all legislation, policies, plans, guidelines, spatial tools, municipal development planning frameworks, and instruments that are applicable to this activity and have been considered in the preparation of the report; and (ii) how the proposed activity complies with and responds to the legislation and policy context, guidelines, tools, frameworks and instruments;	Section A pg 26-29
(f) a motivation for the need and desirability for the proposed development	Section A pg 11

EIA REGULATIONS 2014 GNR 982: Appendix 1, Item 2: CONTENT OF THE BASIC ASSESSMENT REPORT	Cross-reference in this BAR
including the need and desirability of the activity in the context of the preferred location;	
(g) a motivation for the preferred site, activity and technology alternative	Section A pg 12
(h) a full description of the process followed to reach the proposed preferred alternative within the site, including- <ul style="list-style-type: none"> (i) details of all the alternatives considered; (ii) details of the public participation process undertaken in terms of Regulation 41 of the Regulations, including copies of the supporting documents and inputs; (iii) a summary of the issues raised by interested and affected parties, and an indication of the manner in which the issues were incorporated, or the reasons for not including them; (iv) the environmental attributes associated with the alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects; (v) the impacts and risks identified for each alternative, including the nature, significance, consequence, extent, duration and probability of the impacts, including the degree to which these impacts- <ul style="list-style-type: none"> (aa) can be reversed (bb) may cause irreplaceable loss of resources; and (cc) can be avoided, managed or mitigated; (vi) the methodology used in determining and ranking the nature, significance, consequences, extent, duration and probability of potential environmental impacts and risks associated with the alternatives; (vii) positive and negative impacts that the proposed activity and alternatives will have on the environment and on the community that may be affected focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects; (viii) the possible mitigation measures that could be applied and level of residual risk; (ix) the outcome of the site selection matrix; (x) if no alternatives, including alternative locations for the activity were investigated, the motivation for not considering such; and (xi) a concluding statement indicating the preferred alternatives 	Section B (9) pg 40 Section C pg 43-45
(i) a full description of the process undertaken to identify, assess and rank the impacts the activity will impose on the preferred location through the life of the activity, including- <ul style="list-style-type: none"> (i) description of all environmental issues and risks that were identified during the environmental impact process; and (ii) an assessment of the significance of each issue and risk and an indication of the extent to which the issue and risk could be avoided or addressed by the adoption of mitigation measures; 	Appendix D and F
(j) an assessment of each identified potentially significant impact and risk, including- <ul style="list-style-type: none"> (i) cumulative impacts; (ii) the nature significance and consequences of the impact and risk; (iii) the extent and duration of the impact and risk; (iv) the probability of the impact and risk occurring; (v) the degree to which the impact and risk can be reversed; (vi) the degree to which the impact and risk may cause irreplaceable loss of resources; and (vii) the degree to which the impact and risk can be avoided, managed or 	Appendix F

EIA REGULATIONS 2014 GNR 982: Appendix 1, Item 2: CONTENT OF THE BASIC ASSESSMENT REPORT	Cross-reference in this BAR
mitigated;	
(k) where applicable, a summary of findings and impact management measures identified in any specialist report complying with Appendix 6 to these Regulations and an indication as to how these findings and recommendations have been included in the final report;	Section D(1) pg 47 Appendix G
(l) an environmental impact statement which contains- (i) a summary of the key findings of the environmental impact assessment; (ii) a map at an appropriate scale which superimposes the proposed activity and its associated structures and infrastructure on the environmental sensitivities of the preferred site indicating any areas that should be avoided, including buffers; and (iii) a summary of positive and negative impacts and risks of the proposed activity and identified alternatives;	Section D(2) pg 89
(m) based on the assessment, and where applicable, impact management measures from the specialist reports, the recording of the impact management objectives and the impact management outcomes for the development for inclusion in the EMPr;	Appendix G
(n) any aspects which were conditional to the findings of the assessment either by the EAP or specialist which are to be included as conditions of the authorisation;	Section E pg 92
(o) a description of any assumptions, uncertainties, and gaps in knowledge which relate to the assessment and mitigation measures proposed;	Appendix D Section E pg 92-94
(p) a reasoned opinion as to whether the proposed activity should or should not be authorised, and if the opinion is that it should be authorised, any conditions that should be made in respect of that authorisation	Section E pg 92
(q) where the proposed activity does not include operational aspects, the period for which the environmental authorisation is required, the date on which the activity will be conducted and the post construction monitoring requirements finalised;	Appendix F and G
(r) an undertaking under oath or affirmation by the EAP in relation to: (i) the correctness of the information provided in the reports; (ii) the inclusion of comments and inputs from the stakeholders and I&APs; (iii) the inclusion of inputs and recommendations from the specialist reports where relevant; and (iv) any information provided by the EAP to interested and affected parties and any responses by the EAP to the comments or inputs made by interested and affected parties;	Appendix H3
(s) where applicable, details of any financial provisions for the rehabilitation, closure and ongoing post decommissioning management of negative environmental impacts	Not applicable
(t) any specific information that may be required by the competent authority; and	No comments received
(u) any other matters required in terms of section 24(4)(a) and (b) of the Act	Not applicable

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.

1. Project Description

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

Eskom Holdings SOC Ltd is proposing to construct the Tshipi e Borwa substation and two 132kV distribution power lines which will span between the proposed Tshipi e Borwa substation and the existing Fox/Umtu 132kV power line, near Hotazel, in the Northern Cape Province.

The establishment of the proposed development is to be undertaken on farms Mamatwan 331, Moab 700, Sinterfontein 748, Shirley 367 and Alton 368. The site is situated approximately 25 km south east of Hotazel and 40km north of Kathu in the Northern Cape Province and falls within the jurisdiction of both the Gamagara and Joe Morolong Local Municipalities.

The project infrastructure will include two 132 kV single tern distribution power lines approximately 5km long, on a double-circuit structure, typically steel monopole structures, to span the lines. A substation of an area of 100x100m will be constructed to receive the power lines. The electricity will then be distributed to the mines from the proposed Tshipi e Borwa substation. The objective of the proposed power line and substation is to strengthen the electricity supply to the mines in the surrounding area, such as the Mamatwan Manganese Ore Mine as well as the Tshipi e Borwa Mine. A new line from the existing Fox/Umtu power line to a new substation will be the best way to provide the required electricity supply.

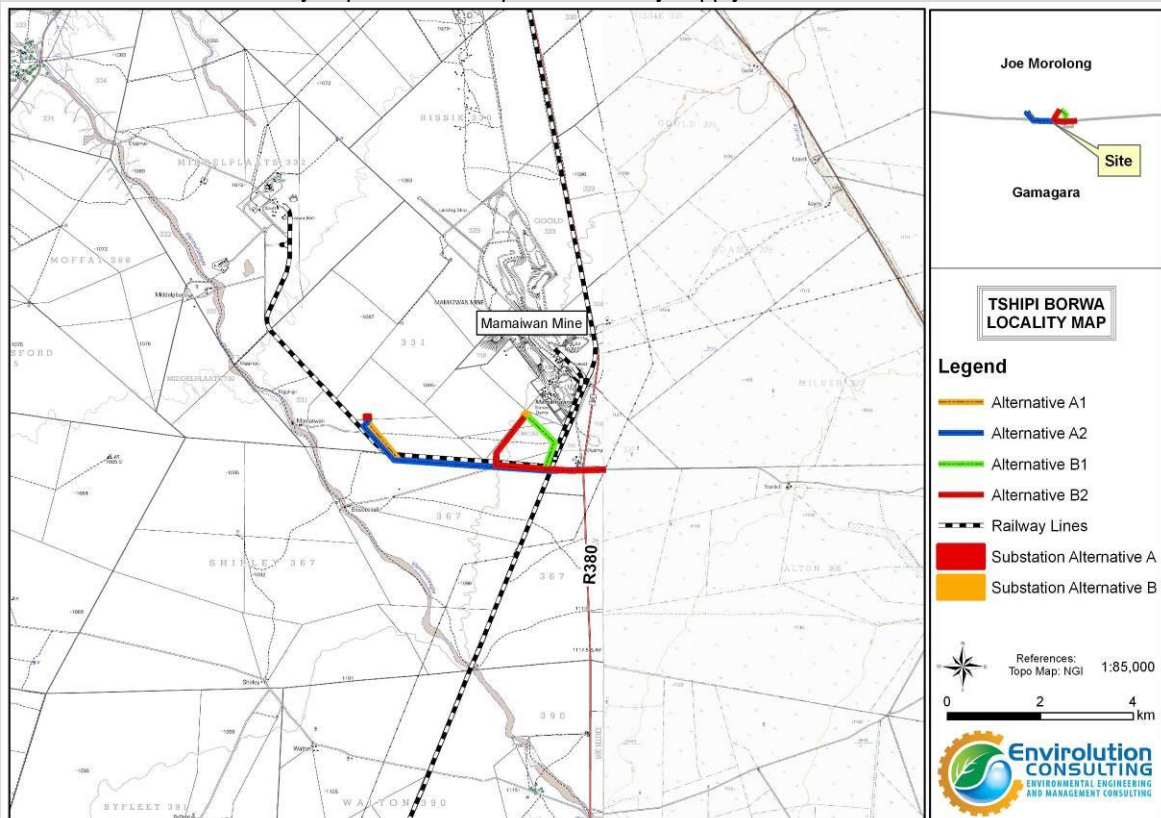


Figure 1.1: Tshipi e Borwa Locality Map showing the preferred substation site and associated power lines as well as the alternatives.

Description of the proposed development (preferred and alternatives)

Substation A and associated power lines (preferred)

As shown in Figure 1.1 above, Substation Site A (Red Square) is situated in an open field on farm Mamatwan 331, 3.6 km west from the entrance to the Mamatwan Manganese Mine. It is within the mine's boundaries but the substation site is on the outskirts along a gravel road leading towards Middelplaats Manganese Mine.

Two power line routes (one preferred and one alternative) connect the substation site A to an existing power line that is located approximately 400m east of the R380. The route distances are approximately 5km each. The preferred route A1 (yellow) originates at substation A and proceeds in a southeastern direction across the gravel road that leads to Middelplaats Manganese Mine. From here it turns east and crosses the R380 to where it connects to the existing power line (Fox-Ferrum line). The alternative route A2 (blue) is a slight deviation of A1 and exits the proposed substation site in a southwesterly direction before turning southeast. From here it follows the same route as described for route A1.

Substation B and associated power lines (alternatives)

Substation Site B (Orange Square) is located closer to the Mamatwan Mine's sinter plant, approximately 1 km north west of the mine's entrance situated on farm Moab 700.

Two power line routes (neither preferred) join the substation site B to the existing power line, east of the R380. Route B1 exits the substation site in a southeasterly direction towards the railway line. It turns south before reaching the railway line and proceeds in this direction towards the Mamatwan Mine's entrance. After crossing the gravel road, it turns east to the point where it connects with the existing power line. Route B2 exits the substation in a southwestern direction. It proceeds towards the gravel road. After crossing the gravel road, it turns east and follows a straight line across the R380 to where it connects with the existing power line.

Required Services

Establishment of Construction Camps

The establishment of construction camps will be done in accordance to the stipulations of the final Environmental Management Plan and negotiations with the affected landowners.

Water

Water will be required for potable use and in the construction of the foundations for the towers. The water will be sourced from municipality points at locations closest to the area of construction.

Sewerage

The generation of sewerage is anticipated for the duration of construction. Onsite treatment will be undertaken through the use of chemical toilets. The toilets will be serviced periodically by the supplier and effluent will be collected for disposal into the registered Waste Water Treatment Works.

Roads

Existing roads will be utilised as far as possible during construction and operation. No roads that trigger NEMA Regulations Listed Activities will be required. The use of roads on landowner property is subject to the provisions of an EMP and will be determined based on discussions with landowners should it be necessary.

Solid Waste Disposal

Eskom has a strong commitment to waste minimisation and recycling. All solid waste will be collected at a central location at each construction site, and will be disposed at the registered waste site or stored temporarily until removal for recycling or disposal at an appropriately permitted landfill site in the vicinity of the construction site.

Foundations

The excavations shall be kept covered or barricaded in a manner accepted by the Supervisor to prevent injury to people or livestock. Failure to maintain proper protection of excavations may result in the suspension of excavation work until proper protection has been restored.

Stringing

Once towers have been erected, cables will be strung between the towers.

Bird Flight Diverters

Bird flight deflectors will be fitted on the structures during the operation phase.

Electricity

Diesel generators will be utilised for the provision of electricity where electricity connection is not readily available.

Construction Process

Generally, the construction of the powerline is expected to consist of the following sequential phases:

- Step 1: Feasibility and identification of line alternatives.
- Step 2: Basic Assessment input and environmental permitting.
- Step 3: Negotiation of final route with affected landowners.
- Step 4: Survey of the proposed route.
- Step 5: Selection of structures suited to the terrain and ground conditions.
- Step 6: Final design of the distribution line and placement of towers.
- Step 7: Issuing of tenders and eventually appointment of contractors for the project.
- Step 8: Vegetation clearance and construction of access roads (if required).
- Step 9: Pegging of structures.
- Step 10: Construction of foundations.
- Step 11: Assembly and erection of structures.
- Step 12: Stringing of conductors.
- Step 13: Rehabilitation of disturbed areas and protection of erosion sensitive areas.
- Step 14: Testing and commissioning.
- Step 15: Operation and routine maintenance.

It is estimated that the construction period for this project will be 18-24 months.

Listed Activities triggered by the proposed development

In terms of Sections 24(2) and 24(D) of the National Environmental Management Act, 1998 (Act No. 107 of 1998), as amended, and as read with EIA Regulations 2014 of GN R982-985, a Basic Assessment is required to be undertaken for the proposed project. The need for a Basic Assessment is triggered by the following listed activities:

GNR. 983, Listing Notice 1 of 2014

- Activity 11: The development 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 kilovolts;
- Activity 27: The clearance of an area of 1 hectares or more, but less than 20 hectares of indigenous vegetation;

In this regard, Eskom Holdings SOC Ltd has appointed Envirolution Consulting (Pty) Ltd as an independent environmental consultant to undertake the required basic assessment and public participation for the proposed project.

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

Detailed description of listed activities associated with the project	
Listed activity as described in GN 983, 984 and 985	Description of project activity that triggers listed activity – if activities in GN 983 are triggered, indicate the triggering criteria as described in the second column of GN 983
<i>GN983 Item 11 (j): The development of facilities or infrastructure for the distribution and distribution of electricity – outside urban areas or industrial complexes with a capacity of more than 33 but less than 275 kilovolts;</i>	The 132kV power line will be constructed outside an urban area.
<i>GN983 Item 27: The clearance of an area of 1 hectares or more, but less than 20 hectares of indigenous vegetation;</i>	An area of about 100m x100m (1hectare) is required to construct the proposed substation and Eskom may clear above 10000m² for the purposes of substation construction.

1. 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 Appendix 1 (3)(h), Regulation 2014. 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)
Substation A	27°23'52.25"S	22°57'14.04"E
Alternative 2		
Description	Lat (DDMMSS)	Long (DDMMSS)
Substation B	27°23'49.73"S	22°59'04.71"E

In the case of linear activities:

Power lines A1 and A2:

Route A1 (preferred)

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

Latitude (S):

Longitude (E):

27°24'14.26"S	22°57'30.68"E
27°24'24.74"S	22°58'26.11"E
27°24'28.53"S	22°59'59.71"E

Route A2 (alternative)

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

27°24'20.96"S	22°57'32.34"E
27°24'24.74"S	22°58'26.11"E
27°24'28.53"S	22°59'59.71"E

Power lines B1 and B2:

Route B1

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

Latitude (S):

Longitude (E):

27°24'26.68"S	22°59'18.08"E
27°24'28.17"S	22°59'21.71"E
27°24'28.53"S	22°59'59.71"E

Route B2

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

27°24'16.63"S	22°58'43.74"E
27°24'27.86"S	22°59'12.39"E
27°24'28.53"S	22°59'59.71"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. **Please find the addendum attached in Appendix A.**

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 of this form.

b) **Lay-out alternatives**

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

Alternative 3		
Description	Lat (DDMMSS)	Long (DDMMSS)

c) Technology alternatives

Substations

Air Insulated Substation (AIS) vs. Gas Insulated Substation (GIS)
<p>AIS are generally used where there is an overhead network and GIS on cable networks. GIS uses SF6 gasses for insulation which have a higher dielectric strength than air which is the insulation medium in AIS. GIS has a smaller foot print than AIS and is usually enclosed indoor (in a building of some sort) whereas AIS is out in the open. However GIS in the context of this project would not be a good option as it would require that we terminate all the overhead lines onto cables creating a source of theft risk. We would still require a 132kV yard for the HV/MV transformers and busbar hence the footprint benefits of GIS would not be realised fully.</p> <p><i>This alternative is therefore not preferred for the reasons stated above. This would not be an option for the proposed substation.</i></p>

Power lines

Steel Monopole Structure vs. Lattice structures
<p>Eskom prefers the proposed steel monopole structure (Figure 2.1) as the technology to be used. A steel monopole structure is considered as the most appropriate technology, and in some cases has been specifically designed for the existing environmental conditions and terrain, as specified by standard ESKOM specifications and best international practice.</p> <p>Monopole structures are considered to be cost effective and preferable in any areas with denser population. When compared to underground cables and other overhead structures, the speed and ease of installation of monopoles is significantly better, the impact on land is less, and the economic decisions associated with easier installations and little post-installation maintenance result in low life-cycle costs. The use of monopole structures also allows much more flexibility with respect to width of right-of-way and height requirements for structures.</p>



Photo plate 1: Double Circuit monopole structures

The impact on the land is much less for monopole structures in comparison to other structures. In addition, the time required on the landowner's property is less for monopole structures. The reduced time on the land reduces the impact on the landowner's use of his land and allows him to get back sooner to his normal operations. Lastly, the footprint required for steel monopole structures is much less when compared to other structures. The reduced footprint can require less right-of way, easier operation on the ground during construction, and allow for more natural uses of land after construction.



Photo plate 2: Steel lattice overhead structures

These monopole tower structures proposed have been selected to reduce visual impacts, impact on sensitive vegetation areas, wetlands and sensitive riparian habitats.

With regards to the issue of lattice vs. monopole, Eskom generally utilises monopole structures as it is aesthetically more pleasing, has a smaller footprint and requires less steel. Monopole structures are not self-supporting hence it needs stays to hold up the strain structures whereas lattice can be self-supporting.

Option Description	Technical Viability	Financial Analysis
<ul style="list-style-type: none"> • Steel Monopole/3-Pole Structures 	<ul style="list-style-type: none"> • Smaller footprint but requires stays/anchors on the strainers and bend points. • Not imposing in appearance. 	R 1,650,890.64 per km
<ul style="list-style-type: none"> • Steel Lattice Structures 	<ul style="list-style-type: none"> • Larger footprint and self-supporting. • Plagued by member theft. • Imposing in appearance. 	R 3,779,814.53 per km

Figure 2.1: Cost and Impact comparison between power line technology alternatives

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

Alternative 1 (preferred alternative)		
Alternative 2		
Alternative 3		

e) No-go alternative: Tshipi e Borwa Substation and associated Power line

The No-go option implies that the project does not proceed, and will thus comprise of Eskom not going ahead with the construction of the proposed power lines and substation. Ideally this would be the preferred alternative as the status quo of the environment remains unchanged, however due to the growing demand for energy and activities that will require electricity in the area, this alternative is not feasible. Should Eskom rely on the existing network to supply future demand it is highly likely that present supply will be compromised due to the increased load on the network. Although the no-go alternative has been considered, it is not a practical project alternative in terms of providing stable electricity supply for the mines in the area and for additional mines that are also being planned in the immediate vicinity as it implies a continuation of the current situation or the status quo, therefore, it doesn't render any positive outcomes.

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

2. PHYSICAL SIZE OF THE ACTIVITY

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

Substations:

Substation A¹ (preferred)

Substation B (alternative)

Alternative A3 (if any)

Size of the activity:

100x100 m ²
100x100 m ²
m ²

or, for linear activities:

Power lines associated with Substation A:

Route A1 (preferred activity alternative)

Route A2 (if any)

Alternative A3 (if any)

Length of the activity:

5150 m
5000 m
m

Power lines associated with Substation B (alternatives):

Route B1

Route B2

Alternative A3 (if any)

Length of the activity:

3600 m
3400 m
m

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

Substations:

Substation A² (preferred)

Substation B (alternative)

Alternative A3 (if any)

Size of the activity:

100x100 m ²
100x100 m ²
m ²

or, for linear activities:

Power lines associated with Substation A:

Route A1 (preferred activity alternative)

Route A2 (if any)

Alternative A3 (if any)

Length of the activity:

31m x5150m=155000m ²
31m x5000m=159650m ²
m

Power lines associated with Substation B (alternatives):

Route B1

Route B2

Alternative A3 (if any)

Length of the activity:

31m x3600m=111600m ²
31m x3400m=105400m ²
m

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

² "Alternative A.." refer to activity, process, technology or other alternatives.

3. SITE ACCESS

Does ready access to the site exist?

YES ✓	NO
m	

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

Describe the type of access road planned:

The site can be accessed from the towns of Kathu or Hotazel via the existing tarred road, the R380 which connects to the N14 from Kathu. From the R380, site access is available via the gravel road towards Middelplaats Mine and Kuruman.

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.

4. 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).

5. 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.

6. 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 DWS);
- 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.

7. 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.

8. 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.

9. 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
The proposed routes and substations are located on privately owned agricultural and mining land. Once the proposed overhead line and substation have been constructed, limited impacts are expected. Eskom will acquire servitudes and affected property owners will be permitted to use areas underneath the lines for activities such as animal grazing. Other activities, except the construction of buildings and tall structures and growing of trees, may also continue below the lines.			

2. Will the activity be in line with the following?			
(a) Provincial Spatial Development Framework (PSDF)	YES✓	NO	Please explain
The PSDF for Northern Cape Province aims at 'building a prosperous, sustainable growing provincial economy to reduce poverty and improve social development'. The proposed project will address such aspects of the province since it will assist in providing electricity to the mines and thus ensure that one of the main sources of industry continue in operation which will have a positive economic impact at a local and regional scale.			
(b) Urban edge / Edge of Built environment for the area	YES	NO✓	Please explain
The site is situated approximately 25 km south east of Hotazel and 40km north of Kathu. The proposed development is outside of the urban edge and will not impact on the urban edge in any way.			
(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 will not compromise the IDP and SDF. Both the Gamagara and Joe Morolong Local Municipalities promote mining beneficiation and find that the mining sector provides many employment opportunities; additionally the municipalities support the "bulk supply of electricity, which includes for the purposes of such supply, the transmission, distribution and, where applicable, the generation of electricity, and also the regulation, control and maintenance of the electricity reticulation network, tariff policies, monitoring of the operation of the facilities for adherence to standards and registration requirements, and any other matter pertaining to the provision of electricity in the municipal areas". Therefore increasing the supply of electricity to the mines in this area ensures their continued operation thus providing a positive economic impact at a local and regional scale.			
(d) Approved Structure Plan of the Municipality	YES✓	NO	Please explain
The proposed project entails electricity infrastructure, which is compatible with the Gamagara Local Municipality IDP (2011-2014) and the Joe Morolong Local Municipality IDP (2011-2012).			
(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
The proposed development will not compromise the John Taelo Gaetsewe District Municipality EMF (2011). As stated within the EMF, the project aligns with the goals and objectives where "the availability of electricity , education and communication networks, water and transportation will create new, and optimise existing, opportunities for economic development and entrepreneurship" via sustainable development. The proposed project is contained within a low sensitivity area close to existing mines where the environmental management priorities will not be unduly affected.			
(f) Any other Plans (e.g. Guide Plan)	YES✓	NO	Please explain
The proposed development is aligned with Eskom's Integrated Strategic Electricity Planning (ISEP) process, which is intended to provide strategic projections of supply-side and demand-side options to be implemented in order to meet long-term load forecasts. It provides the framework for Eskom to investigate a wide range of new supply-side and demand-side technologies with a view to optimising investments and returns.			

<p>3. Is the land use (associated with the activity being applied for) considered within the timeframe intended by the existing approved SDF agreed to by the relevant environmental authority (i.e. is the proposed development in line with the projects and programmes identified as priorities within the credible IDP)?</p>	<p>YES✓</p>	<p>NO</p>	<p>Please explain</p>
<p>The proposed development is in line with the National Development Plan as well as the Gamagara and Joe Morolong Local Municipalities' SDF's and IDP's, which related to the provision of infrastructure such as electricity supply.</p>			
<p>4. Does the community/area need the activity and the associated land use concerned (is it a societal priority)? (This refers to the strategic as well as local level (e.g. development is a national priority, but within a specific local context it could be inappropriate.)</p>	<p>YES✓</p>	<p>NO</p>	<p>Please explain</p>
<p>The power line and substation is required to be built to provide extra electricity for the proposed mines in the area. Since mining is the major employer in the municipality, providing electricity to the mines can be considered a societal priority.</p>			
<p>5. Are the necessary services with adequate capacity currently available (at the time of application), or must additional capacity be created to cater for the development? (Confirmation by the relevant Municipality in this regard must be attached to the final Basic Assessment Report as Appendix I.)</p>	<p>YES✓</p>	<p>NO</p>	<p>Please explain</p>
<p>The proposed project is the construction of a 132kV substation and associated overhead distribution power lines. It will not require any capacity for services such as water and sanitation from relevant Municipalities. It will however provide additional electricity capacity to the area.</p>			
<p>6. Is this development provided for in the infrastructure planning of the municipality, and if not what will the implication be on the infrastructure planning of the municipality (priority and placement of services and opportunity costs)? (Comment by the relevant Municipality in this regard must be attached to the final Basic Assessment Report as Appendix I.)</p>	<p>YES✓</p>	<p>NO</p>	<p>Please explain</p>
<p>The Gamagara and Joe Morolong Local Municipalities both aim to improve the provision of applicable infrastructure and the maintenance of basic services, and therefore the development will be in line with the planning of the municipalities. Additionally, providing the mines with electricity and so ensuring there continued operation will assist with alleviating the unemployment within the municipality boundaries.</p>			
<p>7. Is this project part of a national programme to address an issue of national concern or importance?</p>	<p>YES✓</p>	<p>NO</p>	<p>Please explain</p>
<p>The upgrading of the electricity network and infrastructure especially the substations and transmission and distribution lines is a strategic priority towards addressing the shortage of electricity in South Africa.</p>			

<p>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.)</p>	<p>YES✓</p>	<p>NO</p>	<p>Please explain</p>
<p>The current status quo is the best practicable environmental option. The proposed substation will be constructed within the boundaries of the mining land and therefore the activity is in favour of the current land-use. Additionally, the farmlands in the study area are not economically viable agriculture units and apart from limited and informal grazing, are not utilized. The construction of the 132kV lines power lines will thus not impact significantly on the current land use.</p>			
<p>9. Is the development the best practicable environmental option for this land/site?</p>	<p>YES✓</p>	<p>NO</p>	<p>Please explain</p>
<p>The area marked for the development has already been severely impacted and the project site is considered to have a low sensitivity and aesthetic value, mainly because of its proximity to the Mamatwan Mine and the presence of railway infrastructure, roads and existing power lines. The proposed project will not change the character of the study area to any significant degree.</p>			
<p>10. Will the benefits of the proposed land use/development outweigh the negative impacts of it?</p>	<p>YES✓</p>	<p>NO</p>	<p>Please explain</p>
<p>The potential benefit of the proposed power lines and substation to the area lies in the stimulation of the local economy through a reliable electricity supply to the mines, which will increasingly benefit the provision of services. The provision of electricity may promote local economic development and investment in the area. Provision of electricity is critical for economic development, related employment and sustainable development in South Africa. In the context of the project improvement of the 132kV supply is critical to the improvement of provision of the mines' electricity source.</p>			
<p>11. Will the proposed land use/development set a precedent for similar activities in the area (local municipality)?</p>	<p>YES</p>	<p>NO✓</p>	<p>Please explain</p>
<p>The proposed substation and power lines are being developed to provide electricity to the mines in the area. Additionally, due to the presence of existing power lines in the surrounding area indicates that the development will not set a precedent for similar activities as it will not change the character of the study area.</p>			
<p>12. Will any person's rights be negatively affected by the proposed activity/ies?</p>	<p>YES</p>	<p>NO✓</p>	<p>Please explain</p>
<p>The proposed Tshipi e Borwa substation and associated power lines will not negatively affect any person's rights. The servitude rights for the line will be acquired by Eskom and financial compensation will be paid where applicable.</p>			
<p>13. Will the proposed activity/ies compromise the "urban edge" as defined by the local municipality?</p>	<p>YES</p>	<p>NO✓</p>	<p>Please explain</p>
<p>The proposed site is approximately 40 km from Kathu and 25km from Hotazel and therefore will not impact on the urban edge, as there is none. The urban edge will not be compromised.</p>			

14. Will the proposed activity/ies contribute to any of the 17 Strategic Integrated Projects (SIPS)?	YES✓	NO	Please explain
<p>The project will conform to the objectives of the following SIP:</p> <p>SIP 10: Electricity transmission and distribution for all Expand the transmission and distribution network to address historical imbalances, provide access to electricity for all and support economic development. Align the 10-year transmission plan, the services backlog, the national broadband roll-out and the freight rail line development to leverage off regulatory approvals, supply chain and project development capacity.</p>			
15. What will the benefits be to society in general and to the local communities?	Please explain		
<p>As mining constitutes a major employer in the affected municipalities, providing electricity to the mines will benefit the local communities by generating more employment opportunities as the mines will continue to operate. As a benefit to society in general, the continued operation of the mines will provide necessary products to sell and thus increase the capital within South Africa, which will then boost the economy.</p>			
16. Any other need and desirability considerations related to the proposed activity?	Please explain		
<p>The proposed project will ensure that economic growth continues in the region.</p>			
17. How does the project fit into the National Development Plan for 2030?	Please explain		
<p>Due to a reduction in capital spending from effect, South Africa has missed a generation of capital investment in roads, rail, ports, electricity, water, sanitation, public transport and housing. To grow faster and in a more inclusive manner, the country needs a higher level of capital spending.</p> <p>Chapter 4: <u>Economic Infrastructure</u> 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.</p> <p>Action 20 of The National Development Plan also considers the Ring-fencing the electricity distribution businesses of the 12 largest municipalities (which account for 80 percent of supply), resolve maintenance and refurbishment backlogs and develop a financing plan, alongside investment in human capital.</p> <p>Action 21 aims to revise national electrification plan and ensure 90 percent grid access by 2030 (with balance met through off-grid technologies).</p>			
18. Please describe how the principles of environmental management as set out in section 2 of NEMA have been taken into account.			
<p>This report serves as a Basic Assessment Report that will investigate all potential impacts (social, economic and environmental) that may result from the development including alternatives, assess and evaluate and further provide a mitigation plan for all identified potential impacts.</p> <p>Ecological, heritage, avifaunal, visual and wetland specialists were appointed to investigate potential environmental impacts. Identified environmental impacts were assessed and mitigation measures provided to control and manage these environmental impacts. Interested and Affected parties, land owners and relevant stakeholders were identified and involved throughout the Basic Assessment process and their comments will be addressed and recorded as part of this assessment.</p>			

10. 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
Constitution of the Republic of South Africa, Act 108 of 1996	<p>EIA Regulations have been promulgated in terms of Chapter 5. Activities which may not commence without an environmental authorisation are identified within these Regulations.</p> <p>In terms of Section 24(1) of NEMA, the potential impact on the environment associated with these listed activities must be considered, investigated, assessed and reported on to the competent authority (the decision-maker) charged by NEMA with granting of the relevant environmental authorisation.</p> <p>In terms of GNR 983 of December 2014, a Basic Assessment process is required to be undertaken for the proposed project</p>	Republic of South Africa	1996
National Environmental Management Act (NEMA), No. 107 of 1998	<p>In terms of the Duty of Care provision in S28(1) the project proponent must ensure that reasonable measures are taken throughout the life cycle of this project to ensure that any pollution or degradation of the environment associated with this project is avoided, stopped or minimised.</p> <p>In terms of NEMA, it has become the legal duty of a project proponent to consider a project holistically, and to consider the cumulative effect of a variety of impacts.</p> <p>In terms of GNR 983 of December 2014, a Basic Assessment process is required to be undertaken for the proposed project</p>	Department of Environmental Affairs	1998
Environmental Impact Assessment Regulations (Government Notice No R. 983, 984 and 985)	<p>In terms of GNR 983 of December 2014, a Basic Assessment process is required to be undertaken for the proposed project.</p>	Department of Environmental Affairs	2014

Title of legislation, policy or guideline	Applicability to the project	Administering authority	Date
National Environmental Management Biodiversity Act, No. 10 of 2004 of 1989	Some natural vegetation will need to be cleared for the construction phase of the project; therefore an ecological specialist was appointed for this project.	Department of Environmental Affairs	1999
National Water Act No 36 of 1998	There may have been water courses on the proposed project site therefore a wetland specialist and ecological specialist were appointed to delineate any potential water courses.	Department of Water Affairs	1998
National Environmental Management: Air Quality Act No 39 of 2004	While no permitting or licensing requirements arise from this legislation, this Act will find application during the construction phase of the project. Dust control regulations promulgated in November 2013 may require the implementation of a dust management plan.	Department of Environmental Affairs	2004
National Environmental Management Waste Act No 59 of 2008	<p>Makes provision for the sound management of general and hazardous waste in South Africa, through the integration of a sufficient range of complementary waste management options, in line with the waste management hierarchy and internationally accepted principles of best environmental practice; waste will be generated during the construction phase of the project.</p> <p>No waste license activities are applicable to this project. The developer will however be required to store and manage waste in accordance with the requirements of this Act and associated Standards.</p>	Department of Environmental Affairs	2008
National Heritage Resources Act No. 25 of 1999	<p>The Act aims to promote an integrated system for the identification, assessment and management of the heritage Resources in South Africa.</p> <p>Under section 38. (1) of the NHRA any person who intends to construct a powerline or other linear development exceeding 300m in length must notify the responsible heritage resources agency of its intention.</p> <p>As the power lines proposed exceeds 300 m in length, a Heritage Assessment has been undertaken as part of this Basic Assessment (refer to Appendix G). No identified heritage sites were reported on site. However, should any heritage sites be unearthed during excavations, a permit would be required to be obtained from SAHRA.</p>	SAHRA	1999

Title of legislation, policy or guideline	Applicability to the project	Administering authority	Date
	A heritage specialist was appointed for this project.		
Northern Cape Nature Conservation Act, No. 9 of 2009	<p>This Act provides for the sustainable utilisation of wild animals, aquatic biota and plants; as well as the offences and penalties for contravention of the Act and the appointment of nature conservators to implement the provisions of the Act. The Act also provides lists of protected species for the Province.</p> <p>Permits are required for protected plant and animal species impacted by the project.</p>	NC DENC	2009
Occupational Health and Safety Act No. 85 of 1993	<p>The OHSA governs and ensures the protection of employees in the workplace. A number of permanent and contract skilled and semi-skilled workers will be involved in the construction of the different aspects of the project. Their appointment and work periods will be subject to the provisions of the OHSA.</p> <p>While no permitting or licensing requirements arise from this legislation, this Act will find application during the construction phase of the project. Healthy and safety precautions measures must be put in place for the construction crew and the general public.</p>	Department of Labour	1963
The Conservation of Agricultural Resources Act No 43 of 1983	To provide for the conservation of the natural agricultural resources of the Republic of South Africa by the preservation of the production potential of land, by the combating and prevention of erosion and weakening or destruction of the water sources, and by the protection of the vegetation and the combating of weeds and invader plants. This act will regulate construction activities to prevent the spreading of invasive species and to ensure successful rehabilitation of the receiving environment.	Department of Agriculture, Forestry and Fisheries	1983
Public Access to Information Act No 2 of 2000	<p>Provides the constitutional right of access to any information held by the State and any information that is held by another person and that is required for the exercise or protection of any rights; and to provide for matters connected therewith. Eskom needs to acquire servitude from existing land owners, any individual owner has the right to access to any information pertaining to the project</p> <p>No permitting is required the act finds applicability during the public participation process phase of the</p>	Department of Justice	2000

Title of legislation, policy or guideline	Applicability to the project	Administering authority	Date
	basic assessment process.		
National Forests Act No. 84 of 1998	<p>According to this Act, the Minister may declare a tree, group of trees, woodland or a species of trees as protected. The prohibitions provide that 'no person may cut, damage, disturb, destroy or remove any protected tree, or collect, remove, transport, export, purchase, sell, donate or in any other manner acquire or dispose of any protected tree, except under a license granted by the Minister'.</p> <p>GN 1042 provides a list of protected tree species.</p> <p>Protected trees are present on the site. A permit is required to be obtained prior to construction in order to destroy or disturb these trees.</p>	National Department of Agriculture, Forestry and Fisheries (DAFF)	1998

11. WASTE, EFFLUENT, EMISSION AND NOISE MANAGEMENT

a) Solid waste management

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

YES ✓	NO
m ³	

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

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

Construction rubble/ solid waste will be temporarily stored on site in designated waste skips and then removed by an appropriate waste contractor appointed by the main construction contractor to an approved landfill site. This will be managed through the EMPr.

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

General waste removed from site will be disposed of at the Kathu Landfill Site in Kathu which is the nearest registered landfill. Safe disposal certificates must be obtained and kept on site for the duration of the construction phase.

Will the activity produce solid waste during its operational phase?

YES	NO ✓
m ³	

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

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.

Kathu Municipality Landfill (licence no.: B33/2/350/18/P116)

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

N/A please refer to the above

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?

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:

--

c) Emissions into the atmosphere

Will the activity release emissions into the atmosphere other than 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:

Emissions generated will be in the form of dust, carbon dioxide and other vehicle emissions generated by diesel powered machinery and trucks during the construction process i.e. tip trucks, TLB's, excavators and dust from the movement of the construction vehicles. These emissions will be composed primarily of CO₂ and will be of a low concentration. However these emissions will have a short term impact on the immediate surrounding area and thus no authorisation will be required for such emissions. Appropriate dust suppression measures must be implemented (e.g. removal of vegetation in a phased manner and implementing appropriate dust suppression measures to reduce the impacts). It is recommended that construction vehicles are regularly serviced and kept in good mechanical condition to minimise possible exhaust emissions.

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
YES	NO✓

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

Describe the noise in terms of type and level:

Short term noise impacts are anticipated during the construction phase of the project. It is however anticipated that the noise will be localised and contained within the construction site. The noise levels are anticipated to be less during the day lower during night time as required for rural districts with in terms of SANS 10103 thus no authorisation will be required.

In order to minimise the impacts of noise during the construction phase, construction activities should be restricted to between 07H00 and 17H00 Monday to Friday, and working hours should be negotiated on a Saturday. This is required in order to avoid noise and lighting disturbances outside of normal working hours. All construction equipment must be maintained and kept in good working order to minimise associated noise impacts. If required, adequate noise suppression measures (i.e. screens, etc) must be erected around the point source of construction to reduce noise to an acceptable level. No noise will be generated during the operational phase of the development.

12. WATER USE

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

Municipal ✓	Water board	Groundwater	River, stream, dam or lake	Other	The activity will not use water
-------------	-------------	-------------	----------------------------	-------	---------------------------------

If water is to be extracted from groundwater, river, stream, dam, lake or any other natural feature, please indicate the volume that will be extracted per month:

	litres
YES	NO✓

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

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

13. ENERGY EFFICIENCY

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

Electricity - Apart from the use of energy efficient lighting at the substation, no other measures are considered. The distribution line does not use energy.

Eskom however has introduced and champions the 49m campaign which aims to reduce National energy usage by 10%, which would be as effective as the construction of a new power station, without the potential carbon emission or cost.

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

Energy efficient lighting will be used where practical at the substation.

SECTION B: SITE DESCRIPTION

Important notes:

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

Please note that the environment for both the preferred and alternative sites for the proposed development is *not* significantly different from one another. Therefore no section copies have been generated.

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

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

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

YES <input checked="" type="checkbox"/>	NO <input type="checkbox"/>
-----------------------------------------	-----------------------------

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	Joe Morolong and Gamagara Local Municipalities
Ward Number(s)	Ward 4
Farm name and number	Mamatwan 331 (Substation A-preferred and power line A1 and A2) Moab 700 (Substation B-alternative and all power lines) Sinterfontein 748 (all power lines) Shirley 367 (all power lines) Alton 368 (all power lines)
Portion number	N/A
SG Code	C0410000000033100000 C0410000000070000000 C0410000000074800000 C0410000000036700000 C0410000000036800000

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 (Attached).

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

Mining

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 <input checked="" type="checkbox"/>
-----	----------------------------------------

1. GRADIENT OF THE SITE

Indicate the general gradient of the site.

Substation A (preferred)

Flat <input checked="" type="checkbox"/>	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
---------------------------------------------	-------------	-------------	-------------	--------------	-------------	------------------

Associated power lines:

Route A1 (preferred)

Flat <input checked="" type="checkbox"/>	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
---------------------------------------------	-------------	-------------	-------------	--------------	-------------	------------------

Route A2 (alternative):

Flat <input checked="" type="checkbox"/>	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
---------------------------------------------	-------------	-------------	-------------	--------------	-------------	------------------

Substation B (alternative)

Flat <input checked="" type="checkbox"/>	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
---------------------------------------------	-------------	-------------	-------------	--------------	-------------	------------------

Associated power lines:

Route B1 (alternative)

Flat <input checked="" type="checkbox"/>	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
---------------------------------------------	-------------	-------------	-------------	--------------	-------------	------------------

Route B2 (alternative)

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

3. GROUNDWATER, SOIL AND GEOLOGICAL STABILITY OF THE SITE

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

Substations:

	Substation A (preferred):		Substation B (alternative):		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

Power lines associated with Substation A:

	Route A1 (preferred):		Route A2 (alternative):		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

Power lines associated with Substation B:

	Route B1 (alternative):		Route B2 (alternative):		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 <input checked="" type="checkbox"/>
-----	----------------------------------------

YES	NO <input checked="" type="checkbox"/>
-----	----------------------------------------

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 <input checked="" type="checkbox"/>	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 <input checked="" type="checkbox"/>	UNSURE
Non-Perennial River	YES <input checked="" type="checkbox"/>	NO	UNSURE
Permanent Wetland	YES	NO <input checked="" type="checkbox"/>	UNSURE
Seasonal Wetland	YES	NO <input checked="" type="checkbox"/>	UNSURE
Artificial Wetland	YES	NO <input checked="" type="checkbox"/>	UNSURE
Estuarine / Lagoonal wetland	YES	NO <input checked="" type="checkbox"/>	UNSURE

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

A field investigation of the study area, undertaken by a wetland specialist indicated a lack of hydric soil characteristics at the proposed development site. The scope of the ecological assessment was changed to delineate and classify drainage channels identified within the study area. One “B” section channel was delineated approximately 1km from the proposed development. This is an ephemeral stream which occasionally has base-flow after storm events. Patches of riparian vegetation were identified along the channel edges.

Due to the location of this channel from the development site and the relatively flat topography, no impacts are likely to occur on the channel as a result of the development.

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 Mamatwane shunting yard and railway line services the Mamatwan Mine. The shunting yard lies approximately 1 km north-east of the study area. The shunting yard will not be impacted by the application. The railway line, which lies within a 500m radius of the study site and will be crossed by power line alternative B1 which exits the proposed substation site in a southeasterly direction.

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 ✓
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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	
<div style="border: 1px solid black; height: 20px; width: 100%;"></div>		

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:

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.

The project site for the proposed Tshipi e Borwa substation and associated power lines are situated on the border of the Gamagara and Joe Morolong Local Municipalities. The socio-economic character of each municipality is described below:

Level of unemployment:

Gamagara Local Municipality:

The Gamagara Local Municipality has the lowest unemployment rate in the District, namely 17%. This figure excludes economically active people that are not searching for work. The total percentage of people not working, although they are economically active persons, is estimated at 44.80 % (IDP, 2011).

Joe Morolong Local Municipality:

There are 12 740 people that are economically active (employed or unemployed but looking for work) within the Joe Morolong Municipality, and of these, 38,6% are unemployed. Of the 6 323 economically active youth (15–34 years) in the area, 49,5% are unemployed (IDP 2010/11).

Economic profile of local municipality:

Gamagara Local Municipality:

Gamagara Municipality, an area of 2619 km², is a sparsely populated region. The population of Gamagara Local Municipality is estimated at approximately 41 617 in 2011 (Census 2011 Municipal Fact Sheet). In terms of population groups, Africans comprise 31 392 and whites 10 225. The major employers in Gamagara are mining and quarrying (40.21%), followed by wholesale and retail (13.28%), and community services (10.78%). This indicates that the economy of Gamagara is highly dependent on mining and has a very small base.

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%. Joe Morolong Local Municipality is characterised by a high density rural population, which is poorly served and poorly connected to the main stream of economic activities. There is a high level of unemployment with a dependency on subsistence agriculture, the public sector, seasonal workers and employment in the mining sector. With Kgalagadi district being identified as a Rural Development Node by the President (and therefore forms part of the Integrated Sustainable Rural Development Programme), Joe Morolong Local Municipality is the focal area of the Node.

Level of education:

Gamagara Local Municipality:

A significant portion of the population in Gamagara Municipality has completed Grade 12 (26.5%), with 12.6% obtaining higher education. However, 10.6% have no schooling. The population of Gamagara Municipality is primarily unskilled and has a poor education base, which restricts development and diminishes opportunities for employment.

Joe Morolong Local Municipality:

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.

b) Socio-economic value of the activity

What is the expected capital value of the activity on completion?
 What is the expected yearly income that will be generated by or as a result of the activity?
 Will the activity contribute to service infrastructure?
 Is the activity a public amenity?
 How many new employment opportunities will be created in the development and construction phase of the activity/ies?

What is the expected capital value of the activity on completion?	R40,624,845.07	
What is the expected yearly income that will be generated by or as a result of the activity?	Unknown	
Will the activity contribute to service infrastructure?	YES√	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?	Eskom does an open tender to employ suitable contractors to carry out the construction. Contractors are required to employ local unskilled labourers for non-specialized work.	

What is the expected value of the employment opportunities during the development and construction phase?	This can only be established once the contractor is appointed
What percentage of this will accrue to previously disadvantaged individuals?	>= 90 %
How many permanent new employment opportunities will be created during the operational phase of the activity?	None. Eskom will maintain the powerline once constructed.
What is the expected current value of the employment opportunities during the first 10 years?	N/A
What percentage of this will accrue to previously disadvantaged individuals?	N/A

9. BIODIVERSITY

Please note: The Department may request specialist input/studies depending on the nature of the biodiversity occurring on the site and potential impact(s) of the proposed activity/ies. To assist with the identification of the biodiversity occurring on site and the ecosystem status consult <http://bgis.sanbi.org> or BGIShelp@sanbi.org. Information is also available on compact disc (cd) from the Biodiversity-GIS Unit, Ph (021) 799 8698. This information may be updated from time to time and it is the applicant/EAP's responsibility to ensure that the latest version is used. A map of the relevant biodiversity information (including an indication of the habitat conditions as per (b) below) and must be provided as an overlay map to the property/site plan as Appendix D to this report.

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

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

- b) **Indicate and describe the habitat condition on site**

Habitat Condition	Percentage of habitat condition class (adding up to 100%)	Description and additional Comments and Observations (including additional insight into condition, e.g. poor land management practises, presence of quarries, grazing, harvesting regimes etc).
Natural	85%	The site is dominated by open thornveld.
Near Natural (includes areas with low to moderate level of alien invasive plants)	%	

Degraded (includes areas heavily invaded by alien plants)	%	
Transformed (includes cultivation, dams, urban, plantation, roads, etc)	15%	Some of the site area has been transformed by mining activities prevalent in the area.

c) Complete the table to indicate:

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

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

Vegetation Type:

According to the national vegetation map (Mucina & Rutherford, 2006) Kathu Bushveld is the only vegetation type occurring within the study area. This vegetation type is characterised by medium-tall tree layers dominated by *Acacia erioloba* and *Boscia albitrunca*. The sparsely vegetated Karroid shrub layer is comprised of *Acacia mellifera* with variable grass cover dominated by *Stipagrostis* species. This vegetation type is considered least threatened with only 1% transformed due to urban development and mining (Mucina and Rutherford, 2006).

A band of Gordonia Duneveld occupies the area to the north of the study area and Kuruman Thornveld to the east. Both vegetation types are considered to be least threatened and will not be impacted upon by the proposed development.

The area to north of the site has been transformed by intensive mining and both substation site alternatives are found within the mine's property. Consequently, a network of roads, gates and fences have resulted in varying degrees of vegetation degradation.

The vegetation in this area consists of open thornveld. Both substation sites are situated within the boundary of the Tshipi e Borwa mine. Powerline route alternative A1 and A2 exist within the mine and runs along the adjacent property, the two routes are the longest of the four routes. Route alternative B1 is the shortest route alternative and a large part of this route is within the mine. The dominant tree species at substation A is *Acacia haematoxylon* (Grey camel thorn) and *Acacia mellifera* (Black thorn), the dominant tree species at substation B and along the power line routes is *Acacia mellifera* (Black thorn). Other tree species include *Acacia erioloba* (Camel thorn) *Acacia karroo* (Sweet thorn), *Tarchonanthus camphiratus* (Common camphor bush) and *Acacia hebeclada* (Candle thorn). The dominant grass species is *Eragrostis curvula* (Weeping love grass), other grass species include *Stipagrostis uniplumis* (Silky bushman grass), *Eragrostis rigidior* (Broad curly leaf), *Pogonarthria squarrosa* (Herringbone grass), *Hyparrhenia hirta* (Common thatching grass) and *Acacia congesta subsp. congesta* (Tassel three-awn). The dominant herb species is *Gnidia polycephala*.

The vegetation at substation 2 is highly disturbed with limited ground cover. There are however numerous *Acacia erioloba* (Camel thorn) and *Acacia haematoxylon* (Grey camel thorn) trees present. Both these trees are protected. The vegetation at substation 1 is in a moderately good condition with a more intact ground cover and numerous young *Acacia haemtoxylon* (Grey Camel Thorn) trees.

Two protected tree species were encountered during the site survey namely *Acacia erioloba* (Camel thorn) and *Acacia haematoxylon* (Grey camel thorn). A permit is required to remove these trees if they fall within the construction site. The authority controlling the issuing of permits is the Northern Cape Province: Department of Environment and Nature Conservation (DENC) and the Department of Agriculture, Forestry and Fisheries (DAFF). DAFF also recommends that *Camel*

Thorn trees (*Acacia erioloba*) should be avoided as far as possible when placing the power line. To apply for a Forest Act License, the applicant must provide an indication of the numbers of protected tree species per size classes to be destroyed.

Aquatic Ecosystem:

No wetland or riparian areas were delineated with a 500m buffer of the site. A 'B' Section channel, named the Vlermuisleegte was delineated via a desktop delineation approximately 1km-1.3km from the proposed development site. Small patches of riparian areas were identified along this drainage channel and it is expected to only flow for a brief time after a storm event. This riparian vegetation has the same species as the surrounding area and is only shown by a greater abundance of these species along the channel edge. The apedal or structureless nature of the soils at the site ensures a quick infiltration of water into the soil profile, stopping the creation of wetland conditions.

Due to the distance of this channel from the proposed development (minimum distance of approximately 1km), as well as the gentle slope of the surrounding area, the riparian zone was not assessed as no impacts from the development are likely to occur on the system.

SECTION C: PUBLIC PARTICIPATION

1. ADVERTISEMENT AND NOTICE

Publication name	Ghaapkoerant	
Date published	Project Notification: 16 October 2015	
Site notice position	Latitude	Longitude
	27°35'44.75"S	22°57'40.00"E
	27°24'26.18"S	22°59'45.01"E
	27°24'23.37"S	22°58'41.34"E
	27°24'15.75"S	22°57'24.70"E
	27°24'3.39"S	22°57'12.70"E
Date placed	16 October 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 41(2)(e) and 41(6) of GN 982.

The Methodology that has been adopted to ensure a highly consultative and interactive public participation process is outlined below.

Identification of Interested and Affected Parties (I&APs)

The interested and affected parties (I&APs) in and around the study area have been identified and a dedicated stakeholder database for the project has been developed. The stakeholder database has been split in two, i.e. one for the landowners and the other for the various I&APs, NGOs, Government departments, etc. A dedicated stakeholder database for the project is fundamental to the ultimate success of the consultation process.

The proposed project and its BAR process were announced in the study area in the following ways:

Media Announcements

An English newspaper Advertisement was compiled and placed on the Ghaap Koerant on 16 October 2015 informing stakeholders about the proposed project and inviting them to participate and register as interested and affected parties (see Appendix E1).

Land Owner Letters

Letters to land owners introduced the project provided the rationale for the project, the BAR and public participation processes to be followed in the project, etc. The information was available in English. (see Appendix E2 for Letters & distribution list).

Notice boards

Site notices were fixed at various conspicuous areas along the route alternatives for both Power Line projects. (see Appendix E1 for proof of Site Notices).

Key stakeholders (other than organs of state) identified in terms of Regulation 41(2)(b) of GN 982

Refer to stakeholder list attached within Appendix E5

Title, Name and Surname	Affiliation/ key stakeholder status	Contact details (tel number or e-mail address)

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

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

Please refer to Appendix E2.

3. ISSUES RAISED BY INTERESTED AND AFFECTED PARTIES

Summary of main issues raised by I&APs	Summary of response from EAP

No issues or comments have been received from IAP's during the notification period of the project. Any comments or issues received during the public review period will be combined and placed into the Final Basic Assessment Report.

4. COMMENTS AND RESPONSE REPORT

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

5. AUTHORITY PARTICIPATION

Authorities and organs of state identified as key stakeholders:

Refer to Organ of State list attached within Appendix E5

Authority/Organ of State	Contact person (Title, Name and Surname)	Tel No	Fax No	e-mail	Postal address

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.

Please refer to Appendix E5.

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. **Please refer to 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, 2014 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.

1. 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.

*For the purposes of this assessment and clarification, the proposed **power line routes and substation** for Tshipi e Borwa **and alternatives** will be **assessed collectively** as these fall within a similar geographical environment. Impacts from the abovementioned power lines and substation footprint are likely to be similar. **Notes will be made should significant differences between sites or alternatives occur, to indicate if and why a particular alternative is perceived to be less favourable.***

Table 1: Impact Summary related to the construction and operation of the proposed development for both the preferred and alternative sites.

Impacts Associated with Substation A (preferred)			
CONSTRUCTION PHASE			
Activity	Impact summary	Significance (after mitigation)	Proposed mitigation
Use of various materials, such as diesel, oils and cement during construction	Direct impacts: Mismanagement of waste and pollutants like hydrocarbons, construction waste and hazardous chemicals will result in these substances entering and polluting the soil. Due to the apedal nature of the soil and quick infiltration rate, pollutants can quickly move through the environment during and after storm events and make their way to the Vlermuisleegte stream.	Low	<ul style="list-style-type: none"> All waste generated during construction is to be disposed of as per the Environmental Management Programme and no washing of paint brushes, containers, wheelbarrows, spades, picks or any other equipment adjacent to any drainage channel is permitted. Proper management and disposal of construction waste must occur during the lifespan of the project, including during maintenance of the power lines and substations. No release of any substance i.e. cement, oil, that could be toxic to fauna or faunal habitats within the development area. Do not locate the construction camp or any depot for any substance which causes or is likely to cause pollution within a distance of 100m of any watercourse. Spillages of fuels, oils and other potentially harmful chemicals must be cleaned up immediately and contaminants properly drained and disposed of using proper solid/hazardous waste facilities (not to be disposed of within the natural environment). Any contaminated soil must be removed and the affected area rehabilitated immediately.
	Indirect impacts: Impacts on down-slope of the stream – marginal.	Low	
	Cumulative impacts: Limited due to the proximity of the project site from the stream.	Low	
Clearing of vegetation for construction	Proliferation of Alien invasive species Direct impacts: Alien invasive species dominate the site currently and these will quickly encroach into disturbed areas. Alien species generally out-compete indigenous species for water, light, space and nutrients as they are adaptable to changing conditions and are able to easily invade a wide range of ecological niches (Bromilow, 2010).	Low	<ul style="list-style-type: none"> An alien invasive management programme must be incorporated into the Environmental Management Programme; Ongoing alien plant control must be undertaken along the road route; Areas which have been disturbed will be quickly colonised by invasive alien species. An ongoing management plan must be implemented for the clearing/eradication of alien species. Monitor all sites disturbed by construction activities for colonisation by exotics or invasive plants and control these as they emerge.
	Indirect impacts: Alien invader plant species pose an ecological threat as they alter habitat structure, lower biodiversity (both number and	Low	

	<p>“quality” of species), change nutrient cycling and productivity, and modify food webs (Zedler, 2004).</p> <p>Cumulative impacts: Colonisation of disturbed areas by alien and invasive species.</p>	Low	
Clearing of vegetation for construction	<p>Direct impacts: During the construction phase the area for the proposed substation will be cleared of vegetation. This will result in the loss of indigenous species, disturbance of species of conservation concern and the fragmentation of vegetation communities. The removal of vegetation will also expose soil increasing the risk of erosion.</p>	Low-Moderate	<ul style="list-style-type: none"> Once the route is known, the site must be inspected by a botanist during the summer season to identify all protected tree species of conservation concern in order to record their existence for permitting purposes. Indigenous trees removed during construction must be replaced with the same species at a ratio of 1:2 (2 trees must be planted for every 1 tree removed); Protected trees removed during construction must be replaced with the same species at a ratio of 1:5 (5 trees must be planted for every 1 tree removed); Disturbed areas must be rehabilitated immediately after construction has been completed in that area by planting appropriate indigenous plant species; The clearing of vegetation must be kept to a minimum and within the power line servitude; During the construction phase workers must be limited to areas under construction and access to the undeveloped areas must be strictly controlled; Rehabilitated areas must be monitored to ensure the establishment of re-vegetated areas.
	<p>Indirect impacts: Loss of indigenous vegetation.</p>	Low-Moderate	
	<p>Cumulative impacts: Loss of natural vegetation due to vegetation fragmentation and habitat disturbance in the landscape.</p>	Low-Moderate	
Loss of faunal habitat and ecological structure	<p>Direct impacts: The construction phase of the proposed substation and power line development will result in the loss of faunal habitats within the area. This impact relates to the complete removal or partial destruction/disturbance of existing vegetation by machinery and workers, impacting directly on the ecological condition of natural vegetation and habitat availability. These activities will have an impact on foraging and breeding ecology of faunal species. Loss of vegetation generally</p>	Low-Moderate	<ul style="list-style-type: none"> All construction and maintenance activities must be carried out according to the generally accepted environmental best practice and the temporal and spatial footprint of the development must be kept to a minimum. The boundaries of the development footprint areas are to be clearly demarcated and it must be ensured that all activities remain within the demarcated footprint area. Edge effects of all construction and operational activities, such as erosion and alien plant species proliferation, which will affect faunal habitats adjacent to the development area, need to be strictly managed. Any natural areas beyond the development footprint, which have been affected by the construction activities, must be rehabilitated using

	<p>affects nutrient cycles, removes the organic litter layer and results in habitat fragmentation and destruction of wildlife corridors. The habitat is however already largely transformed due to the adjacent mining activities and fragmented and the site is not a unique habitat within the landscape.</p> <p>Indirect impacts: Loss of indigenous vegetation.</p> <p>Cumulative impacts: Habitat fragmentation</p>	<p>Low-Moderate</p> <p>Low-Moderate</p>	<p>indigenous plant species.</p> <ul style="list-style-type: none"> Education and awareness campaigns on faunal species and their habitat are recommended to help increase awareness, respect and responsibility towards the environment for all staff and contractors.
Impacts on the faunal communities	<p>Direct impacts: Activities involving the clearing/harvesting of natural vegetation will result in the loss of faunal species. Faunal diversity within the study area have been negatively impacted as a result of historic and on-going disturbances associated with mining practices. It is not envisaged that any Red data species will be present on the site and thus directly impacted as a result of the development. During the operational phase, a further loss of faunal diversity and ecological integrity will occur due to the increase in human activity and potential poaching.</p> <p>Indirect impacts: Loss of species diversity.</p> <p>Cumulative impacts: Limited impact on ecological diversity in the vicinity.</p>	<p>Moderate-High</p> <p>Moderate-High</p> <p>Moderate-High</p>	<ul style="list-style-type: none"> It is recommended that a speed limit of 30km/h is implemented on all roads running through the study area during all phases in order to minimise risk to fauna from vehicles. No trapping or hunting of fauna is to take place. Access control must be implemented to ensure that no illegal trapping or poaching takes place. Should any Red Data faunal species be noted within the development footprint areas, these species must be relocated to similar habitat within the vacant land to the west of the development area with the assistance of a suitably qualified ecologist. Any fauna directly threatened by the construction activities must be removed to a safe location by the ECO or qualified Ecologist. All staff and contractors must undergo an environmental induction course held by the ECO as well as faunal education and awareness programmes.
Noise pollution and disturbance	<p>Direct impacts: The proposed development area is located within close proximity to the Tshipi e Borwa Mine, therefore, species within this landscape often experience disturbance. As a result disturbance of fauna by the proposed development during the construction phase is</p>	<p>Moderate</p>	<ul style="list-style-type: none"> Strict control must be maintained over all activities during construction, in line with an approved Construction EMPr. Any Red Data species identified in this report observed to be roosting and/or breeding in the vicinity, the ECO must be notified

	<p>anticipated to be of moderate significance. Species are particularly sensitive to disturbance during the breeding season and this must be borne in mind during both the construction and operational phases.</p>		
	<p>Indirect impacts: Loss of species diversity.</p>	Moderate	
	<p>Cumulative impacts: Movement of species from one area into another.</p>	Moderate	
Avifaunal impacts during the construction phase	<p>Direct impacts: Disturbance particularly during the sensitive parts of the breeding cycle could result in breeding failure. The proposed site alternatives are located within close proximity to the Tshipi e Borwa Open Pit Mine and associated infrastructure. Species residing within this landscape often experience varying degrees of disturbance. As a result, disturbance of birds by the proposed substation is anticipated to be of low significance as birds will move away from the area temporarily. Species sensitive to disturbance and ground-nesting species resident within the development footprint will be particularly susceptible. Disturbance can also influence the community structure of avifauna within close proximity to the development as certain species will be displaced and forced to find alternative territories. Avian species with small territories are particularly susceptible.</p>	Low-Moderate	<ul style="list-style-type: none"> • Strict control must be maintained over all activities during construction, in line with an approved Construction EMPr. • During Construction, if any of the Red Data species identified in this report are observed to be roosting and/or breeding in the vicinity, the ECO must be notified. • The construction camps must be as close to the site as possible • Contractors and working staff must stay within the development footprint and movement outside these areas including avian micro-habitats must be restricted. • Driving must take place on existing roads and a speed limit of 30km/h must be implemented on all roads running through the study area during all phases.
	<p>Indirect impacts: Effect on nesting birds outside the vicinity of the site.</p>	Low-Moderate	
	<p>Cumulative impacts: Moderate as there is a high level of existing disturbance in the vicinity.</p>	Low-Moderate	

Visual Impacts	<p>Direct impacts: Motorists travelling on the R380 and the gravel roads towards Middelplaats Mine and Kuruman, will be briefly exposed to the new project. Motorists on the R380 will only experience views of the power line that crosses the road, and will not be able to see either of the substation sites. Motorists travelling on the gravel road to Middelplaats Mine will be able to view alternative A1 and A2 as well as Substation A. All three roads will have a low viewer incidence. The R380 will experience a higher viewer incidence being a main road, although still considered low due to the low traffic volumes on this route.</p> <p>The visual resource has a low aesthetic value due to its monotonous character and limited number of interesting features. Large areas of the study area are considered natural, but the flat topography and arid savannah like vegetation provide little visual interest. The presence of the Mamatwan Manganese Mine has negatively impacted on the character of the landscape. The large industrial development blighted the natural character of the landscape and future expansion of the mine can be expected. The existing vegetation provides effective visual screening from the roads, which increases the sites ability to absorb low intensity visual changes without severely impacting on the study area's character. The study area is considered to have a low visual sensitivity.</p>	Low	<ul style="list-style-type: none"> When designing the poles/tower, allow for future upgrading of the line to a greater capacity. This may prevent the installation of an additional power line in future and thereby limit potential cumulative visual impacts, should the need arise to increase the capacity; If possible, locate the substation even closer to the sinter plant or to the railway infrastructure. This strategy will strengthen the visual association of the substation with the mine's infrastructure and thereby consolidate similar objects together; Choose a substation site that is already disturbed in order to refrain from stripping natural vegetation to construct the substation; Choose a power line servitude that requires the minimum removal/trimming of higher growing vegetation to adhere to safety regulations; Locate construction camps and stockyards in areas that are already disturbed instead of stripping more vegetation to allow for these facilities. It will be most preferred to locate the construction camps near the sinter plant; Establish limits of disturbances during construction through demarcating of the tower and substation footprints in order to prevent unnecessary damage to vegetation; Keep to existing road infrastructure as far as possible to minimise the physical damage to vegetation in the power line servitude; Implement rehabilitation of disturbed areas as soon as possible to limit the duration of exposed surfaces and the risk of erosion; and Previously rehabilitated areas must be monitored to prevent the infestation of weeds that may become an unsightly feature.
	<p>Indirect impacts: None</p>	Low	
	<p>Cumulative impacts: Low- as the area is dominated by the mining activities.</p>	Low	

Heritage	Direct impacts: Based on available information and prior knowledge of the region, it can provisionally be said that the possibility of the proposed development to impact on any sites, features or object of cultural significance is very low.	Low	<ul style="list-style-type: none"> As per the study, no heritage features or artefacts are expected in the study area, however should any archaeological sites or graves be exposed during construction work, it must immediately be reported to a heritage practitioner so that an investigation and evaluation of the finds can be made.
	Indirect impacts: None		
	Cumulative impacts: Should significant archaeological deposits be located then cumulative impacts will be experienced		
OPERATIONAL PHASE			
Activity	Impact summary	Significance (after mitigation)	Proposed mitigation
Avifaunal impacts during the operational phase (Substations)	Direct impacts: Since there is live hardware in the substation yard, the potential exists for birds to bridge the gap between two phases and earth resulting in electrocution. However, very few electrocutions have been recorded on distribution substations. Species likely to be affected are crows and other species that are tolerant of disturbance. Raptors such as Southern Pale Chanting Goshawk are sometimes attracted into substation yards in pursuit of species nesting there such as sparrows and canaries.	Low	<ul style="list-style-type: none"> A “Bird Friendly” monopole structure, with a bird perch (as per standard Eskom guidelines) should be used for the tower structures. All relevant perching surfaces should be fitted with bird guards as deterrents.
	Indirect impacts: Effect on nesting birds outside the vicinity of the site.	Low	
	Cumulative impacts: Moderate as there is a high level of existing disturbance in the vicinity.	Low	
Loss of faunal habitat	Direct impacts:	Low-Moderate	<ul style="list-style-type: none"> All construction and maintenance activities must be carried out according

and ecological structure	The operational phase of the proposed substation development will result in the loss of faunal habitats within the area. This impact relates to the complete removal or partial destruction/disturbance of existing vegetation by machinery and workers, impacting directly on the ecological condition of natural vegetation and habitat availability. These activities will have an impact on foraging and breeding ecology of faunal species. Loss of vegetation generally affects nutrient cycles, removes the organic litter layer and results in habitat fragmentation and destruction of wildlife corridors. The habitat is however already largely transformed due to the adjacent mining activities and fragmented and the site is not a unique habitat within the landscape.		to the generally accepted environmental best practice and the temporal and spatial footprint of the development must be kept to a minimum. <ul style="list-style-type: none"> The boundaries of the development footprint areas are to be clearly demarcated and it must be ensured that all activities remain within the demarcated footprint area. Edge effects of all construction and operational activities, such as erosion and alien plant species proliferation, which will affect faunal habitats adjacent to the development area, need to be strictly managed. Any natural areas beyond the development footprint, which have been affected by the construction activities, must be rehabilitated using indigenous plant species. Education and awareness campaigns on faunal species and their habitat are recommended to help increase awareness, respect and responsibility towards the environment for all staff and contractors.
	Indirect impacts: Loss of indigenous vegetation.	Low-Moderate	
	Cumulative impacts: Habitat fragmentation	Low-Moderate	
DECOMMISSIONING PHASE			
Decommissioning and closure phase has not been considered as part of this application as the end use of the site and required decommissioning activities are not known at this time; it is therefore not possible to predict the potential environmental impacts. If decommissioning phase is considered in future, the developer will undertake the required actions as prescribed by the legislation at the time and comply with all relevant requirements administered by any relevant authority and competent authority at that time			

Impact associated with the power line Route A1 (preferred)

CONSTRUCTION PHASE			
Activity	Impact summary	Significance (after mitigation)	Proposed mitigation
Use of various materials, such as diesel, oils and cement during construction	Direct impacts: Mismanagement of waste and pollutants like hydrocarbons, construction waste and hazardous chemicals will result in these substances entering and polluting the soil.	Low	<ul style="list-style-type: none"> All waste generated during construction is to be disposed of as per the Environmental Management Programme and no washing of paint brushes, containers, wheelbarrows, spades, picks or any other equipment adjacent to any drainage channel is permitted.

	<p>Due to the apedal nature of the soil and quick infiltration rate, pollutants can quickly move through the environment during and after storm events and make their way to the Vlermuisleegte stream.</p> <p>Indirect impacts: Impacts on down-slope of the stream – marginal.</p> <p>Cumulative impacts: Limited due to the proximity of the project site from the stream.</p>	<p>Low</p> <p>Low</p>	<ul style="list-style-type: none"> • Proper management and disposal of construction waste must occur during the lifespan of the project, including during maintenance of the power lines and substations. • No release of any substance i.e. cement, oil, that could be toxic to fauna or faunal habitats within the development area. • Do not locate the construction camp or any depot for any substance which causes or is likely to cause pollution within a distance of 100m of any watercourse. • Spillages of fuels, oils and other potentially harmful chemicals must be cleaned up immediately and contaminants properly drained and disposed of using proper solid/hazardous waste facilities (not to be disposed of within the natural environment). Any contaminated soil must be removed and the affected area rehabilitated immediately.
Clearing of vegetation for construction	<p><i>Proliferation of Alien invasive species</i></p> <p>Direct impacts: Alien invasive species dominate the site currently and these will quickly encroach into disturbed areas. Alien species generally out-compete indigenous species for water, light, space and nutrients as they are adaptable to changing conditions and are able to easily invade a wide range of ecological niches (Bromilow, 2010).</p>	Low	<ul style="list-style-type: none"> • An alien invasive management programme must be incorporated into the Environmental Management Programme; • Ongoing alien plant control must be undertaken along the road route; • Areas which have been disturbed will be quickly colonised by invasive alien species. An ongoing management plan must be implemented for the clearing/eradication of alien species. • Monitor all sites disturbed by construction activities for colonisation by exotics or invasive plants and control these as they emerge.
	<p>Indirect impacts: Alien invader plant species pose an ecological threat as they alter habitat structure, lower biodiversity (both number and “quality” of species), change nutrient cycling and productivity, and modify food webs (Zedler, 2004).</p>	Low	
	<p>Cumulative impacts: Colonisation of disturbed areas by alien and invasive species</p>	Low	
Clearing of vegetation for construction	<p>Direct impacts: During the construction phase the area for the proposed power line will be cleared of vegetation. This will result in the loss of</p>	Low-Moderate	<ul style="list-style-type: none"> • Once the route is known, the site must be inspected by a botanist during the summer season to identify all protected tree species of conservation concern in order to record their existence for permitting purposes.

	indigenous species, disturbance of species of conservation concern and the fragmentation of vegetation communities. The removal of vegetation will also expose soil increasing the risk of erosion.		<ul style="list-style-type: none"> • Indigenous trees removed during construction must be replaced with the same species at a ratio of 1:2 (2 trees must be planted for every 1 tree removed); • Protected trees removed during construction must be replaced with the same species at a ratio of 1:5 (5 trees must be planted for every 1 tree removed); • Disturbed areas must be rehabilitated immediately after construction has been completed in that area by planting appropriate indigenous plant species; • The clearing of vegetation must be kept to a minimum and within the power line servitude; • During the construction phase workers must be limited to areas under construction and access to the undeveloped areas must be strictly controlled; • Rehabilitated areas must be monitored to ensure the establishment of re-vegetated areas.
	Indirect impacts: Loss of indigenous vegetation.	Low-Moderate	
	Cumulative impacts: Loss of natural vegetation due to vegetation fragmentation and habitat disturbance in the landscape.	Low-Moderate	
Loss of faunal habitat and ecological structure	Direct impacts: The construction phase of the proposed power line development will result in the loss of faunal habitats within the area. This impact relates to the complete removal or partial destruction/disturbance of existing vegetation by machinery and workers, impacting directly on the ecological condition of natural vegetation and habitat availability. These activities will have an impact on foraging and breeding ecology of faunal species. Loss of vegetation generally affects nutrient cycles, removes the organic litter layer and results in habitat fragmentation and destruction of wildlife corridors. The habitat is however already largely transformed due to the adjacent mining activities and fragmented and the site is not a unique habitat within the landscape.	Low-Moderate	<ul style="list-style-type: none"> • All construction and maintenance activities must be carried out according to the generally accepted environmental best practice and the temporal and spatial footprint of the development must be kept to a minimum. • The boundaries of the development footprint areas are to be clearly demarcated and it must be ensured that all activities remain within the demarcated footprint area. • Edge effects of all construction and operational activities, such as erosion and alien plant species proliferation, which will affect faunal habitats adjacent to the development area, need to be strictly managed. • Any natural areas beyond the development footprint, which have been affected by the construction activities, must be rehabilitated using indigenous plant species. • Education and awareness campaigns on faunal species and their habitat are recommended to help increase awareness, respect and responsibility towards the environment for all staff and contractors.
		Indirect impacts: Loss of indigenous vegetation.	

	Cumulative impacts: Habitat fragmentation	Low-Moderate	
Impacts on the faunal communities	Direct impacts: Activities involving the clearing/harvesting of natural vegetation will result in the loss of faunal species. Faunal diversity within the study area have been negatively impacted as a result of historic and on-going disturbances associated with mining practices. It is not envisaged that any Red data species will be present on the site and thus directly impacted as a result of the development. During the operational phase, a further loss of faunal diversity and ecological integrity will occur due to the increase in human activity and potential poaching.	Moderate-High	<ul style="list-style-type: none"> • It is recommended that a speed limit of 30km/h is implemented on all roads running through the study area during all phases in order to minimise risk to fauna from vehicles. • No trapping or hunting of fauna is to take place. Access control must be implemented to ensure that no illegal trapping or poaching takes place. • Should any Red Data faunal species be noted within the development footprint areas, these species must be relocated to similar habitat within the vacant land to the west of the development area with the assistance of a suitably qualified ecologist. • Any fauna directly threatened by the construction activities must be removed to a safe location by the ECO or qualified Ecologist. • All staff and contractors must undergo an environmental induction course held by the ECO as well as faunal education and awareness programmes.
	Indirect impacts: Loss of species diversit.	Moderate-High	
	Cumulative impacts: Limited impact on ecological diversity in the vicinity.	Moderate-High	
Noise pollution and disturbance	Direct impacts: The proposed development area is located within close proximity to the Tshipi e Borwa Mine, therefore, species within this landscape often experience disturbance. As a result disturbance of fauna by the proposed development during the construction phase is anticipated to be of moderate significance. Species are particularly sensitive to disturbance during the breeding season and this must be borne in mind during both the construction and operational phases.	Moderate	<ul style="list-style-type: none"> • Strict control must be maintained over all activities during construction, in line with an approved Construction EMPr. • Any Red Data species identified in this report observed to be roosting and/or breeding in the vicinity, the ECO must be notified
	Indirect impacts: Loss of species diversity.	Moderate	
	Cumulative impacts: Movement of species from one area into	Moderate	

	another.		
Avifaunal impacts during the construction phase	<p>Direct impacts: Disturbance particularly during the sensitive parts of the breeding cycle could result in breeding failure. The proposed site alternatives are located within close proximity to the Tshipi e Borwa Open Pit Mine and associated infrastructure. Species residing within this landscape often experience varying degrees of disturbance. As a result, disturbance of birds by the proposed substation is anticipated to be of low significance as birds will move away from the area temporarily. Species sensitive to disturbance and ground-nesting species resident within the development footprint will be particularly susceptible. Disturbance can also influence the community structure of avifauna within close proximity to the development as certain species will be displaced and forced to find alternative territories. Avian species with small territories are particularly susceptible.</p>	Low-Moderate	<ul style="list-style-type: none"> • Strict control must be maintained over all activities during construction, in line with an approved Construction EMPr. • During Construction, if any of the Red Data species identified in this report are observed to be roosting and/or breeding in the vicinity, the ECO must be notified. • The construction camps must be as close to the site as possible • Contractors and working staff must stay within the development footprint and movement outside these areas including avian micro-habitats must be restricted. • Driving must take place on existing roads and a speed limit of 30km/h must be implemented on all roads running through the study area during all phases.
	<p>Indirect impacts: Effect on nesting birds outside the vicinity of the site.</p>	Low-Moderate	
	<p>Cumulative impacts: Moderate as there is a high level of existing disturbance in the vicinity.</p>	Low-Moderate	
Visual Impacts	<p>Direct impacts: Motorists travelling on the R380 and the gravel roads towards Middelplaats Mine and Kuruman, will be briefly exposed to the new project. Motorists on the R380 will only experience views of the power line that crosses the road, and will not be able to see either of the substation sites. Motorists travelling on the gravel road to Middelplaats Mine will be able to view alternative A1 and</p>	Low	<ul style="list-style-type: none"> • When designing the poles/tower, allow for future upgrading of the line to a greater capacity. This may prevent the installation of an additional power line in future and thereby limit potential cumulative visual impacts, should the need arise to increase the capacity; • If possible, locate the substation even closer to the sinter plant or to the railway infrastructure. This strategy will strengthen the visual association of the substation with the mine's infrastructure and thereby consolidate similar objects together; • Choose a substation site that is already disturbed in order to refrain from

	<p>A2 as well as Substation A. All three roads will have a low viewer incidence. The R380 will experience a higher viewer incidence being a main road, although still considered low due to the low traffic volumes on this route.</p> <p>The visual resource has a low aesthetic value due to its monotonous character and limited number of interesting features. Large areas of the study area are considered natural, but the flat topography and arid savannah like vegetation provide little visual interest. The presence of the Mamatwan Manganese Mine has negatively impacted on the character of the landscape. The large industrial development blighted the natural character of the landscape and future expansion of the mine can be expected. The existing vegetation provides effective visual screening from the roads, which increases the sites ability to absorb low intensity visual changes without severely impacting on the study area's character. The study area is considered to have a low visual sensitivity.</p>		<p>stripping natural vegetation to construct the substation;</p> <ul style="list-style-type: none"> • Choose a power line servitude that requires the minimum removal/trimming of higher growing vegetation to adhere to safety regulations; • Locate construction camps and stockyards in areas that are already disturbed instead of stripping more vegetation to allow for these facilities. It will be most preferred to locate the construction camps near the sinter plant; • Establish limits of disturbances during construction through demarcating of the tower and substation footprints in order to prevent unnecessary damage to vegetation; • Keep to existing road infrastructure as far as possible to minimise the physical damage to vegetation in the power line servitude; • Implement rehabilitation of disturbed areas as soon as possible to limit the duration of exposed surfaces and the risk of erosion; and • Previously rehabilitated areas must be monitored to prevent the infestation of weeds that may become an unsightly feature.
	<p>Indirect impacts: None</p>	<p>Low</p>	
	<p>Cumulative impacts: Low- as the area is dominated by the mining activities.</p>	<p>Low</p>	
<p>Heritage</p>	<p>Direct impacts: Based on available information and prior knowledge of the region, it can provisionally be said that the possibility of the proposed development to impact on any sites, features or object of cultural significance is very low.</p>	<p>Low</p>	<ul style="list-style-type: none"> • As per the study, no heritage features or artefacts are expected in the study area, however should any archaeological sites or graves be exposed during construction work, it must immediately be reported to a heritage practitioner so that an investigation and evaluation of the finds can be made.
	<p>Indirect impacts: None</p>		

	Cumulative impacts: Should significant archaeological deposits be located then cumulative impacts will be experienced		
OPERATIONAL PHASE			
Activity	Impact summary	Significance (after mitigation)	Proposed mitigation
Avifaunal impacts during the operational phase	Direct impacts: Electrocution of birds on associated overhead power lines is an important cause of mortality for a variety of bird species particularly storks, cranes and raptors in South Africa (Van Rooyen & Ledger 1999). Electrocution occurs when a bird is perched or attempts to perch on the electrical structure and causes an electrical short circuit by physically bridging the gap between live components (phase-phase electrocutions) or live and earthed components (phase-earth electrocutions) (van Rooyen 2004). Large raptors including Martial Eagle, Tawny Eagle and African White-backed Vulture have been recording using power line infrastructure for roosting and nesting where suitable natural alternatives are limited (Van Rooyen 2004). This increases the risk of electrocution and potential collisions with the power lines. The impact assessment found the impact of electrocution to be of moderate significance, and medium significance after the mitigation in the form of bird friendly structures.	Moderate	<ul style="list-style-type: none"> • A “Bird Friendly” monopole structure, with a bird perch (as per standard Eskom guidelines) should be used for the tower structures. • All relevant perching surfaces should be fitted with bird guards and perch guards as deterrents (Hunting 2002). • Installation of artificial bird space perches and nesting platforms, at a safe distance from energised components (Goudie 2006; Prinsen et al. 2012). • Mark sections of line in high sensitivity areas with anti-collision marking devices (diurnal and nocturnal diverters) to increase the visibility of the power line and reduce likelihood of collisions. Marking devices should be spaced 10 m apart. • These line marking devices include spiral vibration dampers, strips, Firefly Bird Flight Diverters, bird flappers, aerial marker spheres, ribbons, tapes, flags and aviation balls (Prinsen et al. 2012). • Construction of the power line in close proximity to the existing line will reduce the cumulative impacts and collision risk.
	Indirect impacts: Effect on nesting birds outside the vicinity of the site.	Low	
	Cumulative impacts: Moderate as there is a high level of existing disturbance in the vicinity.	Low	

Loss of faunal habitat and ecological structure	Direct impacts: The operational phase of the proposed power line development will result in the loss of faunal habitats within the area. This impact relates to the complete removal or partial destruction/disturbance of existing vegetation by machinery and workers, impacting directly on the ecological condition of natural vegetation and habitat availability. These activities will have an impact on foraging and breeding ecology of faunal species. Loss of vegetation generally affects nutrient cycles, removes the organic litter layer and results in habitat fragmentation and destruction of wildlife corridors. The habitat is however already largely transformed due to the adjacent mining activities and fragmented and the site is not a unique habitat within the landscape.	Low-Moderate	<ul style="list-style-type: none"> All construction and maintenance activities must be carried out according to the generally accepted environmental best practice and the temporal and spatial footprint of the development must be kept to a minimum. The boundaries of the development footprint areas are to be clearly demarcated and it must be ensured that all activities remain within the demarcated footprint area. Edge effects of all construction and operational activities, such as erosion and alien plant species proliferation, which will affect faunal habitats adjacent to the development area, need to be strictly managed. Any natural areas beyond the development footprint, which have been affected by the construction activities, must be rehabilitated using indigenous plant species. Education and awareness campaigns on faunal species and their habitat are recommended to help increase awareness, respect and responsibility towards the environment for all staff and contractors.
	Indirect impacts: Loss of indigenous vegetation.	Low-Moderate	
	Cumulative impacts: Habitat fragmentation	Low-Moderate	
DECOMMISSIONING PHASE			
Decommissioning and closure phase has not been considered as part of this application as the end use of the site and required decommissioning activities are not known at this time; it is therefore not possible to predict the potential environmental impacts. If decommissioning phase is considered in future, the developer will undertake the required actions as prescribed by the legislation at the time and comply with all relevant requirements administered by any relevant authority and competent authority at that time			

Impact associated with the power line Route A2 (alternative)			
CONSTRUCTION PHASE			
Activity	Impact summary	Significance (after mitigation)	Proposed mitigation
Use of various materials, such as diesel, oils and cement during	Direct impacts: Mismanagement of waste and pollutants like hydrocarbons, construction waste and hazardous chemicals will result in these	Low	<ul style="list-style-type: none"> All waste generated during construction is to be disposed of as per the Environmental Management Programme and no washing of paint brushes, containers, wheelbarrows, spades, picks or any other

<p>construction</p>	<p>substances entering and polluting the soil. Due to the apedal nature of the soil and quick infiltration rate, pollutants can quickly move through the environment during and after storm events and make their way to the Vlermuisleegte stream.</p>		<p>equipment adjacent to any drainage channel is permitted.</p> <ul style="list-style-type: none"> • Proper management and disposal of construction waste must occur during the lifespan of the project, including during maintenance of the power lines and substations. • No release of any substance i.e. cement, oil, that could be toxic to fauna or faunal habitats within the development area. • Do not locate the construction camp or any depot for any substance which causes or is likely to cause pollution within a distance of 100m of any watercourse. • Spillages of fuels, oils and other potentially harmful chemicals must be cleaned up immediately and contaminants properly drained and disposed of using proper solid/hazardous waste facilities (not to be disposed of within the natural environment). Any contaminated soil must be removed and the affected area rehabilitated immediately.
<p>Indirect impacts: Impacts on down-slope of the stream – marginal.</p>	<p>Low</p>		
<p>Cumulative impacts: Limited due to the proximity of the project site from the stream.</p>	<p>Low</p>		
<p>Clearing of vegetation for construction</p>	<p><i>Proliferation of Alien invasive species</i> Direct impacts: Alien invasive species dominate the site currently and these will quickly encroach into disturbed areas. Alien species generally out-compete indigenous species for water, light, space and nutrients as they are adaptable to changing conditions and are able to easily invade a wide range of ecological niches (Bromilow, 2010).</p>	<p>Low</p>	<ul style="list-style-type: none"> • An alien invasive management programme must be incorporated into the Environmental Management Programme; • Ongoing alien plant control must be undertaken along the road route; • Areas which have been disturbed will be quickly colonised by invasive alien species. An ongoing management plan must be implemented for the clearing/eradication of alien species. • Monitor all sites disturbed by construction activities for colonisation by exotics or invasive plants and control these as they emerge.
<p>Indirect impacts: Alien invader plant species pose an ecological threat as they alter habitat structure, lower biodiversity (both number and “quality” of species), change nutrient cycling and productivity, and modify food webs (Zedler, 2004).</p>	<p>Low</p>		
<p>Cumulative impacts: Colonisation of disturbed areas by alien and invasive species</p>	<p>Low</p>		
<p>Clearing of vegetation for construction</p>	<p>Direct impacts: During the construction phase the area for the proposed power line will be cleared of</p>	<p>Low-Moderate</p>	<ul style="list-style-type: none"> • Once the route is known, the site must be inspected by a botanist during the summer season to identify all protected tree species of conservation

	<p>vegetation. This will result in the loss of indigenous species, disturbance of species of conservation concern and the fragmentation of vegetation communities. The removal of vegetation will also expose soil increasing the risk of erosion.</p>		<p>concern in order to record their existence for permitting purposes.</p> <ul style="list-style-type: none"> • Indigenous trees removed during construction must be replaced with the same species at a ratio of 1:2 (2 trees must be planted for every 1 tree removed); • Protected trees removed during construction must be replaced with the same species at a ratio of 1:5 (5 trees must be planted for every 1 tree removed); • Disturbed areas must be rehabilitated immediately after construction has been completed in that area by planting appropriate indigenous plant species; • The clearing of vegetation must be kept to a minimum and within the power line servitude; • During the construction phase workers must be limited to areas under construction and access to the undeveloped areas must be strictly controlled; • Rehabilitated areas must be monitored to ensure the establishment of re-vegetated areas.
	<p>Indirect impacts: Loss of indigenous vegetation.</p>	Low-Moderate	
	<p>Cumulative impacts: Loss of natural vegetation due to vegetation fragmentation and habitat disturbance in the landscape.</p>	Low-Moderate	
Loss of faunal habitat and ecological structure	<p>Direct impacts: The construction phase of the proposed power line development will result in the loss of faunal habitats within the area. This impact relates to the complete removal or partial destruction/disturbance of existing vegetation by machinery and workers, impacting directly on the ecological condition of natural vegetation and habitat availability. These activities will have an impact on foraging and breeding ecology of faunal species. Loss of vegetation generally affects nutrient cycles, removes the organic litter layer and results in habitat fragmentation and destruction of wildlife corridors. The habitat is however already largely transformed due to the adjacent mining activities and fragmented and the site is not a unique habitat within the landscape.</p>	Low-Moderate	<ul style="list-style-type: none"> • All construction and maintenance activities must be carried out according to the generally accepted environmental best practice and the temporal and spatial footprint of the development must be kept to a minimum. • The boundaries of the development footprint areas are to be clearly demarcated and it must be ensured that all activities remain within the demarcated footprint area. • Edge effects of all construction and operational activities, such as erosion and alien plant species proliferation, which will affect faunal habitats adjacent to the development area, need to be strictly managed. • Any natural areas beyond the development footprint, which have been affected by the construction activities, must be rehabilitated using indigenous plant species. • Education and awareness campaigns on faunal species and their habitat are recommended to help increase awareness, respect and responsibility towards the environment for all staff and contractors.
	<p>Indirect impacts:</p>	Low-Moderate	

	Loss of indigenous vegetation.		
	Cumulative impacts: Habitat fragmentation	Low-Moderate	
Impacts on the faunal communities	Direct impacts: Activities involving the clearing/harvesting of natural vegetation will result in the loss of faunal species. Faunal diversity within the study area have been negatively impacted as a result of historic and on-going disturbances associated with mining practices. It is not envisaged that any Red data species will be present on the site and thus directly impacted as a result of the development. During the operational phase, a further loss of faunal diversity and ecological integrity will occur due to the increase in human activity and potential poaching.	Moderate-High	<ul style="list-style-type: none"> It is recommended that a speed limit of 30km/h is implemented on all roads running through the study area during all phases in order to minimise risk to fauna from vehicles. No trapping or hunting of fauna is to take place. Access control must be implemented to ensure that no illegal trapping or poaching takes place. Should any Red Data faunal species be noted within the development footprint areas, these species must be relocated to similar habitat within the vacant land to the west of the development area with the assistance of a suitably qualified ecologist. Any fauna directly threatened by the construction activities must be removed to a safe location by the ECO or qualified Ecologist. All staff and contractors must undergo an environmental induction course held by the ECO as well as faunal education and awareness programmes.
	Indirect impacts: Loss of species diversit.	Moderate-High	
	Cumulative impacts: Limited impact on ecological diversity in the vicinity.	Moderate-High	
Noise pollution and disturbance	Direct impacts: The proposed development area is located within close proximity to the Tshipi e Borwa Mine, therefore, species within this landscape often experience disturbance. As a result disturbance of fauna by the proposed development during the construction phase is anticipated to be of moderate significance. Species are particularly sensitive to disturbance during the breeding season and this must be borne in mind during both the construction and operational phases.	Moderate	<ul style="list-style-type: none"> Strict control must be maintained over all activities during construction, in line with an approved Construction EMP. Any Red Data species identified in this report observed to be roosting and/or breeding in the vicinity, the ECO must be notified
	Indirect impacts: Loss of species diversity.	Moderate	
	Cumulative impacts:	Moderate	

	Movement of species from one area into another.		
Avifaunal impacts during the construction phase	<p>Direct impacts: Disturbance particularly during the sensitive parts of the breeding cycle could result in breeding failure. The proposed site alternatives are located within close proximity to the Tshipi e Borwa Open Pit Mine and associated infrastructure. Species residing within this landscape often experience varying degrees of disturbance. As a result, disturbance of birds by the proposed substation is anticipated to be of low significance as birds will move away from the area temporarily. Species sensitive to disturbance and ground-nesting species resident within the development footprint will be particularly susceptible. Disturbance can also influence the community structure of avifauna within close proximity to the development as certain species will be displaced and forced to find alternative territories. Avian species with small territories are particularly susceptible.</p>	Low-Moderate	<ul style="list-style-type: none"> • Strict control must be maintained over all activities during construction, in line with an approved Construction EMPr. • During Construction, if any of the Red Data species identified in this report are observed to be roosting and/or breeding in the vicinity, the ECO must be notified. • The construction camps must be as close to the site as possible • Contractors and working staff must stay within the development footprint and movement outside these areas including avian micro-habitats must be restricted. • Driving must take place on existing roads and a speed limit of 30km/h must be implemented on all roads running through the study area during all phases.
	<p>Indirect impacts: Effect on nesting birds outside the vicinity of the site.</p>	Low-Moderate	
	<p>Cumulative impacts: Moderate as there is a high level of existing disturbance in the vicinity.</p>	Low-Moderate	
Visual Impacts	<p>Direct impacts: Motorists travelling on the R380 and the gravel roads towards Middelpplaats Mine and Kuruman, will be briefly exposed to the new project. Motorists on the R380 will only experience views of the power line that crosses the road, and will not be able to see either of the substation sites. Motorists travelling on the gravel road to Middelpplaats</p>	Low	<ul style="list-style-type: none"> • When designing the poles/tower, allow for future upgrading of the line to a greater capacity. This may prevent the installation of an additional power line in future and thereby limit potential cumulative visual impacts, should the need arise to increase the capacity; • If possible, locate the substation even closer to the sinter plant or to the railway infrastructure. This strategy will strengthen the visual association of the substation with the mine's infrastructure and thereby consolidate similar objects together;

	<p>Mine will be able to view alternative A1 and A2 as well as Substation A. All three roads will have a low viewer incidence. The R380 will experience a higher viewer incidence being a main road, although still considered low due to the low traffic volumes on this route.</p> <p>The visual resource has a low aesthetic value due to its monotonous character and limited number of interesting features. Large areas of the study area are considered natural, but the flat topography and arid savannah like vegetation provide little visual interest. The presence of the Mamatwan Manganese Mine has negatively impacted on the character of the landscape. The large industrial development blighted the natural character of the landscape and future expansion of the mine can be expected. The existing vegetation provides effective visual screening from the roads, which increases the sites ability to absorb low intensity visual changes without severely impacting on the study area's character. The study area is considered to have a low visual sensitivity.</p>		<ul style="list-style-type: none"> • Choose a substation site that is already disturbed in order to refrain from stripping natural vegetation to construct the substation; • Choose a power line servitude that requires the minimum removal/trimming of higher growing vegetation to adhere to safety regulations; • Locate construction camps and stockyards in areas that are already disturbed instead of stripping more vegetation to allow for these facilities. It will be most preferred to locate the construction camps near the sinter plant; • Establish limits of disturbances during construction through demarcating of the tower and substation footprints in order to prevent unnecessary damage to vegetation; • Keep to existing road infrastructure as far as possible to minimise the physical damage to vegetation in the power line servitude; • Implement rehabilitation of disturbed areas as soon as possible to limit the duration of exposed surfaces and the risk of erosion; and • Previously rehabilitated areas must be monitored to prevent the infestation of weeds that may become an unsightly feature.
	<p>Indirect impacts: None</p>	<p>Low</p>	
	<p>Cumulative impacts: Low- as the area is dominated by the mining activities.</p>	<p>Low</p>	
<p>Heritage</p>	<p>Direct impacts: Based on available information and prior knowledge of the region, it can provisionally be said that the possibility of the proposed development to impact on any sites, features or object of cultural significance is very low.</p>	<p>Low</p>	<ul style="list-style-type: none"> • As per the study, no heritage features or artefacts are expected in the study area, however should any archaeological sites or graves be exposed during construction work, it must immediately be reported to a heritage practitioner so that an investigation and evaluation of the finds can be made.
	<p>Indirect impacts: None</p>		

	Cumulative impacts: Should significant archaeological deposits be located then cumulative impacts will be experienced		
OPERATIONAL PHASE			
Activity	Impact summary	Significance (after mitigation)	Proposed mitigation
Avifaunal impacts during the operational phase	<p>Direct impacts: Electrocution of birds on associated overhead power lines is an important cause of mortality for a variety of bird species particularly storks, cranes and raptors in South Africa (Van Rooyen & Ledger 1999). Electrocution occurs when a bird is perched or attempts to perch on the electrical structure and causes an electrical short circuit by physically bridging the gap between live components (phase-phase electrocutions) or live and earthed components (phase-earth electrocutions) (van Rooyen 2004). Large raptors including Martial Eagle, Tawny Eagle and African White-backed Vulture have been recording using power line infrastructure for roosting and nesting where suitable natural alternatives are limited (Van Rooyen 2004). This increases the risk of electrocution and potential collisions with the power lines. The impact assessment found the impact of electrocution to be of moderate significance, and medium significance after the mitigation in the form of bird friendly structures.</p>	Moderate	<ul style="list-style-type: none"> • A “Bird Friendly” monopole structure, with a bird perch (as per standard Eskom guidelines) should be used for the tower structures. • All relevant perching surfaces should be fitted with bird guards and perch guards as deterrents (Hunting 2002). • Installation of artificial bird space perches and nesting platforms, at a safe distance from energised components (Goudie 2006; Prinsen et al. 2012). • Mark sections of line in high sensitivity areas with anti-collision marking devices (diurnal and nocturnal diverters) to increase the visibility of the power line and reduce likelihood of collisions. Marking devices should be spaced 10 m apart. • These line marking devices include spiral vibration dampers, strips, Firefly Bird Flight Diverters, bird flappers, aerial marker spheres, ribbons, tapes, flags and aviation balls (Prinsen et al. 2012). • Construction of the power line in close proximity to the existing line will reduce the cumulative impacts and collision risk.
	<p>Indirect impacts: Effect on nesting birds outside the vicinity of the site.</p>	Low	
	<p>Cumulative impacts: Moderate as there is a high level of existing disturbance in the vicinity.</p>	Low	

Loss of faunal habitat and ecological structure	Direct impacts: The operational phase of the proposed power line development will result in the loss of faunal habitats within the area. This impact relates to the complete removal or partial destruction/disturbance of existing vegetation by machinery and workers, impacting directly on the ecological condition of natural vegetation and habitat availability. These activities will have an impact on foraging and breeding ecology of faunal species. Loss of vegetation generally affects nutrient cycles, removes the organic litter layer and results in habitat fragmentation and destruction of wildlife corridors. The habitat is however already largely transformed due to the adjacent mining activities and fragmented and the site is not a unique habitat within the landscape.	Low-Moderate	<ul style="list-style-type: none"> All construction and maintenance activities must be carried out according to the generally accepted environmental best practice and the temporal and spatial footprint of the development must be kept to a minimum. The boundaries of the development footprint areas are to be clearly demarcated and it must be ensured that all activities remain within the demarcated footprint area. Edge effects of all construction and operational activities, such as erosion and alien plant species proliferation, which will affect faunal habitats adjacent to the development area, need to be strictly managed. Any natural areas beyond the development footprint, which have been affected by the construction activities, must be rehabilitated using indigenous plant species. Education and awareness campaigns on faunal species and their habitat are recommended to help increase awareness, respect and responsibility towards the environment for all staff and contractors.
	Indirect impacts: Loss of indigenous vegetation.	Low-Moderate	
	Cumulative impacts: Habitat fragmentation	Low-Moderate	
DECOMMISSIONING PHASE			
Decommissioning and closure phase has not been considered as part of this application as the end use of the site and required decommissioning activities are not known at this time; it is therefore not possible to predict the potential environmental impacts. If decommissioning phase is considered in future, the developer will undertake the required actions as prescribed by the legislation at the time and comply with all relevant requirements administered by any relevant authority and competent authority at that time			

Impacts Associated with Substation B (alternative)			
CONSTRUCTION PHASE			
Activity	Impact summary	Significance (after mitigation)	Proposed mitigation
Use of various materials, such as	Direct impacts: Mismanagement of waste and pollutants like	Low	<ul style="list-style-type: none"> All waste generated during construction is to be disposed of as per the

diesel, oils and cement during construction	hydrocarbons, construction waste and hazardous chemicals will result in these substances entering and polluting the soil. Due to the apedal nature of the soil and quick infiltration rate, pollutants can quickly move through the environment during and after storm events and make their way to the Vlermuisleegte stream.		<p>Environmental Management Programme and no washing of paint brushes, containers, wheelbarrows, spades, picks or any other equipment adjacent to any drainage channel is permitted.</p> <ul style="list-style-type: none"> • Proper management and disposal of construction waste must occur during the lifespan of the project, including during maintenance of the power lines and substations. • No release of any substance i.e. cement, oil, that could be toxic to fauna or faunal habitats within the development area. • Do not locate the construction camp or any depot for any substance which causes or is likely to cause pollution within a distance of 100m of any watercourse. • Spillages of fuels, oils and other potentially harmful chemicals must be cleaned up immediately and contaminants properly drained and disposed of using proper solid/hazardous waste facilities (not to be disposed of within the natural environment). Any contaminated soil must be removed and the affected area rehabilitated immediately.
	Indirect impacts: Impacts on down-slope of the stream – marginal.	Low	
	Cumulative impacts: Limited due to the proximity of the project site from the stream.	Low	
Clearing of vegetation for construction	<i>Proliferation of Alien invasive species</i> Direct impacts: Alien invasive species dominate the site currently and these will quickly encroach into disturbed areas. Alien species generally out-compete indigenous species for water, light, space and nutrients as they are adaptable to changing conditions and are able to easily invade a wide range of ecological niches (Bromilow, 2010).	Low	<ul style="list-style-type: none"> • An alien invasive management programme must be incorporated into the Environmental Management Programme; • Ongoing alien plant control must be undertaken along the road route; • Areas which have been disturbed will be quickly colonised by invasive alien species. An ongoing management plan must be implemented for the clearing/eradication of alien species. • Monitor all sites disturbed by construction activities for colonisation by exotics or invasive plants and control these as they emerge.
	Indirect impacts: Alien invader plant species pose an ecological threat as they alter habitat structure, lower biodiversity (both number and “quality” of species), change nutrient cycling and productivity, and modify food webs (Zedler, 2004).	Low	
	Cumulative impacts: Colonisation of disturbed areas by alien and invasive species	Low	
Clearing of vegetation	Direct impacts:	Low-Moderate	<ul style="list-style-type: none"> • Once the route is known, the site must be inspected by a botanist during

for construction	<p>During the construction phase the area for the proposed substation will be cleared of vegetation. This will result in the loss of indigenous species, disturbance of species of conservation concern and the fragmentation of vegetation communities. The removal of vegetation will also expose soil increasing the risk of erosion.</p>		<p>the summer season to identify all protected tree species of conservation concern in order to record their existence for permitting purposes.</p> <ul style="list-style-type: none"> • Indigenous trees removed during construction must be replaced with the same species at a ratio of 1:2 (2 trees must be planted for every 1 tree removed); • Protected trees removed during construction must be replaced with the same species at a ratio of 1:5 (5 trees must be planted for every 1 tree removed); • Disturbed areas must be rehabilitated immediately after construction has been completed in that area by planting appropriate indigenous plant species; • The clearing of vegetation must be kept to a minimum and within the power line servitude; • During the construction phase workers must be limited to areas under construction and access to the undeveloped areas must be strictly controlled; • Rehabilitated areas must be monitored to ensure the establishment of re-vegetated areas.
	<p>Indirect impacts: Loss of indigenous vegetation.</p>	Low-Moderate	
	<p>Cumulative impacts: Loss of natural vegetation due to vegetation fragmentation and habitat disturbance in the landscape.</p>	Low-Moderate	
Loss of faunal habitat and ecological structure	<p>Direct impacts: The construction phase of the proposed substation and power line development will result in the loss of faunal habitats within the area. This impact relates to the complete removal or partial destruction/disturbance of existing vegetation by machinery and workers, impacting directly on the ecological condition of natural vegetation and habitat availability. These activities will have an impact on foraging and breeding ecology of faunal species. Loss of vegetation generally affects nutrient cycles, removes the organic litter layer and results in habitat fragmentation and destruction of wildlife corridors. The habitat is however already largely transformed due to the adjacent mining activities and fragmented and the site is not a unique habitat within the landscape.</p>	Low-Moderate	<ul style="list-style-type: none"> • All construction and maintenance activities must be carried out according to the generally accepted environmental best practice and the temporal and spatial footprint of the development must be kept to a minimum. • The boundaries of the development footprint areas are to be clearly demarcated and it must be ensured that all activities remain within the demarcated footprint area. • Edge effects of all construction and operational activities, such as erosion and alien plant species proliferation, which will affect faunal habitats adjacent to the development area, need to be strictly managed. • Any natural areas beyond the development footprint, which have been affected by the construction activities, must be rehabilitated using indigenous plant species. • Education and awareness campaigns on faunal species and their habitat are recommended to help increase awareness, respect and responsibility towards the environment for all staff and contractors.

	Indirect impacts: Loss of indigenous vegetation.	Low-Moderate	
	Cumulative impacts: Habitat fragmentation	Low-Moderate	
Impacts on the faunal communities	Direct impacts: Activities involving the clearing/harvesting of natural vegetation will result in the loss of faunal species. Faunal diversity within the study area have been negatively impacted as a result of historic and on-going disturbances associated with mining practices. It is not envisaged that any Red data species will be present on the site and thus directly impacted as a result of the development. During the operational phase, a further loss of faunal diversity and ecological integrity will occur due to the increase in human activity and potential poaching.	Moderate-High	<ul style="list-style-type: none"> • It is recommended that a speed limit of 30km/h is implemented on all roads running through the study area during all phases in order to minimise risk to fauna from vehicles. • No trapping or hunting of fauna is to take place. Access control must be implemented to ensure that no illegal trapping or poaching takes place. • Should any Red Data faunal species be noted within the development footprint areas, these species must be relocated to similar habitat within the vacant land to the west of the development area with the assistance of a suitably qualified ecologist. • Any fauna directly threatened by the construction activities must be removed to a safe location by the ECO or qualified Ecologist. • All staff and contractors must undergo an environmental induction course held by the ECO as well as faunal education and awareness programmes.
	Indirect impacts: Loss of species diversity.	Moderate-High	
	Cumulative impacts: Limited impact on ecological diversity in the vicinity.	Moderate-High	
Noise pollution and disturbance	Direct impacts: The proposed development area is located within close proximity to the Tshipi e Borwa Mine, therefore, species within this landscape often experience disturbance. As a result disturbance of fauna by the proposed development during the construction phase is anticipated to be of moderate significance. Species are particularly sensitive to disturbance during the breeding season and this must be borne in mind during both the construction and operational phases.	Moderate	<ul style="list-style-type: none"> • Strict control must be maintained over all activities during construction, in line with an approved Construction EMP. • Any Red Data species identified in this report observed to be roosting and/or breeding in the vicinity, the ECO must be notified
	Indirect impacts: Loss of species diversity.	Moderate	

	<p>Cumulative impacts: Movement of species from one area into another.</p>	Moderate	
Avifaunal impacts during the construction phase	<p>Direct impacts: Disturbance particularly during the sensitive parts of the breeding cycle could result in breeding failure. The proposed site alternatives are located within close proximity to the Tshipi e Borwa Open Pit Mine and associated infrastructure. Species residing within this landscape often experience varying degrees of disturbance. As a result, disturbance of birds by the proposed substation is anticipated to be of low significance as birds will move away from the area temporarily. Species sensitive to disturbance and ground-nesting species resident within the development footprint will be particularly susceptible. Disturbance can also influence the community structure of avifauna within close proximity to the development as certain species will be displaced and forced to find alternative territories. Avian species with small territories are particularly susceptible.</p>	Low-Moderate	<ul style="list-style-type: none"> • Strict control must be maintained over all activities during construction, in line with an approved Construction EMPr. • During Construction, if any of the Red Data species identified in this report are observed to be roosting and/or breeding in the vicinity, the ECO must be notified. • The construction camps must be as close to the site as possible • Contractors and working staff must stay within the development footprint and movement outside these areas including avian micro-habitats must be restricted. • Driving must take place on existing roads and a speed limit of 30km/h must be implemented on all roads running through the study area during all phases.
	<p>Indirect impacts: Effect on nesting birds outside the vicinity of the site.</p>	Low-Moderate	
	<p>Cumulative impacts: Moderate as there is a high level of existing disturbance in the vicinity.</p>	Low-Moderate	
Visual Impacts	<p>Direct impacts: Motorists travelling on the R380 and the gravel roads towards Middelpaats Mine and Kuruman, will be briefly exposed to the new project. Motorists on the R380 will only experience views of the power line that crosses the road, and will not be able to see either of the substation sites. Partial views</p>	Low	<ul style="list-style-type: none"> • When designing the poles/tower, allow for future upgrading of the line to a greater capacity. This may prevent the installation of an additional power line in future and thereby limit potential cumulative visual impacts, should the need arise to increase the capacity; • If possible, locate the substation even closer to the sinter plant or to the railway infrastructure. This strategy will strengthen the visual association of the substation with the mine's infrastructure and thereby consolidate

	<p>may be possible of Substation B and its associated alignments, but most is expected to be screened by the existing vegetation cover. The gravel road to Kuruman provides views of the last section of the loop-in and loop out line where it connects with the existing power line³. All three roads will have a low viewer incidence. The R380 will experience a higher viewer incidence being a main road, although still considered low due to the low traffic volumes on this route.</p> <p>The visual resource has a low aesthetic value due to its monotonous character and limited number of interesting features. Large areas of the study area are considered natural, but the flat topography and arid savannah like vegetation provide little visual interest. The presence of the Mamatwan Manganese Mine has negatively impacted on the character of the landscape. The large industrial development blighted the natural character of the landscape and future expansion of the mine can be expected. The existing vegetation provides effective visual screening from the roads, which increases the sites ability to absorb low intensity visual changes without severely impacting on the study area's character. The study area is considered to have a low visual sensitivity.</p>		<p>similar objects together;</p> <ul style="list-style-type: none"> • Choose a substation site that is already disturbed in order to refrain from stripping natural vegetation to construct the substation; • Choose a power line servitude that requires the minimum removal/trimming of higher growing vegetation to adhere to safety regulations; • Locate construction camps and stockyards in areas that are already disturbed instead of stripping more vegetation to allow for these facilities. It will be most preferred to locate the construction camps near the sinter plant; • Establish limits of disturbances during construction through demarcating of the tower and substation footprints in order to prevent unnecessary damage to vegetation; • Keep to existing road infrastructure as far as possible to minimise the physical damage to vegetation in the power line servitude; • Implement rehabilitation of disturbed areas as soon as possible to limit the duration of exposed surfaces and the risk of erosion; and • Previously rehabilitated areas must be monitored to prevent the infestation of weeds that may become an unsightly feature.
	<p>Indirect impacts: None</p>	<p>Low</p>	
	<p>Cumulative impacts: Low- as the area is dominated by the mining activities.</p>	<p>Low</p>	
<p>Heritage</p>	<p>Direct impacts: Based on available information and prior knowledge of the region, it can provisionally be said that the possibility of the proposed development to impact on any sites, features</p>	<p>Low</p>	<ul style="list-style-type: none"> • As per the study, no heritage features or artefacts are expected in the study area, however should any archaeological sites or graves be exposed during construction work, it must immediately be reported to a heritage practitioner so that an investigation and evaluation of the finds

	or object of cultural significance is very low.		can be made.
	Indirect impacts: None		
	Cumulative impacts: Should significant archaeological deposits be located then cumulative impacts will be experienced		
OPERATIONAL PHASE			
Activity	Impact summary	Significance (after mitigation)	Proposed mitigation
Avifaunal impacts during the operational phase (Substations)	Direct impacts: Since there is live hardware in the substation yard, the potential exists for birds to bridge the gap between two phases and earth resulting in electrocution. However, very few electrocutions have been recorded on transmission substations. Species likely to be affected are crows and other species that are tolerant of disturbance. Raptors such as Southern Pale Chanting Goshawk are sometimes attracted into substation yards in pursuit of species nesting there such as sparrows and canaries.	Low	<ul style="list-style-type: none"> • A "Bird Friendly" monopole structure, with a bird perch (as per standard Eskom guidelines) should be used for the tower structures. • All relevant perching surfaces should be fitted with bird guards as deterrents.
	Indirect impacts: Effect on nesting birds outside the vicinity of the site.	Low	
	Cumulative impacts: Moderate as there is a high level of existing disturbance in the vicinity.	Low	
Loss of faunal habitat and ecological structure	Direct impacts: The operational phase of the proposed substation development will result in the loss of faunal habitats within the area. This impact relates to the complete removal or partial destruction/disturbance of existing vegetation	Low-Moderate	<ul style="list-style-type: none"> • All construction and maintenance activities must be carried out according to the generally accepted environmental best practice and the temporal and spatial footprint of the development must be kept to a minimum. • The boundaries of the development footprint areas are to be clearly demarcated and it must be ensured that all activities remain within the

	by machinery and workers, impacting directly on the ecological condition of natural vegetation and habitat availability. These activities will have an impact on foraging and breeding ecology of faunal species. Loss of vegetation generally affects nutrient cycles, removes the organic litter layer and results in habitat fragmentation and destruction of wildlife corridors. The habitat is however already largely transformed due to the adjacent mining activities and fragmented and the site is not a unique habitat within the landscape.		demarcated footprint area. <ul style="list-style-type: none"> • Edge effects of all construction and operational activities, such as erosion and alien plant species proliferation, which will affect faunal habitats adjacent to the development area, need to be strictly managed. • Any natural areas beyond the development footprint, which have been affected by the construction activities, must be rehabilitated using indigenous plant species. • Education and awareness campaigns on faunal species and their habitat are recommended to help increase awareness, respect and responsibility towards the environment for all staff and contractors.
	Indirect impacts: Loss of indigenous vegetation.	Low-Moderate	
	Cumulative impacts: Habitat fragmentation	Low-Moderate	

DECOMMISSIONING PHASE

Decommissioning and closure phase has not been considered as part of this application as the end use of the site and required decommissioning activities are not known at this time; it is therefore not possible to predict the potential environmental impacts. If decommissioning phase is considered in future, the developer will undertake the required actions as prescribed by the legislation at the time and comply with all relevant requirements administered by any relevant authority and competent authority at that time

Impact associated with the power line Route B1 (alternative)

CONSTRUCTION PHASE

Activity	Impact summary	Significance (after mitigation)	Proposed mitigation
Use of various materials, such as diesel, oils and cement during construction	Direct impacts: Mismanagement of waste and pollutants like hydrocarbons, construction waste and hazardous chemicals will result in these substances entering and polluting the soil. Due to the apedal nature of the soil and quick infiltration rate, pollutants can quickly move through the environment during and after	Low	<ul style="list-style-type: none"> • All waste generated during construction is to be disposed of as per the Environmental Management Programme and no washing of paint brushes, containers, wheelbarrows, spades, picks or any other equipment adjacent to any drainage channel is permitted. • Proper management and disposal of construction waste must occur during the lifespan of the project, including during maintenance of the power lines and substations.

	storm events and make their way to the Vlermuisleegte stream.		<ul style="list-style-type: none"> No release of any substance i.e. cement, oil, that could be toxic to fauna or faunal habitats within the development area. Do not locate the construction camp or any depot for any substance which causes or is likely to cause pollution within a distance of 100m of any watercourse. Spillages of fuels, oils and other potentially harmful chemicals must be cleaned up immediately and contaminants properly drained and disposed of using proper solid/hazardous waste facilities (not to be disposed of within the natural environment). Any contaminated soil must be removed and the affected area rehabilitated immediately.
	Indirect impacts: Impacts on down-slope of the stream – marginal.	Low	
	Cumulative impacts: Limited due to the proximity of the project site from the stream.	Low	
Clearing of vegetation for construction	<i>Proliferation of Alien invasive species</i> Direct impacts: Alien invasive species dominate the site currently and these will quickly encroach into disturbed areas. Alien species generally out-compete indigenous species for water, light, space and nutrients as they are adaptable to changing conditions and are able to easily invade a wide range of ecological niches (Bromilow, 2010).	Low	<ul style="list-style-type: none"> An alien invasive management programme must be incorporated into the Environmental Management Programme; Ongoing alien plant control must be undertaken along the road route; Areas which have been disturbed will be quickly colonised by invasive alien species. An ongoing management plan must be implemented for the clearing/eradication of alien species. Monitor all sites disturbed by construction activities for colonisation by exotics or invasive plants and control these as they emerge.
	Indirect impacts: Alien invader plant species pose an ecological threat as they alter habitat structure, lower biodiversity (both number and “quality” of species), change nutrient cycling and productivity, and modify food webs (Zedler, 2004).	Low	
	Cumulative impacts: Colonisation of disturbed areas by alien and invasive species	Low	
Clearing of vegetation for construction	Direct impacts: During the construction phase the area for the proposed power line will be cleared of vegetation. This will result in the loss of indigenous species, disturbance of species of conservation concern and the fragmentation of vegetation communities. The removal of	Low-Moderate	<ul style="list-style-type: none"> Once the route is known, the site must be inspected by a botanist during the summer season to identify all protected tree species of conservation concern in order to record their existence for permitting purposes. Indigenous trees removed during construction must be replaced with the same species at a ratio of 1:2 (2 trees must be planted for every 1 tree removed);

	<p>vegetation will also expose soil increasing the risk of erosion.</p> <p>Indirect impacts: Loss of indigenous vegetation.</p> <p>Cumulative impacts: Loss of natural vegetation due to vegetation fragmentation and habitat disturbance in the landscape.</p>	<p>Low-Moderate</p> <p>Low-Moderate</p>	<ul style="list-style-type: none"> Protected trees removed during construction must be replaced with the same species at a ratio of 1:5 (5 trees must be planted for every 1 tree removed); Disturbed areas must be rehabilitated immediately after construction has been completed in that area by planting appropriate indigenous plant species; The clearing of vegetation must be kept to a minimum and within the power line servitude; During the construction phase workers must be limited to areas under construction and access to the undeveloped areas must be strictly controlled; Rehabilitated areas must be monitored to ensure the establishment of re-vegetated areas.
Loss of faunal habitat and ecological structure	<p>Direct impacts: The construction phase of the proposed power line development will result in the loss of faunal habitats within the area. This impact relates to the complete removal or partial destruction/disturbance of existing vegetation by machinery and workers, impacting directly on the ecological condition of natural vegetation and habitat availability. These activities will have an impact on foraging and breeding ecology of faunal species. Loss of vegetation generally affects nutrient cycles, removes the organic litter layer and results in habitat fragmentation and destruction of wildlife corridors. The habitat is however already largely transformed due to the adjacent mining activities and fragmented and the site is not a unique habitat within the landscape.</p> <p>Indirect impacts: Loss of indigenous vegetation.</p> <p>Cumulative impacts: Habitat fragmentation</p>	<p>Low-Moderate</p> <p>Low-Moderate</p> <p>Low-Moderate</p>	

Impacts on the faunal communities	Direct impacts: Activities involving the clearing/harvesting of natural vegetation will result in the loss of faunal species. Faunal diversity within the study area have been negatively impacted as a result of historic and on-going disturbances associated with mining practices. It is not envisaged that any Red data species will be present on the site and thus directly impacted as a result of the development. During the operational phase, a further loss of faunal diversity and ecological integrity will occur due to the increase in human activity and potential poaching.	Moderate-High	<ul style="list-style-type: none"> • It is recommended that a speed limit of 30km/h is implemented on all roads running through the study area during all phases in order to minimise risk to fauna from vehicles. • No trapping or hunting of fauna is to take place. Access control must be implemented to ensure that no illegal trapping or poaching takes place. • Should any Red Data faunal species be noted within the development footprint areas, these species must be relocated to similar habitat within the vacant land to the west of the development area with the assistance of a suitably qualified ecologist. • Any fauna directly threatened by the construction activities must be removed to a safe location by the ECO or qualified Ecologist. • All staff and contractors must undergo an environmental induction course held by the ECO as well as faunal education and awareness programmes.
	Indirect impacts: Loss of species diversit.	Moderate-High	
	Cumulative impacts: Limited impact on ecological diversity in the vicinity.	Moderate-High	
Noise pollution and disturbance	Direct impacts: The proposed development area is located within close proximity to the Tshipi e Borwa Mine, therefore, species within this landscape often experience disturbance. As a result disturbance of fauna by the proposed development during the construction phase is anticipated to be of moderate significance. Species are particularly sensitive to disturbance during the breeding season and this must be borne in mind during both the construction and operational phases.	Moderate	<ul style="list-style-type: none"> • Strict control must be maintained over all activities during construction, in line with an approved Construction EMPr. • Any Red Data species identified in this report observed to be roosting and/or breeding in the vicinity, the ECO must be notified
	Indirect impacts: Loss of species diversity.	Moderate	
	Cumulative impacts: Movement of species from one area into another.	Moderate	
Avifaunal impacts during the	Direct impacts: Disturbance particularly during the sensitive	Low-Moderate	<ul style="list-style-type: none"> • Strict control must be maintained over all activities during construction, in

<p>construction phase</p>	<p>parts of the breeding cycle could result in breeding failure. The proposed site alternatives are located within close proximity to the Tshipi e Borwa Open Pit Mine and associated infrastructure. Species residing within this landscape often experience varying degrees of disturbance. As a result, disturbance of birds by the proposed substation is anticipated to be of low significance as birds will move away from the area temporarily. Species sensitive to disturbance and ground-nesting species resident within the development footprint will be particularly susceptible. Disturbance can also influence the community structure of avifauna within close proximity to the development as certain species will be displaced and forced to find alternative territories. Avian species with small territories are particularly susceptible.</p>		<p>line with an approved Construction EMPr.</p> <ul style="list-style-type: none"> • During Construction, if any of the Red Data species identified in this report are observed to be roosting and/or breeding in the vicinity, the ECO must be notified. • The construction camps must be as close to the site as possible • Contractors and working staff must stay within the development footprint and movement outside these areas including avian micro-habitats must be restricted. • Driving must take place on existing roads and a speed limit of 30km/h must be implemented on all roads running through the study area during all phases.
	<p>Indirect impacts: Effect on nesting birds outside the vicinity of the site.</p>	<p>Low-Moderate</p>	
	<p>Cumulative impacts: Moderate as there is a high level of existing disturbance in the vicinity.</p>	<p>Low-Moderate</p>	
<p>Visual Impacts</p>	<p>Direct impacts: Motorists travelling on the R380 and the gravel roads towards Middelplaats Mine and Kuruman, will be briefly exposed to the new project. Motorists on the R380 will only experience views of the power line that crosses the road, and will not be able to see either of the substation sites. Motorists travelling on the gravel road to Middelplaats Mine will be able to view alternative A1 and A2 as well as Substation A. All three roads will have a low viewer incidence. The R380 will experience a higher viewer incidence</p>	<p>Low</p>	<ul style="list-style-type: none"> • When designing the poles/tower, allow for future upgrading of the line to a greater capacity. This may prevent the installation of an additional power line in future and thereby limit potential cumulative visual impacts, should the need arise to increase the capacity; • If possible, locate the substation even closer to the sinter plant or to the railway infrastructure. This strategy will strengthen the visual association of the substation with the mine's infrastructure and thereby consolidate similar objects together; • Choose a substation site that is already disturbed in order to refrain from stripping natural vegetation to construct the substation; • Choose a power line servitude that requires the minimum removal/trimming of higher growing vegetation to adhere to safety

	<p>being a main road, although still considered low due to the low traffic volumes on this route.</p> <p>The visual resource has a low aesthetic value due to its monotonous character and limited number of interesting features. Large areas of the study area are considered natural, but the flat topography and arid savannah like vegetation provide little visual interest. The presence of the Mamatwan Manganese Mine has negatively impacted on the character of the landscape. The large industrial development blighted the natural character of the landscape and future expansion of the mine can be expected. The existing vegetation provides effective visual screening from the roads, which increases the sites ability to absorb low intensity visual changes without severely impacting on the study area's character. The study area is considered to have a low visual sensitivity.</p>		<p>regulations;</p> <ul style="list-style-type: none"> • Locate construction camps and stockyards in areas that are already disturbed instead of stripping more vegetation to allow for these facilities. It will be most preferred to locate the construction camps near the sinter plant; • Establish limits of disturbances during construction through demarcating of the tower and substation footprints in order to prevent unnecessary damage to vegetation; • Keep to existing road infrastructure as far as possible to minimise the physical damage to vegetation in the power line servitude; • Implement rehabilitation of disturbed areas as soon as possible to limit the duration of exposed surfaces and the risk of erosion; and • Previously rehabilitated areas must be monitored to prevent the infestation of weeds that may become an unsightly feature.
	<p>Indirect impacts: None</p>	Low	
	<p>Cumulative impacts: Low- as the area is dominated by the mining activities.</p>	Low	
Heritage	<p>Direct impacts: Based on available information and prior knowledge of the region, it can provisionally be said that the possibility of the proposed development to impact on any sites, features or object of cultural significance is very low.</p>	Low	<ul style="list-style-type: none"> • As per the study, no heritage features or artefacts are expected in the study area, however should any archaeological sites or graves be exposed during construction work, it must immediately be reported to a heritage practitioner so that an investigation and evaluation of the finds can be made.
	<p>Indirect impacts: None</p>		
	<p>Cumulative impacts: Should significant archaeological deposits be located then cumulative impacts will be experienced</p>		

OPERATIONAL PHASE			
Activity	Impact summary	Significance (after mitigation)	Proposed mitigation
Avifaunal impacts during the operational phase	<p>Direct impacts: Electrocution of birds on associated overhead power lines is an important cause of mortality for a variety of bird species particularly storks, cranes and raptors in South Africa (Van Rooyen & Ledger 1999). Electrocution occurs when a bird is perched or attempts to perch on the electrical structure and causes an electrical short circuit by physically bridging the gap between live components (phase-phase electrocutions) or live and earthed components (phase-earth electrocutions) (van Rooyen 2004). Large raptors including Martial Eagle, Tawny Eagle and African White-backed Vulture have been recording using power line infrastructure for roosting and nesting where suitable natural alternatives are limited (Van Rooyen 2004). This increases the risk of electrocution and potential collisions with the power lines. The impact assessment found the impact of electrocution to be of moderate significance, and medium significance after the mitigation in the form of bird friendly structures.</p>	Moderate	<ul style="list-style-type: none"> • A “Bird Friendly” monopole structure, with a bird perch (as per standard Eskom guidelines) should be used for the tower structures. • All relevant perching surfaces should be fitted with bird guards and perch guards as deterrents (Hunting 2002). • Installation of artificial bird space perches and nesting platforms, at a safe distance from energised components (Goudie 2006; Prinsen et al. 2012). • Mark sections of line in high sensitivity areas with anti-collision marking devices (diurnal and nocturnal diverters) to increase the visibility of the power line and reduce likelihood of collisions. Marking devices should be spaced 10 m apart. • These line marking devices include spiral vibration dampers, strips, Firefly Bird Flight Diverters, bird flappers, aerial marker spheres, ribbons, tapes, flags and aviation balls (Prinsen et al. 2012). • Construction of the power line in close proximity to the existing line will reduce the cumulative impacts and collision risk.
	<p>Indirect impacts: Effect on nesting birds outside the vicinity of the site.</p>	Low	
	<p>Cumulative impacts: Moderate as there is a high level of existing disturbance in the vicinity.</p>	Low	
Loss of faunal habitat and ecological structure	<p>Direct impacts: The operational phase of the proposed power line development will result in the loss of faunal habitats within the area. This impact</p>	Low-Moderate	<ul style="list-style-type: none"> • All construction and maintenance activities must be carried out according to the generally accepted environmental best practice and the temporal and spatial footprint of the development must be kept to a minimum.

	relates to the complete removal or partial destruction/disturbance of existing vegetation by machinery and workers, impacting directly on the ecological condition of natural vegetation and habitat availability. These activities will have an impact on foraging and breeding ecology of faunal species. Loss of vegetation generally affects nutrient cycles, removes the organic litter layer and results in habitat fragmentation and destruction of wildlife corridors. The habitat is however already largely transformed due to the adjacent mining activities and fragmented and the site is not a unique habitat within the landscape.		<ul style="list-style-type: none"> The boundaries of the development footprint areas are to be clearly demarcated and it must be ensured that all activities remain within the demarcated footprint area. Edge effects of all construction and operational activities, such as erosion and alien plant species proliferation, which will affect faunal habitats adjacent to the development area, need to be strictly managed. Any natural areas beyond the development footprint, which have been affected by the construction activities, must be rehabilitated using indigenous plant species. Education and awareness campaigns on faunal species and their habitat are recommended to help increase awareness, respect and responsibility towards the environment for all staff and contractors.
	Indirect impacts: Loss of indigenous vegetation.	Low-Moderate	
	Cumulative impacts: Habitat fragmentation	Low-Moderate	

DECOMMISSIONING PHASE

Impact summary	Significance (after mitigation)
Decommissioning and closure phase has not been considered as part of this application as the end use of the site and required decommissioning activities are not known at this time; it is therefore not possible to predict the potential environmental impacts. If decommissioning phase is considered in future, the developer will undertake the required actions as prescribed by the legislation at the time and comply with all relevant requirements administered by any relevant authority and competent authority at that time	

Impact associated with the power line Route B2 (alternative)

CONSTRUCTION PHASE			
Activity	Impact summary	Significance (after mitigation)	Proposed mitigation
Use of various materials, such as diesel, oils and	Direct impacts: Mismanagement of waste and pollutants like hydrocarbons, construction waste and	Low	<ul style="list-style-type: none"> All waste generated during construction is to be disposed of as per the Environmental Management Programme and no washing of paint

cement during construction	hazardous chemicals will result in these substances entering and polluting the soil. Due to the apedal nature of the soil and quick infiltration rate, pollutants can quickly move through the environment during and after storm events and make their way to the Vlermuisleegte stream.		<p>brushes, containers, wheelbarrows, spades, picks or any other equipment adjacent to any drainage channel is permitted.</p> <ul style="list-style-type: none"> • Proper management and disposal of construction waste must occur during the lifespan of the project, including during maintenance of the power lines and substations. • No release of any substance i.e. cement, oil, that could be toxic to fauna or faunal habitats within the development area. • Do not locate the construction camp or any depot for any substance which causes or is likely to cause pollution within a distance of 100m of any watercourse. • Spillages of fuels, oils and other potentially harmful chemicals must be cleaned up immediately and contaminants properly drained and disposed of using proper solid/hazardous waste facilities (not to be disposed of within the natural environment). Any contaminated soil must be removed and the affected area rehabilitated immediately.
	Indirect impacts: Impacts on down-slope of the stream – marginal.	Low	
	Cumulative impacts: Limited due to the proximity of the project site from the stream.	Low	
Clearing of vegetation for construction	<i>Proliferation of Alien invasive species</i> Direct impacts: Alien invasive species dominate the site currently and these will quickly encroach into disturbed areas. Alien species generally out-compete indigenous species for water, light, space and nutrients as they are adaptable to changing conditions and are able to easily invade a wide range of ecological niches (Bromilow, 2010).	Low	<ul style="list-style-type: none"> • An alien invasive management programme must be incorporated into the Environmental Management Programme; • Ongoing alien plant control must be undertaken along the road route; • Areas which have been disturbed will be quickly colonised by invasive alien species. An ongoing management plan must be implemented for the clearing/eradication of alien species. • Monitor all sites disturbed by construction activities for colonisation by exotics or invasive plants and control these as they emerge.
	Indirect impacts: Alien invader plant species pose an ecological threat as they alter habitat structure, lower biodiversity (both number and “quality” of species), change nutrient cycling and productivity, and modify food webs (Zedler, 2004).	Low	
	Cumulative impacts: Colonisation of disturbed areas by alien and invasive species	Low	
Clearing of vegetation for construction	Direct impacts: During the construction phase the area for	Low-Moderate	<ul style="list-style-type: none"> • Once the route is known, the site must be inspected by a botanist during

	<p>the proposed power line will be cleared of vegetation. This will result in the loss of indigenous species, disturbance of species of conservation concern and the fragmentation of vegetation communities. The removal of vegetation will also expose soil increasing the risk of erosion.</p>		<p>the summer season to identify all protected tree species of conservation concern in order to record their existence for permitting purposes.</p> <ul style="list-style-type: none"> • Indigenous trees removed during construction must be replaced with the same species at a ratio of 1:2 (2 trees must be planted for every 1 tree removed); • Protected trees removed during construction must be replaced with the same species at a ratio of 1:5 (5 trees must be planted for every 1 tree removed); • Disturbed areas must be rehabilitated immediately after construction has been completed in that area by planting appropriate indigenous plant species; • The clearing of vegetation must be kept to a minimum and within the power line servitude; • During the construction phase workers must be limited to areas under construction and access to the undeveloped areas must be strictly controlled; • Rehabilitated areas must be monitored to ensure the establishment of re-vegetated areas.
	<p>Indirect impacts: Loss of indigenous vegetation.</p>	<p>Low-Moderate</p>	
	<p>Cumulative impacts: Loss of natural vegetation due to vegetation fragmentation and habitat disturbance in the landscape.</p>	<p>Low-Moderate</p>	
<p>Loss of faunal habitat and ecological structure</p>	<p>Direct impacts: The construction phase of the proposed power line development will result in the loss of faunal habitats within the area. This impact relates to the complete removal or partial destruction/disturbance of existing vegetation by machinery and workers, impacting directly on the ecological condition of natural vegetation and habitat availability. These activities will have an impact on foraging and breeding ecology of faunal species. Loss of vegetation generally affects nutrient cycles, removes the organic litter layer and results in habitat fragmentation and destruction of wildlife corridors. The habitat is however already largely transformed due to the adjacent mining activities and fragmented and the site is not a unique habitat within the landscape.</p>	<p>Low-Moderate</p>	<ul style="list-style-type: none"> • All construction and maintenance activities must be carried out according to the generally accepted environmental best practice and the temporal and spatial footprint of the development must be kept to a minimum. • The boundaries of the development footprint areas are to be clearly demarcated and it must be ensured that all activities remain within the demarcated footprint area. • Edge effects of all construction and operational activities, such as erosion and alien plant species proliferation, which will affect faunal habitats adjacent to the development area, need to be strictly managed. • Any natural areas beyond the development footprint, which have been affected by the construction activities, must be rehabilitated using indigenous plant species. • Education and awareness campaigns on faunal species and their habitat are recommended to help increase awareness, respect and responsibility towards the environment for all staff and contractors.

	Indirect impacts: Loss of indigenous vegetation.	Low-Moderate	
	Cumulative impacts: Habitat fragmentation	Low-Moderate	
Impacts on the faunal communities	Direct impacts: Activities involving the clearing/harvesting of natural vegetation will result in the loss of faunal species. Faunal diversity within the study area have been negatively impacted as a result of historic and on-going disturbances associated with mining practices. It is not envisaged that any Red data species will be present on the site and thus directly impacted as a result of the development. During the operational phase, a further loss of faunal diversity and ecological integrity will occur due to the increase in human activity and potential poaching.	Moderate-High	<ul style="list-style-type: none"> • It is recommended that a speed limit of 30km/h is implemented on all roads running through the study area during all phases in order to minimise risk to fauna from vehicles. • No trapping or hunting of fauna is to take place. Access control must be implemented to ensure that no illegal trapping or poaching takes place. • Should any Red Data faunal species be noted within the development footprint areas, these species must be relocated to similar habitat within the vacant land to the west of the development area with the assistance of a suitably qualified ecologist. • Any fauna directly threatened by the construction activities must be removed to a safe location by the ECO or qualified Ecologist. • All staff and contractors must undergo an environmental induction course held by the ECO as well as faunal education and awareness programmes.
	Indirect impacts: Loss of species diversit.	Moderate-High	
	Cumulative impacts: Limited impact on ecological diversity in the vicinity.	Moderate-High	
Noise pollution and disturbance	Direct impacts: The proposed development area is located within close proximity to the Tshipi e Borwa Mine, therefore, species within this landscape often experience disturbance. As a result disturbance of fauna by the proposed development during the construction phase is anticipated to be of moderate significance. Species are particularly sensitive to disturbance during the breeding season and this must be borne in mind during both the construction and operational phases.	Moderate	<ul style="list-style-type: none"> • Strict control must be maintained over all activities during construction, in line with an approved Construction EMPr. • Any Red Data species identified in this report observed to be roosting and/or breeding in the vicinity, the ECO must be notified
	Indirect impacts: Loss of species diversity.	Moderate	

	Cumulative impacts: Movement of species from one area into another.	Moderate	
Avifaunal impacts during the construction phase	Direct impacts: Disturbance particularly during the sensitive parts of the breeding cycle could result in breeding failure. The proposed site alternatives are located within close proximity to the Tshipi e Borwa Open Pit Mine and associated infrastructure. Species residing within this landscape often experience varying degrees of disturbance. As a result, disturbance of birds by the proposed substation is anticipated to be of low significance as birds will move away from the area temporarily. Species sensitive to disturbance and ground-nesting species resident within the development footprint will be particularly susceptible. Disturbance can also influence the community structure of avifauna within close proximity to the development as certain species will be displaced and forced to find alternative territories. Avian species with small territories are particularly susceptible.	Low-Moderate	<ul style="list-style-type: none"> • Strict control must be maintained over all activities during construction, in line with an approved Construction EMPr. • During Construction, if any of the Red Data species identified in this report are observed to be roosting and/or breeding in the vicinity, the ECO must be notified. • The construction camps must be as close to the site as possible • Contractors and working staff must stay within the development footprint and movement outside these areas including avian micro-habitats must be restricted. • Driving must take place on existing roads and a speed limit of 30km/h must be implemented on all roads running through the study area during all phases.
	Indirect impacts: Effect on nesting birds outside the vicinity of the site.	Low-Moderate	
	Cumulative impacts: Moderate as there is a high level of existing disturbance in the vicinity.	Low-Moderate	
Visual Impacts	Direct impacts: Motorists travelling on the R380 and the gravel roads towards Middelpaats Mine and Kuruman, will be briefly exposed to the new project. Motorists on the R380 will only experience views of the power line that crosses the road, and will not be able to see either of the substation sites. Motorists	Low	<ul style="list-style-type: none"> • When designing the poles/tower, allow for future upgrading of the line to a greater capacity. This may prevent the installation of an additional power line in future and thereby limit potential cumulative visual impacts, should the need arise to increase the capacity; • If possible, locate the substation even closer to the sinter plant or to the railway infrastructure. This strategy will strengthen the visual association of the substation with the mine's infrastructure and thereby consolidate

	<p>travelling on the gravel road to Middelplaats Mine will be able to view alternative A1 and A2 as well as Substation A. All three roads will have a low viewer incidence. The R380 will experience a higher viewer incidence being a main road, although still considered low due to the low traffic volumes on this route.</p> <p>The visual resource has a low aesthetic value due to its monotonous character and limited number of interesting features. Large areas of the study area are considered natural, but the flat topography and arid savannah like vegetation provide little visual interest. The presence of the Mamatwan Manganese Mine has negatively impacted on the character of the landscape. The large industrial development blighted the natural character of the landscape and future expansion of the mine can be expected. The existing vegetation provides effective visual screening from the roads, which increases the sites ability to absorb low intensity visual changes without severely impacting on the study area's character. The study area is considered to have a low visual sensitivity.</p>		<p>similar objects together;</p> <ul style="list-style-type: none"> • Choose a substation site that is already disturbed in order to refrain from stripping natural vegetation to construct the substation; • Choose a power line servitude that requires the minimum removal/trimming of higher growing vegetation to adhere to safety regulations; • Locate construction camps and stockyards in areas that are already disturbed instead of stripping more vegetation to allow for these facilities. It will be most preferred to locate the construction camps near the sinter plant; • Establish limits of disturbances during construction through demarcating of the tower and substation footprints in order to prevent unnecessary damage to vegetation; • Keep to existing road infrastructure as far as possible to minimise the physical damage to vegetation in the power line servitude; • Implement rehabilitation of disturbed areas as soon as possible to limit the duration of exposed surfaces and the risk of erosion; and • Previously rehabilitated areas must be monitored to prevent the infestation of weeds that may become an unsightly feature.
	<p>Indirect impacts: None</p>	<p>Low</p>	
	<p>Cumulative impacts: Low- as the area is dominated by the mining activities.</p>	<p>Low</p>	
<p>Heritage</p>	<p>Direct impacts: Based on available information and prior knowledge of the region, it can provisionally be said that the possibility of the proposed development to impact on any sites, features or object of cultural significance is very low.</p>	<p>Low</p>	<ul style="list-style-type: none"> • As per the study, no heritage features or artefacts are expected in the study area, however should any archaeological sites or graves be exposed during construction work, it must immediately be reported to a heritage practitioner so that an investigation and evaluation of the finds can be made.
	<p>Indirect impacts: None</p>		

	<p>Cumulative impacts: Should significant archaeological deposits be located then cumulative impacts will be experienced</p>		
OPERATIONAL PHASE			
Activity	Impact summary	Significance (after mitigation)	Proposed mitigation
Avifaunal impacts during the operational phase	<p>Direct impacts: Electrocution of birds on associated overhead power lines is an important cause of mortality for a variety of bird species particularly storks, cranes and raptors in South Africa (Van Rooyen & Ledger 1999). Electrocution occurs when a bird is perched or attempts to perch on the electrical structure and causes an electrical short circuit by physically bridging the gap between live components (phase-phase electrocutions) or live and earthed components (phase-earth electrocutions) (van Rooyen 2004). Large raptors including Martial Eagle, Tawny Eagle and African White-backed Vulture have been recording using power line infrastructure for roosting and nesting where suitable natural alternatives are limited (Van Rooyen 2004). This increases the risk of electrocution and potential collisions with the power lines. The impact assessment found the impact of electrocution to be of moderate significance, and medium significance after the mitigation in the form of bird friendly structures.</p>	Moderate	<ul style="list-style-type: none"> • A “Bird Friendly” monopole structure, with a bird perch (as per standard Eskom guidelines) should be used for the tower structures. • All relevant perching surfaces should be fitted with bird guards and perch guards as deterrents (Hunting 2002). • Installation of artificial bird space perches and nesting platforms, at a safe distance from energised components (Goudie 2006; Prinsen et al. 2012). • Mark sections of line in high sensitivity areas with anti-collision marking devices (diurnal and nocturnal diverters) to increase the visibility of the power line and reduce likelihood of collisions. Marking devices should be spaced 10 m apart. • These line marking devices include spiral vibration dampers, strips, Firefly Bird Flight Diverters, bird flappers, aerial marker spheres, ribbons, tapes, flags and aviation balls (Prinsen et al. 2012). • Construction of the power line in close proximity to the existing line will reduce the cumulative impacts and collision risk.
	<p>Indirect impacts: Effect on nesting birds outside the vicinity of the site.</p>	Low	
	<p>Cumulative impacts: Moderate as there is a high level of existing</p>	Low	

	disturbance in the vicinity.		
Loss of faunal habitat and ecological structure	<p>Direct impacts: The operational phase of the proposed power line development will result in the loss of faunal habitats within the area. This impact relates to the complete removal or partial destruction/disturbance of existing vegetation by machinery and workers, impacting directly on the ecological condition of natural vegetation and habitat availability. These activities will have an impact on foraging and breeding ecology of faunal species. Loss of vegetation generally affects nutrient cycles, removes the organic litter layer and results in habitat fragmentation and destruction of wildlife corridors. The habitat is however already largely transformed due to the adjacent mining activities and fragmented and the site is not a unique habitat within the landscape.</p>	Low-Moderate	<ul style="list-style-type: none"> • All construction and maintenance activities must be carried out according to the generally accepted environmental best practice and the temporal and spatial footprint of the development must be kept to a minimum. • The boundaries of the development footprint areas are to be clearly demarcated and it must be ensured that all activities remain within the demarcated footprint area. • Edge effects of all construction and operational activities, such as erosion and alien plant species proliferation, which will affect faunal habitats adjacent to the development area, need to be strictly managed. • Any natural areas beyond the development footprint, which have been affected by the construction activities, must be rehabilitated using indigenous plant species. • Education and awareness campaigns on faunal species and their habitat are recommended to help increase awareness, respect and responsibility towards the environment for all staff and contractors.
	<p>Indirect impacts: Loss of indigenous vegetation.</p>	Low-Moderate	
	<p>Cumulative impacts: Habitat fragmentation</p>	Low-Moderate	
DECOMMISSIONING PHASE			
Decommissioning and closure phase has not been considered as part of this application as the end use of the site and required decommissioning activities are not known at this time; it is therefore not possible to predict the potential environmental impacts. If decommissioning phase is considered in future, the developer will undertake the required actions as prescribed by the legislation at the time and comply with all relevant requirements administered by any relevant authority and competent authority at that time			

A complete impact assessment in terms of Regulation 19(3) of GN 982 must be included as Appendix F.

2. 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.

*For the purposes of this assessment and clarification, the proposed **power line routes and substation** for Tshipi e Borwa **and alternatives** will be **assessed collectively** as these fall within a similar geographical environment. Impacts from the abovementioned power lines and substation footprint are likely to be similar. **Notes will be made should significant differences between sites or alternatives occur, to indicate if and why a particular alternative is perceived to be less favourable.***

Tshipi e Borwa Substation and associated power lines (preferred and alternative sites):

The proposed activities assessed within this Basic Assessment Report are required to provide essential infrastructure associated with the development of the Tshipi e Borwa Substation and associated power lines. In summary, the Basic Assessment has assessed potential impacts and identified appropriate management and mitigation measures. No environmental fatal flows and no significant negative impacts have been identified to be associated with the proposed project (**for both the preferred and alternative sites**). The Impact Assessment section of this report indicates that the identified environmental impacts associated can be effectively mitigated to have a low significance impact rating provided the recommended mitigation and management measures are implemented.

Based on the preceding discussion, the specialists concluded their proposed routes and alternative assessment as follows:

Substation A (preferred) and its associated power line routes, A1 (preferred) and A2 (alternative):

Ecological Impacts

From an ecological perspective, the potential impacts identified included loss of indigenous vegetation; loss of habitat and ecological structure; direct mortalities or injury and disturbance. Habitat destruction will also result from the construction of internal access roads, operation buildings and the clearing of power line servitudes. The proposed development is not predicted to have a detrimental impact on regional populations or Red Data listed species. As a result the majority of impacts associated with the development of the site are likely to be local in nature and not of wider significance. If substation A and its associated power line route are selected more protected trees would be affected resulting in greater costs for rehabilitation. However, due to the low sensitivity of the entire study area either substation site as well as its respective associated power line route would be acceptable from an ecological perspective. Two protected tree species were found on both the preferred and alternative sites namely *Acacia haematoxylon* and *Acacia erioloba*. A permit for the removal of these species will be required should it be disturbed through construction activities. The development footprint does not contain unique or threatened faunal habitats and the some transformation due to the mining activities has taken place. The study area does not have a high sensitivity and is not expected to play an important role in the conservation of Red Data listed species. Provided that mitigation measures to reduce ecological impacts of the development are implemented, the proposed development is not likely to result in long-term significant loss of biodiversity.

Avifaunal Impacts

The longer power line route associated with Substation A (Route A1 and A2) would pose a greater risk (due to the longer length of the power line) but the impacts are predicted to be at an acceptable level and can be appropriately mitigated. Given the relative homogeneity of the habitat within study area as well as existing levels of disturbance, the proposed substation and power line development is unlikely to have a significant, long-term impact on the local avifauna. In terms of impacts on the avifaunal communities, the study site is not

considered unique and is not considered critical for the conservation of Red Data species. Therefore, the proposed substation and power line development is unlikely to have any long-term significant impacts of avifaunal species within the study area. The impact of displacement due to habitat transformation will be moderate, and should only affect a few non-Red Data species at a local level. Due to the low sensitivity of the entire study area, the development either substation site as well as its respective associated power line route would be acceptable from an avifaunal perspective.

Visual Impacts:

In terms of the visual impact findings, the specialist found that, Substation A and route A1 and A2 are the least preferred options, by a small margin. The association with the mine is weaker due to the further distance between the alternatives and the mine's core operations. The impact on the visual resource is considered higher due to the introduction of new electrical infrastructure in an area that is vacant and consists mostly of natural vegetation. The substation will be located within the mine's property boundary but a 3 km section of the power line will be positioned on the neighbouring farm.

Heritage Impact

No preferred routes were recommended in the heritage study as the area is a sparsely populated rural area in which the human occupation is made up of a limited (known) pre-colonial element (Stone Age) as well as a much later colonial (farmer) component. It was only with the development of drilling rigs that sub-surface water sources could be accessed, allowing people to settle more permanently in the region. The discovery of rich mineral resources such as manganese and iron gave rise to the development of a mining component. Based on available information and prior knowledge of the region, it can provisionally be said that the possibility of the proposed development to impact on any sites, features or object of cultural significance is very low. None of the proposed substation locations – A or B – would have an impact on sites, features or objects of cultural heritage significance and either of them can be used for the development of the substation. From a heritage point of view it is recommended that the proposed development be allowed to continue. No heritage features or artefacts are expected in the study area, however should any archaeological sites or graves be exposed during construction work, it must immediately be reported to a heritage practitioner so that an investigation and evaluation of the finds can be made.

Substation B (alternative) and its associated power line routes, B1 (alternative) and B2 (alternative):

Ecological Impacts

From an ecological perspective, the potential impacts identified included loss of indigenous vegetation; loss of habitat and ecological structure; direct mortalities or injury and disturbance. Habitat destruction will also result from the construction of internal access roads, operation buildings and the clearing of power line servitudes. The proposed development is not predicted to have a detrimental impact on regional populations or Red Data listed species. As a result the majority of impacts associated with the development of the site are likely to be local in nature and not of wider significance. Substation site alternative B and associated power line route (either route, B1 or B2) are the favoured alternatives from a faunal and floral perspective as this is close to existing infrastructure and will minimise the risk to faunal species and habitat loss. This power line route is also the shortest route alternative. However, due to the low sensitivity of the entire study area either substation site as well as its respective associated power line route would be acceptable from an ecological perspective. Two protected tree species were found on both the preferred and alternative sites namely *Acacia haematoxylon* and *Acacia erioloba*. A permit for the removal of these species will be required should it be disturbed through construction activities. The development footprint does not contain unique or threatened faunal habitats and the some transformation due to the mining activities has taken place. The study area does not have a high sensitivity and is not expected to play an important role in the conservation of Red Data listed species. Provided that mitigation measures to reduce ecological impacts of the development are implemented, the proposed development is not likely to result in long-term significant loss of biodiversity.

Avifaunal Impacts

Substation B and associated overhead power line routes B1 or B2 are favoured from an avifauna perspective. These alternatives will have a limited threat to the birds occurring in the vicinity of this infrastructure. This is largely due to the homogenous nature of the site, large levels of disturbance due to the Tshipi e Borwa Mine,

low avian diversity and abundance observed and the relatively short length of the proposed powerline. The impact of displacement due to habitat transformation will be moderate, and should only affect a few non-Red Data species at a local level. Furthermore, this site would require the shorter power line to the substation reducing the risk of electrocution to avifaunal species and collisions with the power line.

Therefore, the proposed substation and power line development is unlikely to have any long-term significant impacts of avifaunal species within the study area. The impact of displacement due to habitat transformation will be moderate, and should only affect a few non-Red Data species at a local level. Due to the low sensitivity of the entire study area, the development either substation site as well as its respective associated power line route would be acceptable from an avifaunal perspective.

Visual Impacts:

In terms of the visual impact findings, the specialist found that, Substation B and alignment B1 are the most preferred alternatives. The substation will be located close to the sinter plant of Mamatwan Mine that increases its association with the mine. The substation is considered compatible with the character of the sinter plant. Alignment B1 is the shortest of the proposed alignments. It follows a route that aligns with other linear infrastructure that is compatible in character. The consolidation of linear infrastructure is considered good practice and enforces the association of the power line with the ancillary components of the mine. These alternatives will also have the lowest risk of being a potential impact, as it is furthest away from the major transport routes. The probability of the impact occurring is considered minimal. Alignment B2 is less marginally less preferred. Its route alignment is such that a longer section will be visible from the gravel road to Middelpaats Mine. As indicated in the assessment, a small number of motorists are expected to travel this road, thus keeping the viewer incidence very low.

Heritage Impact

No preferred routes were recommended in the heritage study as the area is a sparsely populated rural area in which the human occupation is made up of a limited (known) pre-colonial element (Stone Age) as well as a much later colonial (farmer) component. It was only with the development of drilling rigs that sub-surface water sources could be accessed, allowing people to settle more permanently in the region. The discovery of rich mineral resources such as manganese and iron gave rise to the development of a mining component.

Based on available information and prior knowledge of the region, it can provisionally be said that the possibility of the proposed development to impact on any sites, features or object of cultural significance is very low. None of the proposed substation locations – A or B – would have an impact on sites, features or objects of cultural heritage significance and either of them can be used for the development of the substation. From a heritage point of view it is recommended that the proposed development be allowed to continue. No heritage features or artefacts are expected in the study area, however should any archaeological sites or graves be exposed during construction work, it must immediately be reported to a heritage practitioner so that an investigation and evaluation of the finds can be made.

Alternative B

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Alternative C

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No-go alternative (compulsory)

This is the option of not undertaking the proposed activities. This option will result in limited or no impacts occurring on the biophysical environment (i.e. the avifaunal communities). However, not constructing the Tshipi e Borwa substation and associated power lines may have a negative effect on the running and operations of the mines, existing and proposed. This could therefore have a significant impact on the economic profile of the region, thus placing additional pressure on existing resources and municipal capabilities due to the existing high level of unemployment in the region. The negative impacts of this option are therefore expected to outweigh the benefits. This option is therefore not preferred.

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

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

This Draft BAR has provided a comprehensive assessment of the potential environmental impacts associated with the proposed power line and substation project for Tshipi e Borwa. These impacts have been identified by the EIA team (including specialists) and I&APs. The key findings are discussed in this Report. In general, the proposed development will have an impact of low significance provided that there is effective application of the mitigation measures proposed in this BAR and the EMPr.

The findings of the specialists as summarised in Section 2 (Environmental Impact Statement) of this report indicate that there are no significant environmental fatal flaws associated with the proposed development and thus, with the application of effective mitigation measures, the proposed project is regarded to be feasible and sustainable.

Due to the low sensitivity and high level of transformation of the entire study area due to the current and historical mining activities, either substation site as well as its associated power line route would be acceptable from an environmental impact perspective. In terms of the specialist studies, Substation B and Power line B1 are marginally preferred due to the shorter line route and closer proximity to the existing mine sinter plant. From a technical and site-access perspective, Substation A and power line A1 are preferred as this site will allow closer access to the future proposed mine and thus reduce the need for future impacts on the surrounds to service the infrastructure and to connect the substation to the mines.

Envirovolution Consulting (Pty) Ltd recommends that the preferred Substation A and power line route A1 be considered for approval as no environmental fatal laws have been recorded and subject to the following conditions:

- EMPr for this application be made a binding document for the contractors and managers on site;
- An independent ECO should be present during construction to monitor the implementation of the EMPr and the environmental authorization once issued;
- Compliance with the mitigation measures outlined in this BA report and EMPr;
- Clearance of the area should be as minimal as possible and construction activities be confined to the development footprint to prevent negative impact of the surrounding environment;
- All waste generated during construction is to be disposed of as per the Environmental Management Programme and no washing of paint brushes, containers, wheelbarrows, spades, picks or any other equipment adjacent to any drainage channel is permitted.

- Ongoing alien plant control must be undertaken;
- Indigenous trees removed during construction must be replaced with the same species at a ratio of 1:2 (2 trees must be planted for every 1 tree removed);
- Protected trees removed during construction must be replaced with the same species at a ratio of 1:5 (5 trees must be planted for every 1 tree removed);
- Disturbed areas must be rehabilitated immediately after construction has been completed in that area by planting appropriate indigenous plant species;
- Any natural areas beyond the development footprint, which have been affected by the construction activities, must be rehabilitated using indigenous plant species.
- Education and awareness campaigns on faunal species and their habitat are recommended to help increase awareness, respect and responsibility towards the environment for all staff and contractors.
- Should any Red Data faunal species be noted within the development footprint areas, these species must be relocated to similar habitat within the vacant land to the west of the development area with the assistance of a suitably qualified ecologist;
- Any fauna directly threatened by the construction activities must be removed to a safe location by the ECO or qualified ecologist;
- Driving must take place on existing roads and a speed limit of 30km/h must be implemented;
- When designing the poles/tower, allow for future upgrading of the line to a greater capacity. This may prevent the installation of an additional power line in future and thereby limit potential cumulative impacts, should the need arise to increase the capacity;
- A “Bird Friendly” monopole structure, with a bird perch (as per standard Eskom guidelines) should be used for the tower structures;
- Mark sections of line in high sensitivity areas with anti-collision marking devices (diurnal and nocturnal diverters) to increase the visibility of the power line and reduce likelihood of collisions. Marking devices should be spaced 10 m apart;
- Should anything of heritage value be discovered during construction and excavation phases, the activity should be stopped and a qualified archaeologist should visit the site to investigate the findings.

Is an EMPr attached?

YES ✓	NO
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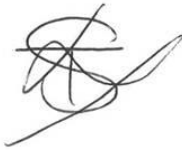
The EMPr must be attached as Appendix G.

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.

Tara Lockwood
NAME OF EAP



SIGNATURE OF EAP

05 February 2016
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