2016

FINAL ENVIRONMENTAL IMPACT REPORT FOR THE PROPOSED DEVELOPMENT OF THE ESKOM AGULHAS 400/132kV 2 X500MVA TRANSMISSION SUBSTATION AND LOOP IN AND LOOP OUT LINES WITHIN THE JURISDICTION OF SWELLENDAM LOCAL MUNICIPALITY IN THE WESTERN CAPE PROVINCE

DEA REF: 14/12/16/3/3/2/927

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NSOVO ENVIRONMENTAL CONSULTING

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EXECUTIVE SUMMARY

Nsovo Environmental Consulting (hereafter referred to as Nsovo) is appointed by Eskom Holdings SOC Ltd (hereafter referred to as Eskom) to undertake an Environmental Impact Assessment (EIA) process for the proposed Vryheid Network Strengthening, which will entail the following:

- The proposed Agulhas 400/132kV 2 x 500 MVA Main Transmission Substation (MTS) for which the study area will be approximately 600m x 600m and the actual footprint of the substation 400m x450m;
- The loop-in and loop-out power lines to connect the proposed Agulhas MTS to the existing 400kV power line Bacchus – Proteus 1;
- Construction of a Double Circuit Kingbird line from Agulhas MTS to Vryheid i.e. distribution 132kV power line to connect the proposed new substation to the existing; and
- Extension of Vryheid 132kV Busbar and addition of 2x132kV feeder bays.

The proposed project includes activities that trigger the requirement of an Environmental Impact Assessment as prescribed in Chapter 4 of GN R. 982 of the Environmental Impact Assessment (EIA) Regulations of December 2014. The primary listed activity under GNR 984 includes *Activity 9 (i.e. the development of facilities or infrastructure for the transmission and distribution of electricity with a capacity of 275 kilovolts or more, outside an urban area or industrial complex)* and other associated listed activities are included herein. The Environmental Impact Assessment process was compiled in accordance with the requirements of GN R 982, 983, 984 and 985 of December 2014 as prescribed in the National Environmental Management Act, 1998 (Act 107 of 1998).

As indicated above, the proposed project triggers activities listed in the afore-mentioned notices which are defined as activities that may have a detrimental impact on the environment and therefore requires Environmental Authorisation from the relevant authority (Department of Environmental Affairs (DEA)) prior to commencement.

The draft Scoping Report was made available to the Interested and Affected Parties (I&APs) as well as Organs of State for a period of thirty (30) days in order to afford them an opportunity to review and comment. All comments received on the draft Scoping Report are included in the Comments and Response Report and were incorporated in the final Scoping Report which was submitted together with the Plan of Study for the EIA to the

DEA. Accordingly, the Scoping Phase of the project is complete and was approved by the DEA on 15th July 2016.

The Scoping phase entailed a detailed description of the baseline environment which would form part of the backdrop of the impact assessment phase. Further it allowed for the identification of key issues and concerns based on input from the relevant stakeholders, I&APs and the EAP's professional judgment based on experience and expertise in the field. Seven alternative sites for the proposed Agulhas substation and loop-in and loop-out lines were identified and assessed. Based on the outcomes of the scoping phase, Site Alternatives B, D, and E have been eliminated and will not be assessed any further.

This EIA report includes specialist studies that were commissioned to respond and provide meaningful input in addressing the issues and concerns raised during the Scoping and the specialist studies undertaken for the proposed development include:

- Heritage Impact Assessment;
- Avifauna Study;
- Wetland Impact Assessment;
- Biodiversity (Fauna and Flora) Study;
- Traffic Impact Assessment;
- Agricultural Assessment; and
- Visual Impact Assessment.

Consideration of alternatives is considered to be a key requirement for any EIA process. Accordingly, the proposed project considered five alternatives (A, C, F, G and H) as well as the no-go alternative. The consideration of alternatives included technical, structural, economic and environmental feasibility. The various alternatives were identified during the Scoping wherein some were dismissed. The EIA phase considered and comprehensively assessed the alternatives and the preferred alternative was selected based on a synthesis of the technical and environmental factors as well as input from the specialist studies that were undertaken. The route and no-go alternatives were comprehensively discussed and highlighted in the draft EIA report as well as this final EIR. Further, the advantages and disadvantages of each alternative are also included which culminates to the selection of the preferred.

This report includes a detailed impact assessment of aspects that were identified as key during the Scoping phase and includes issues that the EAP deems to be significant in projects of this nature based on previous experience. Impacts were assessed and rated accordingly and none of the identified impacts were rated as high and unmanageable. Generally, the nature and scale of the negative impacts are relatively low in comparison to the scale of the entire project and the need and desirability of the project. However, the team proposed mitigation measures to manage and reduce the severity of the identified impacts. Further, the EAP has taken into consideration the issues raised and these have been discussed thoroughly in this report.

The EIA report has been prepared as prescribed in Appendix 3 of the EIA Regulation of December 2014 and will therefore entail the following:

- The details and expertise of the Environmental Assessment Practitioner;
- The location of the activity;
- A locality map;
- Description of the scope of the proposed development;
- Description of Policy and Legislative content within which the development is located and an explanation of how the development complies with and responds to the legislation and policy context;
- A motivation for the need and desirability of the proposed development;
- Motivation for the preferred development footprint within the approved site;
- A full description of the process followed to reach the proposed development footprint within the approved site;
- Full description of the process undertaken to identify, assess and rank the impacts the activity and associated structures and infrastructure will impose on the preferred location through the life of the activity;
- Assessment of each of each identified potentially significant impact and risk;
- A summary of the findings and recommendations of any specialist report complying with Appendix 6 of EIA December 2014 Regulations;
- Environmental Impact Statement;
- The recording of proposed impact management objectives, and the management outcomes for the development;
- Final proposed alternatives which respond to the impact management measures, avoidance, and mitigation measures identified through the assessment;

- Aspects which were conditional to the findings of the assessment either by the Environmental Assessment Practitioner (EAP) or specialist which are to be included as conditions of authorisation;
- Description of any assumptions, uncertainties and gaps in knowledge which relate to the assessment and mitigation measures proposed;
- A reasoned opinion as to whether the proposed activity should or should not be authorised;
- Where the proposed activity does not include operational aspects, the period for which the environmental authorisation is required and the date on which the activity will be concluded and the post construction monitoring requirements finalised;
- Undertaking under oath or affirmation by the EAP;
- Indication of any deviation from the approved scoping report, including the plan of study;
- Specific information that may be required by the competent authority; and
- Other matters required in terms of section 24(4) (a) and (b) of the Act.

The draft EIA Report was submitted to the I&APs and organs of State for a 30 days review and comment period. Comments received on the draft EIA Report are included in the Comments and Response Report which is incorporated in this final EIA Report for submission to DEA for decision making.

Subsequent to consideration of the specialist recommendations the technical requirements as well as stakeholder engagement, Alternative C is the preferred option for construction of the Agulhas substation, associated power lines and infrastructure. Impacts on the environment, sensitivity of the area as well as comments and issues raised by the I&APs were considered.

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DOCUMENT CONTROL

FINAL ENVIRONMENTAL IMPACT ASSESSMENT REPORT FOR THE PROPOSED VRYHEID NETWORK STRENGTHENING WITHIN THE JURISDICTION OF SWELLENDAM LOCAL MUNICIPALITY IN THE WESTERN CAPE PROVINCE

Quality Control

Report Type:	Compiled By:	Peer Reviewed By:
Final Environmental Impact Assessment Report	Munyadziwa Rikhotso _____	Beatrice Matekenya _____

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ACRONYMS

ARC	Agricultural Research Council
CBA	Critical Biodiversity Area
CLN	Customer Load Network
DEA	Department of Environmental Affairs

DEADP	(Western Cape) Department Environmental Affairs and Development Planning
EA	Environmental Authorisation
EIA	Environmental Impact Assessment
EIS	Ecological Importance and Sensitivity
EMPr	Environmental Management Programme
HV	High Voltage
I&APs	Interested and Affected Parties
km	Kilometers
kV	Kilovolts
MTS	Main Transmission Substation
mm	Millimetre
NDP	National Development Plan
NEMA	National Environmental Management Act
PES	Present Ecological Status
SAHRA	South African Heritage Resources Agency
SANBI	South African National Biodiversity Institute
Tx	Transmission
WULA	Water Use Licence Application

1 INTRODUCTION

Eskom Transmission Grid Planning and Eskom Distribution Western Cape Operating Unit initiated a study to investigate possible solutions to address the constraints on the sub-transmission network to the east of Bacchus 2x500 MVA 400/132kV substation. Bacchus substation forms part of the Outeniqua Customer Load Network (CLN) in the Western Cape Grid and it supplies Vryheid and Ashton sub-transmission substations in the east. Ashton substation is supplied via Boskloof 132kV switching station, whilst Vryheid substation is supplied directly from Bacchus substation. Vryheid and Ashton substations are both equipped with 2x40MVA 132/66kV transformers and are radially supplied.

The following sub-transmission network constraints are anticipated by 2018:

- Low voltages will be experienced at Ashton and Vryheid 132kV substations; and
- Boskloof-Ashton 132kV line will reach its thermal capacity.

Consequently, in order to resolve the above-mentioned network constraints the proposed Vryheid strengthening project is proposed and this entails development of the new Agulhas 400/132kV 2x500 MVA Transmission Substation and associated loop in and out lines.

The study area required for the substation is approximately 600m x 600m i.e. 360 000m^2 to account for current and future needs; the substation footprint of 450m x 400m (180 000m^2) will be anywhere within the study area. The proposed turn-in lines will be approximately 2 x 5km 400kV loop in and out lines, however the final distance will be determined by the substation location. Further, the 132kV power line is proposed to connect the proposed Agulhas substation to the existing Vryheid substation. It is therefore paramount that the two substations are close to each other to allow for both transmission and distribution to connect easily.

The project proponent or applicant for this development is Eskom Holdings SOC Limited (Eskom) and the Competent Authority is the National Department of Environmental Affairs (DEA), while the independent Environmental Assessment Practitioner (EAP) is Nsovo Environmental Consulting (Nsovo). The proposed project will be undertaken in terms of the National Environmental Management Act, 1998 (Act 107 of 1998) (NEMA) and the EIA Regulations of December 2014 (hereafter referred as the Regulations). Other applicable Acts and Legislation will be equally considered.

The proposed development will be located within Ward 3 of the Swellendam Local Municipality, which falls within the jurisdiction of Overberg District Municipality in the Western Cape Province; therefore the provincial authority is the Western Cape Department Environmental Affairs and Development Planning (DEADP). Although this is the case, the proponent is a parastatal and therefore the Competent Authority eligible for decision making is the Department of Environmental Affairs (DEA).

The Scoping Report for this project was submitted to the DEA on 30th May 2016 and accepted with recommendations on 15th July 2016. Therefore, preparation of this Draft EIR is in fulfillment to the requirements of the NEMA and the associated process.

2 DETAILS OF THE ENVIRONMENTAL ASSESSMENT PRACTITIONER AND EXPERTISE

Nsovo is conversant with the definition and general requirements of an Environmental Assessment Practitioner (EAP) as defined in Section 12 of the National Environmental Management Act, 1998 (No 107 of 1998) (NEMA) and regulation 13 of the EIA Regulations. Nsovo is:

- Independent and Objective;
- Has expertise in conducting EIAs;
- Takes into account all relevant factors relating to the application; and
- Provides full disclosure to the applicant and the relevant environmental authority.

Table 1 below provide Details of the EAP and relevant experience. A detailed CV and Qualifications is attached as Appendix E.

Table 1: Details of the EAP

Name of Company	Nsovo Environmental Consulting
Person Responsible	Munyadziwa Rikhotso
Professional Registration	South African Council for Natural Scientific Professions (SACNASP)
Postal Address	P/Bag x29 Postnet Suite 697 Gallo Manor

	2052
Telephone Number	011 041 3689
Fax Number	086 602 8821
Email	munyadzi@nsovo.co.za
Qualifications & Experience	B.Sc. Honours Environmental Management **12 years of experience**
Project Related Expertise	In terms of project related expertise the EAP has completed the following projects: • cEMPr, WULA and EA amendment for the proposed Juno Gromis 400kV power line • EIA for the proposed Foskor Merensky 275kV 131km transmission line in Limpopo. • EIA for the proposed Tubatse strengthening phase 1 – Senakangwedi B integration within the jurisdiction of Greater Tubatse Local Municipality in Limpopo Province. • Basic Assessment for Bloemendal Substation and loop in and out lines. • Basic Assessment for the proposed Abersethin Substation and loop-in and loop-out power lines in Bethlehem.

3 DESCRIPTION OF LOCALITY AND THE PROPERTY ON WHICH THE ACTIVITY IS TO BE UNDERTAKEN AND LOCATION OF ACTIVITY ON THE PROPERTY

3.1 PROJECT LOCALITY

The proposed development will be located in Ward 3 of Swellendam Local Municipality which falls within the jurisdiction of Overberg District Municipality in the Western Cape Province. The alternative substation sites, loop-in and loop-out lines and distribution lines are illustrated in **Figure 1** below and an A3 copy of the locality map is attached as **Appendix A**.

The study area earmarked for the proposed substation is approximately 600m x 600m whereas the longest 400kV loop- in and loop-out lines will be approximately 5km long and the longest 132kV approximately 7km depending on the final location of the substation. The proposed sites are located approximately 10km south west of Swellendam town along the N2 and R319 roads. During the Scoping phase of the project, seven site alternatives were considered; however, three (B, D and E) were eliminated for various reasons that deemed the sites unsuitable for the proposed project development. Consequently, the dEIR phase considered four (A, C, F and G) site alternatives while the Final EIR considered 5 including the alternative recommended by the public which is referred to as Alternative H depicted in the Figure 1 below.

3.2 FARM NAMES AND SURVEYOR GENERAL CODE OF EACH CADASTRAL LAND PARCEL

The farms affected by the proposed project are indicated in **Table 2** below.

Table 2: Details of the Affected Farms

Farm Name	Portion Number	SG Code
Farm 253	No Portion Number Available	C07300000000025300000
Farm 257	No Portion Number Available	C07300000000025700000
Mo-Pama 261	Portion RE	C07300000000026100000
Kluitjeskraal 256	Portion 2	C07300000000025600002
Kluitjeskraal 256	Portion 5	C07300000000025600005
Kluitjeskraal 256	Portion RE	C07300000000025600000
Leeuw Rivier 251	Portion 3	C07300000000025100003
Dagbreek 524	No Portion Number Available	C07300000000052400000
Mo-Pama 261	Portion 1	C07300000000026100001
Volmoed 523	Portion 1	C07300000000052300001
Leeuw Rivier 251	Portion 7	C07300000000025100007
Kluitjeskraal 256	Portion 3	C07300000000025600003
Kluitjeskraal 256	Portion 4	C07300000000025600004
Vrede 352	No Portion Number Available	C07300000000035200000
Farm 347	No Portion Number Available	C07300000000034700000

Farm Name	Portion Number	SG Code
Leeuw Rivier 251	Portion 8	C07300000000025100008

4 LOCALITY PLAN

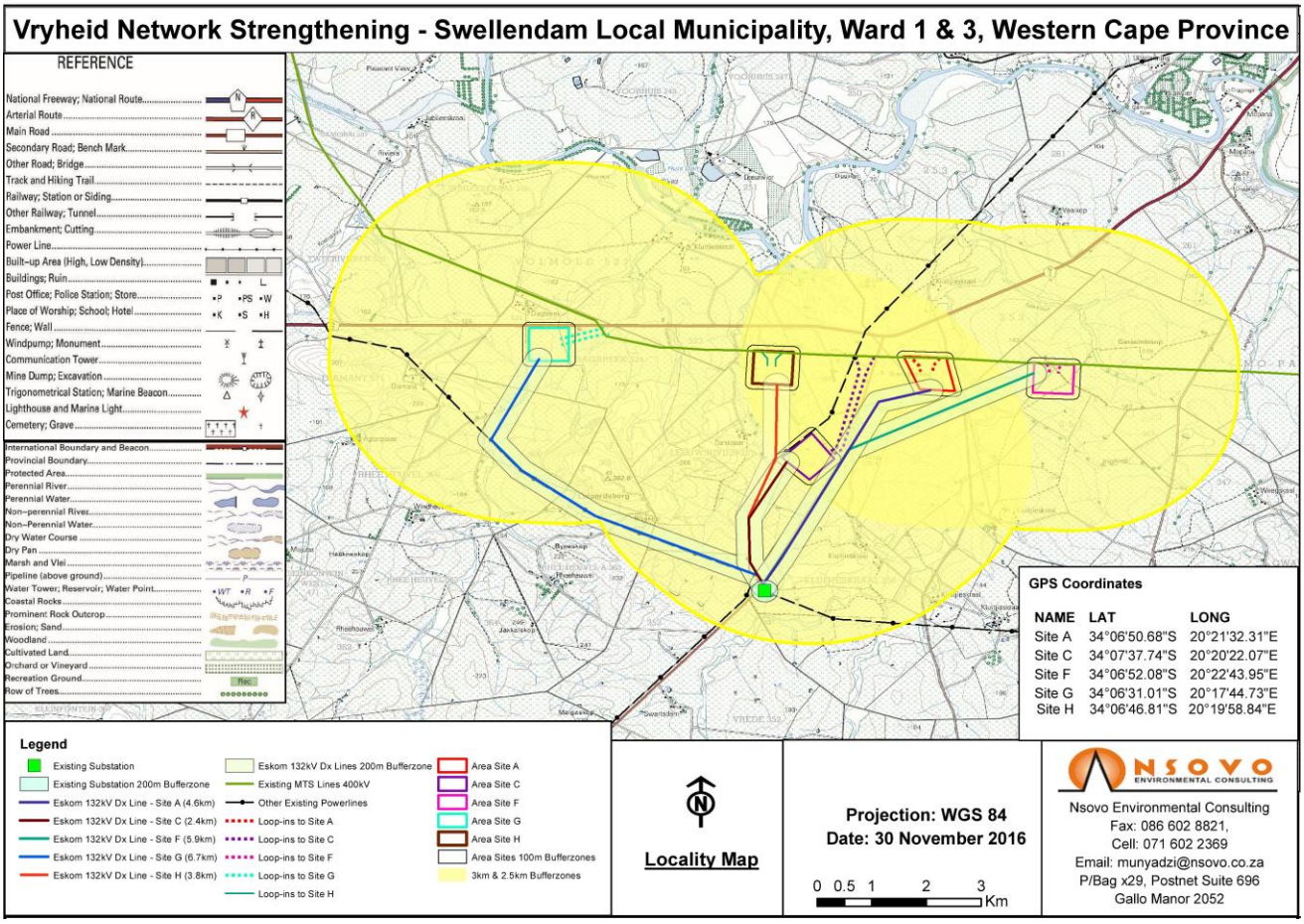


Figure 1: Locality map showing alternative substation sites and loop in loop out lines

As indicated above the EIR phase considers five site alternatives and these are A, C, E, F and H as depicted in the Figure 1 below.

The GPS coordinates of the centre points for the alternative substation sites are indicated in **Table 3** below.

Table 3: The GPS coordinates of the center points for the substation alternative sites

Substation Alternative Site	Latitude	Longitude
Alternative A	34°06'50.68"S	20°21'23.13"E
Alternative C	34°07'37.74"S	20°20'22.07"E

Substation Alternative Site	Latitude	Longitude
Alternative F	34°06'52.08"S	20°22'43.95"E
Alternative G	34°06'31.01"S	20°17'44.73"E
Alternative H	34°06'46.81"S	20°19'58.84"S
Existing Vryheid Substation	34°8'58.02"S	20°19'52.64"E

5 DESCRIPTION OF THE SCOPE OF THE PROPOSED ACTIVITIES

Eskom Transmission Grid Planning and Eskom Distribution Western Cape Operating Unit initiated a study to investigate possible solutions to address the constraints on the sub-transmission network to the east of Bacchus 2x500 MVA 400/132kV substation, which forms part of the Outeniqua CLN in the Western Cape Grid. The substation supplies Vryheid and Ashton sub transmission substations in the east. Ashton substation is supplied via Boskloof 132kV switching station, whilst Vryheid substation is supplied directly from Bacchus substation. Vryheid and Ashton substations are both equipped with 2x40MVA 132/66kV transformers and are radially supplied. In order to resolve the current constraints, Eskom has proposed the Vryheid Network Strengthening. The proposed scope of work entails the development of the following:

- The Agulhas 400/132kV 2 x 500 MVA Main Transmission Substation (MTS);
- The loop in and loop out power lines to connect the proposed Agulhas MTS to the existing 400kV line Bacchus – Proteus;
- Construction of a 132kV Double Circuit Kingbird line from Agulhas MTS to Vryheid; and
- Extension of Vryheid 132kV Busbar and addition of 2x132kV feeder bays.

The construction phase of the proposed project will take approximately 3 years and the activities included are discussed hereunder.

5.1 LISTED ACTIVITIES TRIGGERED AND BEING APPLIED FOR TO THE PROJECT

The listed activities applicable to this project are listed in **Table 4** below:

Table 4: Listed Activities described in Government Notice No. R983, R984 and R985 applicable to this project (as per numbering in the Government Notice)

Indicate the number and date of the relevant notice:	Activity No (s) (in terms of the relevant notice):	Describe each listed activity as per project description:
GN R.984 December 2014	9	The development of facilities or infrastructure for the transmission and distribution of electricity with a capacity of 275kV or more, outside an urban or industrial complex. **The proposed project entails development of the new Agulhas 400/132kV 2x500 MVA substation and associated 2x400kV loop in and loop out transmission power lines.**
GN R.983 December 2014	27 (i)	The clearance of an area of 1 hectare or more, but less than 20 hectares of indigenous vegetation., except where such clearance indigenous- vegetation is required for – The undertaking of a linear activity. • **The construction of the 400/132kV, 2x500 MVA transmission substation will require the clearance of vegetation; the earmarked study area is about 600m x 600m; however the immediate foot print of the substation will be less than the 20 hectare threshold.** • **Temporary transformation of land would be required by the construction team for placement of their construction camps in strategic positions close to the proposed developments.**

GN R.983 December 2014	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. **The proposed project entails development of a 132kV double circuit distribution line to connect the existing Vryheid and proposed Agulhas substations**
GN R.983 December 2014	12	The development of: (xii) infrastructure or structures with a physical footprint of 100m^2 or more Where such development occurs – (a) within a watercourse. **The study area is within proximity of watercourses that may be affected depending on the site alternative selected for the substation and associated power lines. Should DEA authorise an alternative within a watercourse which triggers listed activities under National Water Act, 1998 (Act 36 of 1998) (NWA), a Water Use Licence Application (WULA) process will be undertaken accordingly prior to commencement of construction activities.**
GN R.985 December 2014	3 (f)(i)	The development of masts or towers of any material or type used for telecommunication broadcasting or radio transmission purposes where the mast or tower – (a) is to be placed on a site not previously used for this purpose; and (b) will exceed 15 metres in height – but excluding attachments to existing buildings and masts on rooftops.

		(f) In Western Cape: (i) All areas outside urban areas. **The proposed development will involve the installation of telecommunication mast at the substation that will be used for communication purposes, which will exceed 15m in height.**
GN R.985 December 2014	4(f)(aa)	The development of a road wider than 4 metres with a reserve less than 13, 5 metres. – (f) In Western cape: (i) Areas outside the urban areas; (aa) Areas containing indigenous vegetation. **The proposed development would require the construction and or expansion of additional access roads that would be used during both construction and operations of the proposed substation and loop in and loop out power lines. The proposed sites are outside urban areas and some contain indigenous vegetation.**
GN R.983 December 2014	24 (ii)	The development of – (ii) a road with a reserve wider than 13,5 metres, or where no reserves exists where the road is wider than 8 metres; but excluding – (b) roads where the entire road falls within an urban area. **The proposed development would require the construction of access roads that would be used during both construction and operations of the proposed power lines and the substation**.
GN R.983	28	Residential, mixed, retail, commercial, industrial or institutional

December 2014		developments where such land was used for agriculture or afforestation on or after 01 April 1998 and where such development: - (ii) will occur outside an urban area, where the total land to be developed is bigger than 1 hectare; Excluding where such land has already been developed for residential, mixed, retail, commercial, industrial or institutional purposes. **The site alternatives for the proposed development are zoned agriculture. It is envisaged that the total footprint of the proposed project will be above a hectare and the land is not developed.**
GN R 985 December 2014	14	**The development of-** (xii) infrastructure or structures with a physical footprint of 10 square meters or more; **(f) In Western Cape:** (i) **outside urban areas, in**: (ff) Critical biodiversity areas or ecosystem service areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans. Proposed deviation will encroach on identified CBA, both terrestrial and aquatic in the Western Cape.

5.2 DESCRIPTION OF THE ASSOCIATED ACTIVITIES, STRUCTURES AND INFRASTRUCTURE RELATED TO THE DEVELOPMENT

The associated structures and infrastructure related to the development are briefly discussed hereunder and triggered activities discussed above.

5.2.1 DISTRIBUTION NETWORK

As part of the scope of work the Vryheid Substation 132kV busbar will be extended to the north, to allow for the integration of the 132kV double circuit line to Agulhas; further there will be an additional bay required at Vryheid. The existing power lines are depicted in Figure 2 below.

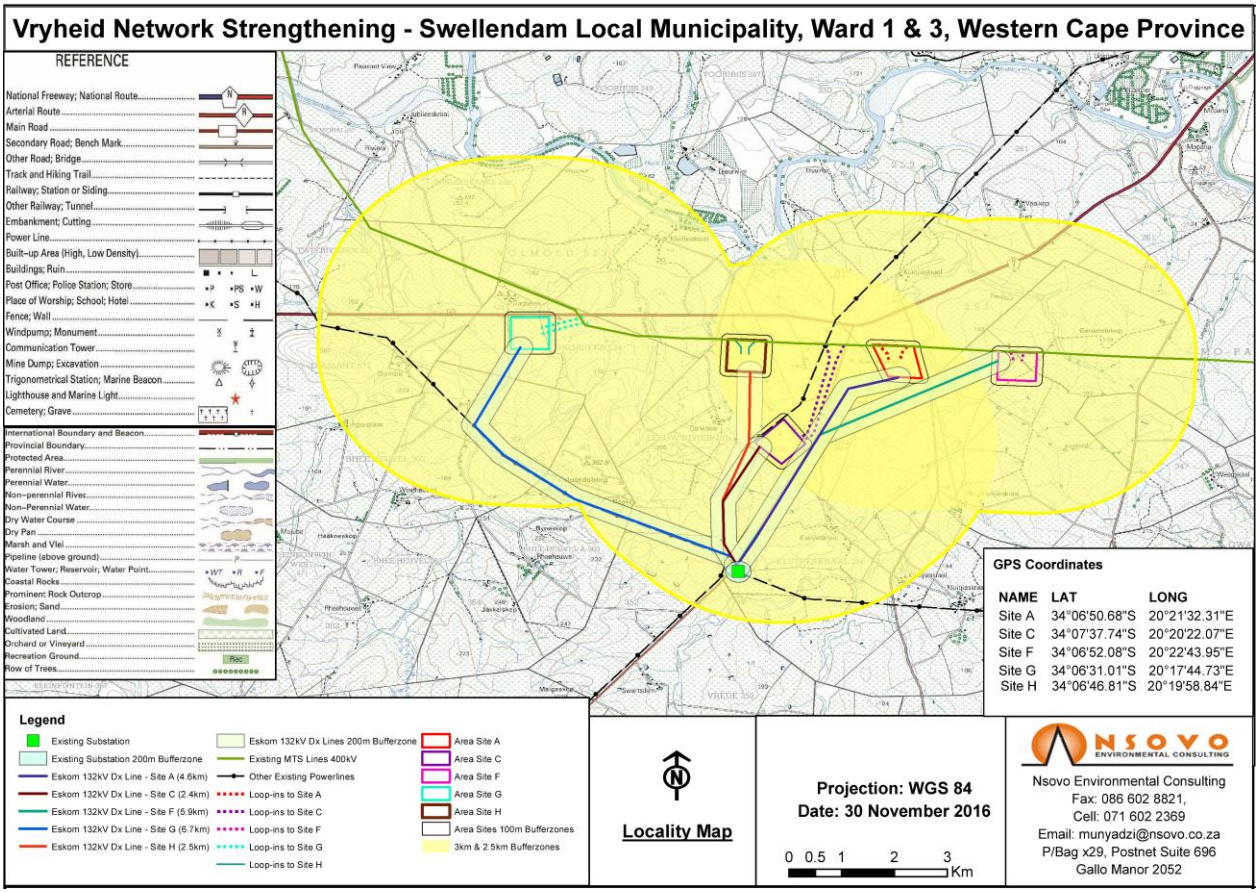


Figure 2: Locality Map depicting existing power lines

5.2.2 ACCESS ROADS

According to the traffic impact assessment study the R319 (MR264) is a Regional Route that connects Agulhas and Struisbaai in the south with the N2 near Swellendam and Bredasdorp and is a class 3 road. The gravel DR1251 road is a class 3 and intersects with the N2 in the north and runs southwards towards Spitskop. MR268 runs in a north-south direction and connects to the N2 to the north and Infanta and Malgas to the south and is a class 4. The OP4468 is a class 5 gravel minor road and runs north-south and connects with the N2 in the north.

The existing road infrastructure is well developed in the area and thus well connected to surrounding major centres via regional routes. The combination of national roads and first and second order roads provides good inter- and intra- regional accessibility. The South African National Roads Agency (SANRAL) is responsible for the maintenance of the N2 which is currently in a good condition. Upgrades and extensions to the existing infrastructure will be implemented to accommodate the additional traffic volumes, if necessary. This means, possible upgrading of certain municipal, district and provincial routes, associated intersections and construction of new link roads, access roads and intersections where required.

Depending on the alternative selected, access roads wider than 4 metres with a reserve less than 13, 5 metres will be required and such access roads will be compliant with a Type 6 gravel road. The access roads will comprise of 6 meter wide (less than 1km long) raised gravel extended with meadow drainage in flat terrain, with additional meters to cater for the 'V' type drainage in rolling terrain. Where necessary, suitable erosion control measures such as the construction of gabions and culverts to control storm-water will be implemented.

5.2.3 VEGETATION CLEARANCE

Fifty five meter (55m) servitude is required for each of the proposed 2x400kV loop in and loop out power lines; as a result, a total of one hundred and ten meter (110m) servitude will be affected. Further 31m servitude will be required for the 132kV double circuit power line. Only flora within the immediate construction footprint will be cleared for construction purposes. Clearance will be according to the Environmental Management Programme (EMPr) as well as Eskom's policies and guidelines.

5.2.4 CONSTRUCTION OF SUBSTATION AND ERECTION OF PYLONS

The civil works will include the establishment of foundations for the Agulhas substation, erecting pylons and associated infrastructure as well as extension of Vryheid 132kV Busbar and addition of 2x132kV feeder bays.

5.2.5 STEELWORKS STRUCTURES

Various types of pylons are under consideration and final selection will depend on the terrain and the possible visual aspects of the selected pylon will be taken into consideration. The pylons will be transported in segments and will be assembled on site.

5.2.6 STRINGING

Once the pylons have been erected, the conductors will be threaded between the pylons and bird guards installed as recommended by the avifauna specialist.

5.2.7 TELECOMMUNICATION MAST

The proposed development will also involve the installation of a telecommunication lattice mast at the Agulhas substation that will be used for communication purposes. The footprint of the mast will cover approximately 8 x 8 meters (64m$^{2)}$ with a height of 50m.

5.2.8 COMPLETION OF CONSTRUCTION WORK

The site rehabilitation must be as per the specifications of the EMPr and approved Method Statements. Among other activities the rehabilitation activities will include:

- Removal of excess building material and waste;
- Repairing any damage caused by construction activities;
- Rehabilitating the area affected by temporary access roads;
- Reinstating existing roads; and
- Replacing topsoil and planting indigenous vegetation where necessary.

6 DESCRIPTION OF THE POLICY AND LEGISLATIVE CONTEXT WITHIN WHICH THE DEVELOPMENT IS LOCATED AND AN EXPLANATION OF HOW THE DEVELOPMENT COMPLIES WITH AND RESPONDS TO THE LEGISLATION AND POLICY CONTEXT

Documented in the subsequent section is a list of the current South African environmental legislation, which is considered to be pertinent to the development and operation of the proposed Vryheid Network Strengthening. A description of legislation pertaining to the project is summarised in Table 5 hereunder. The list of legislations that are applicable to the project is not an exhaustive analysis; however, it provides a guideline to the relevant aspects of each Act.

Table 5: Legislation pertaining to the proposed project

Aspect	Relevant Legislation	Brief Description
Environment	• National Environmental Management: Act 1998, (Act No. 107 of 1998) as amended. • Environmental Impact Assessment Regulations, December 2014	• The overarching principles of sound environmental responsibility are reflected in the National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA) apply to all listed projects. Construction and operation of activities have to be conducted in line with the generally accepted principles of sustainable development, integrating social, economic and environmental factors. The Environmental Impact Assessment (EIA) process followed is in compliance with the NEMA and the Environmental Impact Assessment Regulations of December 2014 (GN R 982, 983, 984 and 985). The proposed development triggers "listed activities", as defined by NEMA. Listed activities are an activity which may potentially have detrimental impacts on the environment and therefore require Environmental Authorisation (EA) from the relevant Competent Authority, in this case DEA. Table 4 above is a comprehensive list of activities triggered.
Biodiversity	National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004)	The purpose of the National Environmental Management Biodiversity Act, 2004 (Act No. 10 of 2004) (NEMBA) is to provide for the management and conservation of South Africa's biodiversity within the framework of the NEMA and the protection of species and ecosystems that warrant national protection. As part of its implementation strategy, the National Spatial Biodiversity Assessment was developed.

Aspect	Relevant Legislation	Brief Description
		The study area is transformed and considered to have low sensitivity. However, some areas contain intact remnants of Ruens Silcrete Renosterveld which is Critically Endangered. Bontebok National Park (buffer zone) is located 1.55km north east of the study area.
Protected Areas	National Environmental Management: Protected Areas Act, 2003 (Act No. 57 of 2003)	The purpose of this Act is to provide for the protection, conservation and management of ecologically viable areas representative of South Africa's biological diversity and its natural landscapes.
Heritage Resources	National Heritage Resources Act, 1999 (Act No. 25 of 1999)	The National Heritage Resources Act, 1999 (Act No. 25 of 1999) legislates the necessity for cultural and heritage impact assessment in areas earmarked for development, which exceed 0.5 ha. The Act makes provision for the potential destruction to existing sites, pending the archaeologist's recommendations through permitting procedures. Permits are administered by the South African Heritage Resources Agency (SAHRA).
Air quality management and control	National Environmental Management: Air Quality Act, 2004(Act 39 of 2004)	The objective of the Act is to protect the environment by providing reasonable measures for the protection and enhancement of air quality and to prevent air pollution. The Act makes provision for measures to control dust, noise and offensive odours. Section 32 of The National Environmental Management:

Aspect	Relevant Legislation	Brief Description
		Air Quality Act, 2004 (Act 39 of 2004) deals with dust control measures in respect of dust control. Whilst none are promulgated at present, it provides that the Minister or MEC may prescribe measures for the control of dust in specified places or areas, either in general or by specified machinery or in specified instances, the steps to be taken to prevent nuisance or other measures aimed at the control of dust.
Noise Management and Control	Noise Control Regulations in terms of the Environmental Conservation, 1989 (Act 73 of 1989)	The assessment of impacts relating to noise pollution management and control, where appropriate, must form part of the EMPr. Applicable laws regarding noise management and control refer to the National Noise Control Regulations issued in terms of the Environment Conservation , 1989 (Act 73 of 1989).
Water	National Water Act, 1998 (Act 36 of 1998)	This Act provides for fundamental reform of law relating to water resources and use. The preamble to the Act recognises that the ultimate aim of water resource management is to achieve sustainable use of water for the benefit of all users and that the protection of the quality of water resources is necessary to ensure sustainability of the nation's water resources in the interests of all water users. There are watercourses located around the proposed Alternative sites A, C, F and G. The Kluitjieskraal River is located 300m east of site A and West of Site F. The large Bree River buffer zone is located 1.2km north of the study site. Many non-perennial streams cover various sections of the study area.
Agricultural	Conservation of	The Act aims to provide for control over the utilization of

Aspect	Relevant Legislation	Brief Description
Resources	Agricultural Resources Act, 1983 (Act No. 43 of 1983)	natural agricultural resources in order to promote the conservation of the soil, water resources and vegetation and to combat weeds and invader plants. Section 6 of the Act makes provision for control measures to be applied in order to achieve the objectives of the Act. The proposed study area is located within a high agricultural area wherein some farms are cultivated while some are left for grazing.
Human	The Constitution of South Africa, 1996 (Act No. 108 of 1996	The Constitution of South Africa, 1996 (Act No. 108 of 1996) provides for an environmental right (contained in the Bill of Rights, Chapter 2). The state is obliged "to respect, protect, promote and fulfil the social, economic and environmental rights of everyone…" The environmental right states that: "Everyone has the right - a) To an environment that is not harmful to their health or well-being; and b) To have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that - - Prevent pollution and ecological degradation; - Promote conservation; and - Secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development."

In preparation of the Scoping report as well as this final EIR, the aforesaid Acts were read with absolute consideration of municipal policies, plans and by-laws as well as consideration of Eskom policies and world best practices.

Further, recommendations were received from various stakeholders including the national and provincial authorities. Such recommendations were aligned to these Acts, Municipal by laws as well as policies and guidelines, therefore, this report takes into consideration same.

7 MOTIVATION FOR THE NEED AND DESIRABILITY OF THE PROPOSED DEVELOPMENT INCLUDING THE NEED AND DESIRABILITY OF THE ACTIVITY IN THE CONTEXT OF THE PREFERRED LOCATION

7.1 MOTIVATION FOR THE DEVELOPMENT

Eskom Transmission's ten years plan indicates that a reliable electricity supply of acceptable quality is essential for the economic development of South Africa. It is also a prerequisite for socio-economic development, as it paves the way to access to education, improved nutrition, health care, and jobs, amongst others. The transmission system plays a vital role in the delivery of a reliable, high quality electricity supply throughout the region and South Africa at large by delivering electricity in bulk to load centres and end-users. From there, the distribution networks owned by Eskom and municipalities deliver electricity to end-users. The transmission system needs to be well-maintained to deliver a reliable supply of electricity, and it also need to be strengthened to meet changing customer needs.

Consequently, the proposed Agulhas substation and associated power lines form part of the Vryheid Network Strengthening which is driven by tourism and agriculture and it forms part of the new infrastructure that Eskom has planned, the objective being to ensure reliable electricity supply.

The proposed project will ensure the following:

- That the supply link between the existing Vryheid substation and the proposed Agulhas substation supply network is strengthened;
- Improvement in reliability of electricity supply which will benefit agriculture and tourism in the area; and
- Improvement of South Africa's socio-economic status.

The proposed project is beneficial as it will allow for load growth in the region. It is envisaged that the proposed project would ensure reliable supply to industry, predominantly the agricultural, tourism and manufacturing industries in the area; this will indirectly benefit communities as reliable electricity will result in uninterrupted supply and therefore growth in industry, which could potentially yield additional jobs. The overarching impact will be positive economic spinoffs, which benefit the community, the region and country at large.

Electrification has significant positive benefits from a socio-economic and ecological perspective. The provision of electricity leads to a number of social benefits for organs of State, individuals, industries and communities which:

- Enables development; and
- Encourages small and medium enterprise development, and as a result, contributes to a possible increase in disposable income.

7.1.1 SUPPORTING STRATEGIES

At the regional level, the project would contribute to reliability of power supply. There would also be a less tangible but nonetheless important benefit of positioning the Municipality ahead in terms of sustainable energy supply.

At the national level, the project would contribute to implementing South Africa's new energy policy as embodied in the White Paper on Energy (DME 1998). The priorities to which this project would contribute are laying the groundwork for enhancing off-grid power supply and electrification capacity.

7.1.2 FUTURE DEVELOPMENT

It is envisioned that most future 132kV lines will be directly connected to Agulhas MTS. Figure 2 below depicts Eskom's planned network development in the area.

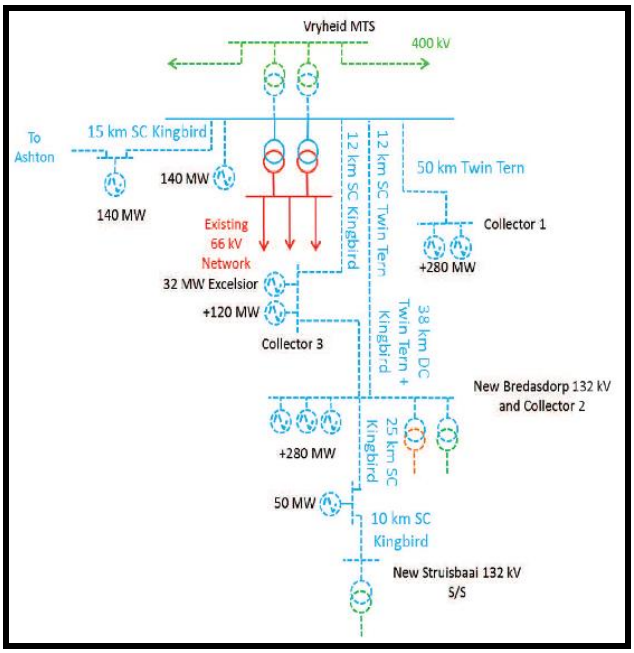


Figure 3: SLD of future 132kV lines in the Vryheid area including the IPP strategic plan and NDP (Eskom, December 2015. Network Planning: Western Cape Operating Unit).

7.1.3 INDEPENDENT POWER PRODUCER (RENEWABLE ENERGY)

The project is required to resolve existing network constraints as well as to accommodate future renewable energy facilities. According to the Eskom 10-year plan, the Distribution network supplying the Ashton and Vryheid area will be extremely constrained. The load growth in the area will further exacerbate the situation i.e. low voltages experienced at Ashton and Vryheid 132kV substations and Boskloof-Ashton 132kV line will reach its thermal capacity. In addition to the capacity constraints, a number of wind generation applications totalling 240 MW have been received around the Vryheid network. The current sub transmission network cannot accommodate the bulk of this power. Consequently, the new planned Agulhas substation and associated sub-transmission strengthening will be used to integrate the planned renewable energy facilities in the vicinity which are at various development phases. Future successful wind generation bids that need to be integrated into the network (some of which are shown below), will require the planned Agulhas substation and associated sub-transmission strengthening.

7.2 THE NEED AND DESIRABILITY OF THE ACTIVITY IN THE CONTEXT OF THE PREFERRED LOCATION

The primary objective from a technical perspective is as follows:

- Selection of a feasible substation site (600m X 600m).
- Determination of the loop-in and loop-out route from 400kV line Bacchus-Proteus1.
- Ensure that the proposed substation sites are reasonably closer to the existing Vryheid substation for distribution to connect easily and also reasonable close to 400kV line for transmission to connect.
- Determination of the 132kV distribution alignment for the connection of the existing Vryheid substation and the proposed new Agulhas.

The project is earmarked on the proposed location due to proximity to the existing Vryheid substation which fulfils the technical requirements. Therefore the primary objective of the EIA process is to determine the least sensitive site within the identified location suitable for the development of the proposed substation, the transmission loop in and out lines as well as the distribution lines.

8 MOTIVATION FOR THE PREFERRED DEVELOPMENT FOOTPRINT WITHIN THE APPROVED SITE

The study area is approximately 5km radius, the proposed substations sites are approximately 600m x 600m and the 132kV distribution corridor is approximately 200m. Therefore the actual footprint for the proposed substation will be 450m x 400m whilst the associated loop in and out line will require 55m servitude along the alignment. Further the proposed 132kV double circuit will requires 31m servitude along the alignment of the approved corridor within the study area.

Taking into consideration input from the landowner regarding Site Alternative H, the site was assessed and proved feasible from a traffic, heritage, and visual perspective; however relative to Site Alternative C the site is not preferred from a wetland and biodiversity perspective as it will have more significant impacts on the renosterveld patches and on the riparian area as depicted on Figures 4 and 5 below.

Figure 4: Sensitive features within Site H include several remnant renosterveld patches which are considered no-go areas.

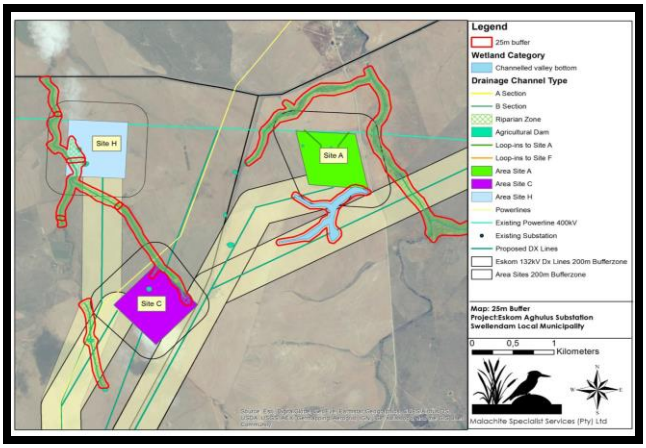


Figure 5: View of the 25m buffer around the riparian zones associated with Site A, C and H

Further due to the highlighted sensitivities, Site H will have space constraints rendering it not viable from a technical perspective further taking away opportunities for expansion.

Based on findings of several specialist studies, technical consideration, public opinion and the EAPs coalition of information presented Alternative C as the preferred alternative. It is therefore apparent that the development footprint within the approved be as depicted on the map below.

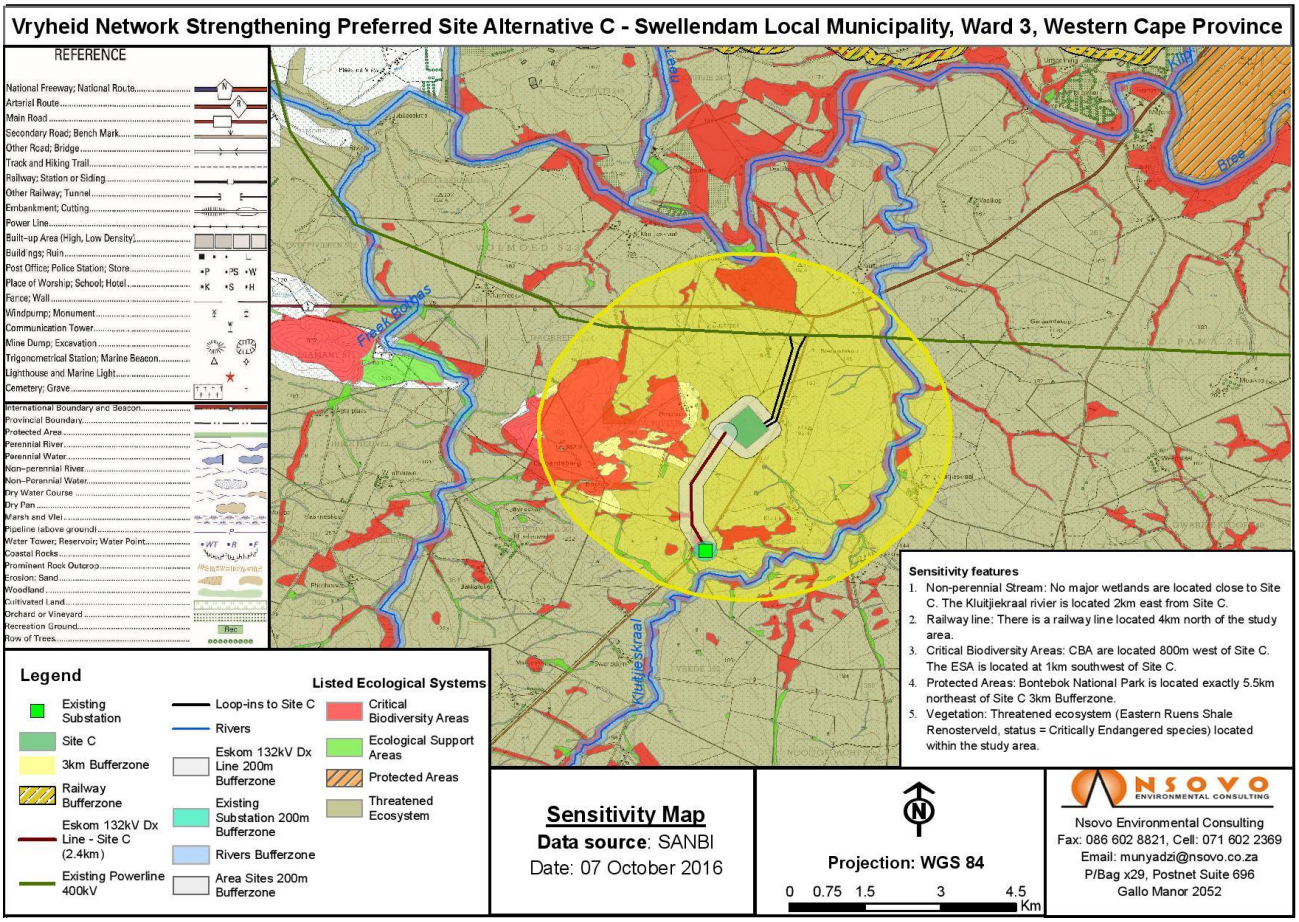


Figure 6: Preferred Alternative C

9 DESCRIPTION OF THE PROCESS FOLLOWED TO REACH THE PROPOSED DEVELOPMENT FOOTPRINT, WITHIN THE APPROVED SITE

The identification of alternatives is an important component of the EIA process. The identified alternatives are being assessed in terms of environmental acceptability, technical as well as economic feasibility.

In the course of the EIR phase, four alternative substation sites and the no-go alternative were considered for the proposed Agulhas 400/132kV 2 x 500 MVA Main Transmission Substation (MTS). An additional site was proposed by the landowner for the substation during the meeting held on the 19th October 2016. This was based on the fact that the Alternative Site C which is more preferred site for the substation is high in agricultural potential consequently Site H was proposed by the landowner, owing to its unproductive state in relation to Site C. A site visit was conducted with the DEA on the 20th to assess the new proposed site alternative. As a consequence, five site alternatives are considered in the final EIR.

The loop in and loop out power lines will be constructed to connect the proposed Agulhas substation to the existing Bacchus – Proteas 400kV power line and a 132kV distribution line will also be constructed to connect the new and existing substations. The power line corridor will be determined by the location of the substation site. A 5km radius study area is under assessment for the proposed development. The project has considered technical alternatives of which were found to be economically and environmentally viable compared to the other options.

The selection of project alternatives was primarily based on Eskom's prefeasibility study that technically determined the broad location based on the need and desirability of the proposed project. Subsequent site visits were undertaken by the engineering, the design, environmental and specialist teams. Further, a detailed public consultation was undertaken to assess the viability of the selected alternative sites which resulted in the identification of more sites for consideration To assess the economic need and desirability of the project, the site selection process also focused on reviewing the municipal Integrated Development Plan, Eskom's 10 Year Development Plan, and associated documents that address current and future development in and around the area.

Ultimately to reach the proposed development footprint within the approved site, specialist integration was undertaken to determine the least sensitive portion within the site and the least sensitive areas within the power line corridor. Consideration of specialist and technical input culminated into the selection of the preferred development alternative and not necessarily the exact footprint.

Subsequent to approval of the proposed project by the Department, the EAP recommends that the exact footprint within the approved site and corridor be determined. Such will be achieved by undertaking a walk down with the specialist team, particularly the wetland, heritage, biodiversity and avifauna depending on the sensitivity of the area. As recommended by the biodiversity specialist, if site H is preferred, then the final detailed layout should be reviewed by the same specialist to ensure than impact on the sensitive areas has been avoided.

9.1 DETAILS OF ALTERNATIVES CONSIDERED

9.1.1 TECHNICAL ALTERNATIVES

Two technical alternatives have been identified for the proposed project i.e. the overhead power line and underground cabling. Instead of constructing the proposed power line above ground, underground construction is considered to be an alternative. The advantages of this alternative would include a reduced impact on bird interaction and a distinct visual impact benefit.

However, for the proposed project the underground cabling alternative would not be the most feasible owing to the sensitive nature of the area. Further, this alternative is associated with major technical problems and cost implications.

The option of constructing an underground cable was assessed and dismissed during the scoping phase. The dismissal was based on the technical feasibility (not feasible) due to the geology, topography, maintenance and financial implications of the proposed routes as well as consideration of advantages and disadvantages as indicated in **Table 6** below.

Table 6: Technical Alternative Analysis

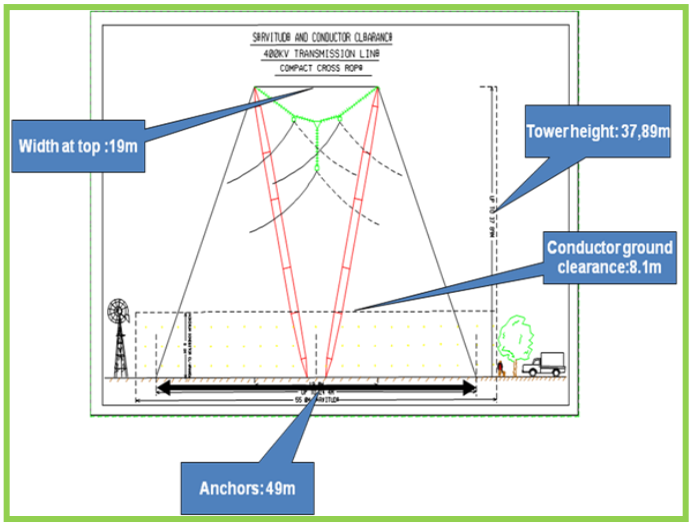
Technical Alternative	Advantages	Disadvantages
400kV underground cable	• Minimal visual impact. • Minimising impact on land use. • No impact on avifauna.	• High impact on sensitive environments. • High maintenance costs; and • High construction costs (four times more than overhead power lines).
400kV overhead power line	• Minimal ground disturbance, therefore reduced impacts on sensitive environments; • Economically feasible; and • Easy to maintain.	• High visual impact. • High impact on avifauna.

9.1.2 STRUCTURAL ALTERNATIVES

Three design alternatives have been proposed, and they include one or more of the following pylons:

- Cross-Rope suspension type;
- Self-supporting type; and
- Guyed V towers.

These are illustrated in Figures 5-10 below. It is important to note that the topography will largely dictate the types of towers to be used. From this perspective, it should be noted that where the line crosses undulating terrains and when it changes direction at an angle, there will be a need to use self-supporting towers.



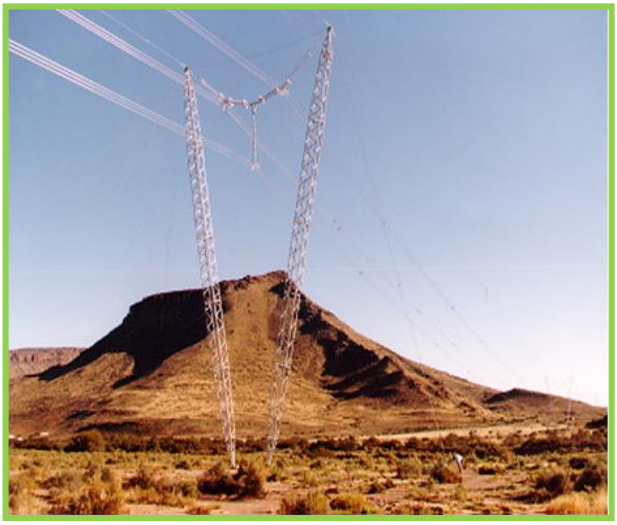


Figure 7 : Guide V tower

Figure 8: Photographic Guide V tower

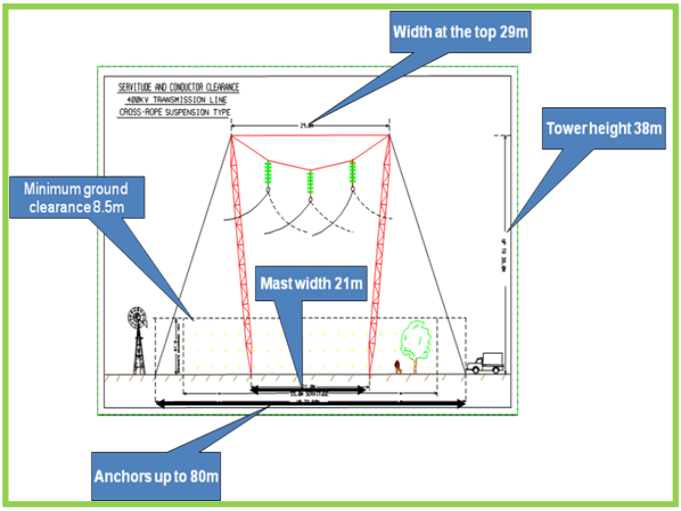


Figure 9: Cross rope suspension tower.

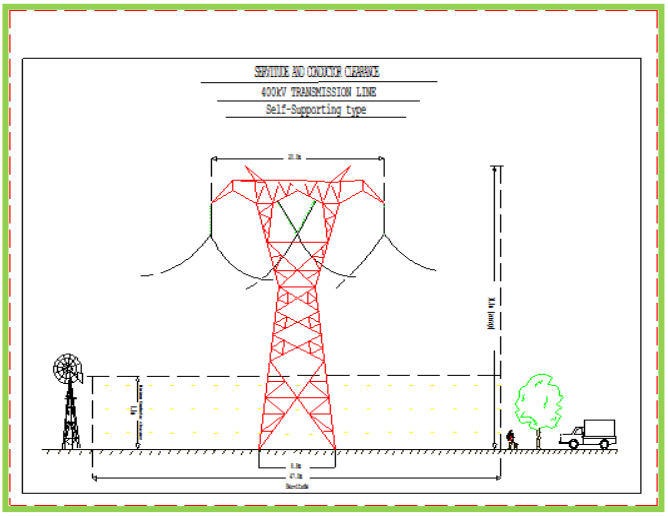


Figure 10: Photographic illustration of a Cross rope suspension tower.

Figure 11: Self-supporting suspension tower.

Figure 12: Photographic illustration of Self-supporting suspension tower.

None of the above options have been dismissed and remain alternatives depending on the terrain and topography. Given the comments received from stakeholders regarding the visual impacts of the proposed project, the selection of the pylons to be used for the proposed loop in and out will take the potential impacts into consideration. In an effort to adequately address the concerns raised with regards to the visual impact, a visual impact study was commissioned and recommendations have been taken into consideration in the compilation of this report. (Refer to Appendix C6 for specialist report)

9.1.3 SITE ALTERNATIVES

Seven site alternatives were identified and assessed as part scoping report. The alternatives including the no-go were studied and of the seven sites, three were eliminated. As indicated above, a fifth Site Alternative (Site H) was proposed during the public review period of the draft EIR. This was an addition proposed by the landowner for the substation during the meeting held on the 19th October 2016. As a consequence, five site alternatives are considered in the final EIR and discussed hereunder.

9.1.3.1 Substation Site Alternative A

Site alternative A is located north of the existing substation. The site is largely transformed and located approximately 50m from the existing 400kV overhead power line and within close proximity to the N2 and R319. About 90% of the site is natural grass and situated on old pasture land used for grazing. Furthermore, the Loop in loop out line from the substation will be approximately 273m. This site is located 500m west of the Kluitjieskraal River and south of a small stream (Refer to Figure 4 below). The terrain has a side slope of about 6 to 9%.

Figure 13: Proposed Alternative site A

Table 7 : Summary of Specialist Findings-Site Alternative A

Specialist	Description
Agricultural Potential	Site A has the lowest agricultural potential as a result of shallow and high percentage of rocks within the soil profile i.e. majority of soils was classified as Mispah. This site is used for livestock grazing and not for cultivation of crops.
Fauna and Flora	Site A is within the transformed habitat considered to be low sensitivity and no potential impacts can result. There is no remnant vegetation within the proposed site and along the loop-in and out power lines. However, the proposed

Specialist	Description
	distribution will traverse over the highly sensitive area (critically endangered) and will be closest to the CBA that was identified as a fatal flaw during the scoping phase.
Heritage	No obvious sites of heritage significance were noted on this site apart from the numerous stone. According to the specialist no shelters were identified in the area, however, the ample stones could have easily been transformed into tools. As a result, it is very likely that Stone Age people did roam around this alternative.
Flora and Fauna	Site A is within the transformed habitat considered to be low sensitivity and no potential impacts can result. There is no remnant vegetation within the proposed site.
Wetland Delineation	A channelled valley bottom wetland is situated on the southern boundary of the site. Two 'B' Section channels are located within a 500m buffer of the northern and eastern boundary of the site. The 25m buffer associated with the wetland system encroaches into the site in the south-eastern corner. This will need to be taken into consideration with regards to the layout of the substation should this site be chosen. This is the least preferred alternative as it is closest to the Kluitjieskraal River.
Visual Impact Assessment	The viewshed is mostly concentrated to within 5km from the project site, although some visual pockets do occur outside this area. The view shed is relatively uniform across the landscape within the 5km radius but tend to be slightly elongated in a north-south direction.
Traffic Impact Assessment	Access to Site A is possible off DR1251 at ±km1.13 and from MR264 at ±km57.71. The location of both these accesses allow for adequate shoulder sight distance (≥380m) in both directions. The proposed access off DR1251 provides direct access to Site A while the proposed access off MR264 will require a servitude right of way over the neighbouring farm (±700m). Site A is the preferred site from a traffic point of view.

9.1.3.2 Substation Site Alternative C

Alternative Site C is located west of Alternative Site B and is situated in an old pasture land used for grazing with a smooth terrain and a side slope of about 2% to 7%. A pan micro-habitat is located within the vicinity of the site. The site is situated approximately 2km south of Bacchus – Proteus 400kV line and approximately 2.5km north of Vryheid Substation; furthermore, the loop-in loop-out line from the substation will be approximately 2km. There is a water course and 3 small dams north of the site. This alternative site is located close to the R319 road to Bredasdorp, which will be the primary access as depicted in Figure 8 below.

Figure 14: Proposed Alternative Site C

Table 8: Summary of Specialist Findings-Site Alternative C

Specialist	Description
Agricultural Potential	Alternative Site C has the lowest agricultural potential as a result of shallow soils and high percentage of rocks within the profile. This site is used for livestock grazing and not for the cultivation of crops.
Flora and Fauna	Alternative Site C is within a transformed habitat considered to be of low sensitivity with no remnant vegetation within the proposed site; therefore no significant impacts are expected.

Specialist	Description
Heritage	Similar to Alternative A, Alternative C has high percentage of rocks and as a result it has low agricultural potential, hence it is used for livestock grazing. Experience has shown that archaeological sites and isolated tools tend to remain stable under areas where game or livestock farming are practiced. Alternative C bears potential for isolated archaeological tools.
Avifauna	The site is situated in old pasture land used for grazing and is in close proximity to human development. There are no sensitive micro-habitats within the site alternative and the site is likely to have low sensitivity for avifauna. Furthermore, the Loop-in loop-out line from the substation will be approximately 300m and the 132kV line approximately 4.6km. This is the shortest line alternative. This short line alternative will pose a limited threat to the Blue Crane and Denham's Bustard population within the area, which have a high susceptibility to collision with overhead power lines.
Wetland Delineation	This is located to the west of Site A and is situated in pasture land used for grazing. A 'B' Section channel and associated riparian zone is situated on the northern and western boundary of the Site. A second 'B' Section channel is situated approximately 370m to the west of the Site. Further to this an agricultural dam is situated within the central portions of the site. The 25m buffer associated with the riparian zone must be taken into consideration when developing the layout for the substation should this site is used.
Visual Impact Assessment	The view shed from Site Alternative C is much more scattered across the landscape. The view shed is largely orientated in a north-south direction and also extends eastwards. The extent of the view shed in a westerly direction is effectively halted by the Luiperdsberg approximately 1.5km from the site.
Traffic Impact Assessment	Site C is approximately 15km to the southwest of the town Swellendam along the N2 national road and the R319 (MR264) road to Bredasdorp, which will be the primary access. MR264 runs north-south to the east of the site and intersects with the N2 national road to the north of the site. Access to Site C is proposed off MR264 at ±km55.74 (2.78km from N2) where adequate shoulder sight distances (≥380m) are achieved. MR264 is a paved road in a good condition. The site is

Specialist	Description
	approximately 2km south of the existing Eskom power line.

9.1.3.3 Substation Site Alternative F

This Site Alternative is located on elevated landform to the east of Site A. This is located within an agricultural area and the existing 400kV power line and National road (N2) are located within close proximity of this site. A drainage line micro-habitat is located to the south west of the site as depicted in Figure 11 below.

Figure 15: Proposed Alternative Site F

Table 9: Summary of Specialist Findings-Site Alternative F

Specialist	Description
Agricultural Potential	Sites 'F' is actively used for the cultivation of Wheat crops and is considered to have a higher agricultural potential with regards to crop cultivation as a result of deeper soils as well as a rapid to good subsoil permeability within the soil profiles sampled in these areas.
Flora and Flora	Site F is within the transformed habitat considered to be of low sensitivity and no potential impacts can result. There is no remnant vegetation within the proposed

	site. Similar to site A, the proposed distribution line will encroach on the highly sensitive area (critically endangered) and will be closest to the CBA that was identified as a fatal flaw during the scoping phase.
Heritage	The site is characterised by extensive agricultural farming, and is fairly undulating. Any archaeological materials that could have existed here in the past had been destroyed.
Avifauna	This site is located within an agricultural area (Wheat production) and the existing 400kV power line and National road (N2) are located within close proximity of this site. A drainage line micro-habitat is located to the south west of the site. The 400kV loop-in loop-out line will be approximately 260m. and the 132kV distribution line is approximately 6m. The longer power line associated with this site alternative poses an increased risk of collision to Blue Cranes and Denham's Bustard.
Wetland Delineation	This site alternative is located on elevated landform to the east of Site A. This is located within an agricultural area used for the cultivation of wheat. The existing 400kV power line and National road (N2) are located within close proximity of this site. There are no drainage channels or wetland areas within the site. Two 'B' Section channels are located to the east and west of the site approximately 670m and 415m respectively.
Visual Impact Assessment	The viewshed from Site Alternative F largely echoes that of Site Alternative A as the zone of visual influence is largely found within 5km from the site. Several isolated pockets do, however, occur outside this area, especially in a south-western direction along the R319.
Traffic Impact Assessment	Site F is located to the east of Site A approximately 12km to the south west of Swellendam town located adjacent to the existing Eskom power line. Site F can be accessed from both MR268 and DR1251 which are both gravel roads. Site F will require the construction of an access road.

9.1.3.4 Substation Site Alternative G

Site Alternative G is located North West of the existing substation, along the N2 Road. Given the non-viability of some of the sites selected at the onset, this specific site was added to the alternatives to allow for a wider and varied selection. The site is located adjacent to the N2 as depicted in Figure 12 below.

Figure 16: Proposed Alternative site G

Table 10: Summary of Specialist Findings-Site Alternative G

Specialist	Description
Agricultural Potential	Sites 'G' is actively used for the cultivation of Canola crops and is considered to have a higher agricultural potential with regards to crop cultivation as a result of deeper soils as well as a rapid to good subsoil permeability within the soil profiles sampled in these areas.
Flora and Fauna	Site G is within the transformed habitat considered to be low sensitivity and no significant impacts are expected within the substation and Tx lines. However, the proposed distribution power line will encroach on a watercourse and the CBA.
Heritage	The area on which this alternative is proposed is transformed due to agricultural activities. No evidence of any archaeological material was

Specialist	Description
	found.
Avifauna	This is the western most substation alternative. The site also falls within agricultural land (Canola cultivation) and is located adjacent to the N2. Blue Cranes were observed within close proximity to this site alternative. This site has the longest power lines associated which poses an increased risk of collision to Blue Cranes and Denham's Bustard. The loop-in loop-out line will be approximately 760m and the distribution line will be approximately 7km.
Wetland Delineation	Substation sites G is not situated within any of the buffer zones identified. No wetlands or watercourses are present in this site; however, the distribution power line will cross a watercourse.
Visual Impact Assessment	Due to the location of Site Alternative G, the view shed generated from the latter presents different to the other sites. The view shed from this site is largely found in a northern direction with isolated pockets occurring east of the site up to 15km. The view shed also extends in a narrow band to the south of the site. Due to the topography of the area, no views present in a South-eastern direction.
Traffic Impact Assessment	Site G is located northwest of the existing substation, along the N2 approximately 18km southwest of the town Swellendam. The site is adjacent the N2 and OP4468. OP4468 runs north south and intersects with the N2 to the north. Although located next to the N2 an access road will have to be constructed to achieve a safe access off the N2. The site is located in close proximity of the existing Eskom power line. Unfortunately, OP4468 cannot be used as an access road as the shoulder sight distance on the N2 is inadequate. SANRAL may require the construction of turning lanes on the N2 at the N2/OP4468 intersection to increase road safety.

9.1.3.5 Substation Site Alterna

9.1.3.6 tive H

Site Alternative H is located north of site alternative C and west of Alternative A. This site was proposed by the landowner during the draft review of the EIR based on the fact that the Alternative Site C which is more preferred site for the substation is high in agricultural potential. It was then that Site H was proposed by the landowner, owing to its unproductive state. This site is situated in the western portion of the larger study area and approximately 455m to the south of the N2. It is used for the cultivation of wheat. A drainage channel and associated riparian zone were delineated along the western boundary of the site as well as approximately 100m to the south of the site. Further to this an agricultural dam is situated adjacent to the riparian zone within the proposed substation site.

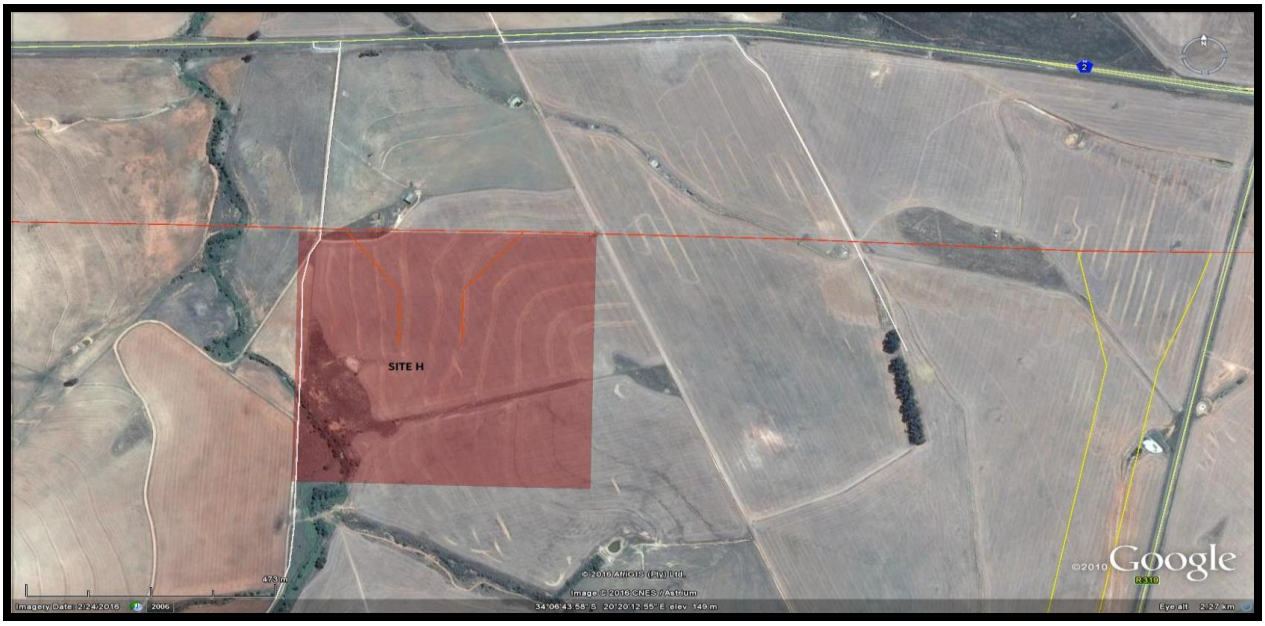


Figure 17: Proposed Alternative site H

Table 11: Summary of Specialist Findings-Site Alternative H

Specialist	Description
Agricultural Potential	Given that the soil characteristics do not change significantly throughout the larger study area, soil characteristics are expected to be similar. The agricultural and land capability for Sites 'H' has been classified as Class IV.
Flora and Fauna	Site H is located on wheat fields with some intact areas within the site which

Specialist	Description
	should be considered to be no-go areas. The development of this site would only be acceptable if these can be avoided. All intact vegetation in the area is listed as Critically Endangered and any loss of intact vegetation should therefore be considered unacceptable.
Heritage	This site is on an agricultural land wherein wheat is being extensively cultivated. The site is fairly steep, and the area was found to be highly degraded by farming activities, any archaeological material that could be found here will be out of context, and of low significance. It must be noted that during the site visit ground visibility was poor due to plantation. On the western section there is a farm stead; however, this dates to recent era and is thus not protected by legislation
Avifauna	The site is situated on the north-western portion of the study area and lies 470m south of the N2. The site is located within an agricultural area utilised for the cultivation of wheat. There is a drainage channel and associated riparian area on the western and southern boundaries of the development footprint. The 132kV distribution power line associated with site H is approximately 4.6km.
Wetland Delineation	This site is situated in the western portion of the larger study area and approximately 455m to the south of the N2. It is used for the cultivation of wheat. A drainage channel and associated riparian zone were delineated along the western boundary of the site as well as approximately 100m to the south of the site. Further to this an agricultural dam is situated adjacent to the riparian zone within the proposed substation site. The 25m buffer placed on the riparian zone will have an impact on the position of the substation should this site be utilised. The distribution line will cross two drainage channels and riparian zones.
Visual Impact Assessment	The viewshed from Site Alternative H extends beyond 5km from the project site. Although the viewshed is relatively uniformly distributed up to 1km from the project site, the viewshed primarily extends in the northerly direction. A secondary viewshed pocket is visible approximately 5km east of the project site. As is evident from the figure below, the viewshed extends across some of the major view corridors in the area.

Specialist	Description
Traffic Impact Assessment	Site H is located north of the existing substation, along the N2 approximately 15km southwest of the town Swellendam. The site is adjacent the N2 situated on Portion 7 of Farm 251. An already approved access to the farm from the N2 exists approximately 42.40km. An additional farm access is located approximately 330m east of the already approved farm access however this access is not recommended due to the inadequate shoulder sight distance (SSD) towards Swellendam. The already approved N2/Portion 7 of Farm 251 access intersection has good shoulder site distance (≥490m) in both directions.

9.1.3.7 No-go alternative

In accordance with GN R.982, consideration must be given to the option not to act. This option is usually considered when the proposed development is envisaged to have significant negative environmental impacts that mitigation measures cannot ameliorate the identified impacts effectively.

The no-go alternative would be the option of not undertaking the development of the proposed project. It would imply that the current electricity supply network is not strengthened, industrial development in the area will be hindered and the integration of potential renewable energy in the area will not be possible. Should the no-go alternative be adopted, the Western Cape grid will be deprived of a much needed essential service, particularly given the already existing energy supply challenge countrywide.

Table 13 below indicates site alternative analysis with advantages and disadvantages of each site.

Table 12: Site alternative analysis

Site Alternative	Advantages	Disadvantages
Site Alternative A	• No residential communities are situated near this site. • According to the Vegetation Assessment Report substation site is situated in an area classified as having "No	• It is closest to the Kluitjieskraal River. • Although it is located close to the N2, construction vehicles would likely have to cross the tributary from the N2 to gain access to the site.

Site Alternative	Advantages	Disadvantages
	Natural Habitat Remaining" and therefore have little conservation value. • The site is located close (±1.1km) to the N2 and access will be directly off DR1251. Easiest site to access. • Technically preferred as it will require less cut and fill.	• A channelled valley bottom wetland is located southern side of the substation site. • The relatively longer power lines pose an increased risk of collision to Blue Cranes and Denham's Bustard.
Alternative C	• Lowest agricultural potential. • Located directly adjacent a regional road (R319) providing easy access to site. • It has the shortest associated Dx and Tx power lines therefore the least impact on avifauna. • According to the Vegetation Assessment Report, is located on transformed habitat of low sensitivity.	• There is a water course and 3 small dams north of the site, however, no riparian or wetland conditions occur on the proposed site. • Bears potential for isolated archaeological tools.
Alternative F	• No sites of heritage significance were identified. • Site F is within the transformed habitat considered to be of low sensitivity. • No wetlands or watercourses are present in these sites. • This site located in close proximity to the N2 main road therefore easy access is expected. • Lowest visual impact	• High agricultural potential. • A drainage line micro-habitat is located to the south west of the site. • The relatively longer power lines pose an increased risk of collision to Blue Cranes and Denham's Bustard. • No direct access, therefore it will require construction of access roads.

Site Alternative	Advantages	Disadvantages
Alternative G	• No sites of heritage significance were identified. • Site G is within the transformed habitat considered to be of low sensitivity. • No wetlands or watercourses are present in these sites.	• High agricultural potential. • It has the longest Dx and Tx power line. The long power lines associated with this site alternative poses an increased risk of collision to Blue Cranes and Denham's Bustard. • Will require construction of an access road. • Highest Visual Impact • The proposed 132kV Dx line will encroach on the critically endangered ecosystem which is a potential fatal flaw • Encroaches on a water course and CBA.
Alternative H	• No sites of heritage significance were identified. • It is within the transformed habitat considered to be of low sensitivity. • Lowest visual impact. • Best suited from traffic impact point. • It has short relatively shorter Dx and Tx power line. • Most preferred by landowner relative to C.	• It is used for the cultivation of wheat. • A drainage channel and associated riparian zone were delineated along the western boundary of the site. • The distribution line will cross two drainage channels and riparian zones. • Site H is characterized by the presence of intact renosterveld patches. • Technically, the sensitivities associated with this site will result in space constraints thus forcing the substation to be constrained which will limit opportunities of expansion.
No-go Alternative	• None of the envisaged impacts will occur; and • No expenditure.	• No construction cost but greater economic disadvantage. • Industry will be deprived of a much needed essential service, particularly

Site Alternative	Advantages	Disadvantages
		given the already existing problem with energy supply countrywide.

9.2 PUBLIC PARTICIPATION PROCESS

The 2014 EIA Regulations, require that during a Scoping and EIA process, the organs of State together with Interested and Affected Parties be informed of the application for environmental authorisation and also be afforded an opportunity to comment on the application.

Public Participation Process (PPP) is any process that involves the public in problem solving and decision-making and it forms an integral part of the Scoping and EIA process. The PPP provides people who may be interested in or affected by the proposed development, with an opportunity to provide comments and to raise issues or concern, or to make suggestions that may result in enhanced benefits for the project.

Chapter 6, regulation 39 - 44, of the December 2014 EIA Regulations stipulates the manner in which the PPP should be conducted as well as the minimum requirements for a compliant process. These requirements include (but not limited to):

(a) fixing a notice board at a place conspicuous to the public at the boundary or on the fence of—

(i) the site where the activity to which the application relates is or is to be undertaken;

(b) giving written notice to—

(i) the occupiers of the site where the activity is or is to be undertaken or to any alternative site where the activity is to be undertaken;

(ii) the owners or persons in control of that land occupiers of land adjacent to the site where the activity is or is to be undertaken or to any alternative site where the activity is to be undertaken;

(iii) the municipal councillor of the ward in which the site or alternative site is situated and any organisation of rate payers that represent the community in the area;

(iv) the municipality which has jurisdiction in the area;

(v) any organ of state having jurisdiction in respect of any aspect of the activity; and

(vi) any other party as required by the competent authority;

(c) placing an advertisement in—

(i) one local Newspaper

The primary purpose of the report is as follows:

- To outline the PPP that was undertaken;
- To synthesise the comments and issues raised by the key stakeholders, interested and affect parties; and
- To ensure that the EIA process fully address the issues and concerns raised, if any.

9.2.1 PUBLIC PARTICIPATION PRINCIPLES

The principle of the Public Participation holds that those who are affected by a decision have the right to be involved in the decision-making process i.e. the public's contribution will influence the decision. One of the primary objectives of conducting the PPP is to provide interested and affected parties with an opportunity to express their concerns and views on issues relating to the proposed project. The principles of public participation are to ensure that the PPP:

- Communicates the interests of and meet the process needs of all participants.
- Seek to facilitate the involvement of those potentially affected.
- Involves participants in defining how they participate.
- Is as inclusive and transparent as possible, it must be conducted in line with the requirements of regulation 39 - 44 of the December 2014 EIA Regulations.

9.2.2 APPROACH AND METHODOLOGY

The Public Participation approach adopted in this process is in line with the processes contemplated in regulation 39 - 44 of the Environmental Impact Assessment Regulations of December 2014, in terms of the National Environmental Management Act, 1998 (Act 107 of 1998) ("the Act"), which provides that:

9.2.3 IDENTIFICATION OF INTERESTED AND AFFECTED PARTIES

Interested and Affected Parties (I&APs) identified include pre-identified stakeholders (government departments), landowners and the general public. Notification and request for comments were submitted to the following key stakeholders during the Scoping Phase:

- Swellendam Local Municipality;
- South African Heritage Resource Agency;
- Western Cape Department of Transport and Public Works;
- South African National Road Agency (SANRAL);
- Western Cape Department of Water and Sanitation;
- Wildlife and Environmental Society of South Africa;
- CapeNature;
- Western Cape Department Environmental Affairs and Development Plan;
- National Department of Water and Sanitation; and
- Breede Gouritz Catchment Management Agency.

The notifications were sent by registered mail and comments were received from some of the stakeholders. All stakeholders will be kept abreast with the project proceedings throughout. The Stakeholders will be engaged and given an opportunity to comment on this Draft EIR.

9.2.4 PUBLIC PARTICIPATION DATABASE

In accordance with the requirements of the EIA Regulations under Section (24) 5 of NEMA, regulation 42 of GN R. 982, a Register of I&APs must be kept by the public participation practitioner.

In fulfilment of this requirement, such a register is compiled and details of the I&APs including their comments will be updated throughout the project cycle. The database is attached as **Appendix D5** and will remain open throughout the project cycle.

9.2.5 SITE NOTICES

On the 9th of June 2015, eight A2 size notices were fixed at different conspicuous locations within and around the proposed project study area including the Swellendam Local Municipality, existing Vryheid substation, Swellendam public library, at proposed Sites and along R319. These notices were informing and inviting the

public to participate in the EIA process. Photographic evidence of the site notices is attached as **Appendix D1** of this report.

9.2.6 DISTRIBUTION OF NOTICES TO SURROUNDING LAND OWNERS/ OCCUPIERS

Notification letters were posted via registered mail to stakeholders on the 15th June 2015 (Refer to **Appendix D3** for proof of postage), whereas site notices were hand delivered to landowners/occupiers on the 9th June 2015. These notifications were informing government stakeholders and the public of the project as well as affording them an opportunity (30 days as per the NEMA Regulations) to register as I&AP and also to comment or raise any issue.

9.2.7 PLACEMENT OF ADVERTISEMENT IN THE LOCAL NEWSPAPER

An advertisement was placed on the Langeberg Bulletin on the 12th June 2015. The advertisement was aimed at further informing the I&APs of the proposed activity. A 30 day period was allowed for the public to submit their comments, issues and concerns. Proof of newspaper advertisement is attached as **Appendix D2.**

9.2.8 PLACEMENT OF DRAFT SCOPING REPORT FOR COMMENTS

The Draft Scoping Report was made available to the public from the 15th February to 18th March 2016. The availability of the draft Scoping report was advertised on Langerberg Bulletin on the 19th February 2016. Proof of newspaper advert was included in the Final Scoping Report**.** The copies of the draft Scoping report were placed at Swellendam Public Library as well on the Nsovo website. Further, copies of the draft Scoping report were submitted to various departments for review and comments; this included the Western Cape Department of Environmental and Development Planning, CapeNature, Department of Water Affairs and Swellendam Local Municipality.

The availability of the draft EIR was advertised on the Langeberg newspaper, while notifications of the same were sent to all registered I&APs, authorities and key stakeholders; who were offered the opportunity to review and comment on the report.

9.2.9 PUBLIC MEETINGS

Two public meetings were held on the 19th and 20th October 2016 at Railton Community Hall in Swellendam.

Minutes of the meetings, photographic evidence, agenda and attendance register are included as **Appendix D8** of this report.

9.2.10 DEVELOPING A STRATEGY AND RESOLVING KEY ISSUES

A strategy for addressing and resolving key issues include:

- Details on all assessments and investigations carried out;
- Use of the Public Meetings to present the findings of the reports and test the acceptability of priority issues and mitigations;
- Openly and honestly relating both positive and negative impacts of the proposed development during the Public Meetings; and
- Allowing the public to understand the consequences of the proposed development in the area.

9.2.11 INTERACTION WITH DEA AND PROVINCIAL ENVIRONMENTAL DEPARTMENTS

Interaction with DEA and the other provincial environmental authorities was undertaken during the Scoping Phase as well as the EIA Phase of the project and included:

- Submission of the draft Scoping and EIA Reports;
- A consultation meeting with various stakeholders and I&APs as appropriate, to discuss the findings of the draft EIR;
- Submission of the final EIR, following a public review period; and
- Notification of registered I&APs of the decision made by the DEA.

9.3 A SUMMARY OF ISSUES RAISED BY INTERESTED AND AFFECTED PARTIES

The comments, issues and concerns raised during the Scoping and EIR phase were taken into consideration during the compilation of this report. Table 12 below provides and summarizes the key comments received from

both stakeholders and the public. A detailed issues and response report is attached as **Appendix D7**. Comments and recommendations from stakeholders to be taken forward into the EIA phase are summarised in the Table below.

Table 13: Summary of comments

Organisation	Comments
Breede Gouritz Catchment Management Strategy	BGCMA highlighted that they have no objections, however, they indicated that the following be adhered to: • Proposed construction may require a Water Use Licence Should the construction of foundations be less than 32m from a watercourse and 500m from a wetland. Thus in terms of Section 21 c and I water uses may be impacted. • Applicant must ensure that aquatic study be conducted to indicate the impact of construction on watercourses and if any wetlands will be impacted should construction be within the limited set out in point 1. • All relevant sections of the water Act must be adhered to.
Cape Nature	• Emphasised the need to investigate the wetland and watercourses in the study area. • Supported the findings of the fauna, flora and avifauna at Scoping level and recommended that alternatives to be taken forward to the EIA phase be A, E, F and G. • Recommended that the EIA phase must include fieldwork and ground trothing and the avifaunal specialist study supplement study done with existing work that has been done for power lines and wind energy facilities in the vicinity. • Sought clarity regarding the 132kV Dx line and extension of the existing Vryheid Substation. They indicated that it would trigger additional listed activities and influence the associated impacts. • Sought clarity whether the proposal is only for the strengthening of the existing network or if the substation is proposed to receive electricity from the renewable energy facilities in the vicinity.

Organisation	Comments
Western Cape Environmental Affairs and Development Planning	• Highlighted that Site A appears to be the most preferred except from a heritage perspective and recommended that a walk down phase for site A be implemented to further investigate the potential of the site to be used for the proposed substation. • Highlighted that the site selection for the proposed location of the substation must take into account the existing agricultural practices particularly Farm Kluitjiekraal, where sites A, B, C and D are located.
Swellandam Municipality	• Highlighted concerns about the cumulative visual impact on the landscape. • Recommended that effort be made to minimize the visual impact of the development. • Indicated that they are not in favour of the development of proposed infrastructure along the eastern side of the R319 as they wish to maintain the views and vistas as far as possible.

These comments were addressed in the FSR, and recommendations made for this EIA phase have been taken into consideration and these include:

- Undertaking of a Wetland Delineation Study;
- Consideration of Sites A, C, F and G in the EIA phase;
- Consideration of an additional Site H in the final EIR,
- Recommendation that a Water Use Licence Application be undertaken as required depending on the site selected;
- Commissioning of a Visual Impact Assessment study; and
- Undertaking a Traffic Impact Study.

The Comments and Issues Report was updated to include comments received during the draft EIR phase of the project.

9.4 DESCRIPTION OF THE ENVIRONMENTAL ATTRIBUTES ASSOCIATED WITH THE ALTERNATIVES FOCUSING ON THE GEOGRAPHICAL, PHYSICAL, BIOLOGICAL, SOCIAL, HERITAGE AND CULTURAL ASPECTS

This section outlines those parts of the socio-economic and biophysical environment that could be affected by the proposed development. Using the project description and knowledge of the existing environment, potential interactions between the project and the environment are identified in the next section. The potential effects of the project on the human environment, socio-economic conditions, physical and cultural resources are included. Below is the description of the receiving environment.

9.4.1 SOCIO-ECONOMIC DESCRIPTION

9.4.1.1 Provincial and District Municipality Description

The Overberg District Municipality governs the Overberg region in the Western Cape Province. The District Municipality is divided into four local municipalities and includes the major towns of Grabouw, Caledon, Hermanus, Bredasdorp and Swellendam. The District Municipality is divided into four Local Municipalities:

- The Waterskloof Local Municipality;
- Overstrand Local Municipality;
- Cape Agulhas Local Municipality; and
- Swellendam Local Municipality.

The Overberg District is located in the southernmost tip of Africa and is world-renown for its fierce winter storms and thus hundreds of shipwrecks scatter the coastline. Quaint little towns and hamlets such as Elim, Suurbraak, Genadendal, Greyton and Tesselaarsdal and larger towns like Swellendam, Barrydale and Caledon with their variety of architectural assets sets the scene for any tourist interested in the history, people and lifestyle of the district.

Furthermore, the Overberg is richly endowed with fynbos, the smallest but yet the most unique floral kingdoms and environmental habitats in the world. The N2 opens doors for wide spectrum of development. Other transport corridors such as the coastal road from Gordon's Bay via Kleinmond, Hermanus, Gansbaai and Elim to Bredasdorp and numerous cross-district routes from e.g. Caledon to Villiersdorp and onward to Worcester, from Bredasdorp to Swellendam, Riviersonderend and Caledon also create numerous opportunities for development.

The District Municipality has a population of 258 176 wherein 24.1% is under the age of 15 and 67.6% between the ages of 15 and 64, while the remaining percentage is over 65 years. The District Municipality has experienced a population growth rate of 2.37%. In terms of the labour market, the official unemployment rate is 17% while youth unemployment rate is 22.9%.

9.4.1.2 Swellendam Local Municipality

According to the 2011 census the Municipality has a population of 35,916 in 10,139 households. Of this population, 68.8% are "Coloured", 17.4% as "White", and 12.4% as "Black African". The first language of 85.1% of the population is Afrikaans, while 6.9% speak Xhosa and 4.7% speak English.

Swellendam is linked with other urban and rural areas mainly through the N2 Road. The area is also served with the main railway line which links Cape Town with the Garden Route. The population of the municipal area is relatively young with 68% of the population being younger than 39 years of age while the gender division for the area is 50% male and 50% female.

Swellendam Local Municipality is currently the third biggest contributor to the economic growth and GDPR of the Overberg District. Swellendam registered an average annual growth rate of 3.2% in GDPR from 1995 to 2004, the second highest rate in the Overberg District. When considering the most recent data and shorter periods, economic growth was higher than the long-term average, averaging 3.5% between 2000 and 2004, 4% between 2003 and 2004 and 5.5% in 2006.

The main economic sectors are primary agriculture and agro-processing of products which includes deciduous fruits, wheat, barley, young berry, livestock and grapes for exporting and the making of wine. Tourism is the other major sector in the area with emphasis on eco-tourism and cultural heritage tourism activities. The other sectors are retail and manufacturing, mining and quarrying. A potential sector for higher economic growth in the area is wholesale and packaging.

9.4.2 CLIMATE

The region has a predominantly Mediterranean climate with long summer days in January and February. During February and March, summer draws to a close, with prevailing south easterly winds. April and May are autumn

months with milder days and occasional showers. June and July bring the Cape winters, with mild weather, rain and possible snow on the mountain tops. August and September are the start of spring.

Figure 14 below shows the monthly distribution of average daily maximum and minimum temperatures. The figure shows that the average midday temperatures for Swellendam range from 20°C in July to 34°C in January. The region is the coldest during July when the mercury drops to 6°C on average during the night.

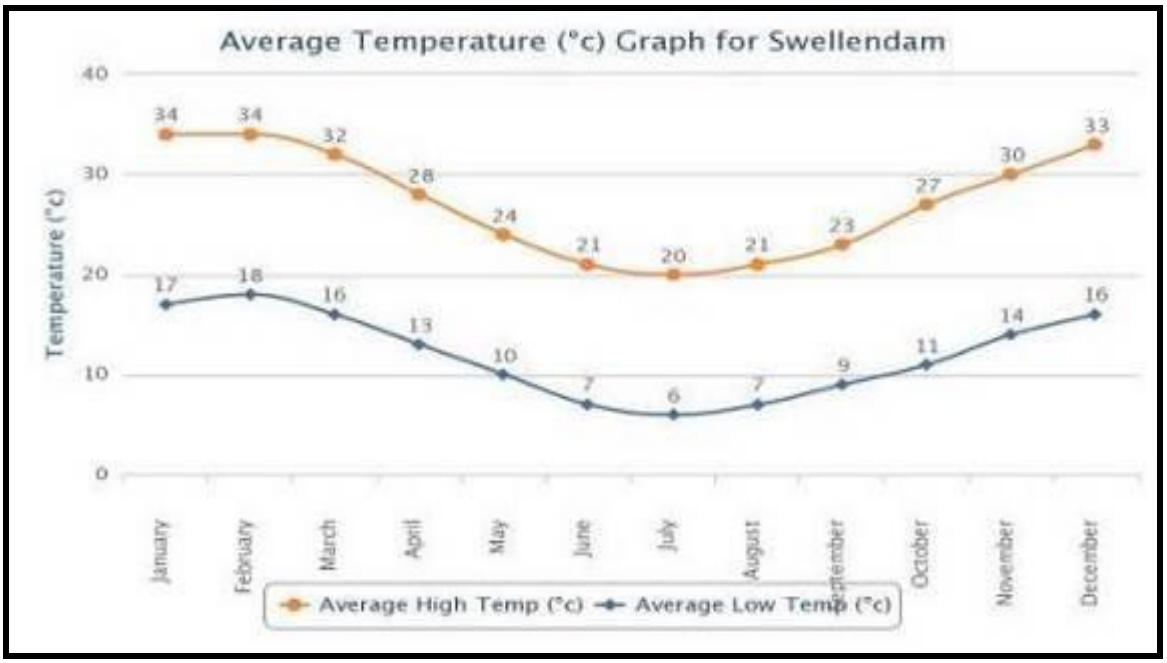


Figure 18: Average Temperature Graph for Swellendam (Source: http://weatherhq.co.za//swellendam)

Swellendam receives the lowest rainfall (10mm) in February and the highest (37mm) in July. The climate for the Swellendam area is warm during the summers with summer rains and very wet winters. Rainfall is spread over the year and ranges between 55% in winter and 45% in summer. Swellendam normally receives about 462mm of rain per year, with rainfall occurring throughout the year.

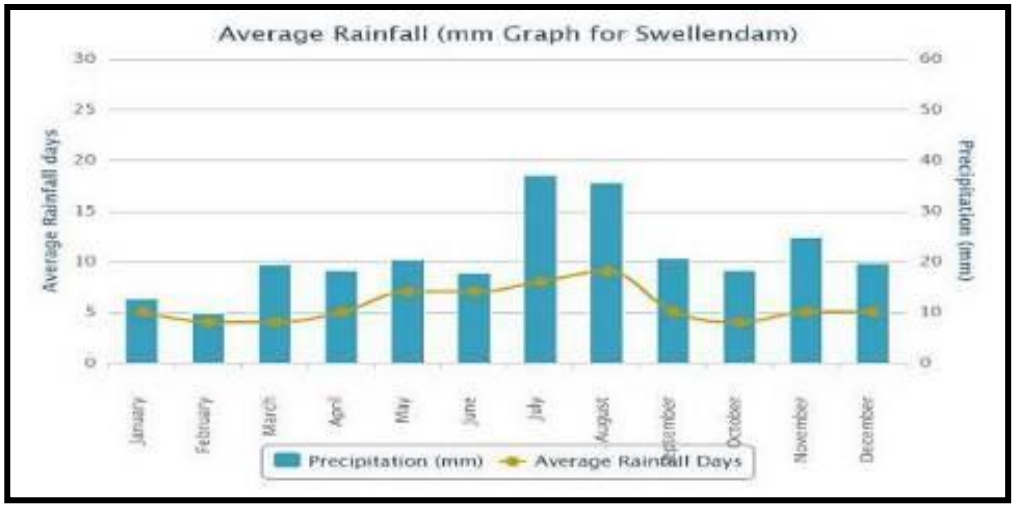


Figure 19: Average Rainfall Graph for Swellendam (Source: http://weatherhq.co.za//swellendam)

9.4.3 GEOLOGY

The geology of the proposed study area is situated on shale, siltstone and subordinate sandstone of the Bokkeveld group and partly on the Witteberg Group as depicted in **Figure 16** below.

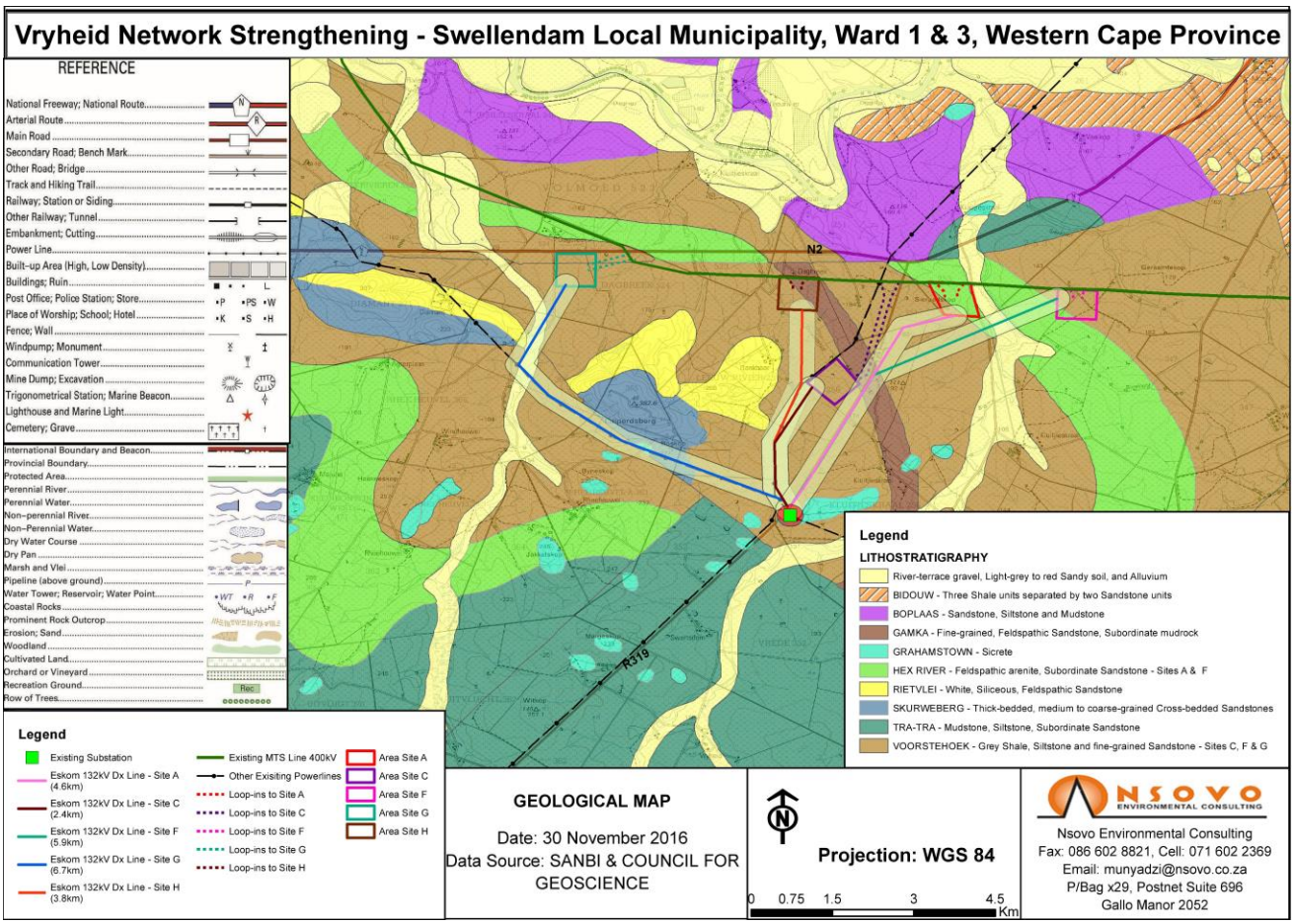


Figure 20: Geological Map

The geology of the Cederberg comprises of the Cape Supergroup (Table Mountain Group, **Bokkeveld Group and Witteberg Group**) and the Karoo Supergroup (Dwyka Group, Ecca Group and Beaufort Group). The Cape Supergroup was formed about 700 – 600 million years ago by a succession of sedimentation of sandstone (silt, mud and sand). The distinct reddish colour of rock is a result of minerals like iron and manganese that formed part of the sediments. The Supergroup constitutes the largely erinaceous Table Mountain Group which unconformably overlies the Malmesbury and Cape Granite rocks, and underlies the Bokkeveld Group (composed predominantly of argillaceous beds) and the uppermost Witteberg Group (consisting of alternating shales and sandstones).

The proposed study is primarily within the Bokkeveld Group and is composed of two Subgroups namely:

- The basal Ceres Subgroup, consisting of alternating dark grey mud rock, lithozones and dark, very fine-grained muddy sandstone; and

- The uppermost Taka Subgroup, consisting primarily of mud rock and rhythmitite and very subordinate sandstone.

The Bokkeveld Group Shales is dominated by clay and loamy soils which are both shallow and well drained including the Mispah and Glenrosa soil forms (Mucina and Rutherford, 2006)

9.4.4 TOPOGRAPHY

The region's landscape is dominated by gently to moderately undulating hills enclosed by mountains and the ocean. The flat and level coastal plain rises from sea level to 100m, the hillier inland coastal Plato are generally the highest points in the landscape and rises approximately 300m above mean sea level.

According to (Partridge, Botha & Haddon, 2006), within the Bokkeveld shale matrix are outcrops of silcrete over deeply weathered pallid soil. The main topographical unit within the proposed study area consists of moderately undulating hills and plains which are characteristic of the area. The gradient of the proposed study area ranges from 0-8% category.

9.4.5 SURFACE WATER

According to the Hydrological map two perennial rivers, namely the Breede and the Kluitjiekraal River are within the proposed study area. The large Breede river buffer zone is located approximately 1.2km north of the proposed study area, while the Kluitjiekraal River is within a 300m distance east of Substation Alternative Site A. A number of non- perennial riparian areas were recorded within the study area.

The proposed project falls within the quaternary catchment H70A with Substation Site G situated on the boundary of H70A and H60L. Both quaternary catchments are part of the Lower Breede Sub Water Management Area and the Breede Water Management Area. The Breede Water Management Area is the southern-most water management area in South Africa. The greater part of the area is drained by the Breede River and its main tributary, the Riviersonderend River. Major impacts to the Breede River are associated with river channel modification, alien species infestation, natural flooding impacts, flow modification and water quality deterioration.

The eastern section of the study area contains seasonal pans which are defined as a near-level shallow depression or basin, usually containing an intermittent supply of water. Further numerous artificial dams were also recorded throughout the study area.

Wetland conditions are associated with numerous perennial rivers and temporary streams recorded in the region of the study area. Wetlands were noted in proximity to Site A while a drainage channel and associated riparian zone were delineated along the western boundary as well as approximately 100m to the south of site H. Further to this an agricultural dam is situated adjacent to the riparian zone within the proposed substation site and the associated distribution line will cross two drainage channels and riparian zones.

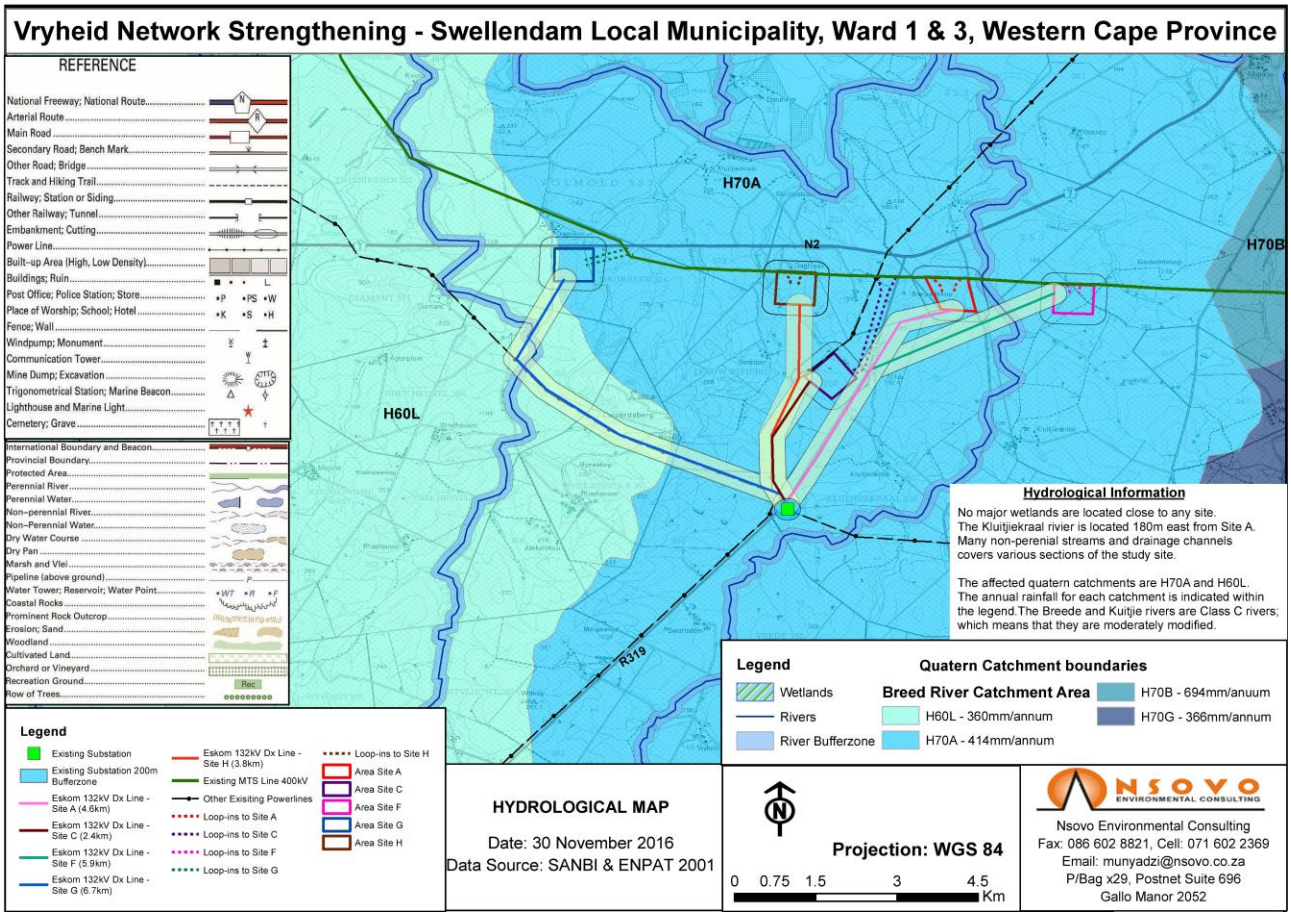


Figure 21: Wetlands and riparian areas within 500m of the proposed study area

9.4.6 AIR QUALITY AND POLLUTION

Air quality is defined to include noise and odour and addresses all sources of air pollution, i.e. point, area and mobile sources. The Air Quality Management Plan for the Overberg has been developed to comply with the

National Environmental Management: Air Quality Act, 39 of 2004 and more specifically, to provide guidance on Air Quality Management in the Overberg. The Plan identifies air pollution sources in the Overberg as follows:

- Industrial operations especially fish factories in Gansbaai and Hermanus;
- Clay brick manufacturing;
- Agricultural activities such as crop burning and spraying;
- Biomass burning (veld fires);
- Domestic fuel burning (wood and paraffin);
- Vehicle emissions;
- Waste treatment and disposal;
- Dust from unpaved roads; and
- Other fugitive dust sources such as wind erosion of exposed areas.

There are few sources of air pollutants in the District and even fewer within the immediate study area. The ambient air quality is generally good; however, emissions from industrial boilers are likely to result in local areas of elevated concentrations of air pollutants. Ambient particulate concentrations are likely to be high in low – income residential areas where wood is used as primary fuel source. The motor vehicle congestion in holiday towns and along the N2 road results in elevated ambient concentrations of particulates and NO_2 (Nitrogen Oxides) at times.

9.4.7 FLORA

The study area is situated predominantly within the Eastern Reuns Shale Renosterveld vegetation and partly the Reuns Silcrete Renostreveld (Mucina & Rutherford, 2006) as depicted in **Figure 18** below. According to literature, Renosterveld form part of South Africa's Fynbos Biome and the Cape Floristic Region and they are species rich. However, it is notably different from Fynbos vegetation in several ways. Firstly in contrast to fynbos it occurs on relatively fertile soils, predominantly derived from shales although it can also occur on silcretes and other lithologies. Further, it is considered to be Critically Endangered and is classed as "100% irreplaceable". Of its former extent, only relatively small fragments remain - often in areas that are too steep or rocky to be reached by the farmer's plough. Transformation for agriculture is one of the main threats, closely followed by continuous heavy grazing and mismanagement of the veld. In the Overberg only 4-6% of Renosterveld is left and of that even less is still ecologically intact.

According to the national vegetation map (Mucina & Rutherford 2006) four vegetation types occurs within the study area. North Sonderend Sandstone Fynbos occupies the north-west corner of the site while the Eastern Ruens Shale Renosterveld forms the majority of the site. Only two vegetation types would be impacted by the development. The majority of the site falls within the Eastern Ruens Shale Renosterveld vegetation type, with a small extent of Ruens Silcrete Renosterveld along the southern section of the site, specifically within Site Alternative D. At this stage, the most pertinent feature of these vegetation types is their conservation status, as both are classified as Critically Endangered. Furthermore, according to Mucina and Rutherford (2006), this critically endangered vegetation type is at least 80% transformed mostly by cultivation and croplands.

The majority of the study area has been transformed by intensive agriculture with all four substation site alternatives falling within agricultural cropland while remnant vegetation is noted along the drainage systems and there is no remnant vegetation within any of the remaining alternatives except for Site H. The proposed 132kV Dx connecting the substations will encroach on critically endangered ecosystem with specific reference to Alternative G and H. The listed ecosystems layer shows some occasional pixels of intact vegetation, which is not intact Renosterveld but pioneer vegetation and invader shrubs along road verges or along fences.

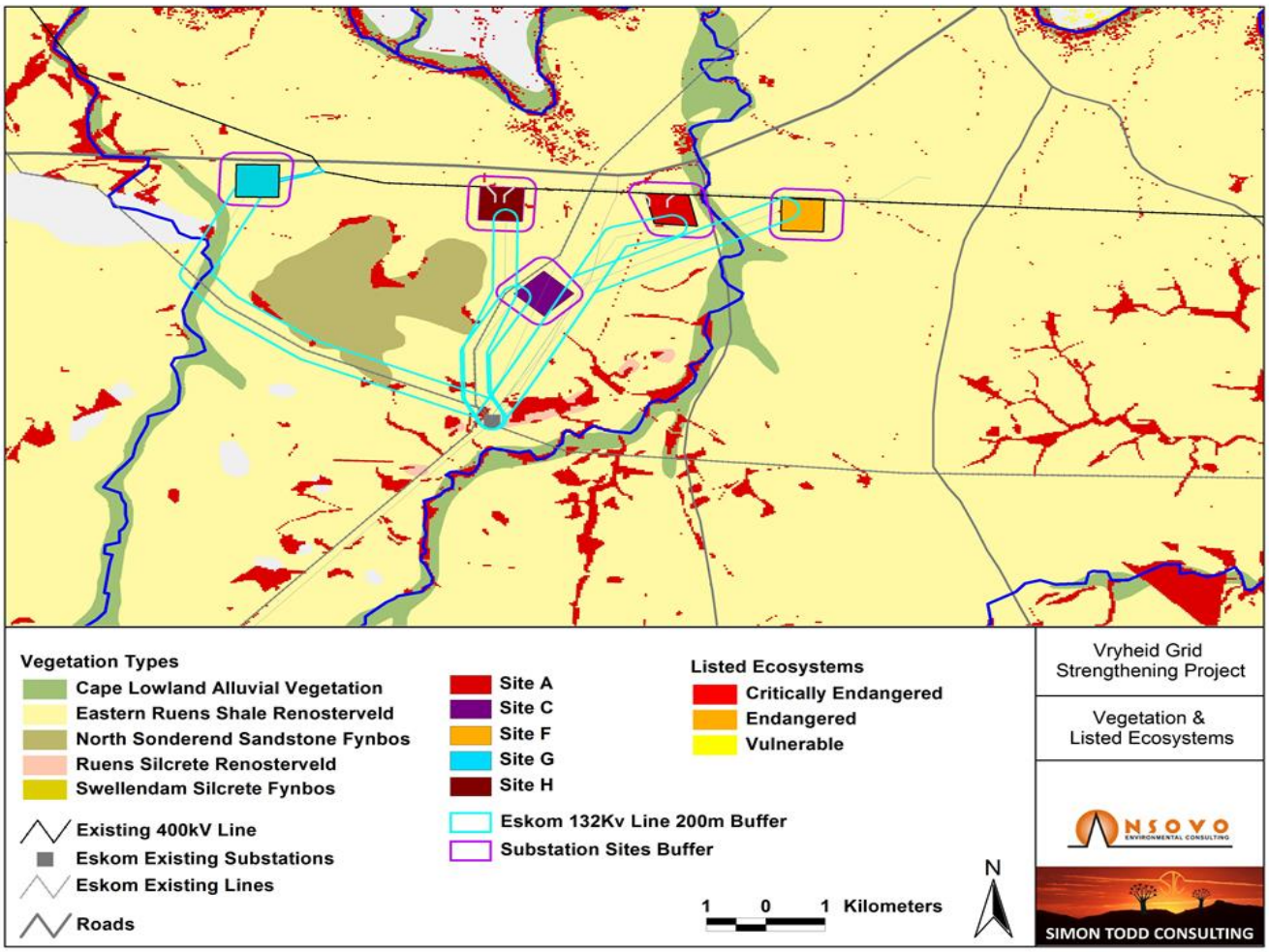


Figure 22: Representation of the vegetation types around the proposed project site.

A vegetation sensitivity map around the site was developed, which is depicted in **Figure 19** below. All of the substation sites are within transformed habitat considered to be low sensitivity; however as indicated above some of the Dx lines will encroach on critically endangered vegetation as they approach the existing substation which is also on highly sensitive vegetation. None of the alternatives considered have any remaining intact vegetation, but Site H which is characterised by several small remnant renosterveld patches.

9.4.7.1 Listed and Protected Species

The Ecological Assessment Report indicates plants of conservation concern that could occur within the area of the proposed development was compiled using information from the South African National Biodiversity Institute's (SANBI) checklist (SANBI, 2009). According to the SANBI SIBIS database, more than 1000 indigenous species have been recorded from the quarter degree square containing the site. This includes 71

species of high conservation concern, illustrating the high diversity of the area as well as the high threat status faced by many species in the area. This result from the high level of transformation the area has experienced and the small population sizes and localised distributions that many species have been reduced to. As such, any additional impact to the intact remnants in the area are likely to impact listed species and any further loss of intact vegetation in the area is highly undesirable.

Table 14: Number of species within the different conservation status categories (SANBI SIBIS database)

Status/ IUCN Red List Category	No. of Species
Critically Endangered (CR)	5
Endangered (EN)	31
Vulnerable (VU)	35
Near Threatened (NT)	27
Rare	9
Declining	6
Data Deficient - Insufficient Information (DDD)	2
Data Deficient - Taxonomically Problematic (DDT)	11
Least Concern	1006
Total	1131

9.4.7.2 Critical Biodiversity Area

Critical Biodiversity Areas (CBA's) are terrestrial and aquatic features in the landscape that are critical for retaining biodiversity and supporting continued ecosystem functioning and services (SANBI 2007). These form the key output of a systematic conservation assessment and are the biodiversity sectors inputs into multi-sectoral planning and decision making. CBA's are therefore areas of the landscape that need to be maintained in a natural or near-natural state in order to ensure the continued existence and functioning of species and ecosystems and the delivery of ecosystem services. In other words, if these areas are not maintained in a natural or near-natural state then biodiversity conservation targets cannot be met. Maintaining an area in a natural state can include a variety of biodiversity-compatible land uses and resource uses (Desmet *et al*, 2009).

The CBA map for the general area surrounding the study area is depicted below in **Figure 19**. The CBA map corresponds closely with the remaining vegetation in the area and all remnant fragments have been classified as CBAs on account of the very high threat status of the remaining vegetation and the high biodiversity value of these areas. Although none of the sites and associated 400kV Tx lines under consideration are within a CBA, it

must be noted that the proposed distribution will encroach on same with specific reference to G. Alternative C remains clear from the identified CBA.

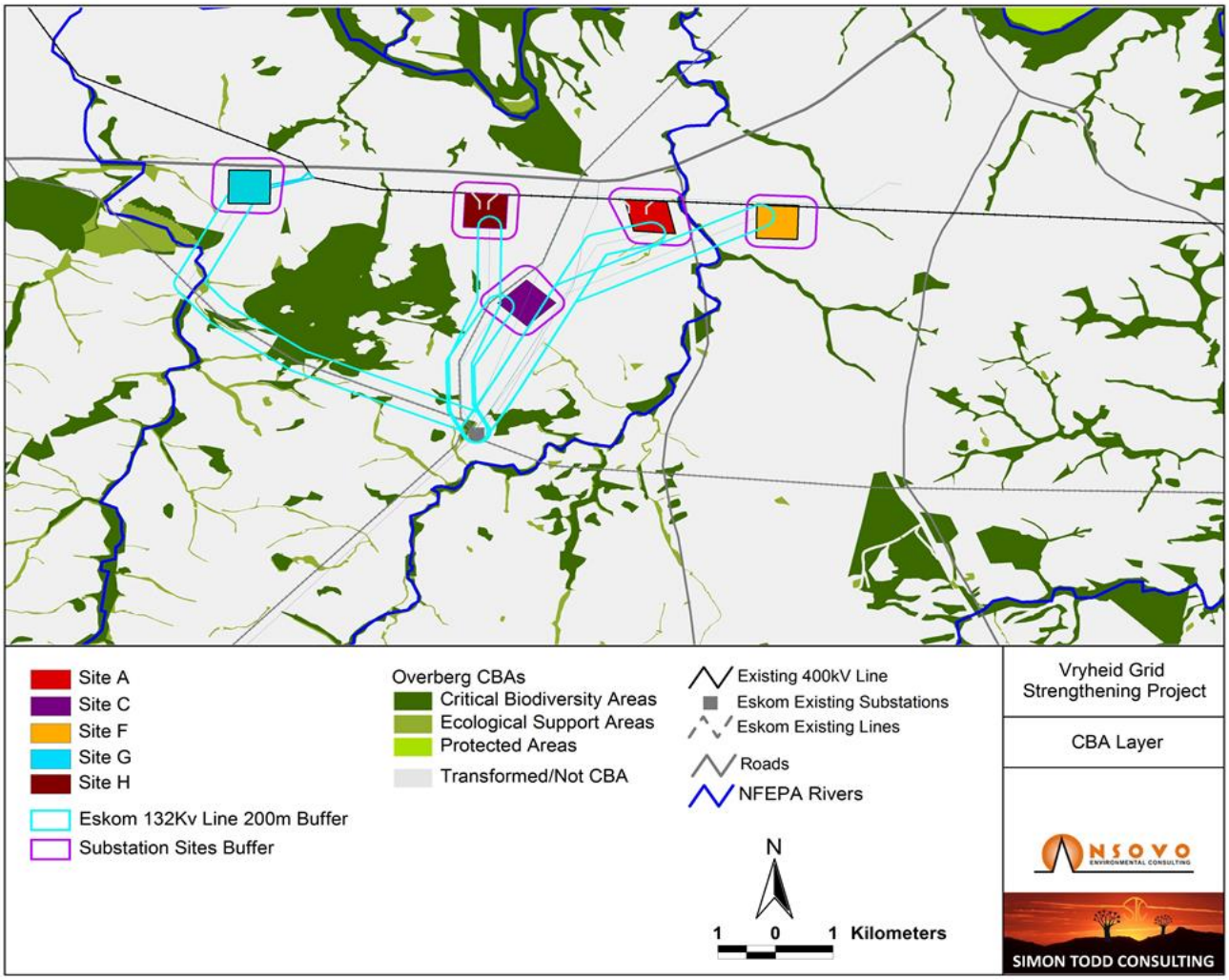


Figure 23: Map indicating Critical Biodiversity Areas within the study area

9.4.8 FAUNA

9.4.8.1 Mammals

According to the Mammal Map database contained in the Ecological Assessment Report only 35 mammals have been recorded from the area, including several conservation dependent species such as Cape Mountain Zebra and Bontebok which would not be encountered in the study area. Given the high level of transformation the area has experienced, this relatively low total is not surprising. Three species of conservation concern occur in the wider area, the White-tailed Mouse *Mystromys albicaudatus* (Endangered), *Leopard Panthera*

pardus (Near Threatened) and the Honey Badger *Mellivora capensis* (SARDB Endangered). Given the high level of transformation and intensive agriculture in the area, it is highly unlikely that the Leopard occurs at the site, but both the White-tailed Mouse and Honey Badger potentially occur in the area, but would be unlikely to frequent the transformed areas much as prey is too low or disturbance too high in these areas.

In the wider area, as many as 50 mammal species may occur, but as the affected area is highly transformed, few of these would actually be present within the affected areas. Larger mammals observed to be present at the local area include Grey Rhebok *Pelea capreolus*, Steenbok *Raphicerus campestris*, Common Duiker *Sylvicapra grimmia*, Porcupine *Hystrix africaeaustralis* and Aardvark *Orycteropus afer*. Smaller mammals observed include Namaqua Rock Mouse *Aethomys namaquensis*, Bush Vlei Rat *Otomys unisulcatus*, Scrub Hare Lepus saxatilis, Cape Gerbil *Gerbilliscus afra*, Cape Grey Mongoose *Herpestes pulverulentus* and Marsh Mongoose *Atilax paludinosus*. As the intact habitats would be most important for these species, the development would have a low impact on these species as the loss of intact habitat would be very negligible.

9.4.8.2 Reptiles

The Ecological Assessment Report indicates that according to the Reptile Map database, only 9 reptile species have been recorded from the quarter degree covering the site. Despite the high level of transformation in the area, this is an underestimate of the reptile richness of the area and according to the literature, as many as 35 reptile species may occur at the site. This is however still a comparatively low total suggesting that the site has a relatively depauperate reptile assemblage. Based on distribution maps and habitat requirements, the composition of the reptile fauna is likely to comprise 2 tortoises, 1 terrapin, 16 snakes, 14 lizards and skinks and 2 geckos.

There are no listed species which are known to occur in the area. Species observed in the immediate area include the Cape Girdled Lizard *Cordylus cordylus* which is associated with rocky outcrops, the Angulate Tortoise *Chersina angulata*, Brown House Snake *Lamprophis capensis* and Cape Skink *Mabuya capensis* all of which occur within intact remnants. The most important habitats in the area for reptiles are likely to be rocky outcrops for lizards as well as the densely vegetated lowlands and areas around the drainage lines for snakes. As the development should be restricted to the transformed areas, the impact on reptiles would be low.

9.4.8.3 Amphibians

Fourteen frog species are known from the area, but these do not include any listed species and only a small proportion of these would be likely to occur within the affected area. The transformed areas are likely to be of very low important for frogs and frogs would only be impacted within intact areas through impact to their habitat through erosion or siltation and pollution due to runoff from the development during construction or operation.
No potential breeding sites for the giant bullfrog is present on any of the four study sites. Considering the size of the substation sites and that no breeding sites for bullfrogs are found on or near any of these or in sample points along the servitude routes, the possibility of giant bullfrogs occurring on the study site is regarded very minimal. Refer to **Appendix C1** for Flora and Fauna Assessment Report.

9.4.9 AVIFAUNA

As indicated above the proposed study area is located within the Renosterveld vegetation which is highly transformed due to agricultural activities. Subsequently, it is important to relate the avifauna to the biomes and vegetation types present in the area. Harrison et al (1997) in "The Atlas of Southern African Birds" provides a description of the various vegetation types represented in the region and the associated bird species. It is generally accepted in the ornithological field that vegetation structure is more important in determining avian species' abundance distribution than vegetation species composition (Harrison *et al*., 1997).

According to the Avifaunal study, arable lands are the dominant land cover throughout the study area and are the most common micro-habitat within the study area. Wheat and other cereals are the dominant crops within the area as well as Canola cultivated within the study area. Relevant bird species that will be attracted to these areas include most importantly Denham's Bustard, Blue Cranes and various Heron species. In particular the White Stork has a high affinity for arable land, with 80% of sightings in South Africa recorded within this habitat (Dean & Ryan 2005). However, active agricultural lands are not a favourable environment for certain avian species due to the lack of natural vegetation cover and the regular disturbance experienced during the harvesting period. During the site visit it was noted that most of the arable land did not appear to be very productive.

The eastern section of the study area contains seasonal pans as depicted below. Pans are defined as a near-level shallow depression or basin, usually containing an intermittent supply of water. At certain times of the year, they are characterised by slow flowing water and tall emergent vegetation. These factors provide habitats for various water birds and the pans in this study area will be particularly important for the Black and White Storks,

Spur-Winged Goose and various Heron species. Furthermore, these water sources are often used by large flocks of granivorous bird species such as Cape Sparrow, Canary Species and Southern Red Bishop's.

Figure 24: Pans identified in the area (Avifauna Specialist Report, 2015)

Drainage lines traverse the eastern and western boundaries of the study area. Various species of water bird are mostly restricted to riverine habitat in Southern Africa. After good rains the standing water will attract species such as Black and White Stork and Cape Teals. These drainage lines are important for Denham's Bustard as they provide foraging opportunities in the form of invertebrates and small vertebrates. Furthermore, the riparian habitat also provides habitat for various species such as Kingfishers, Robin-Chats, Thrushes and Hammerkop. Although the drainage lines within the area are negatively impacted due to the disturbance and encroachment from the croplands, they provide important corridors of natural vegetation, cover and nesting opportunities for many avian species within the largely agricultural landscape. They also represent an important flight path for many species.

A total of 216 species were recorded in 3240AB by SABAP2, with six species (3%) classified as Red Data species (Barnes 2000). Information on the avian micro-habitat level was obtained during the site visit conducted from the 6 - 9 July 2015 and the following was recorded by the specialist:

- A total of 71 bird species were recorded within the study area. This figure was much lower than the species rich area to the east of the site within the Bontebok National Park (219 species recorded).
- The most commonly recorded species within the study sites were granivorous (seed eater) species such as Waxbills, Sparrows and Canaries as well as species often associated with anthropogenically1

modified landscapes (Pied Crow, Common Starling and Cape Crow). The drainage lines were observed to have the highest species richness and abundance of species as opposed to the open agricultural land. The agricultural lands within the proposed site alternatives were fairly unproductive with a low avian species diversity and abundance. This habitat type was dominated by Common Fiscal, African Stone Chat, Common Waxbill and Cape Sparrows and Southern Red Bishop's.

- There were no sightings of the Cape Vulture and Martial Eagle during the site visit. The SABAP2 reporting rate for both species within the pentad was very low and this was further supported by the lack of suitable habitats for both species. Furthermore, the availability of nest sites and suitable habitat is often a limiting factor for both species. Both species also suffer from the direct (trapping and shooting) and indirect (poisoning) persecution by farmers (Birdlife International Factsheet 2010). As the study area falls within agricultural land these factors may account for the limited sightings within this landscape.
- The Black Harrier was only recorded on the eastern boundary of the study area and the flight path was in the direction of the National Park. This area has large sections of natural Renosterveld vegetation. Although this species forages within agricultural landscapes they require untransformed Renosterveld habitat for breeding (Bird Life SA). This may account for the confined sightings within the area.
- Blue Cranes and Denham's Bustard were recorded within the southern and eastern sections of the proposed study area. Both species are vulnerable to collisions with power lines (Allan 1996b). The existing 400kV power line is located within the northern section of the study area and may account for the limited sightings within its proximity. The study area falls within the Overberg Wheat Belt and this Important Bird Area (IBA) contains 30% of South Africa's Blue Crane population. This was confirmed during the site visit with groups of 20 - 30 individuals observed with the agricultural landscape.

Refer to **Appendix C3** for the Avifauna specialist report.

9.4.10 LAND TYPES AND AGRICULTURAL POTENTIAL

The geology of study area is situated on the Bokkeveld Group Shales dominated by clay and loamy soils. Soils are both shallow and well drained including the Mispah and Clovelly soil forms (Mucina and Rutherford, 2006). According to the Land Types and Agricultural Potential specialist report, land type data for the site was obtained from the Agricultural Research Council (ARC). The land type data is presented at a scale of 1:250000 and entails the division of land types, typical terrain cross sections for the land type and the presentation of

dominant soil types for each of the identified terrain units (in the cross section). The soil data is classified according to the Binomial System. The soil data was interpreted and re-classified according to the Taxonomic System (Land Type Survey Staff. (1972-2006).

Site 'A', 'C' and 'F' and H fall within Fb41 land type while Site G falls within land type Fb48. Both land types are predominantly associated with shallow soils of the Mispah and Glenrosa Soil Forms. Textures range from fine sand to clay with most texture classes within the sandy loam category with 2-6% clay.

The soils are generally shallow with underlying shale bedrock, usually no deeper than 300mm, but in many areas even shallower. Field inspection revealed that the soil surface has little or no organic mulch layer over the surface as a result of tillage and the mixing of horizons. Soil properties are described in more detail below:

- The Mispah soils are very shallow (0,2m) The Mispah Form is characterised by an Orthic A topsoil over hard rock/saprolite horizon. Textures ranged from loamy sand to sandy loam texture (2 - 15% clay in the A).
- Clovelly soil samples were also very shallow (200-350mm). The Clovelly Form is an Orthic A horizon over a yellow brown apedal sub horizon. Textures ranged from sandy loam to loam (15-20% clay in both horizons).
- Hutton soil samples taken at Site G were deeper (400-700mm). The Hutton Form is an Orthic A horizon over a red apedal sub horizon. Textures ranged from loam to clay loam (15-25% clay in both horizons).

No significant variation in soil characteristics were observed throughout all target sites. The main characteristics noted were a lack of depth at all sites as well as a high percentage of rocks within the soil profile. A Yellow-Brown apedal B horizon was identified at a number of sampling points at Site C and F as well as in close proximity of Site H. A red brown apedal subsoil was identified in Site G.. This B horizon was however noted to be shallow in the majority of samples taken. No hydric characteristics were identified at any of the samples taken and all soils have been classified as terrestrial in nature.

9.4.10.1 Agricultural Potential

Augur points were dug throughout the site as well as outside of the study boundary in order to determine the extent of soil types located within the target sites. **Figure 25** below indicates the 35 points augured within the study area while **Table 15** accordingly classifies the soil to determine the agricultural potential.

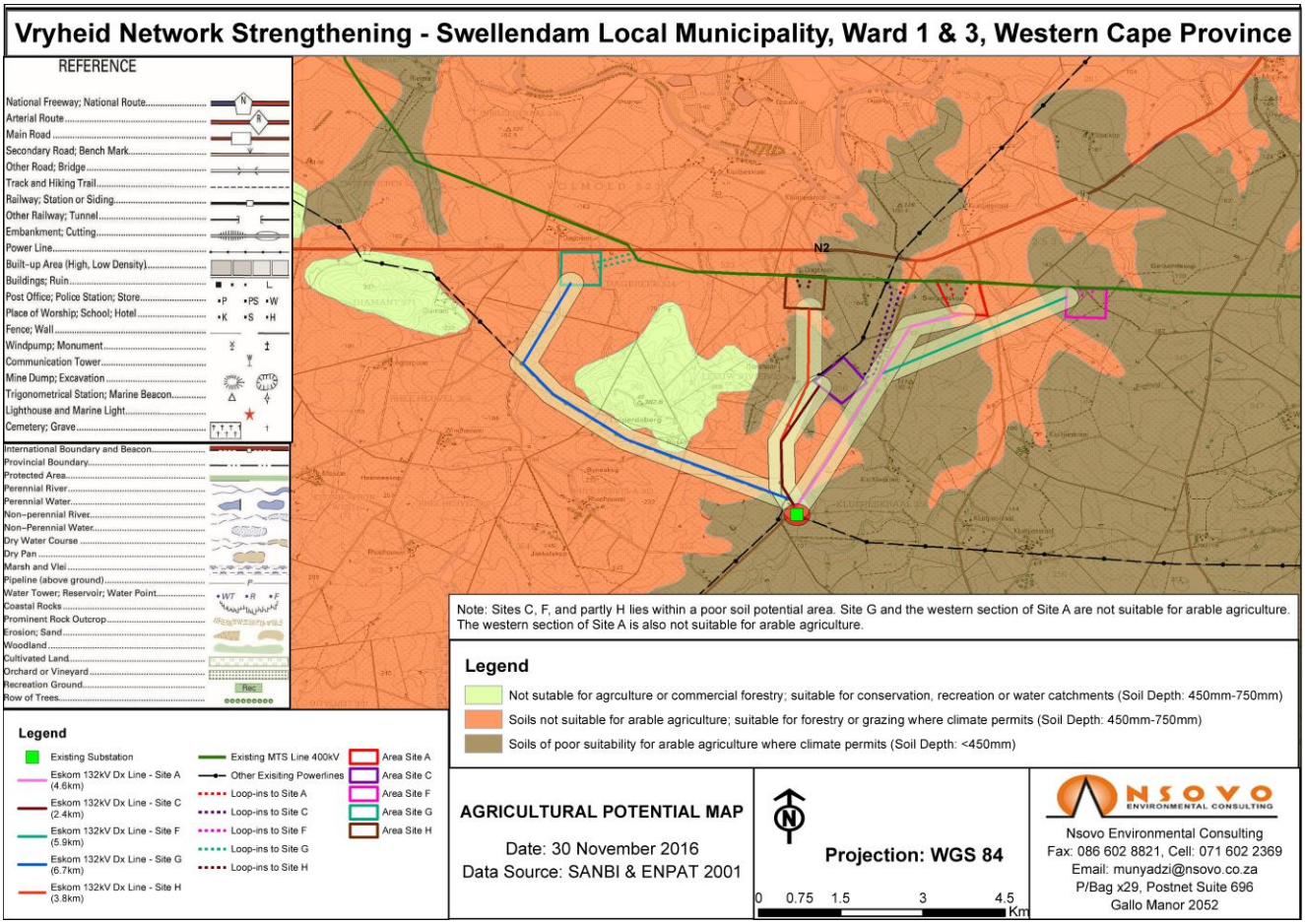


Figure 25: Agricultural Potential Map

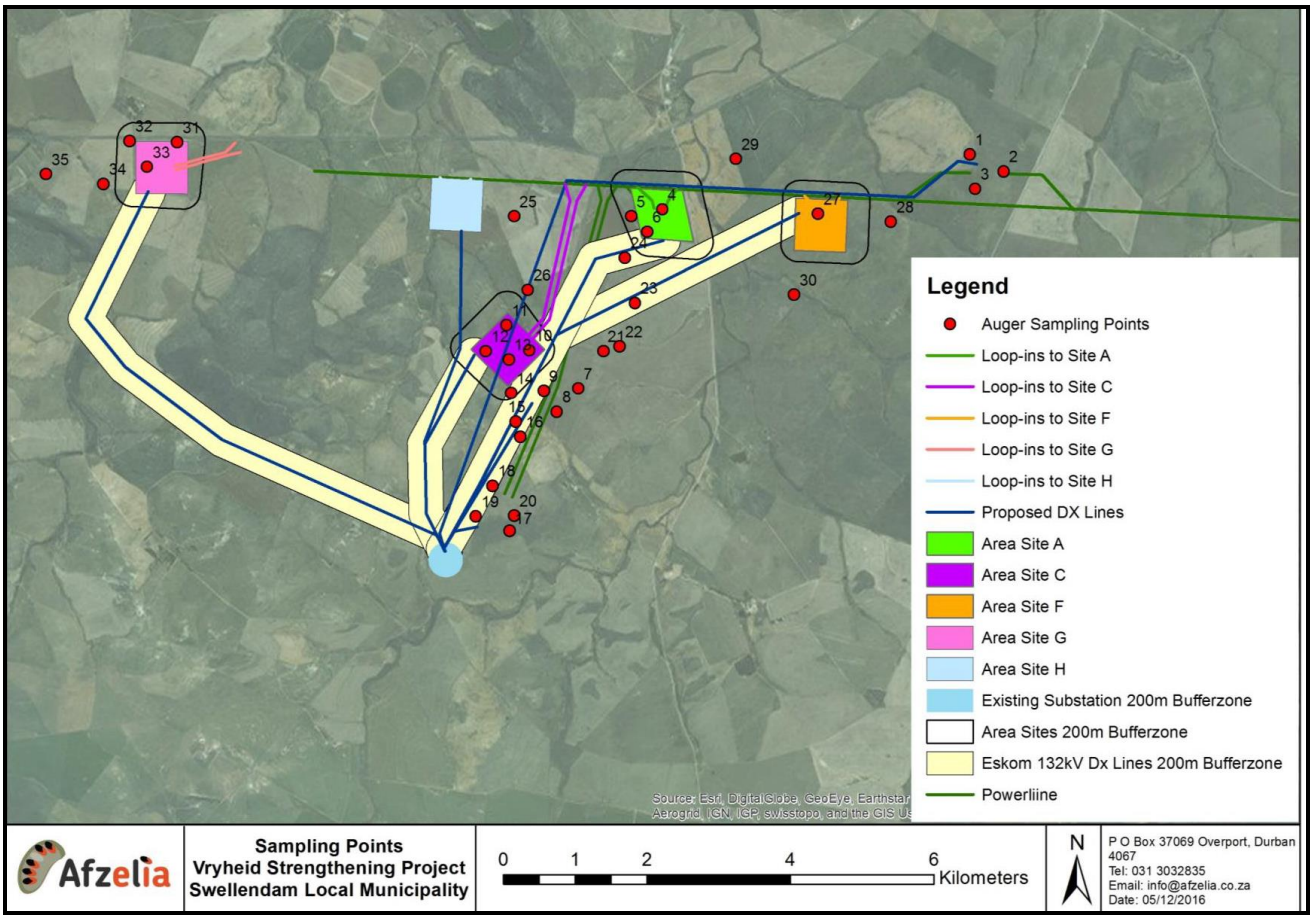


Figure 26: Sampling points to determine agricultural potential

Table 15: Outcomes of sampling - agricultural potential

Aspect	Description
Surface texture	All sites have a low clay percentage (less than 10%) and can be classified as loamy sand, sandy loam or loam. These textures are not a limitation to crop production.
Soil depth	A large percentage of rocks were noted on all target sites. These caused a limitation in the auger sampling depth. Soil depth were therefore recorded as between <200mm-350mm. Due to the fact that rocks in the profile are not a solid layer but are rather mixed with soil, root growth will permeate between these rock layers, making the effective rooting depth for particular plants deeper.
Subsoil permeability	Soils classified as Clovelly have a 'Rapid' to 'Good' subsoil permeability which is not a limitation to crop growth. Sub soils are not associated with the Mispah Soil Form.
Slope	There is a wide range in slopes, which for the land capability classification, have been

Aspect	Description
	grouped as follows: • 0-8% - land, which depending on soil profile characteristics is potentially in Class II • 8-12% - land, which depending on soil profile characteristics is potentially in Class III • 12-20% - land, which depending on soil profile characteristics is potentially in Class IV • o >20% - land, which is in Class VI or even VII, on slopes greater than 40%.
Terrain	All sites consisted of terrain within the 0-8% category. • Rockiness: Rockiness is a major limitation to crop growth and limits the type of plant that can be cultivated at all sites. • Crusting: In the field this was found to not be a limitation to cultivation. There is thus no need to consider this factor further. • Wetness: In the field this was found to not be a limitation to cultivation. There is thus no need to consider this factor further.

Taking into account the above information as well as the limitations to cultivation as a result of soil depth, and rockiness, Site A, C, F and H have been classified as Class IV, with Site G categorised as Class III. Class III and IV has limitations to the choice of crop cultivated at the site as well as the need for careful management of these crops.

With all that considered; the area has a strong agricultural sector which comprises 11.6% of all agricultural production in the Western Cape.

9.4.11 VISUAL ASPECTS

Empirical research indicates that the visibility of a distribution tower, and hence the severity of visual impact, decreases as the distance between the observer and the tower increases. The landscape type, through which the distribution line crosses, can mitigate the severity of visual impact through topographical or vegetative screening. Bishop et al (1988) noticed that in some cases the tower may dominate the view for example, silhouetted against the skyline, or in some cases be absorbed in the landscape.

Visual appreciation or dislike is subjective and thus what is aesthetically pleasing to one can be displeasing to another. The visual analysis of a landscape, the impact of new developments and structures tend to be complicated and it is evident from previous experience that when dealing with reaction to landscape changes, a large diversity of opinion exists.

Much of the study area is utilised for purposes of agriculture. The undulating agricultural landscapes of much of the study area are not necessarily sensitive but are important to preserve for their aesthetics. It is, thus, necessary to maintain a near natural visual landscape, with limited effect on aesthetic, to enable the continuation of nature-based economic activities such as ecotourism in the area.

In this regard, it is an imperative that Eskom be sensitive from a visual impact perspective, to the requirements of the local people, notably rural communities, farmers and operators involved in eco-tourism activities. Many topographical features influence this environment and these features will need to be utilised when selecting substation location and loop alignment so as to minimise visual impacts and intrusions.

In terms of the spatial vision for the District, the proposed MTS substation is located on an area categorised as Intensive Agriculture. The project site is also situated outside of the Critical Biodiversity Areas and areas identified as potential scenic routes or landscape linkages and environmental corridors.

9.4.12 TRAFFIC AND ACCESS

The roads in this study area are the N2, MR264 (R319), MR268, DR1251 and OP4468. The N2 is a national route that runs from Cape Town through Port Elizabeth, East London and Durban to Ermelo. The road is currently in a good condition and is a two-lane undivided national road with hard shoulders managed by SANRAL. The road currently passes through or alongside important urban areas in the district including Caledon, Riviersonderend, Swellendam and Riversdale.

The R319 (MR264) is a Regional Route that connects Agulhas and Struisbaai in the south with the N2 near Swellendam and Bredasdorp and is a class 3 road. The gravel DR1251 road is a class 3 and intersects with the N2 in the north and runs southwards towards Spitskop. MR268 runs in a north-south direction and connects to the N2 to the north and Infanta and Malgas to the south and is a class 4. The OP4468 is a class 5 gravel minor road and runs north-south and connects with the N2 in the north.

The specialist studies highlighted that the existing road infrastructure is well developed in the area and thus well connected to surrounding major centres via regional routes. The combination of national roads and first and second order roads provides good inter- and intra- regional accessibility. The South African National Roads Agency (SANRAL) is responsible for the maintenance of the N2 which is in a good condition. Upgrades and extensions to the existing infrastructure will be implemented to accommodate the additional traffic volumes, if necessary. This means, possible upgrading of certain municipal, district and provincial routes, associated intersections and construction of new link roads, access roads and intersections where required.

10 METHODOLOGY USED IN RANKING AND ASSESSING SIGNIFICANCE OF POTENTIAL IMPACTS

The assessment of impacts is largely based on the Department of Environmental Affairs and Tourism's (1998) Guideline Document: Environmental Impact Assessment Regulations. The assessment will consider impacts arising from the proposed activities of the project both before and after the implementation of appropriate mitigation measures.

The impacts are assessed according to the criteria outlined in this section. Each issue is ranked according to extent, duration, magnitude (intensity) and probability. From these criteria, a significance rating is obtained, the method and formula is described below. Where possible, mitigation recommendations have been made and are presented in tabular form. The criteria given in the tables below will be used to conduct the evaluation. The nature of each impact will be assessed and described in relation to the extent, duration, intensity, significance and probability of occurrence attached to it. This will be assessed in detail during the EIA phase.

Table 16: Methodology used in determining the significance of potential environmental impacts

Status of Impact The impacts are assessed as either having a: negative effect (i.e. at a `cost' to the environment), positive effect (i.e. a `benefit' to the environment), or Neutral effect on the environment. **Extent of the Impact** (**1**) Site (site only), (**2**) Local (site boundary and immediate surrounds), (**3**) Regional (within the City of Johannesburg), (**4**) National, or (**5**) International.

Duration of the Impact
The length that the impact will last for is described as either:
(**1**) immediate (<1 year)
(**2**) short term (1-5 years),
(**3**) medium term (5-15 years),
(**4**) long term (ceases after the operational life span of the project),
(**5**) Permanent.

Magnitude of the Impact
The intensity or severity of the impacts is indicated as either:
(**0**) none,
(**2**) Minor,
(**4**) Low,
(**6**) Moderate (environmental functions altered but continue),
(**8**) High (environmental functions temporarily cease), or
(**10**) Very high / Unsure (environmental functions permanently cease).

Probability of Occurrence
The likelihood of the impact actually occurring is indicated as either:
(**0**) None (the impact will not occur),
(**1**) improbable (probability very low due to design or experience)
(**2**) low probability (unlikely to occur),
(**3**) medium probability (distinct probability that the impact will occur),
(**4**) high probability (most likely to occur), or
(5) Definite.

Significance of the Impact
Based on the information contained in the points above, the potential impacts are assigned a significance rating (**S**). This rating is formulated by adding the sum of the numbers assigned to extent (**E**), duration (**D**) and magnitude (**M**) and multiplying this sum by the probability (**P**) of the impact.
S=(E+D+M)P

The significance ratings are given below
(**<30**) low (i.e. where this impact would not have a direct influence on the decision to develop in the area),
(**30-60**) medium (i.e. where the impact could influence the decision to develop in the area unless it is effectively mitigated),
(**>60**) high (i.e. where the impact must have an influence on the decision process to develop in the area).

10.1 THE IMPACTS AND RISKS IDENTIFIED INCLUDING THE NATURE, SIGNIFCANCE, CONSEQUENCE EXTENT, DURATION AND PROBABILITY OF THE IMPACTS INCLUDING THE DEGREE TO WHICH THEY CAN BE REVERSED, MAY COURSE IRREPLACEBLE LOSS OF RESOURCES AND CAN BE AVOIDED AND MITIGATED

This section of the draft EIR describes the potential impacts that the proposed project may pose on the receiving environment. Impacts associated with the relevant environmental components within the study area as identified, have been assessed based on the consultant's opinion after numerous visits to the site and previous experience on similar undertakings as well as consultation with specialist studies. Refer to Table 16 below, for the potential impacts identified.

10.1.1 IMPACTS THAT ARE LIKELY TO RESULT FROM THE PLANNING AND DESIGN

Direct Impacts

10.1.1.1 Employment Creation

Job creation and investments into the project will result in opportunities during the planning and design phases. This impact will typically be limited to skilled engineers and planning professionals. Proposed project will result in very limited opportunities to the skilled local community during the construction phase. This impact will be positive and provincial in extent.

Issue	Corrective Measure	Impact Rating Criteria					Significance
		Nature	Extent	Duration	Magnitude	Probability	
Employment Creation	No	Positive	3	2	8	4	(30-60) = Medium
	Yes						
Corrective Actions	No mitigation measures have been identified.						

Indirect Impacts:

None Identified.

Cumulative Impacts:

Job creation and investments into the project will result in opportunities during the planning and design phase. This impact will typically be limited to skilled engineers and planning professionals. Proposed project will result in very limited opportunities to the skilled local community during the construction phase. This impact will be positive and provincial in extent.

10.1.2 IMPACTS ASSOCIATED WITH THE CONSTRUCTION PHASE

It is important to note that the impacts identified are similar for Alternative substations sites A C, F. G and H.

10.1.2.1AGRICULTURAL POTENTIAL

10.1.2.1.1 Soil disturbance and compaction leading to erosion

The use of heavy machinery or vehicles during construction will lead to the compaction of disturbed soils. Further to this the exposure of the soil to environmental factors increases the likelihood of erosion. Compacted soils will erode more quickly than natural soils.

Aspect	Corrective measures	Impact rating criteria					Significance
		Nature	Extent	Duration	Magnitude	Probability	
Soil erosion and compaction	No	Negative	2	2	8	4	(30-60) = Medium
	Yes	Negative	1	2	6	3	<30 = Low
Corrective Actions	• Demarcate all sensitive ecological areas outside of the construction servitude and ensure that these areas remain off-limits during construction. This is particularly so if Site A, C, G and H are utilised. • Wetland and Watercourse buffer areas must remain outside of the construction footprint. • The creation of any new access roads must take into account all sensitive areas and must work around these areas. • Erosion control measures must be implemented in areas sensitive to erosion and						

	where erosion has already occurred such as edges of slopes, exposed soil etc. These measures include but are not limited to - the use of sand bags, hessian sheets, silt fences, retention or replacement of vegetation and geotextiles such as soil cells which must be used in the protection of slopes. • Do not allow surface water or storm water to be concentrated, or to flow down slopes without erosion protection measures being in place. • Vegetation clearing must not be undertaken more than 10 days in advance of the work front. The entire construction area must not be stripped of vegetation prior to commencing construction activities. • All disturbed areas must be rehabilitated as soon as construction in an area is complete or near complete and not left until the end of the project to be rehabilitated. • Where any construction will take place adjacent to any wetlands, drainage channels install sediment barriers along the edge of the construction servitude to contain sediment and spoil within the construction area.

10.1.2.1.2 Pollution of soil resources

Mismanagement of waste and pollutants like hydrocarbons, construction waste and other hazardous chemicals will result in these substances entering the soil resources and polluting sensitive natural environments either directly through surface runoff during rainfall events or subsurface water movement through the soil profile.

Aspect	Corrective measures	Impact rating criteria					Significance
		Nature	Extent	Duration	Magnitude	Probability	
Pollution of soil resources	No	Negative	2	2	6	5	(30-60) = Medium
	Yes	Negative	1	2	4	4	<30 = Low
Corrective Actions	• All waste generated during construction is to be disposed of as per an Environmental Management Programme (EMPr) and no washing of containers, wheelbarrows, spades, picks or any other equipment adjacent to or in any of the						

	channels is permitted. • Proper management and disposal of construction waste must occur during the lifespan of the project, including during the operational phase of the project. • No release of any substance i.e. cement, oil, that could be toxic. • Place the construction camp or any depot for any substance which causes or is likely to cause pollution outside of sensitive areas. • Spillages of fuels, oils and other potentially harmful chemicals must be cleaned up immediately and contaminants properly drained and disposed of using correct 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.

10.1.2.2 Change in land-use

The proposed study area is predominantly agricultural. The primary uses identified are crop and livestock farming; proposed sites A and C are used for stock farming, while F,G and H are used for wheat and canola cultivation respectively. The proposed project may have a considerable impact particularly during construction while the extent and severity of the operational impact will be greatly reduced as the land uses are likely to continue.

Issue	Corrective Measure	Impact Rating Criteria					Significance
		Nature	Extent	Duration	Magnitude	Probability	
Change in Land-use.	No	Negative	1	4	6	4	(30-60) = Medium
	Yes	Negative	1	4	2	2	<30 = Low
Corrective Actions	• Activities must be restricted to the demarcated construction site. • Care must be taken to ensure that land is not contaminated and destroyed as a result of construction activities; and • Where damaged, land must be rehabilitated immediately to return it to its previous/original state. • Landowner conditions must be respected.						

10.1.3 AVIFAUNAL IMPACTS

10.1.3.1 Habitat Destruction and Disturbance of Birds

During the construction phase and maintenance of substations and power lines, some habitat destruction and alteration will occur due to the clearing of servitudes and vegetation at the substation site. These activities have an impact on foraging, breeding and roosting ecology of avian species within the area through modification of habitat. The continual clearing of servitudes will have the effect of altering bird community structure along the length of the power line (Kind and Byers, 2002).

It is not envisaged that any Red Data species will be displaced by the habitat transformation that will take place as a result of the construction of the proposed substation. The impact on smaller, non-Red Data species that are potentially breeding in the area will be local in extent, in that it will not have a significant effect on regional or national populations.

The habitat is already largely transformed and fragmented by agricultural land. Furthermore, this is not a unique habitat within the landscape. The construction of the proposed transmission substation should therefore have a low displacement impact from an avifaunal perspective; however this impact will be more severe for Alternative F and G as the associated Tx and Dx are much longer. The impacts identified are habitat destruction and disturbance to birds and are rated hereunder.

Aspect	Corrective measures	Impact rating criteria					Significance
		Nature	Extent	Duration	Magnitude	Probability	
Habitat Destruction	No	Negative	2	5	8	5	>60 = High
	Yes	Negative	1	5	6	4	(30-60) = Medium
Disturbance to birds	No	Negative	2	2	6	5	(30-60) = Medium
	Yes	Negative	1	2	4	4	<30 = Low
Corrective	• Standard Construction best practice must be followed.						

Actions	• Care must be taken if any breeding sensitive species are encountered close to the servitude. • Key sensitive areas must be avoided as far as practically possible. • Certain sections of the proposed power lines must fitted with line marking devices in order to mitigate for bird collision. • 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 should be kept to a minimum. • In particular, care must be taken in the vicinity of the drainage lines and existing roads must be used as much as possible for access during construction. • 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. Special care must be taken in sensitive avifaunal micro-habitats such as drainage lines, pans and natural Renosterveld. • Provide adequate briefing for site personnel. • Any bird nests that are found during the construction period must be reported to the Environmental Control Officer (ECO). • 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 so immediate removal can be facilitated. • The construction camps must be as close to the site as possible. • Contractors and working staff should 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. • The above measures must be covered in a site specific EMPr and controlled by an ECO.

10.1.4 IMPACTS ON FLORA AND FAUNA

10.1.4.1 Flora

The broader Vryheid Strengthening study site contains some features of very high sensitivity including several Critically Endangered vegetation types. Further habitat loss within these ecosystems would be considered a fatal flaw of the development. Substation sites affecting intact vegetation have however been screened out during the scoping phase; however, the Dx line connecting the existing and proposed new substation may encroach on intact vegetation with specific reference to G and H. This implies that this sites will have a relatively higher impact compared to A, C and F. Similarly Alternative A will have a higher impact due to its proximity to the Kluitjieskraal; consequently Alternative C and F will have the least impacts and are rated hereunder.

Issue	Corrective Measure	Impact Rating Criteria					Significance
		Nature	Extent	Duration	Magnitude	Probability	
Impact on Flora	No	Negative	1	2	4	4	<30 = Low
	Yes	Negative	1	2	2	2	<30 = Low
Corrective Actions	• Prohibit vehicular or pedestrian access into natural areas beyond the demarcated boundary of the construction area; • No open fires are permitted within naturally vegetated areas; • Formalise access roads and make use of existing roads and tracks where feasible, rather than creating new routes through naturally vegetated areas; • Maintain as much vegetation cover as possible; • Runoff water needs to be trapped by either the mechanical breaking of the soil surface to trap water, packing of stones, tyres or brush along contours to trap mulch, slow down water movement and reduce the impact on bare soil; • Where possible, construction activities must be restricted to previously disturbed areas; • Construction workers must not tamper or remove these plants and neither may anyone collect seed from the plants without permission from the local authority.						

10.1.4.2Faunal Impacts

Increased levels of noise, pollution, disturbance and human presence during construction will be detrimental to fauna resident or utilising the site. Sensitive and shy fauna would move away from the area during the construction phase as a result of the noise and human activities present, while some slow-moving species would not be able to avoid the construction activities and might be killed. Some mammals and reptiles would also be vulnerable to illegal collection or poaching. Further the site is home to agricultural stock that could also be at risk.

Issue	Corrective measures	Impact rating criteria					Significance
		Nature	Extent	Duration	Magnitude	Probability	
Faunal Impacts During Construction	No	Negative	1	1	4	4	<30 = Low
	Yes	Negative	1	1	3	2	<30 = Low
Corrective Actions	• Any active faunal burrows within the development footprint should be located and marked before construction and avoided until the occupant animals can be excluded or have moved away due to the nearby construction activities. • Any fauna threatened by construction activities should be removed to safety by the ECO or other suitably qualified person. • Existing roads and access routes should be used wherever possible. • During construction all vehicles should adhere to demarcated tracks or roads and the speed limit should not exceed 40km/h on larger roads and should be 20-30km/h on smaller access tracks. • Where necessary, dust suppression should be used to reduce dust impacts on surrounding areas. • All construction staff should undergo environmental induction before construction commences in order to raise awareness and reduce potential faunal impacts. • To avoid impacts on amphibians, all spills of hazardous material should be cleared in the appropriate manner according to the nature and identity of the spill and all contaminated soil removed from the site. • Avoid sensitive faunal habitats such as drainage lines and wetlands.						

10.1.5 IMPACT ON TRAFFIC

During construction phase, increase in traffic is likely to occur from delivery of construction materials to the construction site. The proposed alternatives are close to national and regional roads such i.e. N2 and respectively which are proposed to be the primary access to the proposed sites. Given the estimated low volume of construction traffic daily and during the peak periods, it is not expected that this additional traffic will have a detrimental impact on the surrounding road network i.e. the additional construction traffic will not be significant in comparison to the current daily traffic on the N2 and the DR1251. By virtue of this low additional volume of daily traffic required during construction, the impact will be negligible on the surrounding road network. The impact of increased traffic can be considered negative short term and medium in significance. With the implementation of proper mitigation measures, it can be reduced to low significance.

Issue	Corrective Measure	Impact Rating Criteria					Significance
		Nature	Extent	Duration	Magnitude	Probability	
Impact on Traffic.	No	Negative	3	2	4	5	(30-60) = Medium.
	Yes	Negative	2	2	2	4	<30 = Low.
Corrective Actions	• The delivery of construction material and equipment should be limited to off-peak traffic times (including weekends) prevailing on the surrounding roads; and • Delivery vehicles must comply with all traffic laws and by laws.						

10.1.6 HERITAGE IMPACT

No obvious sites of heritage significance were noted within the study area; therefore, impact on heritage will have low significance.

Issue	Corrective Measure	Impact Rating Criteria					Significance
		Nature	Extent	Duration	Magnitude	Probability	
Impact on heritage artefacts.	No	Negative	1	2	4	2	<30 = Low.
	Yes	Negative	1	2	2	1	<30 = Low.
Corrective	• Should heritage or archaeological artefacts be discovered during construction or operational						

Actions	phases, all work must stop at the affected area and SAHRA must be contacted. • Personnel must be made aware heritage features that are likely to occur and the possibility of chance finds during construction.

10.1.7 AIR POLLUTION

Construction activities on the site will lead to land clearing and disturbance to the soil resulting in dust creation. The one direct potential air pollutant during construction may be dust emanating from site preparation and excavations during construction. Further, movement of construction vehicles also represents temporary, but important sources of particulates and dust deposition that can be respired. Given the nature and magnitude of the proposed project it is anticipated that minor dust will be generated from the construction activities. The potential impact on air quality will be short term and can be controlled. Proper implementation of recommended corrective measures will reduce the impact to become insignificant and of very low probability. It is therefore anticipated that this impact will be limited and of low negative significance.

Issue	Corrective Measure	Impact Rating Criteria					Significance
		Nature	Extent	Duration	Magnitude	Probability	
Air Pollution.	No	Neutral	2	1	4	4	Low.
	Yes	Neutral	2	1	3	3	Low.
Corrective Actions	• Unnecessary clearing of vegetation must be avoided; • All exposed surfaces subjected to dust generation must be managed with appropriate dust suppression methods including amongst others, the use of water tankers etc.; • Vehicles speed limit should be imposed to reduce potential dust; • Unnecessarily exposed surfaces should be rehabilitated after the construction period; • The amount of exposed soil at a particular time must be limited; • Vehicles transporting load beds must be covered to prevent them from being blown by wind when transported; • Regular dust suppression must be implemented by means of spraying water on the affected areas; • Air quality must be regularly monitored and reported on throughout the construction phase; and • Targets must be set for the management of air quality during construction.						

10.1.8 SURFACE AND GROUNDWATER POLLUTION

Given the identified wetlands and drainage lines there is a risk that construction material may pollute the surface and/or ground water on site. Substances such as cement residue, bio fuels, and paints must be adequately controlled. In addition exposed surfaces during construction would provide a source of sediments to be taken up by storm water and resulting in down-stream sedimentation of water resources. Care must be taken during construction to prevent leaks and spillage of materials that may detrimentally affect water quality (especially fuels and chemicals). Adequate measures must be put in place to prevent runoff of construction debris to nearby streams or water bodies. If construction takes place during the rainy season, storm water will have to be managed appropriately to reduce the possibility of construction debris being washed off. This impact is of medium negative significance and can be reduced to a low significance.

Issue	Corrective Measure	Impact Rating Criteria					Significance
		Nature	Extent	Duration	Magnitude	Probability	
Surface and ground water pollution.	No	Negative	3	3	6	3	(30-60) = Medium.
	Yes	Negative	2	2	4	2	<30 = Low.
Corrective Actions	• Adequate measures must be taken during construction to manage storm water runoff; • Care must take not to spill fuels or oil during service or re-fuelling of construction equipment; • Prevent pedestrian and vehicular access into the wetland and buffer areas as well as riparian areas; • No vehicle access is allowed within watercourses; • Access roads and bridges should span the wetland area, without impacting on the permanent or seasonal zones; • Possible leaks and spills of hazardous substances into the ground should be avoided at all times; • In the event of a spillage of a hazardous substance the requirements of the EMPr must be implemented; • Obtain Water Use License as appropriate and ensure compliance with the conditions; • 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 the delineated water resources; • All waste generated during construction is to be disposed of at an appropriate facility and no						

	washing of paint brushes, containers, wheelbarrows, spades, picks or any other equipment adjacent to the watercourses is permitted; • Proper management and disposal of construction waste must occur during the construction of the development; • No release of any substance i.e. cement, oil, that could be toxic to fauna or faunal habitats within the watercourses; • 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; and • A spill contingency plan must be drawn up for the construction phase.

10.1.9 WASTE MANAGEMENT

The inhibition of sites by human beings results to waste generation. A variety of waste material will be produced during the construction phase. The Contractors must adhere to all recommended measures and provide adequate waste skips and bins on the site. Waste must be regularly removed from site and disposed of at appropriate waste disposal sites. With mitigation measures implemented, this impact can be kept at a Low significance.

Issue	Corrective Measure	Impact Rating Criteria					Significance
		Nature	Extent	Duration	Magnitude	Probability	
Waste Management.	No	Negative	2	3	8	2	<30 = Low.
	Yes	Negative	1	2	6	2	<30 = Low.
Corrective Actions	• No waste will be buried on site or incorporated into the foundation trenches; • The work force must be encouraged to sort waste into recyclable and non-recyclable waste; • Waste bins/skips will be appropriately labelled; • No burning of waste is allowed on site; • Waste must be regularly removed from site and disposed of at a registered waste disposal facility and safe disposal certificates will be filed appropriately; and • Where permits are required, it must be obtained from the relevant authority.						

10.1.10 Noise Pollution

The study area consists of farms which are used for agriculture. It must be noted that closest residential is 10km from the study area. Construction process is likely to result in an increase in noise levels due to construction vehicles, machinery which can be a nuisance during the construction. The level of noise and the distance it will travel will depend entirely on the prevailing construction activities within the site which will include groundwork, foundations, hauling of building material to and from specific area assembling of equipment. The additional noise will be local, short term in duration and low in significance.

Issue	Corrective Measure	Impact Rating Criteria					Significance
		Nature	Extent	Duration	Magnitude	Probability	
Noise Pollution	No	Negative	2	1	4	3	<30 = Low.
	Yes	Negative	1	1	2	2	<30 = Low.
Corrective Actions	• All construction equipment and vehicles used during construction must be appropriately maintained; • Surrounding residents should be notified in advance of construction schedules; • Working hours must be restricted to daytime only (7am – 5pm); • Where there is a need to for construction work to take place outside these time frames, the Contractor will, with the approval of the ECO, communicate with the I&APs; and • Selecting equipment with lower sound power levels which is in accordance with the Health and Safety Regulations.						

10.1.11 Safety and Security

The presence of the construction workforce within these private properties is a potential risk to the surrounding landowners in terms of safety, crime and security. The significance of the potential impacts without the corrective actions (adequate safety measures in dangerous areas) is considered to be of high significance. The implementation of corrective actions could reduce the impacts to a low level of significance.

Issue	Corrective Measure	Impact Rating Criteria					Significance
		Nature	Extent	Duration	Magnitude	Probability	
Safety and Security.	No	Negative	3	2	6	3	(30-60) = Medium
	Yes	Negative	1	2	2	2	>30 =Low.

Corrective Actions	• Liaison with landowners prior to entering their properties; • Access to the construction site should be controlled; • Warning signs should be placed on site to make people aware of the dangers; • No-go area should be clearly demarcated, marked and visible; • Landowners must be kept abreast with movements in and around their properties; • Health and Safety standards and guidelines must be implemented; • It must be ensured that personnel undertaking the construction work do so when conditions are safe (i.e. no work at night, no work during unfavourable weather conditions, etc.); • The construction team should be clearly visible and identifiable so that they can be differentiated from ordinary members of the public; • There should be warning signs that are clear and visible on the site; • Construction vehicles should be fitted with warning signs and devices to warn personnel in case of dangerous manoeuvres (e.g. reversing); • No construction personnel may be allowed to stay overnight on site except for the security personnel; • The construction site must be clearly demarcated and indicated by barrier tape and/or proper fence; • The access gate to the construction site must be closed at all times; and

10.1.12 FIRE HAZARDS

There may be an increase in the risk of veld fires as a result of construction activities and these would result from activities such as smoking and cooking food, storage of fuel and other flammable solvents on site. These uncontrolled fires on site could cause damage to infrastructure, the biophysical environment and impact on the working environment. This impact is considered to be of medium significance. Should the recommended mitigation measures be implemented, the significance of the impact will be even lower and negative.

Issue	Corrective Measure	Impact Rating Criteria					Significance
		Nature	Extent	Duration	Magnitude	Probability	
Fire Hazards	No	Negative	2	2	4	4	(30 – 60) = Medium.
	Yes	Negative	2	2	4	2	<30 = Low.
Corrective Actions	• Camp sites and laydown areas will not be allowed within the game farm and sensitive area; • Areas were flammable substances are kept must have proper warning signs on display (e.g.						

	highly flammable, No smoking etc.) to warn personnel of risks associated with such areas; • No burning of waste and cooking will be allowed on site; • Contracting personnel must be well versed in the relevant existing fire and safety management procedures and activities on site; • Implement fire hazard sensitive on- and offloading procedures; • Designate a site safety official and ensure that personnel are adequately trained regarding fire hazards and procedures; • Fire fighting equipment (fire beaters, fire extinguishers etc.) must be made available on site; and • Strategically placed emergency access points along servitude at times when access is restricted to ensure that landowners and emergency services are able to respond to any outbreak of a fire.

10.1.13 VISUAL IMPACT

During the construction phase, unsightly views may be created by the presence of the construction camp and the lay-down yards. The duration of the potential visual impact will be temporary which will result in an anticipated low significance of visual impact for all the alternatives. The visual exposure to the construction activity will be limited. The uncertainty pertaining to the number, location and size of the construction camps, relates to a low level of confidence in the assessment of the visual impact. The cleared site, construction camp and material lay-down yards will appear unsightly and out of character. Large scale construction elements such as cranes will be highly visible and increase awareness of the construction activity over a considerable area. Their exposure to possible unsightly views of the construction camps and the associated activity will however be minimal and localised. The potential visual impact on tourists during the construction phase of the proposed project can be mitigated with relative ease. The greatest factor to consider is the location of the construction camp. The visual intrusion caused during the construction stage will be moderate, but will be temporary in nature. With mitigation the impacts can be reduced to low during the construction phase.

Issue	Corrective Measure	Impact Rating Criteria					Significance
		Nature	Extent	Duration	Magnitude	Probability	
Visual Impact	No	Negative	2	2	6	4	(30 – 60) = Medium.
	Yes	Negative	1	2	4	3	<30 = Low.

Corrective Actions	<u>Access Roads</u> • Make use of existing access roads where possible; • Where new access roads are required, the disturbance area should be kept to a minimum. A two track dirt road will be the most referred option; • Locate access routes so as to limit modification to the topography and to avoid the removal of established vegetation; • Maintain no or minimum cleared road verges; • If it is necessary to clear vegetation for a road, avoid doing so in a continuous straight line. Alternatively, curve the road in order to reduce the visible extent of the cleared corridor; and • Provide strategically distributed crossing points to secure existing access routes currently used by the public. <u>Construction Camp and Laydown Area</u> • Locate construction camps in areas that are already disturbed or where it isn't necessary to remove established vegetation like for example naturally bare areas; • Utilise existing screening features such as dense vegetation stands or topographical features to place the construction camps and lay-down yards out of the view of sensitivity visual receptors; • Keep the construction sites and camps neat, clean and organised in order to portray a tidy appearance; and • Screen the construction camp and lay-down yards by enclosing the entire area with a dark green or black shade material of no less than 2m height. • Keep disturbed areas to a minimum. • No clearing of land to take place outside the demarcated footprints. • Make use of stepping in building platforms to minimise cut-and-fill areas and lower the structures into the site as much as possible. • Institute a planting regime around the boundaries of the project site to 'soften' the views onto the infrastructure from the respective receptors. Only indigenous plant species to be introduced. • The contractor should maintain good housekeeping on site to avoid litter and minimise waste. • Erosion risks should be assessed and minimised. • The steel components should not be painted but be galvanised and allowed to oxidise naturally over time. The grey colour produced in this process will help to reduce the

	visual impact.

10.1.14 Employment Creation

The proposed development will have the capacity to produce considerable employment opportunities during the construction phase, the job opportunities will however, be limited as the construction is put out to tender and Contractors who usually have their own skilled workforce are appointed to undertake the construction activities. The construction activities will also result in a demand for equipment, building material and labour. The use of local labour would have a positive impact on the local economy and promote skills transfer. The significance of this impact is anticipated to be medium positive.

Issue	Corrective Measure	Impact Rating Criteria					Significance
		Nature	Extent	Duration	Magnitude	Probability	
Employment Creation	No	Positive	3	4	6	3	(30-60) = Medium
	Yes						
Corrective Actions	• Ensure the prioritisation of locals as and when opportunities arise; • Create opportunities for the employment of women; • Where possible use labour intensive methods of construction; and • Where possible, go beyond the minimum wage rate and invest in local staff.						

10.1.15 Influx of Job Seekers

Construction activities will require a well-established work force. The workmanship required may not necessarily be available from the local communities and result in workers being sourced from other communities. In addition there may be a likelihood of migrant workers (including unskilled labourers) moving into the area in search of employment. These workers could have an impact on the social structures present in the local communities due to the lengthy period of construction.

- The threat of HIV/Aids and other STI's may also have an impact on the local community resulting from an influx of migrant labourers to the areas surrounding the site.
- Increased risk of criminal activities due to influx of workers.
- Social instability on existing families

With the implementation of the recommended mitigation measures the significance of the impact can be reduced from medium negative to low negative

Issue	Corrective Measure	Impact Rating Criteria					Significance
		Nature	Extent	Duration	Magnitude	Probability	
Influx of Job Seekers.	No	Negative	3	4	4	3	(30-60) = Medium
	Yes	Negative	2	3	2	2	<30 = Low
Corrective Actions	• Ensure that employment procedures and policies are communicated to local stakeholders, especially community representative organisations and ward councillors; • Raise awareness amongst construction workers about local traditions and practices; • Ensure that the local community communicates their expectations of construction workers' behaviour with them; • Have clear rules and regulations for access to the camp / site office to control loitering. Consult with the local SAPS to establish standard operating procedures for the control of the workforce; • Make condoms and other forms of contraceptives readily accessible to workers; • Construction workers should be clearly identifiable by wearing proper construction uniforms displaying the logo of the construction company. Where possible, construction workers could also be issued with identification tags to enable them to be visible and distinguishable within the construction site.						

Direct Impacts: No-Go

Should the proposed development not occur, none of the identified impacts will result.

Indirect Impacts –No Go

The spread and transmission of HIV and STI's is one of indirect impact associated with the development however; the No-go alternative would remove the need for construction workers and thereby eliminate the associated social impacts identified above.

10.2 OPERATIONAL PHASE IMPACTS

Direct Impacts

10.2.1 BIRD COLLISION, ELECTROCUTIONS AND FAULTING

The impacts associated with the proposed substation and associated power lines are collision and electrocution on associated overhead power lines. Collisions with the earth wire are the main impact associated with the project operational phase. Direct interactions occur when birds collide with power lines, possibly because they fail to see the wires as they are focusing on something that lies beyond, e.g. a perch or food source. Birds might also be killed by striking power lines support structures .The likelihood of birds colliding with power lines depends on various aspects. Bird collision and electrocution at substation yard has been rated as low for this project, while faulting which is caused by bird on power lines was rated medium. With proper mitigation in place, the potential impact of faulting is one that can be reduced to low significance.

Issue	Corrective Measure	Impact Rating Criteria					Significance
		Nature	Extent	Duration	Magnitude	Probability	
Bird Faulting	No	Negative	1	4	4	4	(30-60) = Medium
	Yes	Negative	1	4	3	2	<30 = Low
Electrocution	No	Negative	2	4	6	3	(30-60) = Medium
	Yes	Negative	2	4	4	2	<30 = Low
Bird Collision	No	Negative	2	4	4	2	(30-60) = Medium
	Yes	Negative	2	4	4	2	<30 = Low
Corrective Actions	• 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). This must be conducted as per Eskom standard guidelines. • Installation of artificial bird space perches and nesting platforms, at a safe distance from energised components (Goudie 2006; Prinsen *et al.* 2012). In order to mitigate this impact, it is imperative that earth wires crossing important avian						

	habitats (agricultural lands, rivers, drainage lines and avian flyways) are fitted with anti-collision marking devices to increase the visibility of the power line and reduce likelihood of collisions. These must be Eskom approved anti-collision devices that are durable as the area is prone to strong winds.

10.2.2 VISUAL IMPACT

The proposed activity will indeed change the visual character of the site particularly considering that the proposed site is located in an area that is sloping; the elevated points of the site can be viewed from the nearby roads, however, it must be noted that there are already existing overheard power lines located within the vicinity of the proposed project site local variations in topography and man-made structures could cause local obstruction of views in certain parts of the view shed. The distance between the observer and the observed activity is an important determinant of the magnitude of the visual impact. This is due to the visual impact of an activity diminishing as the distance between the viewer and the activity increases.

A negative visual impact is expected during the operational phase as the towers and substation intrude on existing landscape views. This may impact on tourism i.e. the presence of the transmission line in the field of the tourists, in the study area, will only have a high significance on tourists in near proximity to the power line, which will be mainly along main transportation routes. The severity of the visual impact of the power lines on tourists will be moderate, causing a moderately significant visual impact further; the impact will be definite, local in extent and long term. The impacts for sites A and C are medium negative significance; F is low negative significance while G is medium to high negative significance.

Issue	Corrective Measure	Impact Rating Criteria					Significance
		Nature	Extent	Duration	Magnitude	Probability	
Visual Impact	No	Negative	2	4	6	4	(30-60) = Medium
	Yes	Negative	2	4	4	3	<30 = Low
Corrective Actions	• The steel components should not be painted but be galvanised and allowed to oxidise naturally over time. The grey colour produced in this process will help to reduce the visual impact. • Maintain the general appearance of the substation as a whole.						

	• Monitor land surface in the vicinity of the substation to prevent loss of vegetation and first signs of desertification. • Maintain access roads to prevent scouring and erosion, especially after rains.

10.2.3 IMPACT ON ECONOMY

The development of the proposed project has become necessary as part of Eskom's strategy to upgrade the country's existing electricity infrastructure. The proposed project is beneficial as it will allow for load growth in the region. It is envisaged that the proposed project would ensure reliable supply to industry; this will indirectly benefit communities as reliable electricity will result in uninterrupted production and therefore growth in industry, which could potentially yield additional jobs. The overarching impact will be positive economic spinoffs, which benefit the community, the region and country at large.

Issue	Corrective Measure	Impact Rating Criteria					Significance
		Nature	Extent	Duration	Magnitude	Probability	
Economy	No	Positive	3	4	6	5	>60= High
	Yes	Positive	3	4	6	5	>60= High
Corrective Actions	• Regular maintenance of the facility should be done continuously to ensure uninterrupted supply of energy; • Ensure that the project is run in a responsible manner and that the environment is adequately protected from negative impacts; • Put adequate monitoring systems in place throughout the duration of the project and beyond; and • Ensure that the value of the project is balanced against cost related to both the negative environmental and social impacts on the region.						

10.2.4 EMPLOYMENT CREATION

During operation, employment opportunities will arise as a result of the actual maintenance work required to keep the facility running. The significance of this impact is anticipated to be low and positive.

Issue	Corrective	Impact Rating Criteria	Significance

	Measure	Nature	Extent	Duration	Magnitude	Probability	
employment Creation	No	Positive	1	4	6	2	<30= Low
	Yes	Positive	1	4	6	2	<30= Low
Corrective Actions	• Employment of locals should be encouraged during operational phase.						

Indirect Impacts:
None identified.

No-Go Alternative
Direct Impacts: None of the impacts identified for the proposed activity will occur (including positive and negative impacts) if the proposed activity does not proceed. Indirect Impacts: None identified Cumulative Impacts: None identified.

10.3 DECOMMISSIONING PHASE

At present it is not anticipated that the proposed infrastructure will be decommissioned. On-going maintenance and upgrades, where necessary will be carried out. In the unlikely event that decommissioning is necessary it is recommended that the potential impacts identified below are reviewed and a detailed decommissioning strategy and rehabilitation plan is prepared and implemented. It must be noted that decommissioning is a listed activity that requires and Environmental Authorization prior commencement. The impacts of this phase will be similar for all alternatives considered, further they are similar impacts identified for the construction phase. Impacts for decommissioning phase are assessed hereunder.

Direct Impacts

10.3.1.1 Dust Generation

Decommissioning of the facility and other infrastructure may lead to an increased amount of airborne particles in the local atmosphere as the infrastructure is dismantled and transported to the disposal site. This impact will be of low significance with proper mitigation in place.

Issue	Corrective Measure	Impact Rating Criteria					Significance
		Nature	Extent	Duration	Magnitude	Probability	
Dust Generation	No	Negative	2	1	4	4	<30= Low
	Yes	Negative	2	1	4	3	<30= Low
Corrective Actions	• Personnel must be well versed in the relevant existing waste management procedures and activities on site; and • This will include sorting of waste types and correct disposal to either recycling facilities, local registered waste disposal sites, and in extreme cases to registered hazardous waste disposal sites.						

10.3.2 SURFACE AND GROUND WATER POLLUTION

During the decommissioning phase spillages from construction vehicles and machinery may occur when existing facility is removed from the site. Potential sources of pollution to this resource result from surface and sub-surface activities that could possibly leak and or spill hazardous substances onto the surface that are then transported to the groundwater body through the underlying soils. It is anticipated that the significance rating can be reduced to low with the implementation of mitigation measures.

Issue	Corrective Measure	Impact Rating Criteria					Significance
		Nature	Extent	Duration	Magnitude	Probability	
Surface and Ground Water	No	Negative	2	1	6	4	(30-60)= Medium.
	Yes	Negative	2	1	4	3	<30= Low.

Pollution.							
Corrective Actions	• Drip trays must be placed underneath parked construction equipment; • Adequate spill kits must be provided on site; • Possible leaks and spills of hazardous substances into the ground should be avoided at all times; and • In the event of a spillage of a hazardous substance the requirements of the EMPr must be implemented.						

10.3.3 SOIL EROSION

The clearing of vegetation, as well as soil exposure during decommissioning of the facilities may lead to erosion of these surfaces due to rain and wind. It is anticipated that the significance of this impact can be reduced from medium negative to low negative significance with the implementation of the recommended mitigation measures.

Issue	Corrective Measure	Impact Rating Criteria					Significance
		Nature	Extent	Duration	Magnitude	Probability	
Soil Erosion	No	Negative	2	1	6	4	(30-60)= Medium
	Yes	Negative	2	1	4	3	<30= Low
Corrective Actions	• No unnecessary clearing of vegetation will be allowed; • Construction vehicles and machinery to be driven on designated roads; and • Areas cleared of vegetation must be re-vegetated with indigenous vegetation.						

10.4 ASSESSMENT OF CUMULATIVE IMPACTS PER SITE

Cumulative impacts in relation to an activity, means the past, current and reasonably foreseeable future impacts of an activity, considered together with the impacts of activities associated with that activity, that in itself may not be significant, but may become significant when added to the existing and reasonably foreseeable impacts eventuating from similar or diverse activities (DEA, 2014 EIA Regulations).

10.4.1 CUMULATIVE IMPACTS ON BROAD-SCALE ECOLOGICAL PROCESSES

The presence of the substation and daily activity at the site may deter certain species from the area, resulting in a loss in broad-scale landscape connectivity. The extent of this impact is likely to be low given the transformed nature of the landscape. At a more regional scale, the potential cumulative development of Wind Farms associated with the Renewable Energy Development Zone (REDZ) in the area are also of significance as these would also contribute towards the disruption of landscape connectivity.

Issue	Corrective measures	Impact rating criteria					Significance
		Nature	Extent	Duration	Magnitude	Probability	
Ecosystem Degradation	No	Negative	1	2	3	3	18 = Low
	Yes	Negative	1	2	2	3	15 = Low
Corrective Actions	• Avoid development within the high sensitivity parts of the site. • The development footprint should be kept to a minimum and natural vegetation should be encouraged to return to disturbed areas. • An Open Space Management plan should be developed for the site, which should include management of biodiversity within the affected areas, as well as that in the adjacent rangeland. • Avoid impact to potential corridors such as the riparian corridors associated with the larger drainage lines within the area.						

10.4.2 WASTE GENERATION

During the construction phase there will be a variety of waste material produced.

Aspect	Corrective measures	Impact rating criteria					Significance
		Nature	Extent	Duration	Magnitude	Probability	
Waste generation	No	Negative	2	2	8	5	(30-60) = Medium
	Yes	Negative	1	2	4	2	<30 = Low
Corrective	• No waste will be buried on site or incorporated into the foundation trenches;						

Actions	• The work force must be encouraged to sort waste into recyclable and non-recyclable waste; • No burning of waste will be allowed on site; and • Waste must be regularly removed from site and disposed of at a registered waste disposal facility.

10.4.3 SOCIO-ECONOMIC IMPACT

The proposed development will result in a positive socio-economic impact as the demand for equipment, building material and labour will increase. Secondary service provision such as food supply, toilet hire, equipment maintenance etc. would also stimulate the local economy especially during the construction phase.

Aspect	Corrective measures	Impact rating criteria					Significance
		Nature	Extent	Duration	Magnitude	Probability	
socio-economy	No	Positive	3	2	8	5	>60 = High
	Yes	Negative	1	2	4	2	<30 = Low
Corrective Actions	• Contractors must by all means practice the localisation matrix while seeking for construction equipment or building materials. • For minimal jobs, the appointed contractor should by all means consider the local residents for jobs that do not need any skill transfer. • Property owners or occupiers must be treated with respect and courtesy at all times; • The culture and lifestyles of the communities living in close proximity to the proposed development must be respected; • No firewood is to be collected except with the written consent of the landowner; and • A register must be maintained of all complaints or queries received as well as action taken.						

10.4.4 VISUAL IMPACT

The proposed activity will change the visual character of the area particularly considering that the proposed site is located next to major roads (N2 and R319). Given the undulating topography of the site and the proximity to these routes, the impact can be considered definite and long term. Cumulatively, the impact may be lower than anticipated due to existing power lines and substation.

Aspect	Corrective	Impact rating criteria	Significance

	measures	Nature	Extent	Duration	Magnitude	Probability	
Visual impact	No	Negative	2	4	8	5	>60 = High
	Yes	Negative	2	4	6	3	(30-60) = Medium
Corrective Actions	• Contractors should by all means practice the localisation matrix while seeking for construction equipment or building materials. • For minimal jobs, the appointed contractor should by all means consider the local residents for jobs that do not need any skill transfer.						

10.4.5 TRAFFIC IMPACT

During the construction phase increased heavy vehicle traffic should be expected. Without management, such increased traffic loads may negatively impact existing traffic flow. Further unmanaged construction vehicles may decrease road safety for other road users and uncontrolled movement of construction vehicles may result in unnecessary impacts to the environment through vegetation and habitat destruction.

Aspect	Corrective measures	Impact rating criteria					Significance
		Nature	Extent	Duration	Magnitude	Probability	
Waste	No	Negative	3	2	8	3	(30-60) = Medium
	Yes	Negative	2	2	6	2	<30 = Low
Corrective Actions	• The delivery of construction material and equipment should be limited to hours outside peak traffic times (including weekends) prevailing on the surrounding roads; • Access roads must be clearly marked; and • Delivery vehicles must comply with all traffic laws and bylaws.						

10.4.6 AVIFAUNA

There are other high voltage Eskom Transmission power lines and substations in the broader area. Further renewable energy projects have also been proposed with the region while some are already operational; thus the assessment of the potential impact on birds should take such into consideration. The potential cumulative impact of this infrastructure as proposed is the high mortality of birds as a result of collision with power line cables. Although the proposed project is relatively small in nature, the cumulative impact of power lines on bird species will be significant if not managed, since the species already suffer from significant power line

mortalities. However, given the relatively small scale of proposed development, the cumulative impact of power lines on bird species will be low with mitigation measures in place.

Aspect	Corrective measures	Impact rating criteria					Significance
		Nature	Extent	Duration	Magnitude	Probability	
Waste	No	Negative	3	2	8	4	(30-60) = Medium
	Yes	Negative	2	2	6	3	<30 = Low
Corrective Actions	Similar to construction and operational management measures.						

11 SUMMARY OF SPECIALISTS FINDINGS AND RECOMMENDATIONS

Seven specialist studies were undertaken during the EIA process and are listed in **Table 16** below. The contact details of the specialists are also included in the table. In addition to the ones undertaken during the Scoping phase three additional studies were undertaken as recommended by the DEA and other stakeholders. These include:

- Traffic Impact Assessment
- Visual Impact Assessment
- Wetland and Aquatic Impact Assessment

Table 17: Specialists and Contact Details

Specialist Studies	Organisation	Specialist	Contact Details
Archaeological Impact Assessment	Vhubvo Archaeo-Heritage Consultants	Munyadziwa Magoma	Tel: 012 771 3488 Fax: 086 566 8079 munyadziwam@gmail.com
Ecological Impact Assessment	Simon Todd Consulting	Simon Todd	Cell: 082 332 6502 Simon.Todd@3foxes.co.za
Wetland Impact Assessment	Malachite Consulting	Rowena Harrison	Cell: 078 023 0532 rowena@malachitesa.co.za

Avifaunal Study	Afzelia Environmental Consultants	Craig Widdows	E: craigw@hotmaill.com
Land Types and Agricultural Potential Study	Afzelia Environmental Consultants	Craig Widdows	E: craigw@hotmaill.com
Visual Impact Assessment	Zone Land Solutions	Johan Claassen	E: johan@zonesolutions.co.za Cell: 083 299 6650
Traffic Impact Assessment	Sturgeon consulting (Pty) Ltd	Mr Barend du Preez	Tel no: 021 553 4167

11.1 AGRICULTURE

The primary aim of this Agricultural Potential Assessment included:

- Establishment and description of the soil and agricultural status quo of the four target sites for the proposed substation;
- Description of the land use and capability of the site based on the soil forms identified, slope of the site, climatic data, rockiness, surface crusting and wetness;
- Recommendations as to which sites are preferable for the construction of the substation and associated loop-in loop-out lines based on the agricultural assessments;
- Determination of the impact of the civil works required for construction of the proposed substation on the status quo of soils and agricultural activity within each target site and the immediately adjoining landscape; and
- Mitigation recommendations for any agricultural impacts that might be associated with the construction of the proposed development.

The dominant crop grown around the Swellendam area is Wheat (Triticum aestivum) and Canola (Brassica napus L.). The Canola is used in the production of canola oil in the SOILL factory based in Swellendam. Site A and C were found to have the lowest agricultural potential as a result of the shallow soils and high percentage of rocks within the profile. This is probably why these sites are used for livestock grazing and not the cultivation of crops. Sites 'F' and 'G' are actively used for the cultivation of Wheat and Canola crops respectively and are considered to have a higher agricultural potential with regards to crop cultivation as a result of deeper soils as well as a rapid to good subsoil permeability within the soil profiles sampled in these areas. The construction of

the substation will result in a complete loss of the agricultural land at all target sites, however given the small size (450mx400m) of the substation the construction and operation of the substation is not expected to have a long term negative impact on surrounding agricultural activities. Given that Site 'F' 'G' and 'H' are actively used for the cultivation of crops it is recommended that either **Site 'A' or Site 'C'** is used for the construction of the substation.

There are potential impacts associated with the construction of the proposed project and these are predominantly associated with soil disturbance and compaction. The use of heavy machinery or vehicles will lead to the compaction of the disturbed soil, making rehabilitation of these areas unlikely to be successful. Sedimentation of surrounding drainage lines could occur if construction activities lead to the dumping of soil into these sensitive areas or soil is deposited downslope in surface runoff. Potential mismanagement of waste and pollution including hydrocarbons, construction waste and hazardous chemicals will result in the pollution of the soil through surface runoff during rainfall events, or subsurface water movement.

The impacts of the construction phase on the surrounding environment therefore must be controlled through the use of an Environmental Management Programme that will address these impacts as well as provide mitigation to lower their significance. Mitigation measures include but are not limited to the strict use of internal roads for heavy machinery; the control/limitation of vegetation clearing and exposure of soil; and the management of construction waste.

The specialist recommended that either Site 'A' or Site 'C' for the construction of the proposed substation with regards to agricultural production; as dependent on the land owner; however, the landowner recommended that site H be used instead as site 'C' is highly productive and not well positioned.

11.2 AVIFAUNA

The Avifaunal report was compiled by Craig Widdows of Afzelia Environmental Consultants.

The primary aim of this assessment was to determine and assess the avifaunal communities associated with the study area and the sensitivity of the site from an avifaunal perspective in an effort to provide valuable insight pertaining to the impacts of the substation on avian ecology within the study site.

The study highlighted that a total of 216 bird species are predicted to occur with the 3420AB quarter degree grid square within which the proposed substation and associated power line will traverse (South African Bird Atlas Project 2), two of which are considered "Endangered", three listed as "Vulnerable" and two are considered "Near Threatened" (Barnes 2014). Avian species likely to be impacted by the proposed substation and associated 132Kv loop-in loop-out lines include local populations of endemic passerine species (Agulhas Long-billed Lark), locally resident or transient raptors (Martial Eagle and Black Harrier) and large terrestrial birds (Denham's Bustard, Blue Crane and Secretarybird). During the site visit 71 bird species were recorded within the greater study area including the Near Threatened Blue Crane (*Anthropoides paradiseus*) and Karoo Korhaan (*Eupodotis vigorsii*), the Vulnerable Denham's Bustard (*Neotis denhami*), and the Endangered Black Harrier (*Circus maurus*). The avian composition was dominated by smaller passerine species including African Stonechat (*Saxicola torquatus*), Familiar Chat (*Cercomela familiaris*), Common Waxbill (*Estrilda astrild*), Cape Sparrow (*Passer melanurus*) and Southern Red Bishop's (*Euplectes orix*).

The impacts associated with the proposed substation and associated power lines project include:

- Destruction and alteration of avian habitats;
- Disturbance and displacement of bird species; and
- Collision and electrocution on associated overhead power lines.

In order to mitigate for collision prone species, it is imperative that earth wires crossing important avian habitats are fitted with anti-collision marking devices to increase the visibility of the power line and reduce likelihood of collisions. These must be Eskom approved anti-collision devices that are durable as the area is prone to strong winds. Anti-collision devices must be installed as soon as the wires are strung.

The specialist highlighted that the construction of the proposed new Eskom Agulhas MVA transmission substation and associated power line at Site A and C are the most favorable sites from an avifaunal perspective. These sites will pose a limited threat to the birds occurring in the vicinity of the new infrastructure. This is largely due to the extensive impacts already evident at the sites (existing 400kV power line, transformed landscape and few suitable avian should only affect a few non-Red Data species at a local level. Furthermore, this site would require the shortest loop-in loop-out line from the substation reducing the risk of electrocution to avifaunal species and collisions with the power line. micro-habitats) coupled with the short length (4.9km and 4.4km respectively) of the associated loop-in loop-out power line and 132kV distribution power line. The power line poses a moderate collision risk once the recommended mitigation measures are implemented. The

southern boundary of Site 'H' is located with a riparian zone. Should the footprint be moved away from this ecotone this site alternative will also be acceptable from an avifaunal perspective. Site alternatives 'F' and 'G' are the least favourable sites from an avifaunal perspective. These line alternatives have the longest associated 132kV power line and the line will traverse through sensitive avian habitats, thus increasing collision and disturbance risks to avifauna.

Given the relative homogeneity of the habitat within the study area as well as existing levels of disturbance (existing power line infrastructure, roads, urban development, agricultural practices), the proposed project is unlikely to have a significant, long-term impact on the local avifauna.

11.3 BIODIVERSITY

The Fauna and Flora Impact Assessment was undertaken by Simon Todd of Simon Todd Consulting.

The report highlighted that the broader Vryheid study site contains some features of very high sensitivity including several Critically Endangered vegetation types. Further habitat loss within these ecosystems would be considered a fatal flaw of the development. Sites affecting intact vegetation have however been screening out in the scoping phase and all the sites assessed here are within transformed areas with no intact vegetation remaining.

In terms of the identification of the preferred alternative, Sites C and G are not adjacent to the 400kV line and would require loop-in loop-out lines to connect to the line, which potentially increases their impact, although for Site C the total length of lines is still relatively short compared to the other options. The 132kV line between Site G and Vryheid substation would need to traverse some sensitive areas and as any additional impact on intact vegetation in the area is highly undesirable, this is not considered to be a preferred alternative.

Sites A, C and F are considered acceptable alternatives with low potential impacts on the terrestrial environment. As site A is fairly close to the Kluitjieskraal River, Site F and Site C are considered the overall preferred alternatives, with Site C likely to generate the lowest overall impacts due to the proximity of the lines and substation to existing lines and roads and the lack of any sensitive features within the development footprint. Site H is similar but the presence of intact renosterveld patches in this area brings the viability of this option into question. Site H can only be considered viable if these areas are not affected. If this is chosen as

the preferred option, then the final detailed layout should be reviewed by this ecologist to ensure than impact on the sensitive areas has been avoided.

With the application of the suggested mitigation measures, the impacts associated with the substation and grid connection development would be low and of a local nature only. Since the development footprint can be restricted to transformed habitat, it would not contribute significantly to cumulative impacts on fauna and flora.

11.4 HERITAGE

The Heritage Impact Assessment was undertaken by Munyadziwa Magoma of Vhubvo Archeo-Heritage Consultants.

The Archaeological and Cultural Heritage Phase I Impact Assessment for the proposed construction of a substation and respective power line has identified no significant impacts to archaeological material that will need to be mitigated prior construction. Despite that no significant archaeological materials were identified, alternative (s) A and C remain susceptible, and chances of encountering isolated artefacts are considered modest in those sites. Thus, isolated and out of context artefacts may be found in those areas.

After considerable screening of all the proposed sites, alternative F, G and H are the most preferred sites. This recommendation is based on that these areas are vehemently disturbed by activities related to cultivation.

The study further highlighted that none of the materials on the proposed site are considered to be of such significance that can prevent the proposed development from proceeding therefore, the impact of the proposed substation and power line on archaeological and cultural heritage remains is rated low. The probability of locating any important archaeological heritage remains during construction of the project is less likely on all alternatives. The proposed site is thus not considered to be archaeologically sensitive.

The specialist recommended that the project proceeds and emphasised that the mitigation measures be put in place.

11.5 WETLAND DELINEATION

The Wetland Delineation was undertaken by Rowena Harrison of Malachite Specialist Services.

The wetland assessment initially involved desktop investigations for the presence of wetland and watercourse systems within a 500m buffer around the proposed alternative substation sites. A subsequent field investigation identified the presence of one wetland on the southern boundary of Site A. This wetland system flows in an easterly direction eventually linking into a 'B' Section drainage channel. The wetland system was classified into a single hydrogeomorphic unit, namely a channelled valley bottom wetland.

The current status of the wetland system was assessed using the wetland health methodology and was categorised as seriously modified (PES Category E). There have been major modifications to the system as a result of the cultivation of wheat within this system as well as the creation of a number of agricultural dams. These anthropogenic activities have resulted in the alteration of the hydrological flow through the wetland having an effect on the geomorphological processes which govern the wetland system. The cultivation of soil within the wetland boundary and use of the wetland for agricultural production has led to the formation of erosion gullies within the wetland as well as the deposition of soil.

Further, modifications to the wetland system have impacted the system's ability to provide ecological goods and services with scores for this assessment ranging from moderate to low. Functions relating to flood attenuation as well the filtration of nutrients and toxicants received moderate scores. The use of the wetland system for wheat and therefore agricultural activities also received moderate scores. The use of the wetland for agricultural productivity has had a negative impact on the functional integrity of the channelled valley bottom wetland.

An Ecological Importance and Sensitivity (EIS) assessment was undertaken to rank water resources in terms of provision of goods and service or valuable ecosystem functions which benefit people; biodiversity support and ecological value; and reliance of subsistence users (especially basic human needs uses). The very low Ecological Importance and Sensitivity score assigned to the wetland was primarily attributed to the degraded state of the channelled valley bottom wetland, therefore lowering its ability to provide natural resources to floral and faunal species; and its ability to maintain biodiversity within the larger landscape.

One 'A' Section channel and seven 'B' Section channels, with associated riparian areas were also delineated within a 500m buffer of all sites. 'B' Section channels are non-perennial systems that are in contact with the zone of saturation often enough to be associated with a riparian zone. They are therefore, considered to be hydrologically sensitive areas.

The riparian zones have been generally classified as moderately modified (PES Class C), with one drainage channel classed as largely modified (PES Category D). The riparian zones are predominantly intact, with limited impacts on these sensitive ecotones from the surrounding agricultural activities. Modifications to all systems are associated with a decrease in water quality as a result of the high influx of fertilisers into the watercourses. Agricultural dams which have been built in the drainage channels have also caused the removal of the riparian zone at these points within the drainage channel system.

Baseline aquatic assessments were conducted as part of the aquatic impact assessment on the Kluitjieskraal River. Tributaries associated with the Freek Botha River could not be undertaken due to low flows and site access concerns. The Kluitjieskraal River was determined to be largely to seriously modified when assessed using the tools and indexes of the RHP. The primary impact throughout the sites assessed appears to be water quality related. This is likely due to the intense agricultural practises that occur in the area.

A 25m buffer has been calculated for all delineated water resource systems in order to provide protection from the proposed substation development for the functions these water resources perform. This buffer is situated within portions of Substation Sites A and C and must be maintained with vegetation basal cover and not developed. Substation sites F and G are not situated within any of the buffer zones identified.

The impact assessment identified the following negative impacts associated with the proposed development on the wetland and watercourses;

(i) soil erosion and sedimentation of the wetland and watercourses, and;

(ii) pollution of the wetland, watercourses and soil as a result of construction and the degradation of this wetland during operational activities. When assessing the current land use and its impact on the aquatic systems within the parameters of the study it was demonstrated that current land management practises place a large burden on the aquatic systems. In comparison the construction and operational activities of the proposed substation are unlikely to unduly impact on the aquatic ecology of the area. During both the construction and operational phases the impacts were assessed to be of a low environmental significance.

Mitigation measures were proposed and focus on trapping sediment when the site is cleared and slowing runoff rates when surfaces are hardened.

The specialist highlighted that the preferred sites for the construction of the substation with regards to both the wetland and aquatic integrity is Site G and F as no wetlands or watercourses are present in these sites and both pose the least risk to any of the delineated water resources. Further she emphasised provided that the mitigation measures specified in the report attached as Appendix C5 be implemented and the continued monitoring and rehabilitation of eroded areas undertaken, the proposed construction of the substation and loop-in loop-out lines is expected to have a limited long term negative impact on the receiving environment.

11.6 VISUAL IMPACT ASSESSMENT

The VIA was undertaken by Johan Claasen of Zoneland Solutions.

The on-site verification from the selected Key Observation Points and the view sheds generated from the latter points indicated that, with the exception of one or two of the alternative sites, the proposed activity will be visually shielded from most of the observation points in region. This is primarily due to the undulating landscape which provides a natural high visual absorption capacity.

The results of the Visual Impact Assessment for the proposed Agulhas Main Transmission Substation consequently found that the overall visual impact of the respective site alternatives is as follows:

- Site Alternative A - medium negative significance
- Site Alternative C - medium negative significance
- Site Alternative F - low negative significance
- Site Alternative G - medium to high negative significance
- Site Alternative H- Medium to low significance

From a visual perspective site H will have the least visual impact.

11.7 TRAFFIC IMPACT ASSESSMENT

The primary purpose of the TIA was to evaluate all four Alternative sites and the expected traffic impact of the proposed transmission substation associated loop-in and loop-out lines and with the main focus on access and traffic distribution during the construction phase and during the operational phase. The report further focussed on the assessment of impact of the proposed transmission substation and associated infrastructure's activities on the existing external road network surrounding the development. According the report sought to achieve the following:

- identify the preferred site and access route to the site;
- comment on the condition of the existing roads in the site vicinity;
- identify possible access points to the site and recommends road improvements to minimise the impact on the surrounding road network.

Accordingly the study identified the roads included in this study are the N2, MR264 (R319), MR268, DR1251 and OP4468. The N2 was described as a route that runs from Cape Town through Port Elizabeth, East London and Durban to Ermelo. The study t highlighted that the road is currently in a good condition and is a two-lane undivided national road with hard shoulders managed by SANRAL.

Taking into account the above the study described the Alternatives in relation to possible access roads as follows:

- Site A is located close (±1.1km) to the N2 and access will be directly off DR1251. The site is also located directly adjacent to the existing Eskom power line. The site will however require regular maintenance of DR1251 to ensure that the section up to the site access remains at an acceptable condition. DR1251 currently carries low traffic volumes.
- Site C is ±2.8km from the N2 but access is off MR264, a paved road in a good condition. However, the site is approximately 1.8km from the existing Eskom power line.
- Site F will require the construction of an access road and it can only be accessed from MR268 or DR1251 which are both gravel roads. The site is however located adjacent to the existing Eskom power line.
- Site G, although located next to the N2 an access road will have to be constructed to achieve a safe access off the N2. The site is located in close proximity of the existing Eskom power line. Unfortunately, OP4468 cannot be used as an access road as the shoulder sight distance on the N2 is inadequate.

SANRAL may require the construction of turning lanes on the N2 at the N2/OP4468 intersection to increase road safety.

- Site H is located close (<600m) to the N2 and access will be directly off the N2. The site is located directly adjacent to the existing Eskom power line. Site H has direct access from the N2 from an already approved access off the N2 which has good shoulder sight distance in both directions.

The specialist recommended Site H as the best located site for the new substation from a traffic impact point of view. Further the specialist highlighted the following:

- Access to Site H will be from the N2 via the already approved farm access to Portion 7 of Farm 251. The access road will need to be widened and the bellmouths increased in size to accommodate the additional heavy vehicles. Turning lanes may be required by SANRAL as well.
- The current demand on the existing road network in the vicinity of the site is low and the road network and intersections will operate at acceptable levels of service. The majority of the construction vehicles and abnormal loads (if any) will come from the east on N2.
- During construction the road surface of DR1251 is maintained at regular intervals. However, once construction is completed, the day to day operation of the proposed substation will generate no to very little traffic which can easily be accommodated by the existing road surface and must be in the same condition it was before construction started.
- SANRAL and the Western Cape Government are informed of the preferred site for their comments and conditions.

In conclusion the specialist indicated that provided that the above recommendations are adhered to, the proposed development of the Agulhas MTS facility can be supported from a traffic engineering perspective.

12 ENVIRONMENTAL IMPACT STATEMENT

12.1 SUMMARY OF THE KEY FINDINGS OF THE ENVIRONMENTAL IMPACT ASSESSMENT

This EIR serves to primarily assess the likely impact the proposed development may have on the surrounding environment and to provide recommendations regarding available alternatives, mitigation and management measures. The process aims to ensure that impacts are identified and where negative impacts are anticipated

that these are prevented, minimised and remedied (should these be unavoidable). Further, where positive impacts are identified these are enhanced as far as possible.

In addition, this report presents the relevant information to the Competent Authority for the purposes of decision making. In making a decision regarding this application the key findings must be considered as well as the other information contained within this report. The suggested mitigation measures must also be considered and compliance therewith should form a condition of any decision made to proceed with the development. In addition these conditions should be incorporated into a Construction Phase EMPr which serves to guide and inform sustainable environmental practices during the construction process. The complete identified management and mitigation measures are listed in the EMPr. These measures include those listed in this report.

12.1.1 PLANNING AND DEVELOPMENT PHASE

Impacts associated with the planning and development phase of the proposed activity includes the creation of job opportunities for skilled engineers and planning professionals. This positive impact will be definite and short term in duration. No significant negative impact has been associated with this phase and the proposed activity.

12.1.2 CONSTRUCTION PHASE

The positive impact identified for this phase is job creation and this impact must be enhanced in order to maximize the benefits.

The negative impacts associated with the construction phase are as follows:

- Impact on flora will be low with the exception of Alternative G and H;
- Impact on fauna will be generally low;
- Impact on ground and surface water will be low;
- Impact on agriculture will also be low;
- Impact on avifauna as a result of habitat destruction is considered low; and
- Impact on traffic is considered to be generally low.

Impacts of medium to high significance include the following:

- The impact on flora within all the propose substation sites is considered to be low; however an impact of medium significance is expected on H while high significance is expected on alternative G as the proposed Dx power lines will encroach on critically endangered vegetation and loss of this vegetation is considered a fatal flaw unless the Dx lines are realigned.

With corrective measures in place as well as implementation of recommendations made by the specialist none of the identified negative impacts are considered to be a fatal flaw as they can be reduced to lower significance.

12.1.3 OPERATIONAL PHASE

The negative impacts associated with the operational phase of the proposed activity include impacts on avifauna due to electrocution and collision as a result of the proposed substation and associated power lines. Further a negative visual impact of medium significance is foreseen during the operational phase of the proposed project. Mitigation measures have been proposed to manage and reduce the severity of these impacts to low.

Further, positive impact associated with the operational phase will include the following:

- Reliable uninterrupted power supply in the region;
- Positive economic outlook for the municipality and country at large

The identified positive impacts need to be enhanced to ensure maximum benefit.

12.1.4 DECOMMISSIONING PHASE

The decommissioning phase of the proposed activity will not take place in the foreseeable future. However, if decommissioning were to take place it will have a negative impact due to job losses, dust generation, potential soil erosion, waste generation and surface and ground water pollution.

12.2 SUMMARY OF POSITIVE AND NEGATIVE IMPACTS AND RISKS OF THE PROPOSED ACTIVITY AND IDENTIFIED ALTERNATIVES

Table 18: Potential Environmental Impact Identified

Issue	Rating	Description
Employment	Positive-No mitigation required	Job creation and investments into the project will result in opportunities during the planning and design phase. This impact will typically be limited to skilled engineers and planning professionals. Proposed project will result in very limited opportunities to the skilled local community during the construction phase. This impact will be positive and provincial in extent.
Air Pollution	Neutral	Potential air pollutant during construction may be dust emanating from site preparation and excavations during construction. Given the nature and magnitude of the proposed project it is anticipated that if not mitigated the impact will be local in extent, and short term. Mitigation measures such as regular dust suppression can reduce the impact to become site specific.
Visual Impact	Negative	The visual impact of an object in the landscape decreases quickly as the distance between the observer and the object increases. The visual impact at 1km is approximately a quarter of the impact viewed from 500m; and the visual impact at 2km is one eighth of the impact viewed from 500m. Therefore, objects appear insignificant in any landscape beyond 5km. The visibility of the proposed structure and infrastructure would be a function of several factors, including: landform, vegetation, views and visibility, genius loci (or sense of place), visual quality, existing and future land use, landscape character and scale. The proposed activity will change the visual character of the site particularly considering that the proposed site is located in an area that

Issue	Rating	Description
		is sloping; the elevated points of the site can be viewed from the nearby roads, however, it must be noted that there are already existing overheard power lines and a substation located within the vicinity of the proposed project site. Local variations in topography and man-made structures could cause local obstruction of views in certain parts of the view shed. Given the topography of the study area the impact can be considered definite, long term, local in extent but low in significance during construction and medium significance during the operational phase.
Fauna	Negative	Considering the insignificant extent of the substation campus and the relatively narrow and linear servitude it is not expected that any endangered species of conservation will be put at risk. No sensitive species or sensitive areas are flagged. The project will not substantially change the reigning ecological character of the general area. Further, the proposed project will not significantly impact negatively on the assemblages and conservation of the general area.
Flora	Negative	Potential ecological impacts resulting from the development of the Vryheid substation and grid strengthening would stem from a variety of different activities and risk factors associated with the preconstruction, construction and operational phases of the project potentially including the following: **Construction Phase** • Vegetation clearing for access roads, laydown areas and the substation site itself may impact intact vegetation. • Increased erosion risk would occur due to the loss of plant cover and soil disturbance during the construction phase. Some of the site options are steep and risk of erosion would

Issue	Rating	Description
		be high. This may impact downstream riparian and wetland habitats if a lot of silt enters the drainage systems. • Increased human presence can lead to illegal plant harvesting and other forms of disturbance such as fire. **Operational Phase** • The presence of the facility may disrupt the connectivity of the landscape for some species which may impact their ability to disperse or maintain gene flow between subpopulations. • The facility will require management and if this is not done appropriately, it could impact adjacent intact areas through impacts such as erosion, alien plant invasion and contamination from pollutants, herbicides or pesticides. **Cumulatively,** the development would contribute to the cumulative fragmentation of the landscape and would potentially disrupt the connectivity of the landscape for fauna and flora and impair their ability to respond to environmental fluctuations.
Noise	Negative	In South Africa, the assessment of noise levels in the environment is governed by the South African Bureau of Standards (SABS) noise standard 0103 – 'The measurement and rating of environmental noise with respect to annoyance and to speech communication' (SABS 1994). Additional SABS standards cover the measurement of noise over different distances from the source (SABS 0357 – 'The calculation of sound propagation by the Concave method'), and standards for different sectors (e.g. industry). An increase in noise is expected to emanate from construction activities, which might have an impact especially on the surrounding farms. Noise associated with the construction activities can be mitigated by limiting the construction operation to business hours,

Issue	Rating	Description
		during which noise will not be of such a big concern to surrounding residents. According to the SABS 0103 acceptable noise levels at day time is 45dBA. A noise intrusion is disturbing if it exceeds 7dBA or more. Given the nature of the project, it is highly unlikely that the stipulated noise levels will be exceeded at any given time. During the operational phase the impact of noise will also be reduced to almost insignificant levels, given the nature of the proposed project. Noise has been identified as potentially low due to the proposed development being in a remote area, far removed from communities. The noise impact may be local during construction and site specific during operations.
Soil and Agricultural potential	Negative	The predominant land use within the study area is commercial agriculture. Any development activity in a natural system will have an impact on the surrounding environment, usually in a negative way. The construction of the substation will not have a significant impact on the agricultural activities at any of the target sites; however, the impact will be slightly higher at Sites 'F' and 'G' as crops are actively cultivated in these areas. The overall impacts of the proposed substation on the soil and agricultural capability of any of the target sites and their immediate surrounds will be low due to the shallow soils present, the relatively small size of the substation study area (600m x 600m) and the continued use of the land adjacent to the substation for agricultural activities.
Bird Population	Negative	Due to its size and prominence, electrical infrastructure constitutes an important interface between wildlife and man. Negative interactions between wildlife and electricity structures take many forms, but two

Issue	Rating	Description
		common problems in southern Africa are electrocution of birds (and other animals) and collision of birds with power lines. With proper mitigation measures implemented, these potential impacts can be reduced. For the proposed development, major risks to birds that may be caused by the proposed facilities are disturbance by construction activities (temporary), on-going disturbance during operation phase, collision with and electrocution on the power line. The proposed construction of the new Agulhas MVA transmission substation and associated power lines will pose a limited threat to the birds occurring in the vicinity of the new infrastructure. This is largely due to the extensive impacts already evident at the site (the existing 400kV power line, transformed landscape and few suitable avian micro-habitats) coupled with the short length of the proposed power line. The power line poses a low collision risk and a low electrocution risk. The impact of displacement due to habitat transformation will have a low impact on avifauna due the largely transformed nature of the proposed site. The construction and maintenance activities associated with the proposed development will have an impact on avifaunal species through disturbance. Species will be particularly sensitive to this disturbance during the breeding season. The proposed site alternatives are located within an agricultural habitat close to National and Domestic roads as well as the Vryheid substation. Therefore, species within this landscape often experience disturbance and as a result disturbance of birds by the proposed substation is anticipated to be of low significance.

Issue	Rating	Description
Waste	Negative	Naturally, the inhabitation of the land will result in the accumulation of various forms of waste in the area. The aesthetic value of the area would decrease if such waste is not collected and disposed of appropriately. Waste material will be generated during the construction phase. Such waste may accumulate from the workers campsite or from litter left around the work area by the construction staff. Other waste substances may accumulate from cement bags amongst other construction material. The impact of waste is definite and will last for the duration of the construction phase as well as the operational phase, although reduced.
Soil Erosion	Negative	Movement of heavy machinery across the land as well as vegetation clearance may cause destabilisation of soils which then become susceptible to erosion. Continuous movement of vehicles over the land during the construction phase may leave it susceptible to erosion.
Heritage	Negative	The heritage significance of each alternative site has been assessed in terms of the National Heritage Resources Act, 1999 (No 25 of 1999). A Phase 1 Archaeological Impact Assessment was conducted and the results indicate that no significant impacts of heritage are anticipated.
Surface and Groundwater Pollution	Negative	The proposed alternatives are in close proximity to a number of watercourses. The impact on water quality, if any, could be sedimentation, decrease in quality and possible contamination of surface water and groundwater. This could result from fuel spillages, sewer systems, liquid waste, etc. An increased volume of storm water runoff, peak discharges, and frequency and severity of flooding is therefore often characteristic of transformed catchment. The impact on water is site specific but can be

Issue	Rating	Description
		local or regional if proper measures are not put in place. There may be a need to apply for a Water Use Licence with DWS considering the proximity of the study area to water bodies.
Social Environment	Negative/Positive	The construction phase may have a negative impact on the surrounding landowners if not properly managed. It could result to disturbance of residents as a result of construction related activities. Other social related issues may include theft and risk of fire. Conversely, a positive impact can emanate from the proposed development through employment of local residents. Also, a micro-economic environment could be created through vending/trade between contract workers and the locals. This impact will be local.
Climate	Neutral	Local climate conditions do not appear to be of a significant concern to the proposed project. In a broader scale the project will have no impact on the local and/or global climate change.
Topography	Negative	The topography of the study area is undulating; this may pose design challenges particularly in the steeper area.
Tourism	Neutral	N2 road is part of the Garden route which is one of the South Africa's well sought tourist attraction. The positioning of the substation and the power line must take into consideration the potential impact on tourism in the area. This has been well covered in the Visual Impact report.
Traffic	Negative	A significant amount of material and equipment will be delivered to the site during the construction phase of the development. It is therefore expected that there will be a considerable impact considering that the N2 and R319 considering that it forms part of the Garden Route. This will have an indirect impact on tourism.

13 RECOMMENDATION FROM SPECIALIST REPORTS, THE RECORDING OF PROPOSED IMPACT MANAGEMENT OBJECTIVES AND THE IMPACT MANAGEMENT OUTCOMES FOR THE DEVELOPMENT FOR INCLUSION IN THE EMPR AS WELL AS FOR INCLUSION AS CONDITIONS IN THE ENVIRONMENTAL AUTHORISATION

Seven specialist studies were undertaken and input from these studies was key in the preparation of this EIA report. The recommendation made by the specialist advised the recommendation of the preferred alternative. The specialist made several recommendations to be included in the EMPr in an effort to reduce the severity of the identified impacts on the environment. The recommendations to be included in the EA are highlighted in the Table below:

Specialist	Recommendations
Traffic Impact Assessment	• SANRAL and the Western Cape Government are informed of the preferred site for their comments and conditions. • During the construction phase and as part of the contract, the contractor is required to monitor the condition of the roads used and repair the road where it becomes damaged due to construction traffic.
Visual Impact Assessment	• Institute a planting regime around the boundaries of the project site to 'soften' the views onto the infrastructure from the respective receptors. Only indigenous plant species to be introduced. • The steel components should not be painted but be galvanised and allowed to oxidise naturally over time. The grey color produced in this process will help to reduce the visual impact. • Parts of the substation that require the protection of paint should be painted in colors chosen from a palette that is matched to the natural colors found in the surrounding landscape.
Wetland and Aquatic Impact Assessment	• Biannual aquatic ecology assessments should be conducted during the construction phase of the project. There after annual aquatic ecology bio monitoring should take place for two years during operations. • The requirements of the National Water Act must be complied with in terms of Water Use License Application.

Flora and Fauna Assessment	• Should site Site H be the preferred option, then the final detailed layout should be reviewed by this ecologist to ensure than impact on the sensitive areas has been avoided. • Total avoidance of any intact renosterveld fragments is recommended. • Walk down to be done prior to commencement of construction.
Heritage Impact Assessment	• In the event that archaeological materials are unearthed, all construction within a radius of at least 10m of such indicator should cease and the area be demarcated by a danger tape. • A final Cultural-Heritage walk down phase of the area proposed for loop in and loop out be commissioned is recommended. This measure will provide a final opportunity to identify any archaeological materials within the loop in and out lines, and reduce adverse impacts to a less than significant level if any archaeological materials are encountered.
Avifauna	• Eskom approved anti-collision devices that are durable must be installed as soon as the wires are strung in order to mitigate for collision. • A final avifaunal walk down must be undertaken for specialist to recommend site specific mitigation measures.

14 THE FINAL PROPOSED ALTERNATIVES WHICH RESPOND TO THE MANAGEMENT MEASURES, AVOIDANCE, AND MITIGATION MEASURES IDENTIFIED THROUGH ASSESSMENT

The identification of alternatives is an important component of the EIA process. Consideration of alternatives focused mostly on site alternatives as compared to activity alternatives. The various alternatives have been assessed in terms of both environmental acceptability as well as economic and technical feasibility.

The selection of the preferred alternative is based on several factors:

- Specialists' recommendations;
- Environmental constraints;
- Technical feasibility;
- Economic cost-benefit analysis;
- Best practicable environmental option i.e. the option that provides the most benefit or causes the least damage to the environment at a cost acceptable to society in both the long and short term; and

- Optimization of existing infrastructure, such as access roads

14.1 COMPARATIVE ASSESSMENT

Following the public participation process, the undertaking of specialist studies and impact assessment of the proposed routes a comparative analysis was made as depicted in **Table 15** below.

Table 19: Comparative Assessment of Alternatives

Aspect	Alternative A	Alternative C	Alternative F	Alternative G	Alternative H
Total Dx and Tx power line distance	±4.9km Shorter route therefore minimal disturbance	±4.4km Shortest route therefore minimal disturbance	±6.1km	7.46km Longest Route, Least preferred.	4.9km.
	Recommended	Highly Recommended	Moderately recommended	Not Recommended	Recommended
Ecological	Site A, considered acceptable alternative with low potential impacts on the terrestrial environment; however this site is fairly close to the Kluitjieskraal River.	Site C is the shortest and does not traverse any sensitive ecological features.	Site F is considered acceptable.	Site G requires the longest Dx power line which increases the impact on floral disturbance. The Dx power line will encroach on a watercourse and CBA.	Site H is similar to C but the presence of intact renosterveld patches in this area brings the viability of this option into question. Site H can only be considered viable if these areas are not affected.
	Moderately	Highly Recommended	Recommended	Not Recommended	Recommended

Aspect	Alternative A	Alternative C	Alternative F	Alternative G	Alternative H
	Recommended				
Agricultural	Lowest agricultural potential as a result of shallow soils and high percentage of rocks.	Same as A.	Site 'F' is actively used for the cultivation.	Same as F.	Soil characteristics are expected to be similar to F with high percentage of rocks.
	Highly Recommended	Highly Recommended	Not recommended	Not recommended	Moderately Recommended
Heritage	No sites of heritage significance were identified on the footprint during the survey, however high percentage of rocks was recorded.	No sites of heritage significance were identified on the footprint during the survey, however high percentage of rocks was recorded.	No sites of heritage significance were identified on the footprint during the survey. Site is highly disturbed due agricultural activities.	Same as F	No sites of heritage significance were identified on the footprint during the survey. Site is highly disturbed due agricultural activities.
	Recommended	Recommended	Highly Recommended	Highly Recommended	Highly Recommended
Avifauna	Relatively shorter power lines therefore reduced risk is expected.	Shortest distance therefore least risk for bird collision and electrocution.	The Dx power line is relatively longer posing a higher threat to avifauna.	The longest Dx power lines therefore the highest impact on avifauna.	Relatively shorter distance therefore least risk for bird collision and electrocution.
	Recommended	Highly Recommended	Moderately Recommended	Not Recommended	Recommended

Aspect	Alternative A	Alternative C	Alternative F	Alternative G	Alternative H
Wetland Delineation	The channelled valley bottom wetland is situated on the southern boundary of the site. Two 'B' Section channels are located within a 500m buffer of the northern and eastern boundary of the site.	A 'B' Section channel and associated riparian zone is situated on the northern and western boundary of the Site. A second 'B' Section channel is situated approximately 370m to the west of the Site. Further to this an agricultural dam is situated within the central portions of the site.	The preferred sites for the construction of the substation with regards to both the wetland and aquatic integrity as no wetlands or watercourses are present in these sites and both pose the least risk to any of the delineated water resources.	The preferred sites for the construction of the substation with regards to both the wetland and aquatic integrity as no wetlands or watercourses are present on the substation and Tx lines. However, the distribution line will encroach on watercourses well as CBAs.	A drainage channel and associated riparian zone were delineated along the western boundary of the site as well as approximately 100m to the south of the site. Further to this an agricultural dam is situated adjacent to the riparian zone within the proposed substation site. The 25m buffer placed on the riparian zone will have an impact on the position of the substation should this site be utilised. The distribution line will cross two drainage channels and riparian zones.
	Not Recommended	Recommended	Highly Recommended	Not Recommended	Recommended
Visual	Medium negative significance	Medium negative significance	Low negative significance	Medium to high negative significance	Medium to low significance
	Moderately Recommended	Moderately Recommended	Recommended	Not Recommended	Highly Recommended

Aspect	Alternative A	Alternative C	Alternative F	Alternative G	Alternative H
Traffic	Easy access which requires regular maintenance	Easy access with a road in good condition.	Requires construction of an access road and can only be accessed from gravel roads.	Requires construction of access road off the N2.	Good location for a substation from traffic point of view.
	Recommended	Recommended	Moderately Recommended	Not Recommended	Highly Recommended

15 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 AUTHORISATION

Recommendations made by the specialists have been highlighted in section 13 above and the EAP recommends that all those recommendations be included in the EA.

Further based on the thorough and detailed assessment undertaken for this proposed development the EAP recommends that Alternative C be authorized. This recommendation is based on the following:

- It has the shortest combined Dx and Tx power line distance of the five alternatives under consideration.
- It has an easy access which will not warrant extensive development of roads.
- It is the least sensitive from an ecological point of view as it is far removed from the identified critically endangered vegetation within the study area. Being the shortest alignment it will have the least impact on the vegetation in the area.
- Given the highly productive agricultural nature of the proposed study area, Alternative C will have the least impact on same.
- Although not the most preferred from a visual perspective, the impact is manageable.
- This Alternative may impact on water courses, therefore the requirements of the National Water Act will have to be adhered to before project commencement.

From an environmental perspective none of the specialist studies undertaken indicated any possible fatal flaws on Alternative C. It is therefore recommended that Alternative C be authorised. This alternative is technically, environmentally and the most economically feasible and all identified impacts can be mitigated. It is however imperative that the conditions of the landowner, Mr. Schoonwinkel, are taken into consideration and such include the following:

- That longer span towers be implemented i.e. spacing of the towers must be further apart so as to reduce the number of towers in the farm.
- The height of the towers must be higher to allow for his agricultural activities to continue with minimal interruption.
- The proposed 132kV Dx line must be as close as possible to the existing one as well as the road.

An EMPr has been prepared and it will serve as the key reference of the Environmental Assessment Practitioners recommendations jointly with Eskom's policies that are already in place. The EMPr has included measures proposed to mitigate any adverse impacts of the activities and the monitoring.

The exact footprint within the proposed location of the proposed substation and associated power lines has not be determined; it is therefore recommended that a walk down be undertaken by the specialist to determine the least sensitive location within the approved corridors.

16 A DESCRIPTION OF ANY ASSUMPTIONS, UNCERTAINITIES AND GAPS IN KNOWLEDGE WHICH RELATE TO THE ASSESSMENT AND MITIGATIONS MEASURES PROPOSED

16.1 ASSUMPTIONS

- It is assumed that technical data supplied by the client was correct and valid at the time of compilation of specialist studies and the Draft EIA report.
- It is assumed that all information provided by the client is true and correct.
- It is furthermore assumed that the alternatives presented by the client are feasible.

16.2 LIMITATIONS

16.2.1 PUBLIC PARTICIPATION PROCESS

It is likely that some I&APs may not have been reached; however, efforts were made as part of the process to advertise on local media as well as placing of notices at noticeable places within the communities.

16.2.2 LITERATURE REVIEWS IS VIEWED AS CORRECT

The compilation of the reports was based on various literature reviews which are viewed as correct at the time. However, it is acknowledged that there might be some gaps in knowledge with regards to the literature reviewed although conceited efforts were made to attain as much information as possible.

16.2.3 HERITAGE STUDY

It is possible that the Phase 1 HIA may have missed heritage resources in the project area, as some heritage sites may lie below the surface of the earth and may only be exposed once development commence.

16.2.4 ECOLOGICAL ASSESSMENT

The major potential limitation associated with the sampling approach is the narrow temporal window of sampling. Ideally, a site should be visited several times during different seasons to ensure that the full

complement of plant and animal species present are captured. However, this is rarely possible due to time and therefore, the representivity of the species sampled at the time of the site visit should be critically evaluated.

The lists of amphibians, reptiles and mammals for the study area are based on those observed in the vicinity of the site as well as those likely to occur in the area based on their distribution and habitat preferences, as well as the implications of the high levels of transformation for faunal presence. This represents a sufficiently conservative and cautious approach which takes the study limitations into account.

16.2.5 WETLAND ASSESSMENT

The assessment of wetlands is based on environmental indicators such as vegetation, that are subjected to seasonal variation as well as factors such as fire. Although background information was gathered, the information provided in this report was mainly derived from what was observed on the study site at the time of the field survey.

16.2.6 VISUAL IMPACT ASSESSMENT

This assessment was undertaken during the impact assessment phase of the project and is based on the information provided by Nsovo Environmental Consulting on 14 and 18 July 2016, for the Visual Impact Assessment mentioned project. Assessments of this nature generally suffer from a number of defects that must be acknowledged:

- Limited time: A comprehensive assessment requires a systematic assessment of the environment at different times of the day. Such luxury is not always possible and therefore most assessments are based on observations made at a specific time of day. Educated estimates are made, where applicable, based on the knowledge of the area.
- Availability of literature: A thorough assessment requires that all relevant literature on the subject matter is studied, acknowledged and incorporated in the report. Due to a range of factors, forward planning documents are not always available for all spheres of government.

17 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

The Draft Scoping, Final Scoping and associated Public Participation Process were performed as dictated by the requirements of the NEMA and associated regulations.

The proposed sites have been under detailed assessment, the primary objective been to assess the suitability of the proposed study area for the intended use from an environmental perspective. This thorough investigation was furthermore enhanced by input from ecologists, archaeologist, wetland specialist, visual impact, traffic, avifauna and agricultural specialist.

The findings of the investigations from specialists input from interested and affected parties and findings of the EAP have been comprehensively documented in this report together with the specified recommendations. Based on the investigations, no fatal flaws or highly significant impacts that would impede the proposed development or necessitate redesign or termination of the project have been identified.

Based on the reasons highlighted above it is recommended that **Alternative Site C** be approved and all management and mitigation measures put in place to reduce the environmental impact. The reasons for this recommendation are discussed in Section 8 above.

The no-go alternative was assessed and consideration of this option will have even greater social and economic consequences particularly if the security of electricity supply is compromised. Therefore, given the various developments, both industrial and residential taking place across the country the need to secure reliable supply is vital.

With mitigation measures proposed as well as recommendations made by the specialist the impacts are manageable.

18 WHERE THE PROPOSED ACTIVITY DOES NOT INCLUDE OPERATIONAL ASPECTS, THE PERIOD FOR WHICH THE ENVIRONMENTAL AUTHORISATION IS REQUIRED AND THE DATE ON WHICH THE ACTIVITY WILL BE CONCLUDED AND THE POST CONSTRUCTION MONITORING REQUIREMENTS FINALISED

The proposed activity entails the construction of a substation and associated power lines, wherein construction is expected to commence in 2017 following which the operational phase will commence. The associated impacts of both the construction and operational phases of the project have been detailed and mitigation measures and monitoring plan have been put in place.

The proposed construction activity will take approximately 3 years, while the operation will be almost permanent as decommissioning is not foreseen in the near future. It is therefore recommended that the Environmental Authorisation be issued for the construction phase of the project and conditions be put in place for post construction monitoring until the site is fully reinstated and further for the ongoing management.

19 AN UNDERTAKING UNDER OATH OR AFFIRMATION BY THE EAP IN RELATION TO THE LEVEL OF AGREEMENT BETWEEN THE EAP AND INTERESTED AND AFFECTED PARTIES ON THE PLAN OF STUDY FOR UNDERTAKING THE ENVIRONMENTAL IMPACT ASSESSMENT

The Plan of Study was part of the Scoping Report which was made available to I&APs and Organs of State for a 30 days review and comment period. Comments/issues raised have been addressed and are included in the Issues and Response Report (**Appendix D4**). This EIR is prepared in line with the Plan of study as approved by DEA.

No agreement between the EAP and I&APs is in place.

20 WHERE APPLICABLE DETAILS OF ANY FINANCIAL PROVISIONS FOR THE REHABILITATION, CLOSURE, AND ONGOING POST DECOMMISSIONING MANAGEMENT OF NEGATIVE ENVIRONMENTAL IMPACTS

There are no financial provisions made for this project, however, detailed rehabilitation measures are included in the attached EMPr.

21 AN INDICATION OF ANY DEVIATION FROM THE APPROVED SCOPING REPORT, INCLUDING THE PLAN OF STUDY

The Scoping Report and Plan of Study were prepared and approved by the department in July 2016 and this report forms the basis of this EIR. The report is as per the approved plan of study and there are no deviations.

21.1 ANY DEVIATION FROM THE METHODOLOGY USED IN DETERMINING THE SIGNIFICANCE OF POTENTIAL ENVIRONMENTAL IMPACTS AND RISKS

The methodology used in determining the significance of potential environmental impacts is discussed above which is in aligned to the Department of Environmental Affairs' standard and minimum requirement. There are no deviations from the methodology.

21.2 A MOTIVATION FOR THE DEVIATION

There are no deviations from the methodology.

22 UNDERTAKING UNDER OATH OR AFFIRMATION BY THE EAP

In undertaking the Environmental Impact Assessment of the proposed project the EAP has taken into consideration the requirements stipulated in the EIA Regulation of December 2014 as amended, as well as other relevant Acts and Regulations. The EAP hereby confirm that with the information available at the time of preparing the Report and the reports prepared by the specialists, the following has been taken into account in preparing this report:

- The correctness of the information provided in the report;
- The inclusion of comments and inputs from stakeholders and interested and affected parties; and
- Any information provided by the EAP to the interested and affected parties and any responses by the EAP to comments or inputs made by interested and affected parties.

Refer to **Appendix E2** for the Declaration of the EAP.

23 WHERE APPLICABLE, ANY SPECIFIC INFORMATION REQUIRED BY THE COMPETENT AUTHORITY

The information required by the authority is currently available and has been included in this Draft EI Report.

24 ANY OTHER MATTER REQUIRED IN TERMS OF SECTION 24(4) (a) AND (b) OF THE ACT.

This Report has been prepared in terms of NEMA, its respective 2014 EIA Regulations as well as other various Acts.

25 CONCLUSION

The Environmental Impact Assessment was undertaken as dictated by the National Environmental Management Act and associated regulations as well as the EIA regulation of June 2010.

The alternative sites and routes have been scrutinized and a detailed assessment conducted; the primary objective being to assess the suitability of the site for the intended use as well as to assess the impact of the proposed development on the environment. This report has comprehensively addressed the baseline environment which formed the backdrop of the impact assessment. Information provided has been supported by Specialist studies that were undertaken. The findings of the investigations, comments from affected and interested stakeholders are documented in this report together with the specified recommendations. Based on the investigations, no critical flaws that would impede the development have been identified.

Potential fatal flaws identified during both the scoping phase and EIA phases of the project that would necessitate substantial redesign or termination of the project and associated sites are therefore eliminated. The main impacts have been discussed and mitigation measures have been identified that will serve to mitigate the scale, intensity and significance of the impacts that have high or medium rating. The EMPr contains more detailed mitigation measures.

The mitigations measures and recommendations made in the following specialist studies must be adhered to:

- Biodiversity Assessment;
- Land Types and Agricultural Potential;
- Avifauna Assessment;
- Wetland Assessment;
- Archaeological Assessment;

- Traffic Impact Assessment ; and
- Visual Impact Assessment.

Further, the following is recommended by the EAP:

- That given all the reasons discussed above Alternative Site C is supported.
- That the landowner conditions be taken into consideration throughout the development phases i.e. construction and operation.
- That a final walkthrough of the approved corridor must take place to identify sensitivities and assist in identifying areas that require conservation.
- That all mitigation measures made by the specialist are taken into consideration during both the construction and operational phase.
- The applicant shall ensure that fluids are stored and handled properly in a concrete to cement lined with berm walls to avoid any seepage into the ground water resources and also to ensure that the design of the storage area is such that any leakages or spillages can be contained.
- That the Environmental Management Programme attached hereto be a living document that guides the construction and operational phases of the proposed project.
- That all necessary permits and licenses required by any Act, Policy, Law or By-Law be obtained prior construction.
- An integrated waste management approach be implemented that is based on waste minimisation and must incorporate reduction, reuse, recycling and disposal where appropriate.
- That necessary Water Use Licenses must be obtained as applicable from the Department of Water and Sanitation.
- Excessive wash-down of soil shall be prevented and the disturbed areas shall be rehabilitated on an on-going basis to prevent erosion.
- The applicant will provide the Department of Water and Sanitation with the quality and estimated quantity of the water that will be used for dust suppression during the developmental phase of the proposed project.
- As per Section 19(1) of the NWA, the applicant will ensure that any pollution incident(s) (of a water resource) originating from the proposed project shall be reported to the Regional Office of the DWA within 24hours.
- Issues of landownership must be dealt with prior to construction.
- The National Environmental Management principles must be adopted and strict adherence maintained.
- The applicant must ensure that the following takes place with regard to the power line to reduce the identified impacts
    - Sections of the power line crossing adjacent to dams, rivers, drainage lines and watercourses are marked with bird flappers on the earth wires to reduce the impact on avifauna.

- Where power lines runs parallel to riverine, riparian and wetland areas, the design should be in accordance with the requirement of the National Water Act, 1998 (Act 36 of 1998).
- The identified areas of red data floral and other sensitive vegetation are avoided at all times.
- The spans between the towers must be increased to the maximum necessary to meet technical and safety requirements in order to limit the impact on sensitive areas.
- Specialist report must inform the nature and positioning of the power lines to ensure that no sensitive environments are impacted upon.

- The undertaking of this EIA has fully complied with the requirements of the NEMA and associated regulations. It is therefore recommended that the proposed project proceed.

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