ENVIRONMENTAL IMPACT ASSESSMENT PROCESS

FOR THE

PROPOSED ESKOM 400/132KV HOUHOEK TRANSMISSION SUBSTATION INCLUDING THE BACCHUS-PALMIET LOOP-IN AND LOOP-OUT POWER LINES, WESTERN CAPE PROVINCE

NEAS REFERENCE NUMBER: DEA/EIA/0000698/2011
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DRAFT
SCOPING REPORT

November 2012

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TITLE	:	ENVIRONMENTAL IMPACT ASSESSMENT PROCESS FOR THE PROPOSED ESKOM 400/132KV HOUHOEK TRANSMISSION SUBSTATION INCLUDING THE BACCHUS-PALMIET LOOP-IN AND LOOP-OUT POWER LINES, WESTERN CAPE PROVINCE
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For BKS (PTY) LTD

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PURPOSE OF THE SCOPING REPORT AND PLAN OF STUDY FOR ENVIRONMENTAL IMPACT ASSESSMENT

Eskom Holdings SOC Limited has commissioned an Environmental Impact Assessment (EIA) process to investigate the potential environmental impacts for the proposed Houhoek Eskom Transmission Substation project (DEA Reference Number: 14/12/16/3/3/2/401 and NEAS Reference Number: DEA/EIA/0001397/2012).

The EIA process is being undertaken by BKS (Pty) Ltd as an independent Environmental Assessment Practitioner (EAP), and conducted in terms of the National Environmental Management Act (No. 107 of 1998) (NEMA), and the EIA Regulations Government Notice Regulation (GNR) 543, 544, 545 and 546, that were promulgated on 18 June 2010 (as amended), but came into effect on 2 August 2010.

Environmental studies are required to identify the potential impacts associated with the Houhoek Transmission Substation project, and to provide an assessment of the project in terms of the biophysical, social and economic environments. It is this assessment, which aids the environmental authorities (i.e. the national Department of Environmental Affairs, DEA) and the proponent (i.e. Eskom) in making decisions regarding the future of the project.

The first phase of the EIA process, the Scoping Phase, is an important part of an EIA process. This is the phase during which issues and concerns are identified in order to focus the specialist studies and to provide a framework within which the assessment is to be undertaken.

The accompanying Plan of Study for EIA sets out the tasks that will be undertaken as part of the impact assessment process and the manner in which such tasks will be conducted. It outlines the methodology for the EIA and includes the specialist studies that will be undertaken. The details of the ongoing public participation, which was started during the Scoping Phase, are also included in the Plan of Study for EIA.

In keeping with environmental legislation, it is the responsibility of the EAP to ensure that the public is provided the opportunity to participate meaningfully in the environmental investigation process. This includes identification of issues and review of reports. Accordingly, interested and affected parties (I&APs) are invited to review the Draft Scoping Report (SR) to verify that their contributions are captured and correctly understood. Issues raised by I&APs to date have been used, together with issues identified by the specialists, to define the terms of reference for the Specialist Studies to be undertaken in the detailed Environmental Impact Assessment Phase. The public will also have the opportunity to review the Draft EIA Report and Specialist Studies.

The comments received during the Draft SR review period will be incorporated into the Final SR, and submitted to the DEA. The DEA will consider the proposed scope of the Specialist Studies, after which these studies will proceed as part of the EIA Phase. An outcome of the EIA phase, as informed by the specialist studies, is a site-specific Environmental Management Programme (EMPr), which will describe the measures that need to be undertaken by the Applicant to mitigate the environmental impacts assessed.

EXECUTIVE SUMMARY

PROJECT DESCRIPTION

Eskom Holdings SOC Limited has applied for environmental authorisation from the National Department of Environmental Affairs (DEA) for the proposed development, herein referred to as, the Houhoek Transmission Substation project. The proposed project entails the construction of the 400/132kV Houhoek Eskom Main Transmission Substation (MTS), linking to the existing 132kV Houhoek Eskom Distribution Substation, and, the loop-in and loop-out (LILO) connecting power lines from the MTS into the existing Bacchus-Palmiet 400kV Transmission power line and back to the MTS. The existing 132kV Houhoek Eskom Distribution Substation is 4.5 hectares in area.

The project site is located approximately 1km south-west of the town of Botrivier, a ward in the Theewaterskloof Local Municipality, in the Western Cape Province.

BKS (Pty) Ltd was appointed by Eskom as the Environmental Assessment Practitioner (EAP) to undertaken the required EIA process for the development of the Houhoek Transmission Substation project. BKS meets the requirements for the independent EAP in terms of Section 17 of the EIA Regulations (GN R543 of 18 June 2010, as amended).

STUDY AREA AND ALTERNATIVES

The Houhoek Transmission Substation project requires the following activities:

- A 2×500MVA, 400/132kV MTS of approximately 12 hectares in area that needs to link into the existing 132kV Houhoek Eskom Distribution Substation.
- A LILO power line that connects the existing Bacchus-Palmiet 400kV Transmission power line to the proposed Houhoek Eskom MTS. This would entail a double-circuit 400kV Transmission power line. The distances of this power line will depend on where these LILO lines will connect to the Bacchus-Palmiet 400kV Transmission power line.
- A 132kV Distribution power line that connects the proposed Houhoek Eskom MTS to the existing Houhoek Eskom Distribution Substation. The distances of these Distribution power lines depend on the location of the proposed Houhoek Eskom MTS.
- The construction of the LILO 400kV Transmission power line could require the construction of related access roads.

The EIA process requires the identification and analysis of alternatives in order to satisfy the need of the Houhoek Transmission Substation project. Therefore, the following items have been identified and are included as part of this Scoping Report (SR):

- The following macro alternatives will be considered:
  - No-Go Alternative
  - Demand-side Management
- The following site and layout alternatives will be considered:
  - Site Alternative 1 is located ±200m to the west of the existing Houhoek Eskom Distribution Substation, across the R43 road. Within this Site Alternative there are two layout alternatives that will be considered (350×320m and 450×250m).
  - Site Alternative 2 is located ±1.6km north of Site Alternative 1, and to the north-west of the existing Houhoek Eskom Distribution Substation. Due to the topographical constraints on the site, only one layout alternative (350×320m) will be considered.

  - Site Alternative 3 is located north and adjacent to the existing Houhoek Eskom Distribution Substation. Within this Site Alternative there are two layout alternatives that will be considered (350×320m and 450×250m).
  - An additional layout option, i.e. 320m × 720m (23.04ha), will also be considered during the EIA phase of the process.
- The following design alternatives will be considered:
  - Pylon Tower Structure Types
  - Optimisation of Existing Servitudes
  - Underground Transmission power lines

ENVIRONMENTAL SCOPING STUDY

The aim of the scoping study is to identify, to record and to examine the issues raised by stakeholders and specialists concerning the Houhoek Transmission Substation project in the context of the wider environment (biophysical, social and economic environmental facets). This identification and examination enables the EIA Team to focus on the Specialist Studies required and provides a framework for the EIA Phase, addressing the effects of the Houhoek Transmission Substation project on the environment, as well as the effects from the surrounding environment on the Houhoek Transmission Substation project.

As legally required, the Draft SR and Plan of Study (PoS) for EIA have been compiled in accordance with Section 28 of GN R543.

POTENTIAL IMPACTS IDENTIFIED

The following aspects were identified, for further investigation in the EIA Phase:

- Kogelberg Sandstone Fynbos and Western Rûens Shale Renosterveld vegetation within the study area which results in the ecotones established in the study area.
- Ecological Impacts related to the critically endangered vegetation types within the study area. This includes the nature reserves and the areas with high botanical and avifaunal sensitivity.
- Wetlands and watercourses within the study area, including the dam located on Site Alternative 3.
- Visual sensitivity of the study area, which relates to heritage and social aspects as well.
- Site Alternative 1 is located on agricultural land, which could also relate to the geotechnical viability of the site.

ENVIRONMENTAL STUDIES AND PUBLIC PARTICIPATION

The need for the following specialist studies has been identified during the Scoping Phase for consideration in the EIA Report:

- Geotechnical Investigation
- Soil and Agricultural Assessment
- Wetland Delineation and Assessment
- Ecological Assessment
- Avifaunal Assessment
- Social Impact Assessment
- Visual Impact Assessment
- Heritage Impact Assessment

All the issues and concerns that have been raised by the I&APs through the various channels during the Scoping Phase, including I&AP registration forms and e-mail communications, have been captured in an Issues and Response Report (IRR). Comments received during the Public Open Day, scheduled for 6 December 2012, and the focus group meetings around this date with the relevant I&APs will be included in the Final SR, after the public review of the Draft SR is completed.

THE WAY FORWARD

The Draft SR and PoS for EIA will be available for review by the public and stakeholders over a period of 40 calendar days (excluding the period between 15 December 2012 and 2 January 2013 due to the festive season), from **29 November 2012** to **25 January 2013**. The Final SR and the PoS, including all comments from the stakeholders and public, will be submitted to the DEA as the competent authority, for consideration and potential acceptance.

Thereafter, the detailed specialist studies will be undertaken for the study area in accordance with Section 32 of GN R 543. Subsequently, the EIA Report will be compiled in terms of Section 31 of GN R 543 and will include:

- A description of the project, together with a motivation for the project and details of the alternatives that were investigated.
- A description of the general environment that may be affected by the Houhoek Transmission Substation project (social, biophysical, political, etc.).
- Details of the public participation process conducted.
- Impacts and issues that were identified.
- Identification and analysis of alternatives.
- An assessment of the significance of the identified impacts according to standard assessment criteria (nature, extent, duration, intensity, probability and significance). These impacts will be assessed with and without taking cognisance of recommended mitigation measures.
- A summary of the findings and recommended mitigation measures.
- The Public Participation Process report, draft Environmental Management Programme (EMPr) and required Specialist Study reports will be collated as appendices.

The site-specific EMPr will be compiled in terms of Section 33 of GN R543, taking into account Section 24N (EMPr) and Section 28 (Duty of Care) of the National Environmental Management Act (No. 107 of 1998).

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LIST OF ABBREVIATIONS

BA	Basic Assessment
BID	Background Information Document
CFR	Cape Floristic Region
CLN	Customer Load Network
D/C	Double Circuit
DEA	Department of Environmental Affairs
DEA&DP	Western Cape Provincial Department of Environmental Affairs & Development Planning
DoA	Department of Agriculture
DoE	Department of Energy
DMR	Department of Mineral Resources
DWA	Department of Water Affairs
EA	Environmental Authorisation
EAP	Environmental Assessment Practitioner
ECO	Environmental Control Officer
EIA	Environmental Impact Assessment
EMPr	Environmental Management Programme
FEPA	Freshwater Ecosystem Priority Areas
GN R	Government Notice Regulation

HIA	Heritage Impact Assessment
HSA	Hazardous Substances Act (No. 15 of 1973)
HV	High Voltage
I&AP(s)	Interested and affected party (-ies)
IBA	Important Bird Areas
IDP	Integrated Development Plan
IRR	Issues and Responses Report
km	kilometre
kV	kilovolt
LILO	Loop-in and Loop-out
m	metre
MTS	Main Transmission Substation
MVA	Mega Volt Amperes
N2	National Road No. 2
NEMA	National Environmental Management Act (No. 107 of 1998)
NEM:BA	National Environmental Management: Biodiversity Act (No. 10 of 2004)
NEM:WA	National Environmental Management: Waste Act (No. 59 of 2008)
NFEPA	National Freshwater Ecosystem Priority Areas
NWA	National Water Act (No. 36 of 1998)
ODM	Overberg District Municipality
QDGC	Quarter-Degree Grid Cell
PPP	Public Participation Process
PoS	Plan of Study
SABAP	Southern African Bird Atlas Project
SAHRA	South African Heritage Resources Agency
SANBI	South African National Biodiversity Institute
SANRAL	South African National Roads Agency Limited
SANS	South African National Standards
SCC	Species of Conservation Concern
SDF	Spatial Development Framework
SDP	Spatial Development Plan
SIA	Social Impact Assessment

SOC	State Owned Company
S/S	Sub-Station
SR	Scoping Report
TLM	Theewaterskloof Local Municipality
VIA	Visual Impact Assessment
WEF	Wind Energy Facility

1 INTRODUCTION

1.1 BACKGROUND

The Southern Cape customer load network of the Western Grid of the Western Cape Province requires further strengthening. As such, Eskom Holdings SOC Limited (hereafter to referred to as Eskom) has applied for an environmental authorisation from the National Department of Environmental Affairs (DEA) for the proposed development, herein referred to as the Houhoek Transmission Substation project (DEA Reference Number: 12/12/20/2541 and the NEAS Reference Number: DEA/EIA/0001397/2012).

The Houhoek Transmission Substation project entails the construction of the 400/132kV Houhoek Eskom Main Transmission Substation (MTS), linking to the existing 132kV Houhoek Eskom Distribution Substation, and, the loop-in and loop-out (LILO) connecting power lines into the existing Bacchus-Palmiet 400kV Transmission power line.

The existing 132kV Houhoek Eskom Distribution Substation is 4.5 hectares in area. The existing substation is located approximately 1km south-west of the town of Botrivier, Theewaterskloof Local Municipality in Western Cape Province. The study area being considered for the development of the MTS is located in close proximity to Botrivier close to the existing Houhoek Eskom Distribution Substation.

The Houhoek Transmission Substation project requires the following activities:

- A 2×500MVA, 400/132kV Main Transmission Substation (MTS) of approximately 12 hectares in area, near the existing 132kV Houhoek Eskom Distribution Substation site.
- A LILO Transmission power line that connects the existing Bacchus-Palmiet 400kV Transmission power line to the proposed Houhoek Eskom MTS. This would entail a double-circuit 400kV Transmission power line. The distances of this power line will depend on where the LILO power line will intersect the Bacchus-Palmiet 400kV Transmission power line.
- A 132kV Distribution power line that connects the proposed Houhoek Eskom MTS to the existing Houhoek Eskom Distribution Substation. The distances of these Distribution power lines depend on the location of the proposed Houhoek Eskom MTS.
- The construction of the LILO 400kV Transmission power line could require the construction of related access roads.

BKS (Pty) Ltd was appointed by Eskom as the Environmental Assessment Practitioner (EAP) to undertaken the required EIA process for the Houhoek Transmission Substation project. BKS meets the requirements for the independent EAP in terms of Section 17 the EIA Regulations (GN R543 of 18 June 2010, as amended).

The EIA process for the Houhoek Transmission Substation project will be undertaken in accordance with Section 24 of the NEMA and sections 26 to 35 of the EIA Regulations (2010). The formal application for environmental authorisation and a declaration of independence of the EAP was submitted to the DEA on 15 August 2012.

1.2 PURPOSE OF THE STUDY

An EIA is a planning and decision-making tool. It identifies any potential negative and positive impacts that a proposed project may have and recommends ways to enhance the positive impacts and minimise the negative ones.

The EIA for this project will address the impacts associated with the project, and provide an assessment of the project in terms of the biophysical, social and economic environments to assist both the environmental authority (the DEA) and the applicant (Eskom) in making decisions regarding the implementation of the Houhoek Transmission Substation project.

The Houhoek Transmission Substation project falls under the ambit of the EIA Regulations (2010) promulgated in terms of Section 24(2)(a) and (d) of the National Environmental Management Act, 1998 (No. 107 of 1998) (NEMA), under the Government Notice Regulation (GN R) 543 of 18 June 2010, as amended. Cognisance will also be taken of the following:

- NWA – the National Water Act, 1998 (Act No. 36 of 1998);
- Related guideline documents; and
- Other relevant legislation, including provincial and municipal legislation.

The EIA consists of three (3) phases:

- The Scoping Phase;
- The Environmental Impact Assessment (EIA) Phase; and
- The Decision-Making Phase.

1.3 PURPOSE OF THE SCOPING REPORT

The main purpose of the Scoping Phase of the project is to identify and define the issues that need to be addressed in the EIA Phase. In this regard, input from the technical team, the interested and affected parties (I&APs) and the authorities have been considered and integrated in this Draft Scoping Report (SR).

In the continuing EIA process, the environmental team will then assess the identified impacts during the EIA Phase and recommend mitigation measures to prevent or minimise the possible impacts.

The purpose of this Draft SR is to document all the issues that were identified during the Scoping Phase of the EIA process and the feedback from the Public Participation Process (PPP). Prior to finalisation and submission to the DEA, this Draft SR has been made available to the public for comment from **29 November 2012** to **25 January 2013** to afford I&APs the opportunity to check that their comments and input have been accurately captured and correctly understood.

1.4 STRUCTURE OF REPORT

The following information, in accordance with Section 32 of the EIA Regulations (GN R543 of 18 June 2010, as amended), is included in this report:

- Project team details (**Chapter 2**).
- An overview of the Houhoek Transmission Substation project and the extent of the study area (**Chapter 0**).
- A description of the project alternatives (**Chapter 3.6**).
- A description of the affected environment (**Chapter 5**).
- Legislation and guidelines that pertain to the project (**Chapter 6**).
- A description of the anticipated issues to be assessed in the EIA Phase (**Chapter** 7).
- A description of the methodology followed for the EIA process including the PPP and any assumptions / limitations (**Chapter 8**).
- A plan of study for the EIA Phase (**Chapter 9**).
- Conclusions and Recommendations (**Chapter 10**)

2 PROJECT TEAM

2.1 APPLICANT

Details of the Applicant are as follows:

Applicant	Eskom Holdings SOC Limited Transmission Division: Land and Rights
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2.2 ENVIRONMENTAL ASSESSMENT PRACTITIONER

Details of the Environmental Assessment Practitioners (EAPs) are as follows:

Environmental Consultant	BKS (Pty) Ltd	
Environmental Assessment Practitioners	Mr Peter Teurlings	Ms Bronwen Griffiths
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Peter Teurlings, Senior Principal Environmental Specialist at BKS, is the EAP and Project Director and is responsible for providing guidance on the EIA Process and ensuring the professional quality of the project reports. Peter is a registered Professional Natural Scientist (Registration No. 400027/95) in the Environmental Science field of practice in terms of Section 18(1) of the Natural Scientific Professions Act (No. 27 of 2003) and is a member of the South African Chapter of the International Association of Impact Assessments (IAIA). Peter holds an MSc (Biogeography) and specialises in environmental assessment processes and project management. He has been involved in a variety of EIA processes, including residential developments, Transmission power lines, wastewater treatment projects, water supply projects, dams, roads and airports in Southern Africa.

Bronwen Griffiths, a Chief Environmental Scientist at BKS, is responsible for managing this project. Bronwen is a registered Professional Natural Scientist (Registration No 400169/11) in the Environmental Science field of practice in terms of Section 18(1) of the Natural Scientific Professions Act (No. 27 of 2003), and is a member of both the South African Chapter of the IAIA (currently serving on the National Executive Committee) and the Botanical Society of South Africa (BotSoc). Bronwen holds a BSc (Botany/Zoology), a BSc (Honours) Botany, and, a MSc (Quantitative Conservation Biology). She has been

involved in a range of sectors within the environmental assessment profession, and has been involved in all facets of projects from review, drafting, project management, to provision of advice to members of the local community. Bronwen has been involved in a range of projects from petrochemical industry, waste developments, and particularly projects with a specific biodiversity bent. Bronwen is currently also working on a regional waste disposal site and a large inter-catchment water transfer project.

Robin Swanepoel, a Chief Environmental Scientist at BKS, is responsible for the compilation of the Environmental Management Programme (EMPr) derived from the EIA process. Robin has a B.Tech in Nature Conservation and a B.Tech in Environmental Management. Robin has fourteen years of hands-on specialist experience in the environmental / conservation related fields and one year in the security industry. Through the former period he has been employed in both the Government and Private sectors managing areas of conservation worthy status. During this period he has managed (as a Managing Member) an Environmental Technical Services company providing specialist input/services to local and national Governmental organisations and in the capacity of Principal Environmental Manager, oversaw some of the large construction activities in southern Africa. Currently, he is employed by BKS as Chief Environmental Scientist: EMPr and ECO, where his focus has shifted to include the overseeing of project inception and planning and design phases, through to and including, construction-related environmental compliance monitoring of large scale infrastructural developments.

Bharat Gordhan, a Senior Environmental Scientist at BKS, is responsible for compiling the Environmental Assessment Report. Bharat holds a BSc (Geography and Environmental Management) and specialises in environmental assessment processes and the compilation of EMPrs. He has been involved in a variety of EIA processes, including Eskom Transmission power lines, residential developments, road upgrades, filling stations and pipelines in Southern Africa. At the time of this report, he was working on the proposed 400kV Eskom Transmission power line from a proposed Mitchell's Plain Substation to Firgrove Substation in Cape Town, Western Cape.

2.3 PUBLIC PARTICIPATION TEAM

Dr David de Waal is the Senior Principal Social Specialist at BKS who specialises in the fields of community development, community capacity building and participative planning processes. His experience includes numerous years of close involvement in the rural and urban development environment at policy, strategy and grass roots implementation levels. He has been extensively involved in community-based capacity building process. He has facilitated a number of processes at Local Government level, which required intensive public participation. These included mediation between affected parties and government structures to ensure consensus-based outcomes and decision-making. Processes he has successfully facilitated include public participation and facilitation for the establishment of landfill sites, road structures, flood attenuation structures and pollution problems. He serves on a number of development and community based committees. He also sits on the ISO 14001 Advisory Committee of the South African Bureau of Standards. He is co-author of: *"The promotion of participate development management at grass roots level, a field guide"*, for the Water Research Commission of South Africa. He is also the author of various courses,

articles and reports in his field of activity. David will oversee the public participation process and his team of experts. David will also act as facilitator, at need, should any conflicts require resolution.

Marti le Roux is the social facilitator for the project for which she has a sound working knowledge of the public participation field over the last 12 years. During this time, Marti has worked on a range of projects of varying scales. Her ability to effectively communicate in Afrikaans and English will be an asset during consultation with I&APs. Marti will act as a direct interface between the environmental team and the members of the community.

Mamokete Maimane has gained experience in data collection and collation, identification of I&APs, taking and compiling of minutes of meetings, and, basic environmental management. Her ability to effectively communicate in English and Afrikaans, as well as a number of African languages, will also be an asset during consultation with I&APs. Mamokete is a trained scientist and will bring this ability to the project team. Mamokete will oversee the day to day roll out of the PPP and will be a primary contact point for the community.

2.4 GEOTECHNICAL, SOIL AND AGRICULTURAL POTENTIAL

Surita Madsen-Leibold of BKS is a professional engineer that has over 20 years of experience in the fields of geotechnical engineering, roadway engineering and bridge design. Her key experience includes geotechnical investigations for a large variety of infrastructures and projects, including housing developments, buildings, dams, canals, pipelines, culverts and bridges. She has obtained a Masters Degree in Pavement Engineering from the University of Stellenbosch and regularly consults on geotechnical engineering aspects of projects. Surita will be gathering and presenting a detailed consideration of the geotechnical information for the wider project site.

Garry Paterson is a Senior Soil Scientist at the ARC-Institute for Soil, Climate and Water. His fields of speciality are soil classification and mapping, soil interpretations, soil surveys and land capability, and ground penetrating radar. Garry will be providing a detailed consideration of the soils and the potential limitations imposed thereby for the Houhoek Transmission Substation project sites and their alternatives.

2.5 WETLAND, ECOLOGICAL AND AVIFAUNAL

Dean Ollis **from Freshwater Consulting is a professional natural scientist** (Registration No 400102/06) **and a member of the Southern African Society of Aquatic Scientists.** He has more than 10 years of experience in the environmental sciences field, specialising in water quality, aquatic ecosystems, “river health” assessments, and, wetland assessments. He has contributed to the development of a national wetland classification system for South Africa. Freshwater Consulting has undertaken numerous assessments for a range of proposed developments in the Western Cape region. Deon will provide a consideration of the presence of either watercourses (including seep-lines) or wetlands that may be impacted on by the Houhoek Transmission Substation project for each site alternative.

Nick Helme **is a registered professional natural scientist** (Registration No 400045/08) **at Nick Helme Botanical Surveys.** He specialises in the diverse flora of the South Western Cape

and the Cape Floristic Region. He has done over 1000 botanical assessments for various proposed developments throughout the Western Cape Province. Nick is a co-author of the Fynbos chapter in the Vegetation Map for South Africa (Mucina & Rutherford, 2006) and guidelines for biodiversity offsets in the Western Cape (DEA&DP, 2007). **Nick has also worked on the Vegetation Assessment for an Eskom power line from the Hermanus to the existing Houhoek Substation (2004).** Nick will provide a consideration of the biodiversity and ecological functionality of each of the site alternatives as they may be impacted on by the Houhoek Transmission Substation project.

Chris van Rooyen has 14 years' experience in the management of avifaunal interactions with industrial infrastructure. He was head of the Eskom-Endangered Wildlife Trust Strategic Partnership from 1996 to 2007, which has received international acclaim as a model of co-operative management between industry and natural resource conservation. He is an acknowledged global expert in this field and has worked in South Africa, Namibia, Botswana, Lesotho, New Zealand, Texas, New Mexico and Florida. Chris also has extensive project management experience and has received several management awards from Eskom for his work in the **Eskom-EWT Strategic Partnership**. He is the author of 15 academic papers (some with co-authors), co-author of two book chapters and several research reports. He has been involved as ornithological consultant in more than 100 power line projects and several wind generation EIA processes and risk assessments on existing power lines and power stations. In January 2008, Chris established an ornithological consultant firm together with Albert Froneman, who specialises in wildlife hazard management on airports. They are currently involved in numerous environmental projects with a focus on avifaunal related impacts associated with various industrial sectors, including mining, residential development, electricity supply and air transport. Chris will consider the wider area in terms of possible impacts on the avifaunal species occurring or believed to occur within the area, with specific consideration of each of the site alternatives under investigation.

2.6 SOCIAL, VISUAL, AND HERITAGE

Ingrid Snyman is an experienced Social Impact Assessment (SIA) practitioner, with extensive experience in implementing SIAs. She has worked on over 20 SIAs for Eskom projects, and has worked in the areas surrounding the existing Houhoek Substation. Ingrid will gather the social related information, including that obtained through the PPP, and will integrate this and consider it formally in a SIA for the project area, including consideration of the various site alternatives.

Stephen Stead (PrLArch) **of VRM Africa CC is registered with the Association of Professional Heritage Practitioners** (APHP) **Western Cape as an independent professional visual impact practitioner to facilitate Visual Impact Assessments** (VIA). VRM Africa makes use of the well documented Visual Resource Management methodology developed by the Bureau of Land Management (USA) for assessing the suitability of landscape modifications. In association with ILASA qualified landscape architect Liesel Stokes, he has assessed over 100 major landscape modifications throughout southern and eastern Africa. VRM Africa has been operating for eight years and has successfully established and retained a large client base throughout Southern Africa. Stephen is also a past President of IAIAsa. Stephen and his team

will be considering the existing visual characteristics of each site alternatives, and then the implications of the Houhoek Transmission Substation project thereon.

Tim Hart of the Archaeology Contracts Office (ACO) **at the University of Cape Town is a registered professional archaeologist** (principal investigator level) **and registered generalist/specialist heritage impact assessor, with 21 years of working experience in heritage impact assessment, heritage management and archaeological research.** As a founder member of the ACO, he has worked in a very wide variety of contexts including mitigation of archaeological sites in suburban, rural and industrial situations. Tim served a term on the Heritage Western Cape's Built Environment and Landscapes Committee (BELCOM) and is now serving on the Archaeology, Palaeontology and Meteorites committee thereof. He has a particular interest in industrial heritage, historic landscapes and development of conservation management plans. Tim is a member of the Association of Southern African Professional Archaeologists and its Cultural Resource Management section. Tim will be considering the heritage aspect of the Houhoek Transmission Substation project on the site alternatives under consideration – this will include consideration of archaeological and paleontological considerations, as well as other facets relating to heritage.

2.7 ENVIRO-LEGAL

The environmental legal input and review of the Draft Scoping Report has been provided by **Gillian Arenstein**, Associate of Warburton Gunn Attorneys, a firm of attorneys specialising in the sustainability of projects. Gillian will be providing a consideration of the documentation as generated for submission and checking for legal compliance, potential oversights, etc. from an environmental specialist legal point of view.

2.8 PEER REVIEW

In order to ensure that the reports as generated from the EIA process are deemed to be (a) unbiased, (b) comprehensive, (c) appropriate and compliant to the legislative framework (i.e. meeting the letter and spirit of the law), (d) meet the procedural requirements of the legislation, and (e) are in line with best practice in South Africa, the **reports will be reviewed in detail by an acknowledged environmental assessment specialist**. Edits will be made according to this input, the documents then finalised, and the documentation finally submitted to the DEA for consideration. The peer reviewer is to be chosen shortly in order to review the Draft SR at the same time as the document is out for public review.

2.9 GEOGRAPHICAL INFORMATION SYSTEMS

All data provided by the above-mentioned specialist studies will be captured on a Geographical Information System (GIS) **tool by Vee Cowie of EcoGIS**. This will allow the project team to recommend a location for the construction of the Houhoek Substation upgrade and a route alignment for the 400kV Bacchus-Palmiet LILO project. This data will also support the Scoping and EIA Reports by producing various maps to indicate the different scenarios.

The process of capturing the information and mapping will be undertaken within the parameters of a standardised GIS format. This adds value to the process as all available data sets would then be consistent with each other, resulting in the delivery of relevant, timely, accurate information for decision-making purposes.

2.10 SUMMARY

The senior EAP and his team at BKS are supported by other BKS personnel and a range of specialists (listed in **Table 2-1**). Input from Eskom Transmission is important for the completeness of the process and accuracy of project-related information. An enviro-legal peer review is also undertaken to ensure the legality of the process.

Table 2-1: Project Team

NAME	ROLE ON TEAM	COMPANY
Peter Teurlings	Project Director, EAP & Professional Natural Scientist	BKS (Pty) Ltd
Dr David de Waal	Public Participation Facilitator	BKS (Pty) Ltd
Bronwen Griffiths	EAP's Project Manager & Professional Natural Scientist	BKS (Pty) Ltd
Robin Swanepoel	EMPr compilation & Environmental Technician	BKS (Pty) Ltd
Bharat Gordhan	Environmental Scientist	BKS (Pty) Ltd
Robin Swanepoel	EMPr Specialist	BKS (Pty) Ltd
Marti le Roux	Public Participation Manager	BKS (Pty) Ltd
Mamokete Maimane	Public Participation Officer	BKS (Pty) Ltd
Elsje Greyling	Project Administrator	BKS (Pty) Ltd
SPECIALISTS		
Surita Madsen-Leibold	Geotechnical Assessment	BKS (Pty) Ltd
Garry Paterson	Soil and Agricultural Assessment	Agricultural Research Council
Dean Ollis	Wetland Delineation and Assessment	Freshwater Consulting
Nick Helme	Ecological Assessment	Nick Helme Botanical Studies
Chris van Rooyen	Avifaunal Assessment	Chris van Rooyen Consulting
Tim Hart	Heritage Impact Assessment	University of Cape Town
Steven Stead	Visual Impact Assessment	VRM Africa
Ingrid Snyman	Social Impact Assessment	Ingrid Snyman Development Consultants
Vee Cowie	GIS Coordinator	EcoGIS
LEGAL REVIEW		
Gillian Arenstein	Enviro-Legal Review	Warburton Gunn Attorneys
ESKOM TRANSMISSION		
Rudzani Ranwedzi	Eskom Senior Environmental Advisor: Project Manager for this project	Eskom Transmission

NAME	ROLE ON TEAM	COMPANY
Boitumelo Mosiane	Eskom Senior Engineer (Planning)	Eskom Transmission
Sipho Shabalala	Eskom Surveyor	Eskom Transmission
Derrick Angrove	Eskom Senior Electrical Engineer (Line Designer)	Eskom Transmission
Cass Naidoo	Eskom Electrical Design Engineer (Substations)	Eskom Transmission
Fred Grové	Eskom Senior Design Engineer (Geotechnical)	Eskom Transmission
Solly Phalanndwa	Eskom Senior Civil Design Engineer (Geotechnical)	Eskom Transmission
ESKOM DISTRIBUTION		
Henk Landman	Eskom Senior Supervisor	Eskom Distribution
Mazafar Ebrahim	Eskom Design Engineer	Eskom Distribution

3 OVERVIEW OF THE PROJECT

3.1 BULK SUPPLY OF ELECTRICITY IN SOUTH AFRICA

Eskom is divided into Eskom Generation, Eskom Transmission and Eskom Distribution divisions. Eskom Generation is responsible for the generation of electricity at power stations, while Eskom Transmission is responsible for the transmission of electricity between 765kV to 132kV from power stations at high voltages across the country to Main Transmission Substations (MTS). Eskom Distribution is responsible for the distribution of electricity below 132kV from the MTS to local municipalities and other end-users.

Most cities and municipalities purchase electricity in bulk from Eskom Transmission / Eskom Distribution and sell it to households, industries and other end users within their areas of jurisdiction, while Eskom Distribution also sells electricity directly to bulk end users in some parts of South Africa.

Since electricity cannot be stored, demand and supply of electricity must be balanced instantaneously (Schoefield, 2007). Therefore, power has to be generated and delivered over long distances at the moment it is required. The nature of bulk supply of electricity in South Africa is illustrated in **Figure 3-1**.

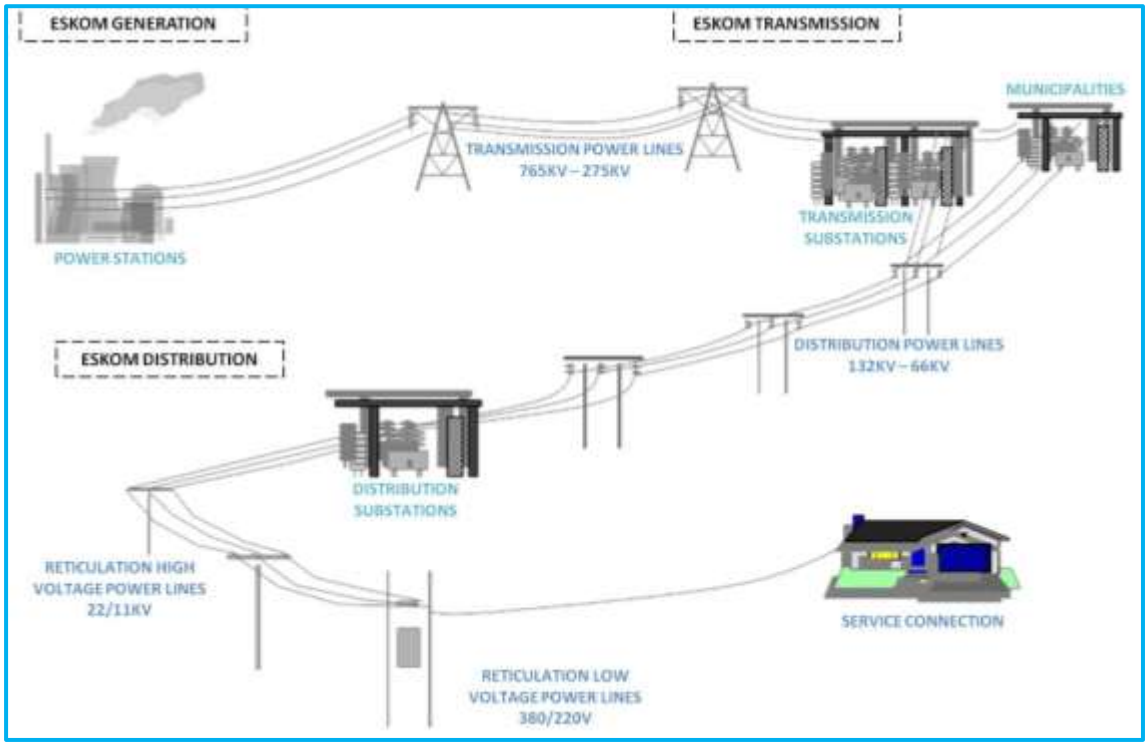


Figure 3-1: Nature of bulk electricity supply in South Africa

Eskom has a mandate to satisfy potential customer needs as an essential service, which implies certain responsibilities. One of the most significant of these is to find and maintain the balance between satisfying society's needs for electricity without having a detrimental effect on the environment. In order to achieve this, Eskom must continually re-assess its present infrastructure and take new developments into account to ensure that growing needs for electricity are satisfied, without considerably impacting on the environment.

3.2 NEED AND DESIRABILITY OF THE PROJECT

The Customer Load Network (CLNs) in the Western Grid of the Western Cape Province is divided into the Cape Peninsular, West Coast, Southern Cape and Namaqualand CLNs. Each CLN is interconnected with an MTS and a distribution network (400kV, 220kV and 132kV). The project area falls within the **Southern Cape CLN**, which accounts for 21% of the entire load in the Western Grid network, and consists of the following MTSs:

- Bacchus MTS.
- Droerivier MTS.
- Komnsberg MTS.
- Mossel Bay MTS.
- Palmiet MTS.
- Proteus MTS.

The Houhoek area is largely fed by the Bacchus MTS, with electricity supply is also received from the Stikland MTS (via the Firgrove MTS) and Muldersvlei MTS. The Bacchus MTS is currently at 450 mega volt amperes (MVA) – 90% of the firm capacity of 500MVA. Based on the load forecast (or the anticipated demand for electricity), the Bacchus MTS will reach firm capacity by 2014-2015. The thermal capacity of the 132kV Distribution power lines that supply the Houhoek area will *technically* be exceeded by 2013. It is possible to operate the distribution network till approximately 2016 by providing supply to the Houhoek area from the Gala Distribution Substation in Grabouw. However, there are still technical limitations that apply to this possible solution. The 132kV distribution network in the Houhoek area would no longer comply with the N-1 criteria (**see inset for further detail**).

Criteria	Description
N-1	The network can withstand the loss of any element and maintain supply to all customers.
N-1 secure	The network can withstand the loss of any element and maintain supply to all customers. In addition the network can be subsequently re-configured to withstand a further outage. During the time taken to re-configure, the network is at risk.

In order to solve these network constraints, it is proposed that a new 400kV MTS be constructed **by 2014** to supplement the existing 132kV Houhoek Distribution Substation. The new Houhoek MTS would relieve the pressure on the Bacchus MTS as more than 90% of the Houhoek Distribution network is fed from the latter MTS.

In addition, the new Houhoek MTS will be able to supply the long-term future load growth anticipated in the Southern Cape CLN. The anticipated growth can also be attributed to Wind Energy Facilities that are currently being explored by Independent Power Producers in this region.

3.3 TECHNICAL DETAILS

3.3.1 Proposed Houhoek Main Transmission Substation

The proposed Houhoek MTS will be approximately 12 hectares, in extent. Initially two alternative layout options would be considered, i.e. 320m × 350m (11.2ha), and 450m x 250m (11.25ha).

Discussions with Eskom however indicate that the need may exist for an additional layout option, i.e. 320m × 720m (23.04ha).

In addition, three (3) location alternatives will be considered.

The proposed Houhoek MTS will thus contain the following infrastructure:

- 500MVA MTS;
- 2 × 400kV line bay for the 400kV LILO from the Bacchus-Palmiet 400kV Transmission power line;
- Electrical Transformers;
- Circuit breakers or line termination structures;
- High voltage switchgear;
- Low voltage switchgear;
- Telecommunication high mast;
- Surge and lightning protection equipment;
- Control and metering equipment;
- Office and ancillary buildings;
- Approximately 3.5m high fencing around the substation site;
- Platforms; and
- Access Roads.

3.3.2 Loop-in and Loop-out Transmission Power Line

The project intends establishing a 400kV double-circuit Transmission power line to LILO of the existing Bacchus-Palmiet 400kV Transmission power line.

See **Chapter 4.3** for alternative pylon structure designs.

3.3.3 Distribution Power Line

The project intends establishing a 132kV Distribution power line to link the proposed Houhoek 400kV MTS and the existing Houhoek 132kV Substation.

The type of pylon structures or the extent of the Distribution Power Line to be considered has not been determined at this stage of the EIA process.

3.3.4 Linkage of proposed project into Eskom network

The existing Houhoek 132kV Substation and High Voltage (HV) Line configuration is indicated in **Figure 3-2**.

The context of the proposed development is given in the sections that follow.

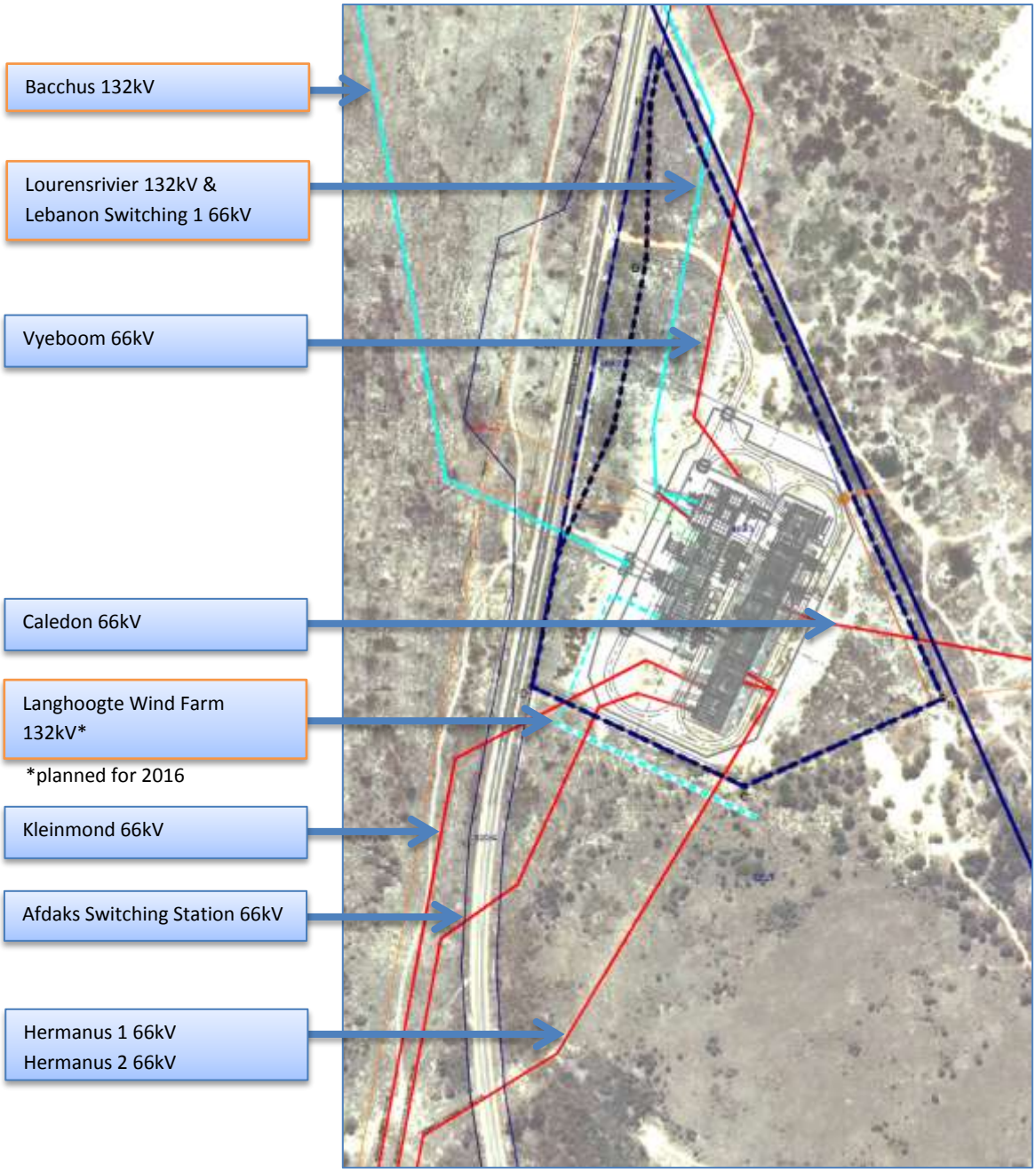


Figure 3-2: Nature of bulk electricity supply in South Africa

a) 132kV Lines

The existing Houhoek substation is supplied via the 132kV Bacchus single circuit line, and from the Lourensrivier 132kV circuit.

The Lourensrivier 132kV circuit shares a 132kV double circuit (D/C) line with the Lebanon Switching 1 circuit which is running at 66kV. This D/C line runs parallel to the decommissioned Lebanon2 66kV line.

b) 66kV Lines

The Houhoek 132/66kV substation feeds:

- 2x Hermanus circuits via a 66kV D/C line running South;

- Kleinmond via a 66kV line running South;
- Afdaks Switching via a 66kV line running South;
- Caledon via a 66kV line running East;
- Lebanon Switching 1 @66kV via a 132kV D/C line running North-West; and
- Vyeboom via a 66kV line running North.

c) Future Developments

There are two wind farm applications currently awaiting approval; the Langhoogte Wind farm and Caledon Wind. Each approaches the existing Houhoek substation (S/S) from a different direction; Caledon from the North, and Langhoogte from the South. The routes proposed for the wind farms are shown in **Figure 3-3** below; Caledon Wind will have to find a route for a double circuit from the north to Houhoek S/S.

Both aim to be connected to the grid by 2016 but there is only capacity for one of the wind farms to be connected to the Eskom network as the network stands at this time.

Lebanon Switching 1, running at 66kV on a 132kV line, is expected to be upgraded to 132kV around 2025. A 66kV supply will still be needed in that direction, and the disconnected Lebanon2 66kV line could be brought back into commission to accomplish that.

Figure 3-3: Linkages of surrounding Eskom infrastructure into existing Houhoek Substation

The initial site visit carried out as part of this EIA process to determine which sites, identified as Site Alternatives in this document, could be technically feasible, revealed the options as shown in **Figure 3-4**.

In the scenarios presented by the development of the new 400/132kV Houhoek Eskom MTS on one of the proposed footprints, a total of 13 available 132kV feeder bays will be made available, this will serve:

- 2 lines to the current Houhoek S/S;
- Take in the Bacchus-Houhoek line;
- Take in the Houhoek-Lourensrivier 132kV line, on a double circuit with provision for the 66kV to 132kV upgrade of Houhoek-Lebanon Switching 1;
- Wind double circuit, either Caledon or Langhoogte, the other will remain on Houhoek S/S;
- Bredasdorp double circuit, future strengthening;
- Hermanus double circuit, future upgrade from 66kV to 132Kv; and
- Space for two future 132kV feeder bays.

3.4 SERVITUDE AGREEMENT

The servitude width required to accommodate the towers on which the Transmission power line will be strung varies from 40m to 55m wide, depending on the type of pylon tower required. The servitude is required in order to ensure safe construction, maintenance and operation of the Transmission power line and Eskom will be entitled to unrestricted access.

For safety reasons, the 400kV Transmission power line requires minimum clearance distances, which are summarised as follows:

- The horizontal clearance to cater for Transmission power line swinging in adverse climatic conditions.
- The minimum vertical clearance distance between the ground and the Transmission power lines is 15m.
- The minimum vertical clearance to any fixed structure that does not form part of the Transmission power line is 0.4 – 11m.
- The maximum operational height under the tower conductors is 5.5m.
- Most farming activities can be carried out under the conductors, provided that there is adherence to safe working clearances, building restrictions and restrictions to certain crop types, e.g. tree crops.

Minimum clearance distances for the 132kV Distribution power line is not known at this stage of the process.

Registration of the servitude would give Eskom the right to erect, operate and maintain the Transmission power lines and to access the land to carry out such activities, but it does not constitute full ownership of the land. In turn, access and the activities must be carried out with due respect to the affected landowners. The servitude required for the project will be registered at the Deeds office and will form part of the title deed of the relevant properties once the environmental authorisation has been obtained. The Servitude Negotiation Process is described in **Section 8.5.1.**

3.5 STUDY AREA OF PROJECT

The study area is located approximately 92km east from Cape Town within the Theewaterskloof Local Municipality (TLM). The TLM is the largest local authority in the Overberg District Municipality (ODM), embracing the City of Cape Town on its western boundary and sharing the eastern coastline with the Overstrand Municipality, within the Western Cape Province. See **Figure 3-4** for a locality map of the study area.

The N2 Highway between Cape Town and Caledon borders the northern and eastern sides of the study area, whilst the R43 provincial road to Hermanus bisects the study area through the middle in a north-south direction.

There is a railway line, also running between Cape Town and Caledon that is situated just outside the north and eastern border of the study area.

The eastern section of the study area, adjacent to and into the lower edges of the Houwhoek Nature Reserve, slopes downwards towards the east and thus towards the middle of the study area.

Agricultural activities are noted along the R43 provincial road, toward the middle of the study area dominantly in the form of smallholdings on the western side of the R43, and larger agricultural developments such as vineyards on the eastern side.

The town of Botrivier is to the north-east of the study area and falls within the curve of the N2 highway.

The northern boundary of the study area is the existing Bacchus-Palmiet 400kV Transmission power line.

The study area includes for the proposed Transmission Substation and power line, and the Distribution power line (as described in **Chapter 3.3**). The Transmission power line is for a servitude width of 55m, with the Distribution power line servitude width at 22m.

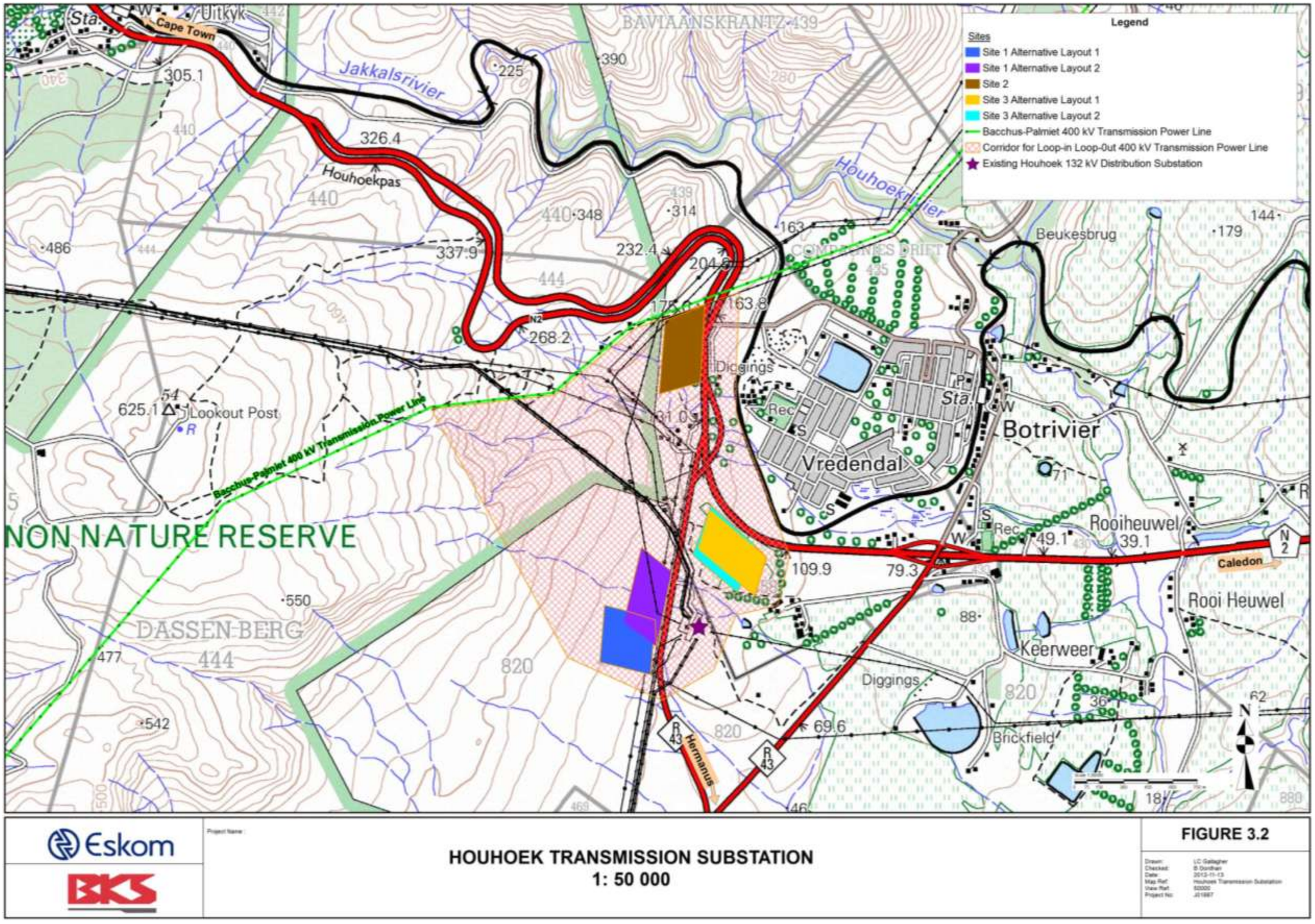


Figure 3-4: Locality Map of study area

3.6 CONSTRUCTION PROCESS

3.6.1 Construction Camps

The Contractor will require a site office/yard for the duration of the contract period. The entire construction workforce is unlikely to be accommodated in a construction camp that will be situated along the recommended route alignment and substation location (**Figure 3-4**). This is especially so for the lesser-skilled contract workers that will potentially be able to be drawn from the local community based at Botrivier.

Aspects such as access to the construction site, access to services and access to materials will be considered for the location of the construction camp. The location of the construction camp will only be determined once a route alignment and substation location is recommended.

The Contractor's site camp shall be located within the development footprint, or on a site appropriately zoned and/or authorised for such use and approved by the Environmental Control Officer (ECO) that will need to be appointed to monitor the Contractor's compliance to the site-specific Environmental Management Programme (EMPr) once an environmental authorisation has been obtained. The Contractor shall select a location that is easy to access and that has already been cleared or disturbed by previous human activity (e.g. previous construction camps or stockpile areas). All construction activities, materials, equipment and personnel will be restricted to within the area specified. The site camp may not be located on any of the environmentally sensitive areas, such as nature reserves, Critical Biodiversity Areas or wetlands.

All materials are stored at the construction camp, with the exception of concrete and the steel towers (which may come direct from the factory). Generally, in a rural area there is one construction camp per 100km of Transmission power line. Therefore, only **one construction camp** will be used for the construction of the proposed Houhoek MTS project. **Figure 3-5** shows photographs of typical construction camps.

Figure 3-5: Examples of typical construction camps

3.6.2 Construction Process for the Proposed Houhoek Transmission Substation

The construction of the Houhoek MTS will be constructed using the following sequence of activities:

1. Determine technically feasible alternatives
2. EIA input into alternative locations for substation and route alignments for the 400kV Transmission and 132kV Distribution power lines into the substation
3. Negotiate with affected landowners, including Post-Authorisation negotiations
4. Survey the site
5. Design the substation
6. Issue tenders and award the contract
7. Clear vegetation and construct access roads (where required)
8. Construct terrace and foundations, including the Transmission oil pond
9. Assemble and erect equipment
10. Connect conductors to equipment
11. Rehabilitate any disturbed areas and protect erosion-sensitive areas
12. Test and commission
13. Continue maintenance

a) Timing

The construction of the proposed Houhoek MTS will be undertaken over 12 months.

b) Access/Service Roads

Eskom requires access/service roads for the construction and maintenance phases. As the recommended alignment will be along existing road infrastructure, no new access roads should be required for this project. However, this will be confirmed in the EIA phase.

c) Ongoing Maintenance

The standard lifespan of an MTS and its associated components is approximately 25 years. Continuous maintenance will be carried out (including the replacement of components).

3.6.3 Construction Process for Transmission Power Line

The construction process outlined in **Table 3-1** will be followed for the route of the LILO Transmission power line to tie into the existing Bacchus-Palmiet 400kV Transmission power line.

Activities will be undertaken in steps so that, at any point, an observer will see a chain of events with different working teams involved. At any time, some or all of the different teams may work at different points along the line.

Construction of this line will take approximately 12 months to complete, and is expected to begin towards the end of 2014 after approximately the negotiation process (**Section 4.3.2**).

Table 3-1: Construction Process for Transmission Power Lines

Activity		Approximate Team Size	Approximate Duration of Activity
1	Survey of the route	-	-
2	• Determination of the conductor type and selection of best-suited conductor, towers, insulators and foundations • Define final centre line • Determine the co-ordinates of each bend in the line • Undertake an aerial survey to obtain an accurate profile of the area • Identify optimal tower sizes and positions	-	2 months
3	Final design of power line	-	2 – 3 months
4	Issue tenders and award contract to construction company / companies	-	3 – 6 months
5	Find suitable location for the construction camp	-	1 week
6	• Vegetation clearance centre line (4x4 vehicle access for the shallower slopes and access limited to by foot for the steeper areas, is required) • Clear shrubs and trees (as determined by the Environmental Management Programme) along the centre line with the aid of a surveyor • Clear vegetation (trees and large shrubs only – grass and forb species (including fynbos shrubs) will not be cleared in order to minimise disturbance and potential erosion in accordance with the minimum standards to be used for vegetation clearing for the construction of the proposed Transmission power lines	5 – 15	1 – 2 days, depending on local conditions
7	• Centre line pegging and identification of requirements and locations for the new gate (4x4 vehicle access for the shallower slopes and access limited to by foot for the steeper areas, is required)	3	1 day
8	• Access negotiations (4x4 vehicle access for the shallower slopes and access limited to by foot for the steeper areas, is required) • Develop and agree on an access plan (Eskom, Contractor and landowners) • Agree to rehabilitation process • Photograph pre-construction conditions off-site • Establish access roads (where required)	1	1 day
9	New gate installation (4x4 vehicle access for the shallower slopes and access limited to by foot for the	5	1 day

Activity		Approximate Team Size	Approximate Duration of Activity
	steeper areas, is required)		
10	• Vegetation clearance (tower positions) • Clear four strips (40m × 40m square for Cross Rope Suspension (CRS) towers and 20m × 20m areas for the self-supporting towers) for assembly and erection at each marked tower position	5 – 15	1 – 2 days, depending on local site conditions
11	• Foundation nominations for main structure and anchors (heavy vehicle access is required) • Check soil types to determine foundation requirements • Dig trial pits at main foundation points (usually using mechanical back-actor/auger methods, although manual labour may be used)	5	2 days
12	• Excavate foundations (heavy vehicle access is required) • Excavate foundations of up to 4m × 4m and up to 4m deep per pylon footing, depending on soil conditions (mechanically where access to tower sites is available, and by hand where access is poor) • Cover or fence-off the foundation pit until foundation is poured (see **Figure 3-7**)	15	2 days
13	• Foundation steelwork – reinforcing (heavy vehicle access is required) • Transport steelwork structure to site by truck or potentially by air for mountainous landscapes • Transport of steelwork structure to any parts of the site higher up the slope may need to be by air • Fitting and wiring on site (limited welding on site)	10	2 days
14	• Pour concrete foundation (heavy vehicle access is required) • Shuttering • Use standard concrete truck • Where there are access problems, mix concrete on site • A 28-day period is required after concrete has been laid • Heavy usage of access/service roads during this stage	20	30 days
15	• Deliver tower steelwork (heavy vehicle access; extra-long trucks used, or potentially by air for mountainous landscapes)	5	1 day

	Activity	Approximate Team Size	Approximate Duration of Activity
	• Deliver steelwork in sections and assemble on site (see **Figure 3-8**) • Mark access roads to ensure the correct tower is delivered to each site (towers are designed as unique for each location)		
16	• Assembly team/punching and painting (light vehicle access is required) • Assemble steelwork on the ground • Punch nuts and paint with non-corrosive paint	10	3 days
17	• Erection (abnormal-load-vehicle access or potentially by air is required for mountainous landscapes) • Final assembly of towers by cranes (minimum of 50 tons) – see **Figure 3-9**.	20	2 days
18	• Stringing (abnormal load vehicle access or potentially by air is required for mountainous landscapes) • Place cable drums within the servitude • Undertake stringing in both directions • The working area at each drum will be as long as 130m, but will be within the servitude • Intensive vehicle activity within the working area is likely • Pilot tractor will lay cable on the ground • Pull up cable using a pulley • Ensure conductors never touch the ground	50	7 days
19	• Sag and tension (heavy vehicle access or potentially by air is required) • Tension the line from each station to ensure minimum ground-clearance heights (8.4m for 400kV Transmission power lines)	10	3 days
20	• Rehabilitation (heavy and light vehicle access is required) • Continuous process throughout the construction phase • Typically only commences after the first 100 towers are constructed but, in this instance, will commence after all the towers are constructed • There is a one-year guarantee on the Contractor's work, during which rehabilitation must be concluded	5 – 15	2 – 10 days, depending on local site conditions

Figure 3-6: Foundations drilling

Figure 3-7: Cover for foundations

Figure 3-8: On-site erection of towers

Figure 3-9: Erection of towers by crane

3.7 ESKOM AGRICULTURAL POLICY

Eskom's *Vegetation Management under Power Lines* (Vosloo, 2009) has elements that relate to agricultural activities under Transmission power lines, and is therefore applicable to this project. There is no specific guideline document that relates directly to the agricultural activities under any power lines.

Agricultural activities are allowed to be undertaken under Eskom Transmission power lines as long as the agricultural crops and equipment do not interfere with the power line infrastructure. The minimum ground clearances and minimum safe distances to trees/ structures according to the particular voltages are presented in **Table 3-2**.

Table 3-2: Safe Distance Specifications of Transmission Power Lines (Vosloo, 2009)

Voltage	Servitude Width	Ground Clearance	Safe distance to Trees
132kV	31 – 36m	6.3m	3.8m
220kV	47m	6.7m	4.2m
275kV	47m	7.2m	4.7m
400kV	40 – 55m	8.1m	5.6m
765kV	80m	10.4m	8.5m

Although it could not be confirmed at this time, it is doubtful that Eskom will allow overhead irrigation under Transmission power lines. Although not directly relevant to this project, it is interesting to note that it would not be possible to use pivot irrigation if the Transmission power line intersects the pivot circle. Drip and micro-irrigation are possible under the Transmission power line, but Eskom needs to confirm this in the servitude agreement with the specific landowner (see **Section 8.5.1** for the Servitude Negotiation Process).

The servitude is required to ensure safe construction, maintenance and operation of the Transmission power line and Eskom will be entitled to unrestricted access. The servitude width required to accommodate the towers on which the Transmission power line will be strung varies from 40m to 55m, depending on the type of pylon tower required and the space available for the servitude (e.g. in urban areas a servitude width of 40m could be accommodated).

Eskom will need to use access/service roads for the construction and maintenance of the proposed substation and power lines. Where there are no access/service roads they will be negotiated with the specific landowner.

4 DESCRIPTION OF ALTERNATIVES

4.1 INTRODUCTION

> "*Alternatives are different means of meeting the general purpose and need of a proposed activity. The identification, description, evaluation and comparison of alternatives are important for ensuring the objectivity of the assessment process. In cases where there is no objective and thorough assessment of alternatives, the EIA process usually only confirms a chosen activity and the value of the assessment as an input to a decision-making may be compromised*" (DEAT Guideline 5, 2006c).

The following alternatives will be assessed (which were determined and screened based on specialist planning, environmental, social, engineering and economic inputs):

- Macro Alternatives
  - No-Go Alternative – *status quo*
  - Demand-Side Management
- Design Alternatives:
  - Pylon Tower Structure Types
  - Optimisation of Existing Servitudes
  - Underground Transmission power lines
- Technical Alternatives:
  - Site Alternatives for Houhoek Substation
  - Layout Alternatives for Houhoek Substation
  - Route Alternatives for LILO 400kV Transmission power lines and for 132kV Distribution connection power lines

4.2 MACRO ALTERNATIVES

4.2.1 The No-Go Alternative

The DEA stresses that the No-Go alternative must be considered in cases where the proposed activities will have a significant negative impact that cannot be avoided and/or effectively or satisfactorily mitigated.

The No-Go alternative necessitates that the construction of the proposed Houhoek Transmission Substation project should **not** be undertaken.

If the aforementioned scenario transpires, then the Bacchus MTS will reach firm capacity and not be able to provide a secure supply of electricity to the Houhoek area and the remainder of the Southern Cape CLN after 2014 – 2015.

In addition, the existing distribution network would exceed thermal capacity by 2013, resulting in possible lack of/intermittent supply of electricity to the Houhoek area.

It should be noted that the proposed development in the region (including the Wind Energy Facilities that are currently being explored) would not have access to a firm supply of electricity in the near future.

The No-Go alternative will illustrate the implications of the proposed activity not being authorised and will be used as a *status quo*, against which the other alternatives will be assessed.

4.2.2 Demand-Side Management

Demand side management is a task undertaken by Eskom in order to reduce the amount of electricity used during peak periods. This can be attained by the reduction of peak demand and load shedding.

However, this alternative cannot be assessed further as Eskom has been undertaking load shedding since 2008, and this would not be able to provide the Southern Cape CLN with the necessary power supply to meet the projected shortfalls as described in **Chapter 3.2**.

4.3 DESIGN ALTERNATIVES

4.3.1 Pylon Tower Structure Types

Different types of pylon towers can be considered for the Houhoek Transmission Substation project. Different pylon tower types have different impacts on land use. The types of pylon towers to be used along the recommended route alignment of the LILO 400kV Transmission power lines are determined based on the following criteria:

- Space available to construct the LILO 400kV Transmission power line and maintain its servitude.
- Horizontal distance between two pylon towers is approximately 350m to 400m.
- The type of pylon towers adjacent to its horizontal axis.
- The angle created on its horizontal axis by the adjacent pylon towers.
- Visual impact on the affected landowners.

Any of the following pylon towers may be used:

- Self-Supporting Pylon (**Figure 4-1**): required for a bend of more than 2° in the horizontal alignment of the recommended route alignment of the power line.
- Guyed V Suspension Pylon (**Figure 4-2**).

Figure 4-1: Self-supporting Pylon

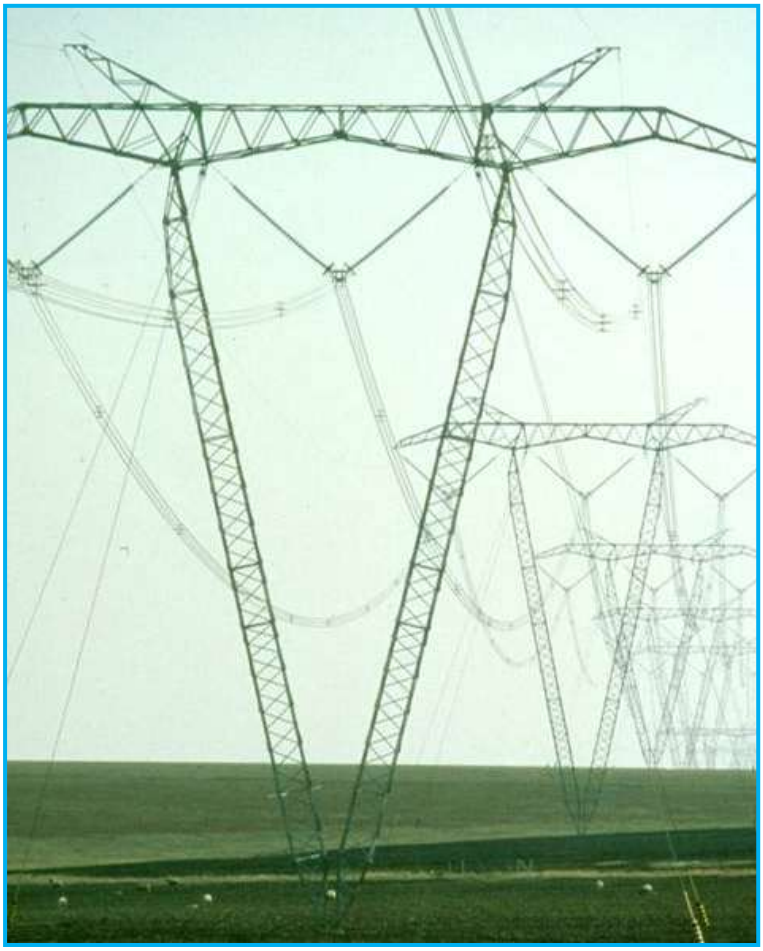


Figure 4-2: Guyed Vee Pylon

4.3.2 Optimising of Existing Servitude(s)

This alternative entails Eskom Transmission expanding into existing servitudes instead of acquiring new servitudes for the LILO 400kV Transmission power lines or the Distribution 132kV connection power lines into the proposed MTS. This will result in the expansion of the existing servitudes from a minimum of 20m for a 66kV Distribution power line to a maximum width of 55m, depending on the type of pylons to be used.

The risk attached to this alternative is that the existing power line will need to be switched off for the duration of the construction phase. The existing link would be temporarily removed. This could result in voltage collapses and an unreliable electric network, which will affect Eskom's customers and the end users in the Houhoek and Southern Cape CLN regions.

Based on the anticipated demand for electricity in the Southern Cape, the risk to the CLN is too great to be considered a feasible option. Therefore, this design alternative will not be possible and has not been considered further in this report.

4.3.3 Underground Transmission Power Lines

A design alternative of burying Transmission power lines as opposed to overhead power lines in excess of 132kV is currently technically not feasible in South Africa. This would entail an excavation as wide as a 12-lane highway and 1.5m deep to allow for the spacing required to avoid overheating. Overhead power lines are cooled with the air. But if the power lines are placed underground, a cooling system would need to be installed. The technology for these specific cooling systems is however not available in South Africa for power lines in excess of 132kV.

Although the existing Houhoek Distribution Substation needs to connect to the proposed Houhoek MTS using 132kV Distribution power lines, it would not be technically possible to bury these 132kV power lines without significant changes to the existing above-ground configuration and design of the existing Distribution substation.

Trees or shrubs would also be prohibited on or within a specified buffer due to the risk of root invasion. Excavation in the servitude would be restricted to 0.5m deep.

In addition to a significantly greater impact (with the exception of visual intrusion), underground power lines cost significantly more to construct and maintain. Considering the undulating terrain within the study area, the fact that the natural vegetation that may in places need to be kept from growing above the buried power lines is a critical consideration in the Western Cape, the placement of power lines underground will be not be feasible and has thus not been considered further for this project.

4.4 TECHNICAL ALTERNATIVES

4.4.1 Site Alternatives for Houhoek Transmission Substation

The following site alternatives of 350m × 320m will be considered:

- **Site Alternative 1** is located ±200m to the west of the existing Houhoek 132kV Distribution Substation, across the R43 road. **Site Alternative 1** is presented as a **blue** and a **purple** (for the 2 layout alternatives) pair of coloured square blocks in **Figure 3-4.**
- **Site Alternative 2** is located ±1.6km north of Site Alternative 1, and to the north-west of the existing Houhoek Eskom Distribution Substation. **Site Alternative 2** is presented as a **brown** coloured square block in **Figure 3-4.**
- **Site Alternative 3** located north and adjacent to the existing Houhoek Eskom Distribution Substation. **Site Alternative 3** is presented as a **light blue / turquoise** and a **yellow** (for the 2 layout alternatives) pair of coloured square blocks in **Figure 3-4.**

4.4.2 Layout Alternatives for Houhoek Transmission Substation

Layout alternatives of the proposed Houhoek Transmission Substation site will be considered, due to the topography of the study area, and the limited availability of flat land for the placement. Due to the topographical constraints of the property, only 1 layout will be considered for **Site Alternative 2**, i.e. the standard layout of **350m × 320m**. The following layout alternatives will be considered for **Site Alternative 1** and **Site Alternative 3**:

- The EAP suggested that a more elongated (rectangular) layout be investigated by Eskom's Substation Designers. As such, a layout of 450m x 250 m will also be considered.
- Eskom Transmission planners suggested that the doubling of the standard layout design of 720m × 320m should also be considered to allow for more expansion in the future.

Detailed drawings of the layout alternatives are not available during the scoping phase as they are dependent on the outcome of the alternatives assessment during the Impact Assessment Phase, and should be included in the Final EIA Report.

4.4.3 Site integration options linked to Site Alternatives

The integration plan for each site is outlined below. These will be investigated in more detail as part of the EIA phase of the project.

a) Site Alternative 1, Layout 1 Scenarios

Site Alternative 1, Layout 1 is the preferred option from 132kV line integration perspective (as detailed in **Table 4-1** below).

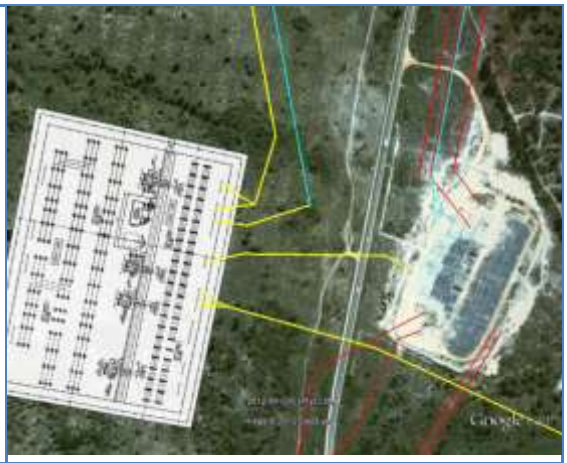
This scenario allows for better integration of future 132kV lines. More space is available to take future 132kV lines out of the MTS.

From a technical point of view, this site will thus be able to support more future renewable energy projects favourable to the environment in many respects such as reducing Eskom's carbon footprint.

It should be noted that this alternative has no impact on the future Toll gate across the N2 and will have little or no effect on the small olive farm near to the substation.

Table 4-1: Technical scenario A – Site Alternative 1, Layouts 1 and 2

(i) Move the southern wind farm linkage from Houhoek S/S to the proposed new Houhoek MTS, freeing up a 132kV feeder bay at the existing site.	
(ii) Disconnect the northern wind farm at Houhoek S/S and disconnect at the crossing point. (iii) Reroute the Lourensrivier circuit into the proposed Houhoek MTS using the disconnected portion of Caledon wind farm D/C line. (iv) Connect the Caledon wind farm onto the Houhoek S/S via the portion of Lourensrivier circuit which is no longer in use.	
(v) Build a 132kV circuit on a D/C line from the proposed Houhoek MTS to supply the existing Houhoek S/S.	

(vi) Reroute the Bacchus-Houhoek line into the proposed Houhoek MTS, leaving an open 132kV feeder bay at the existing Houhoek S/S.	
(vii) Add in an additional 132kV circuit from the proposed Houhoek MTS to supply the existing Houhoek S/S on the old Bacchus feeder bay.	
(viii) Provisioned to allow double circuit 132kV to the northern wind farm from the existing Houhoek S/S by moving Lebanon Switching 1 over to the old Lebanon 2 structure (would require re-conductoring and rebuilding of a section of the Lebanon Switching 2 line, with a single circuit up to a point and a D/C 66kV to connect the Houhoek-Vyeboom 66kV line by diverting it to the 66kV busbar at the back of the substation using two 66kV feeder bays. This would avoid crossing the 132kV feeder bay.	
(ix) Provisioned to reroute the Hermanus 66kV feeder to the MTS when increased to 132kV in the future. (x) Provisioned to build a 132kV line to Bredasdorp.	

b) Site Alternative 1, Layout 2 Scenario

This site layout, **Site Alternative 1, Layout 2**, offers the same integration points as the previous Site Alternative 1 layout (refer to Table 4-1: Technical scenario A – Site Alternative 1, Layouts 1 and 2**Table 4-1** above), but with the following disadvantages:

- It may pose possible interference with a future toll gate planned in the area.
- It also requires construction underneath the main 132kV line, Bacchus-Houhoek, entering the current Houhoek S/S.

c) Site Alternative 2 Scenario

The site has several disadvantages resulting in it not being a preferred option from a 132kV line integration perspective:

- Three additional 132kV servitudes required from the MTS affecting a larger area environmentally;
- The 132kV servitudes will cross site 1 in any case having the same environmental impact as Site Alternative 1 (both layouts);
- Additional future 132kV lines not indicated could impact a very large area where Site Alternative 1 (both layouts) is located; and
- Integration of the 400kV line would require crossing the N2.

The integration plan is presented below in **Table 4-2**.

Table 4-2: Technical scenario B – Site Alternative 2

(i) Cut in/out Bacchus-Houhoek live to feed Houhoek S/S from MTS, break down 132kV line between the in and out points.	
(ii) Cut in/out Caledon Wind, connecting Caledon wind directly to the proposed Houhoek MTS and provide alternate supply to the existing Houhoek S/S. (iii) Rebuild the old Bacchus-Houhoek as a double circuit Tern line.	

(iv) Build a 132kV D/C line to feed Lourensrivier directly from the proposed Houhoek MTS. This allows the disconnected Lourensrivier line to be broken down if 66kV is supplied via the disconnected Lebanon2.	
(v) Provisioned to reroute the Hermanus 66kV feeder to the proposed Houhoek MTS when increased to 132kV in the future. (vi) Provisioned to build a 132kV D/C line to Bredasdorp from the old Caledon wind farm line alongside the Langhoogte wind farm line.	

d) Site Alternative 3, Layouts 1 and 2 Scenario

These Site Alternative layouts offer similar integration requirements and are grouped together with the following integration plan presented in Table 4-3.

- Site Alternative 3 is restricted as to future 132kV lines that can be taken out of the proposed Houhoek MTS. Future renewable energy generation will thus be restricted with Site Alternative 3 partly defeating the purpose of the proposed MTS (which is also needed for future economic developments in the Overberg area of supply);
- The 400kV lines will either pass across the small olive farm or impact the town of Botrivier with its crossing; and
- Site 3 will impact the Toll gate and also affect the small olive farm.

Table 4-3: Technical scenario C – Site Alternative 3 Layouts 1 and 2

(i) Build a new 66kV D/C line to reroute the Houhoek-Vyeboom and Lebanon Switching 1 lines as shown in the diagram.	
(ii) Build two 132kV double circuits to Lourensrivier-Houhoek, to bypass a portion of the 132kV circuit. Providing alternate supply to the existing Houhoek S/S. (iii) Break down the double circuit 132kV Lourensrivier-Houhoek line between the newly built bypass.	
(iv) Reroute Bacchus-Houhoek into the proposed Houhoek MTS. (v) Provisioned to reroute the Hermanus feeder to the proposed Houhoek MTS when increased to 132kV in the future.	
(vi) Provisioned to build a 132kV D/C line to southern routed Langhoogte wind farm. (vii) Provisioned to build a 132kV D/C line to Bredasdorp alongside the southern wind farm line.	

4.4.4 Route Corridor Alternatives for Power Lines

This EIA process will consider the proposed 400kV Transmission LILO power line and the 132kV Distribution power line within the study area. As such, **the corridor within which these power lines are considered is presented as a red hashed area in Figure 3-4**. This corridor is located south of the existing Bacchus-Palmiet 400kV Transmission power line, and includes all the site and layout alternatives mentioned above. The irregular shape of the corridor is approximately 2.5km × 2km in area. The 400kV Transmission LILO and the 132kV Distribution power lines will only be considered within this specified area.

5 DESCRIPTION OF AFFECTED ENVIRONMENT

This chapter provides a preliminary overview of the known / expected issues of concern given the characteristics of the specific project study area. Note that these are limited to either desktop studies or a preliminary site visit and desktop study to highlight potential significant issues of concern. The full detailed specialist studies will be carried out hereafter and will be presented in the EIA Phase of the project for consideration by the I&APs.

5.1 TOPOGRAPHY

The Overberg District is well known for the tourist value of its historical and natural features.

The study area for **Site Alternative 1** slopes from the west to east with a gradient of approximately 4%-5%. The area earmarked for the proposed substation development occurs at heights varying between 137m and 160m above mean sea level. The Houhoek Transmission Substation project footprint would be cut into the above slope.

The study area for **Site Alternative 2** slopes very steeply towards south east with a gradient of approximately 8%-10%. The area earmarked for the proposed substation development occurs at heights varying between 157m and 168m above mean sea level. The Houhoek Transmission Substation project footprint would be cut into the above slope.

The study area for **Site Alternative 3** slopes from north-west to south-east, with a gradient of approximately 2%. The area earmarked for the proposed substation development occurs at heights varying between 122m and 128m above mean sea level. The Houhoek Transmission Substation project footprint would be cut into the above slope. There is an existing earth dam located on site.

5.2 GEOLOGY

The Bokkeveld shales that underlie the Botriver valley have weathered to form clays and loamy clay soils, with a strong ferricrete (koffieklip) element in certain areas. The ferricrete weathers to form the special iron-rich gravels characteristic of the area.

According to the available geological maps, 1:250 000 Geological Series 3319 WORCESTER map the regional geology of the three sites comprises Light grey-thick bedded, coarser grained Quartzitic Sandstone, cross-bedded with grit and pebble stringers and lanticles Quartzite, of Skurweberg formation, Nardouw Subgroup and Cape Supergroup (see **Figure 5-3** for further details about the regional geology).

5.2.1 Groundwater

In general, the permanent water table could occur within the fractured quartzite sandstone aquifer at depth and should be deep enough not to affect the Houhoek Transmission Substation project. On Site Alternative 3, a shallow water table could be expected at areas near the existing earth dam.

5.2.2 Seismicity

The SANS code (Seismic actions and general requirements for buildings) (SANS-10160-4;, 2011), shows that the three sites are situated in the area where the peak ground

acceleration with a 10% probability of being exceeded in 50 year period is 98cm/sec^2 (**Figure 5-1**). Zone I is defined as "Regions of natural seismic activity".

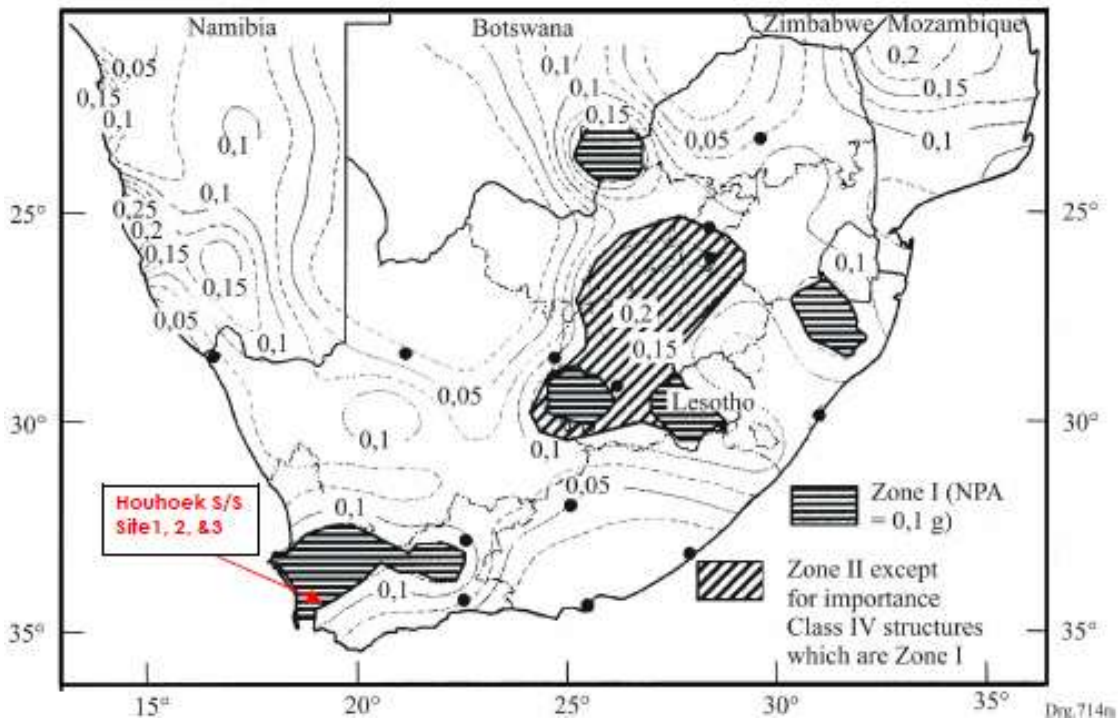


Figure 5-1: Seismic Hazard Map and Zones

A more recent data map produced by the Council of Geoscience is presented in **Figure 5-2**, showing peak ground accelerations with a 10% probability of being exceeded in 50 years. On this figure, the three sites are classified with ground accelerations of 0.15g (or 147cm/sec^2). This will be confirmed by the geotechnical report carried out during the EIA phase.

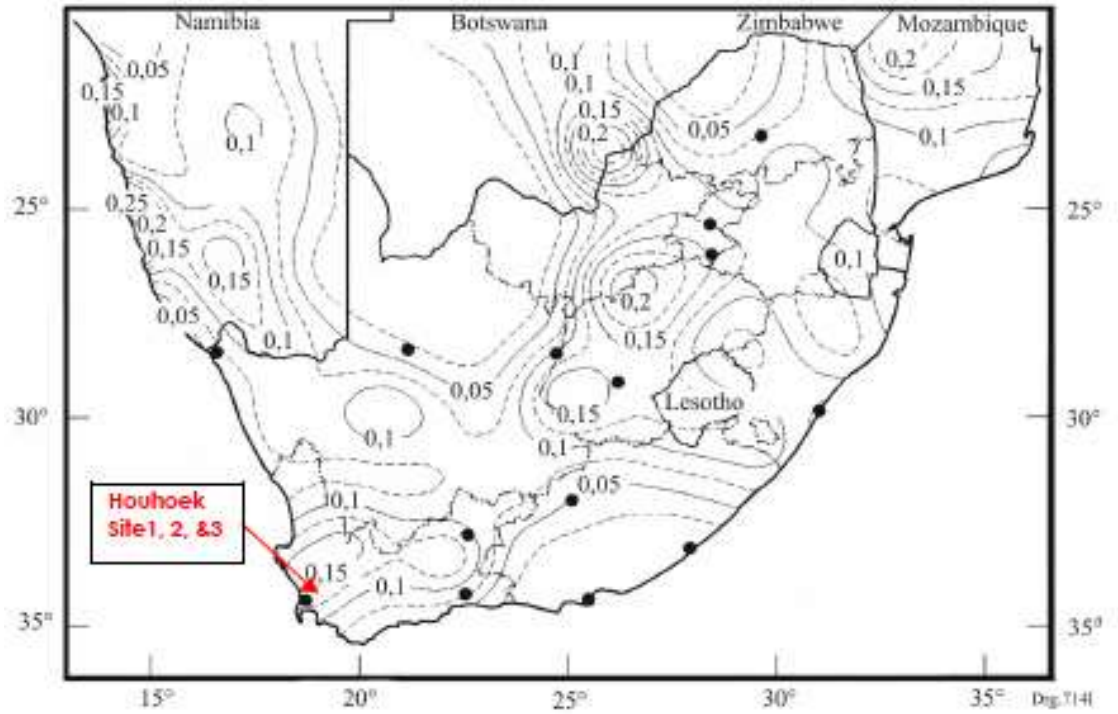


Figure 5-2: Recent Seismic Hazard Map (Council for Geoscience, 2003)

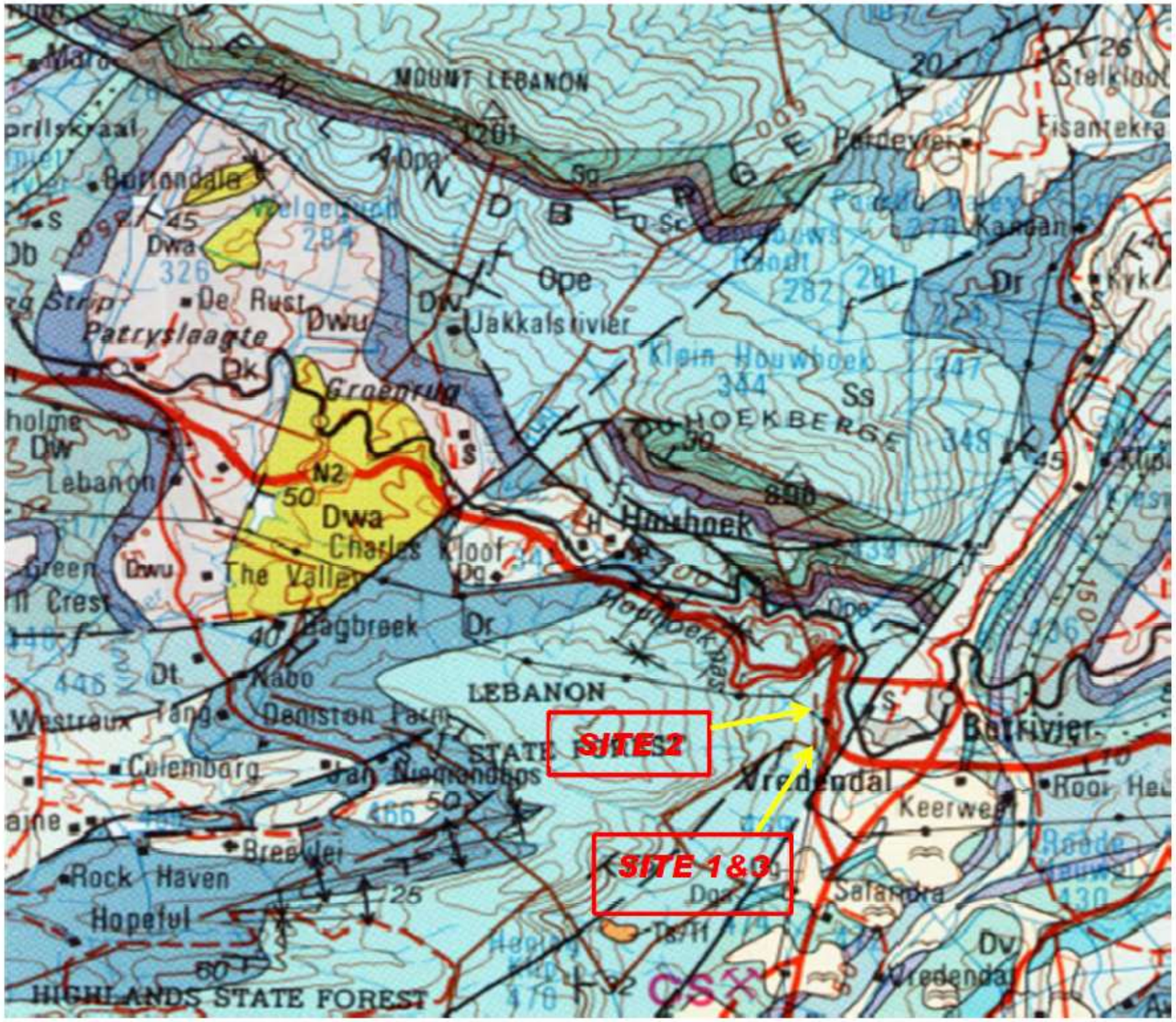


Figure 5-3: Regional Geology of the Study Area

5.3 SOIL AND AGRICULTURAL POTENTIAL

The soils in the study areas are generally a mixture of coarse-grained sandy soils on rock, or duplex soils (sandy topsoil abruptly overlying a subsoil clay), and the agricultural potential varies from low to moderate at best.

The whole area is covered by locally derived sandy and gravelly colluvial deposits of variable thickness.

Soils in the study area, north of the R43 that includes **Site Alternative 1**, are generally **deep acid sands or loamy sands** (overlying shales). The soils at **Site Alternative 2** are **shallower, with a significant amount of exposed Table Mountain Group sandstone bedrock**, and elements of shaliferous sandstone. The soils at **Site Alternative 3** are **either shallow sands overlying shale-derived clays, pure shales, or ferricrete (koffieklip)-enriched shales**.

A fault, running in a south-westerly to north-easterly direction, results in a general division of the survey area into two parts with reference to the geology.

Site Alternative 1 (both layouts) and Site Alternative 2 are mainly underlain by quartzitic sandstone, cross-bedded with grit and pebble stringers of the Skurweberg Formation, Table Mountain Group. Site Alternative 3 (both layouts) consists of shale, mudstone and siltstone of the Gydo Formation, Bokkeveld Group (Council for Geoscience, 1997).

At this point in the process a broad soil description of seven (7) soil association groups only is given in **Table 5-1** and represented on the map presented in **Figure 5-4**.

Table 5-1: Preliminary soil map units (according to Soil Classification Working Group, 1991)

Map units	General Description	Effective depth (mm)
Cf 1	Soil / Rock complex. Shallow, coarse-textured soils on sandstone (Cartref and Mispah soil forms), with rock outcrops	< 300
Cf 2	Coarse-textured, gravelly and stony, lithosolic and podzolic soil association (Cartref, Houwhoek, Lamotte, Concordia and subdominant Kroonstad and Fernwood soil forms))	600 – 900
Ct 1	Poorly-drained, coarse-textured sandy soils (Constantia, Lamotte, Fernwood and Concordia soil forms)	600 – 1200
Es 1	Duplex soils; poorly-drained, coarse-textured, gravelly topsoil abruptly overlying dense prismatic structured clay (Estcourt, Cartref, Kroonstad soil forms)	300 – 600
Es 2	Duplex soils ; poorly-drained, fine to coarse-textured, gravelly and stony topsoil abruptly overlying dense prismatic structured clay (Escourt, Kroonstad soil forms)	600 – 700
Pn 1	Poorly-drained, coarse-textured, gravelly, yellow and grey sandy topsoil with hydromorphic subsoil (Pinedene, Avalon and Kroonstad soil forms)	600 – 700
Ss 1	Duplex soils; poorly-drained, fine to medium-textured, gravelly topsoil abruptly overlying dense prismatic structured clay (Sterkspruit and Estcourt soil forms)	300 – 600

Figure 5-4: Broad soil association of the study site alternatives

5.4 WETLANDS

The entire study area falls within the Southern Folded Mountains aquatic ecoregion, as delineated by Kleynhans *et al.* (2005). This ecoregion is characterised by a highly diverse topography and a similarly diverse array of vegetation types, with Mountain Fynbos, Grassy Fynbos and Little Succulent Karoo being the most characteristic vegetation types.

The study area contains moderate and steep slopes that form the small valleys in which mostly non-perennial rivers and potentially also valley-bottom wetlands ((SANBI, 2009) occur. The largest valley in the nearby area is the Bot River valley approximately 2km to the east of the site, through which the perennial Bot River flows in a north-south direction. The Bot River and its floodplain wetland are classified as a Freshwater Ecosystem Priority Areas (FEPA) river and wetland respectively. The **Bot River**, rising south of the Theewaterskloof Dam, runs more or less north-south, passing to the east of the town of Botrivier, and flowing into the Atlantic Ocean through the **Bot River Lagoon** that lies between Kleinmond and Hawston. The marshy Bot River Lagoon forms wetlands that are home to thousands of water fowl and South Africa's only herd of wild horses that roam a wetland habitat. The altitude of the proposed areas for the substation is generally low-lying (<200m), but the LILO Transmission power lines require routing over a relatively steep part of the Houhoekberg mountain range at an altitude of approximately 380m.

The surrounds of the study area includes several rivers and water features such as the **Theewaterskloof Dam** and **Hottentots-Holland Mountain Catchment Area**. The **Houwhoek River** joins the Bot River from the west, just north of the town of Botrivier, and the **Swart River** joins the Bot River a little further south.

The Overberg Wetland Map, which was compiled as the aquatic component for the Overberg CBA Map (Holness & Bradshaw, 2010), did not identify any natural wetlands within the study area (only one dam was mapped in the area). The FEPA project, which used the Overberg Wetland Map as an input layer, did not map any rivers or natural wetlands at the site alternatives. The closest FEPAs identified by the NFEPA project are the Bot River and its associated floodplain wetland, but these freshwater ecosystems are unlikely to be affected by the proposed Houhoek Transmission Substation project.

Figure 5-6 shows the preliminary map of freshwater ecosystems produced for the study area. Several non-perennial rivers and four small dams were mapped in the study area. The rivers in the study area drain towards the perennial Bot River system. Several wetlands have been mapped on the Overberg Wetland Map or by the FEPA project immediately south of the town of Botrivier and further to the east on the Bot River floodplain (not included in **Figure 5-6**).

Several rivers appear to have been incorrectly mapped on the relevant 1:50,000 topographical map (3419AA), as indicated on **Figure 5-6** (see 'probably non-riverine' features), one of which was mapped as flowing through Site Alternative 2 but was not verified to be absent due to access constraints (see **Chapter 8.6**: Limitations).

As explained in **Chapter 8.6**, to minimise potential impacts on river ecosystems, 50m wide 'no-go' buffer zones were demarcated along the rivers falling within the study area, but no buffers were recommended at this stage for artificial features such as dams and the

drainage channel leading into the dam at Site Alternative 3. There is at least one river flowing through Site Alternative 2 (as observed from a high point above the site) although its exact course through the site has not been ground-truthed. There is also a river flowing through the proposed development footprint of Alternative Layout 2 on Site Alternative 1. The river flowing through the footprint of Alternative Layout 2 of Site Alternative 1 appears to be highly ephemeral, and it has been incised through erosion and encroached upon by alien invasive vegetation (mainly *Acacia* spp.). As such, a reduction in the recommended buffer area may be possible during the EIA Phase, once the detailed Ecological Assessment is conducted (see **Chapter 9.1.4**: Terms of Reference for the Ecological Assessment).

Although the dam on Site Alternative 3 is an artificial feature, which is understood to be fed by groundwater extracted via a nearby borehole, the site visit revealed that this dam does have some ecological value given that it is well vegetated by aquatic / wetland plants (mainly *Eleocharis limosa*, c.f. *Isolepis prolifera* and *Aponogeton* sp.) and thus provides wetland habitat suitable for habitation by invertebrates, amphibians and water birds (see **Figure 5-5**).

Figure 5-5: Photograph of Wetland Habitat on Site Alternative 3

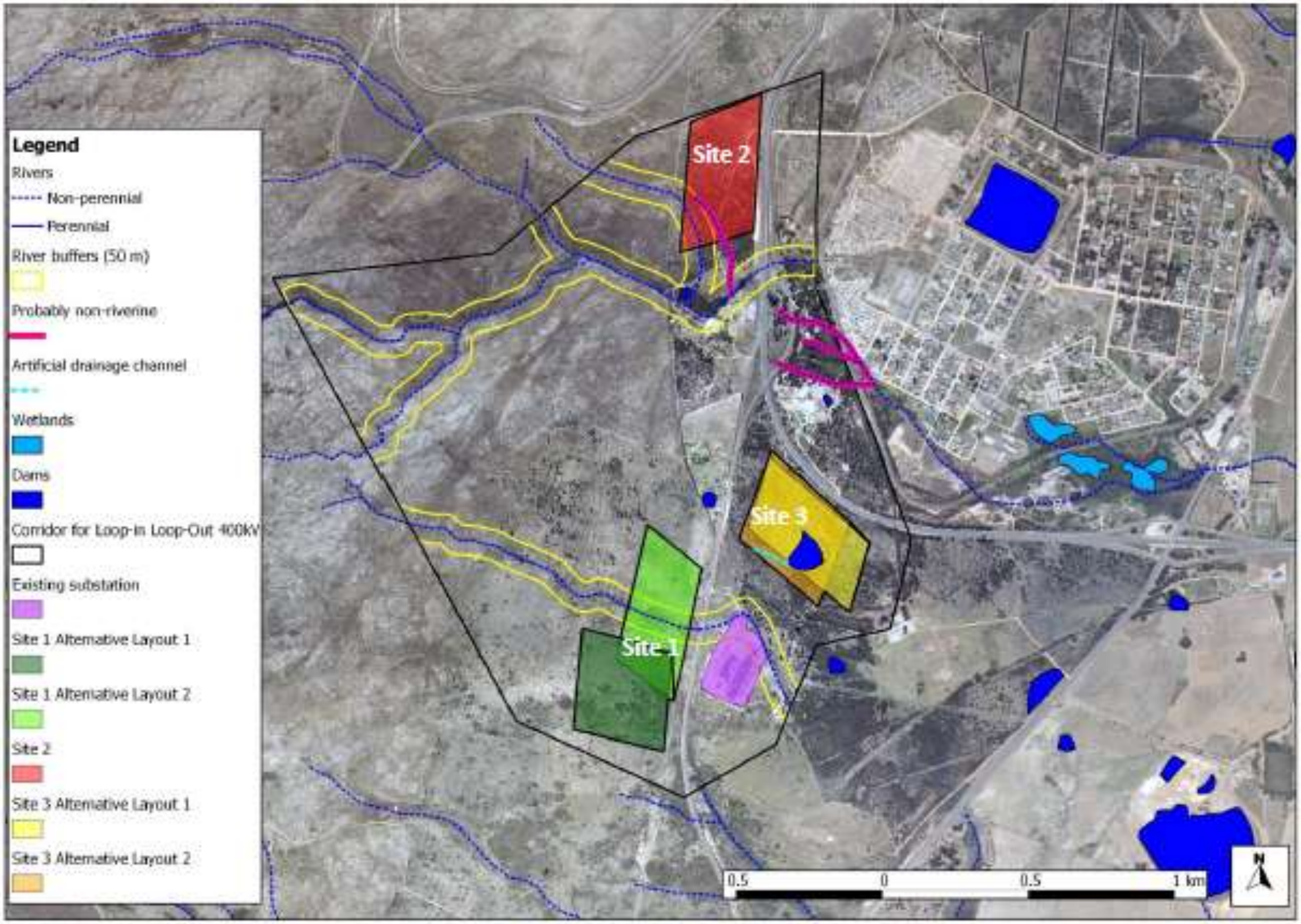


Figure 5-6: Regional Wetland Map of Study Area

5.5 ECOLOGY

5.5.1 National and Regional Context

The study area is located at the western edge of the Cape Overberg Region, which falls within the Fynbos Biome and the south-west coastal region of the Cape Floristic Region (CFR). The CFR is one of only six Floristic Regions in the world, and is the only one confined to a single country. It is also by far the smallest floristic region, occupying only 0.1% of the world's land surface, and supporting approximately 9,000 plant species, almost half of all the plant species in South Africa. At least 70% of all the species in the Cape region do not occur elsewhere (also known as **endemics**), and many have very small home ranges (also known as **narrow endemics**). Many of the lowland habitats are under pressure from agriculture, urbanisation and alien plants, and thus many of the range restricted species are also under severe threat of extinction, as habitat is reduced to extremely small fragments. Data from the recent nationwide plant Red Listing process undertaken is that 67% of the threatened plant species in the country occur only in the south-western Cape, and these total over 1,800 species (Raimondo, *et al.*, 2009). It should thus be clear that the south-western Cape is a major national and global conservation priority, and is quite unlike anywhere else in the country in terms of the number of threatened plant species.

The Overberg Critical Biodiversity Area (CBA) map for this area (Holness & Bradshaw, 2010) shows that all three sites are classified as CBA. This map is not copied into the current report as it is not particularly useful, nor is it based on any ground-truthing exercise, and typically includes any even partly natural (but badly degraded) habitat as a CBA (*pers. obs. of Ecologist*) The current report is regarded as a substantially more accurate assessment of the true ecological value of the sites, being based on actual ground-truthing.

The vegetation map of South Africa (Mucina & Rutherford, 2006) indicates that four different vegetation types would originally have been present in the greater study area, but in reality this can be simplified down to two extant vegetation types (*pers. obs. of Ecologist*). Essentially, all the vegetation in the study area north of the R43 and west of the road, can be considered as **Kogelberg Sandstone Fynbos**, and the vegetation east of the road can be considered **Western Rûens Shale Renosterveld** (with elements of Rûens Silcrete Renosterveld and Kogelberg Sandstone Fynbos). The coming together of four vegetation types in this fairly small area suggests that there would originally have been many ecotones (habitat transitions) in this area, and this is true, but unfortunately these have been largely lost due to soil disturbance, cultivation, alien invasive vegetation and construction. These ecotones are not usually sharp boundaries, but typically span a couple of hundred metres, and thus putting a line on a map is somewhat arbitrary at anything finer than a regional scale. For this reason the actual SA vegetation map is not included in this report, as it is more distracting than helpful.

The National List of Threatened Ecosystems (DEA, 2011) has listed both Kogelberg Sandstone Fynbos and Western Rûens Shale Renosterveld as **Critically Endangered** vegetation types. The former is well conserved (75% of original extent) and approximately 83% of its original extent still remains, but it is listed on account of its exceptional species diversity and the very high number of rare, endemic or threatened plant species that are supported by this

vegetation type (DEA, 2011). The Shale Renosterveld is listed because it has been significantly impacted by cultivation, having already lost at least 86% of its original extent, and nothing (0%) of this vegetation type is formally conserved, leaving it very vulnerable to further loss.

Nature reserves in the sub-region around the project area include:

- Hottentots-Holland Nature Reserve
- Theewaters Nature Reserve
- Witdraai Private Nature Reserve
- Groenlandberg Nature Reserve
- Babilonstoring Nature Reserve
- Kogelberg Nature Reserve
- Houwhoek Nature Reserve

5.5.2 Site Alternative 1

Both layout alternatives of Site Alternative 1 have been previously cultivated, probably for cereals, but this cultivation probably ceased more than twenty years ago, and there has been partial natural rehabilitation since. This disturbance can be seen in the aerial imagery, where characteristic lines caused by ploughing are evident, and on site, where the plant species present are typical of a previously disturbed area that has undergone partial passive rehabilitation.

Indigenous species typical of a disturbed habitat in this area include:

- *Cynodon dactylon* (fynkweek)
- *Carpobrotus edulis* (suurvy)
- *Stoebe plumosa* (slangbos)
- *Passerina corymbosa* (gonna)
- *Aristida junciformis*
- *Merxmuellera stricta* (wiregrass)
- *Athanasia trifurcata* (kouterbos)
- *Moraea flaccida* (tulp)
- *Chrysanthemoides monilifera* (bietou)
- *Chrysocoma ciliata* (bitterbos)
- *Helichrysum patulum* (kooigoed)
- *Senecio burchelli* (hongerblom)
- *Anthospermum spathulatum*
- *Hyparrhenia hirta* (thatching grass; S Cape invasive)

Alien invasive species tend to be patchy, and woody invasive species generally cover less than 2% of each alternative. The most prominent woody invasive species are:

- *Acacia saligna* (Port Jackson)
- *A. longifolia* (longleaf wattle)
- *A. mearnsii* (black wattle)
- *A. pycnantha* (golden wattle)
- *Pinus radiata* (cluster pine)

- *Hakea sericea*

Additional indigenous species recorded, not necessarily indicative of disturbance, included:

- *Amphithalea imbricata*
- *Aristea africana*
- *Restio capensis*
- *Ursinia anthemoides*
- *Metalasia inverse*
- *Helichrysum moeserianum*
- *Restio viminea*
- *Ehrharta calycina*
- *Ficinia secunda*
- *Cliffortia juniperina*
- *Trichogyne stipularis*
- *Muraltia rhamnoides*
- *Erica anguliger*
- *E. imbricate*
- *Ornithogalum thyrsoides* (tjienks)
- *Serruria inconspicua*
- *Berkheya armata*
- *Pelargonium chamaedryfolium* (burnt areas)
- *Restio monanthos*
- *Lachenalia* sp.
- *Trachyandra flexifolia*

The drainage line through Layout Alternative 2 does not support any wetland specific vegetation, which is indicative of the fact that it holds water for only very short periods (see **Chapter 0** for further details).

The only plant Species of Conservation Concern (SCC)[1] (*sensu* (Raimondo, *et al.*, 2009)) recorded on site was *Serruria inconspicua*, which is Red Listed as Vulnerable (Raimondo, *et al.*, 2009). Only a single plant was found, in the south-eastern corner of the Site Alternative 2 study area, and its presence here is not considered particularly significant. There is deemed to be a low likelihood of viable populations of other SCC occurring in the Site Alternative 1 study area, primarily as a result of the previous cultivation.

The **Critically Endangered *Erica rhodopis*** has been recorded in similar habitat (although less disturbed) next to the existing Houhoek Substation site (Helme, 2004), and there is thus a chance that it may still be present in low numbers in either of the site alternative study areas on this site. If this species occurs in viable numbers in any of the sites it would be significant, and would be a potential Red Flag to the development of that area.

1 The Red List of South African Plants (Raimondo, et al., 2009) has assessed all plant species in South Africa, and **all** indigenous species are now technically Red Listed or Red Data Book species, and thus it is preferable to use the term Species of Conservation Concern to refer to species that are listed as either Threatened or Rare.

5.5.3 Site Alternative 2

Site Alternative 2 supports remnants of Kogelberg Sandstone Fynbos, but the vegetation on site has been severely disturbed by road construction, and alien plant invasion. Until recently the area between the N2 and the dirt road (about 40% of the site) was 70% covered by a dense pine invasion, but this has all been recently felled. The upper portion still supports dense pine, and other alien vegetation (including *Acacia longifolia* and *A. saligna*), and these cover an average of 30-60% of this part of the site. This does not appear to have been a formal pine plantation, but was self-sown and thus very dense in places, and less so in others.

Indigenous plant diversity has been negatively impacted by the dense cover of alien vegetation, and is probably less than 20% of what would be expected in similar but pristine vegetation nearby.

Some of the indigenous species noted include:

- *Wachendorfia paniculata*
- *Lichtensteinia lacera*
- *Restio vimineus*
- *Restio triticeus*
- *Gladiolus hyalinus*
- *Leucadendron salignum*
- *Roella* sp.
- *Hypodiscus aristatus*
- *H. argenteus*
- *Cannomois parviflora*
- *Erica anguliger*
- *Willdenowia glomerata*
- *Carpobrotus edulis*
- *Elytropappus scaber*
- *Berkheya armata*
- *B. glabrata*
- *Restio capensis*
- *Crassula capensis*
- *Romulea tabularis*
- *Oxalis luteola*

The only plant SCC (*sensu* (Raimondo, *et al.*, 2009)) recorded on site was *Serruria flagellifolia*, which is Red Listed as Vulnerable (Raimondo et al 2009). Only a single plant was found, just above the dirt road in the northern part of the site, and its presence here is not considered particularly significant, although there may be a larger population of this cryptic, creeping species on site, and there are large populations in the adjacent mountain (Protea Atlas Project data). There is deemed to be a low to medium likelihood of viable populations of other SCC occurring in the Site Alternative 2 study area, primarily as a result of the dense alien plant invasion and associated soil disturbance.

5.5.4 Site Alternative 3

Site Alternative 3 lies between the existing substation and the N2 highway, and occurs at a point where sandy soils meet shale derived clays and stony ferricrete (koffieklip). Prior to disturbance it would have been a very interesting botanical area due to these numerous ecotones. Both layout alternatives have been disturbed by heavy machinery at some stage in the fairly distant past (but it is not clear if the site was ever ploughed), which is probably the reason why the areas now support such dense stands of alien invasive vegetation.

Woody alien vegetation cover ranges approximately 30% – 50% (ignoring the effects of the recent fire), and the primary alien invasive species are:

- *Leptospermum laevigatum* (Australian myrtle)
- *Pinus radiata* (pine)
- *Hakea sericea* (silky hakea)
- *Acacia saligna* (Port Jackson)

Indigenous plant species noted include:

- *Berkheya herbacea*
- *Oxalis pes caprae*
- *Oxalis versicolor*
- *Moraea fugacissima*
- *Restio capensis*
- *Restio vimineus*
- *Cliffortia ruscifolia*
- *Passerina corymbosa*
- *Disa bracteata*
- *Elytropappus rhinocerotis*
- *Stoebe plumosa*

No plant SCC (*sensu* (Raimondo, *et al.*, 2009)) were recorded on Site Alternative 3, and there is deemed to be a medium likelihood of viable populations of various SCC occurring in the study area. *Cliffortia ferricola* is a recently described and Critically Endangered (Raimondo, *et al.*, 2009) species that is only known from the Bot River area, and has been recorded from similar habitat not more than 500m from the site. *Phylica diosmoides* (Endangered) (Raimondo, *et al.*, 2009) is another local endemic that has also been recorded from nearby. Both these species, and others, could thus potentially occur within the study area, but observation was severely hampered by the recent fire, which had temporarily eliminated most of the shrubby plant cover.

5.5.5 Faunal Overview

No threatened reptiles, amphibians or mammals are expected to occur in significant or viable numbers in the proposed Houhoek MTS study areas ((Bates, *et al.*, in press); (Minter, *et al.*, 2004); (EWT, 2004)), and none of the study areas are thought to be exceptional in any regard in terms of these animals.

5.5.6 Ecological Conservation Value

The ecological conservation value of a site is a product of plant species diversity, plant community composition, rarity of habitat, degree of habitat degradation, rarity of species, ecological viability (functionality) and connectivity, vulnerability to impacts, and reversibility of threats. Maps of the regional conservation value are included as **Figure 5-7**, **Figure 5-8** and **Figure 5-9**.

Both layout alternatives of **Site Alternative 1** are deemed to have a Low to Medium regional ecological conservation value, with the exception of the drainage line and associated buffer crossing Layout Alternative 2, which has a Medium regional conservation value.

The upper parts of **Site Alternative 2** are deemed to have a Medium regional ecological conservation value, whilst the lower parts (more disturbed) have a Low to Medium regional conservation value.

Both alternatives of **Site Alternative 3** are deemed to have a Medium to High regional ecological conservation value, which is a reflection of the wetland elements associated with the excavated dam and the richer soils (ferricrete and shale), and associated possibility of various plant and animal SCC.

Figure 5-7: Ecological Sensitivity Map: Site Alternative 1 and Site Alternative 3

Figure 5-8: Ecological Sensitivity Map: Site Alternative 2

Figure 5-9 shows that most of the area through which the proposed Transmission and Distribution power lines will need to be routed is regarded as being of High botanical sensitivity, on account of it being largely undisturbed Kogelberg Sandstone Fynbos (Critically Endangered) and it being very likely to support significant numbers of rare, localised or threatened plant species.

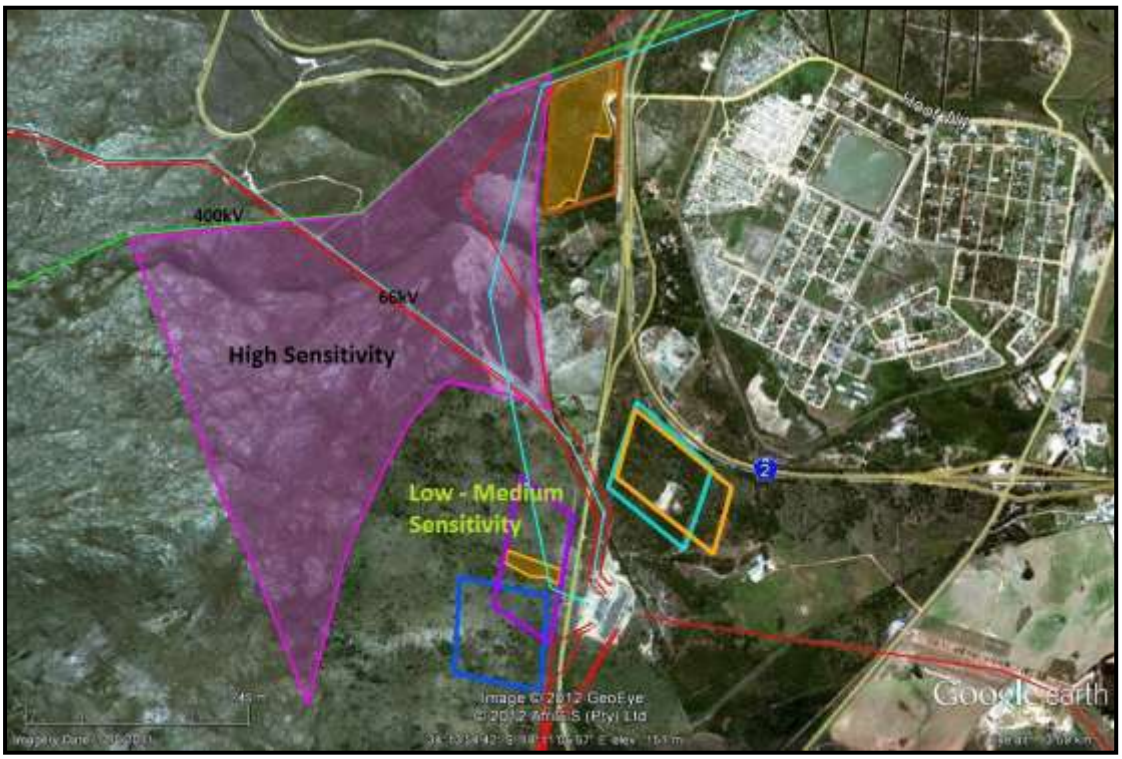


Figure 5-9: Ecological Sensitivity Map: Study Area for Transmission and Distribution Power Lines

5.6 AVIFAUNA

5.6.1 Regional Vegetation in Avifauna Context

The study area is wedged between the fynbos-covered Eastern False Bay Mountains Important Bird Areas (IBA) (Barnes, 1998) and the Overberg mosaic of grain fields interspersed with pastures, which starts just east of Botrivier (see **Figure 5-10**). The Eastern False Bay Mountains IBA is located at the western extremity of the Cape fold belt and encompasses a continuous chain of mountains consisting of several State Forests, Mountain Catchment Areas and Nature Reserves. The IBA runs north from the Kogelberg State Forest for 120km to the Kluitjieskraal State Forest, southwest of Tulbagh. The mesic mountain fynbos, which occurs on the mountain slopes of the Cape fold belt, is dominated by a multitude of communities, with the primary constituents being *Proteaceae*, *Ericaceae* and *Restionaceae* (Barnes, 1998). The natural vegetation at the proposed site is Kogelberg Sandstone Fynbos, which occurs on high mountains, with steep to gentle slopes and undulating plains and hills of varied aspect. General appearance of vegetation is low, closed, shrubland, with scattered emergent tall shrubs. Numerous seeps and seasonally started mountain plateau wetlands are common (Mucina & Rutherford, 2006).

Figure 5-10: Location of False Bay Mountains IBA (green shaded) relative to the study area

a) Untransformed Areas

It is widely accepted that vegetation structure is more critical in determining bird habitat, than the actual plant species composition (Harrison, *et al.*, 1997). The criteria used, by the Southern African Bird Atlas Project (SABAP) 1 authors to amalgamate botanically defined vegetation units, or to keep them separate, were:

- The existence of clear differences in vegetation structure, **likely to be relevant to birds**.
- The results of published community studies on **bird/vegetation associations**.

SABAP1 classifies the natural vegetation in 3419AA as Fynbos vegetation (Harrison, *et al.*, 1997). Fynbos can be divided into two categories, Fynbos proper and Renosterveld. Despite

having a high diversity of plant species, Fynbos and Renosterveld have a relatively low diversity of bird species. Untransformed Fynbos occurs mostly on the western side of the study area against the mountain slopes, which form part of the Eastern False Bay Mountains IBA. None of the proposed substations site alternatives fall within the untransformed habitat (**Figure 5-11**).

Figure 5-11: Bird Habitat in the Study Area (red = untransformed, yellow = semi-transformed, purple = transformed)

Red data species that could potentially occur in untransformed areas on the site are:

- Black Harrier (*Circus maurus*)
- Secretarybird (*Sagittarius serpentarius*)
- Martial Eagle (*Polemaetus bellicosus*)
- Lanner Falcon (*Falco biarmicus*)
- Peregrine Falcon (*Falco peregrinus*)

Non-Red Data power line sensitive species include:

- Booted Eagle (*Aquila pennatus*)
- Verreaux's Eagle (*Auila verreauxii*)
- Cape Eagle Owl (*Bubo capensis*)

b) Semi-Transformed Areas

The study area contains areas where the Fynbos was cleared for agricultural activity in the past, but is now reverting back to a mixture of Fynbos scrub with scattered alien trees. These areas could occasionally be utilised by a limited number of Red Data species, mostly raptors such as Peregrine Falcon, Lanner Falcon and Martial Eagle, for foraging. Non-Red Data power line sensitive species that could also utilise this habitat include:

- Black-shouldered Kite (*Elanus caeruleus*)

- Jackal Buzzard (*Buteo rufofuscus*)
- Spotted Eagle-Owl (*Bubo africanus*)
- Steppe Buzzard (*Buteo vulpinus*)

Substation site alternative 1 falls within the semi-transformed habitat (**Figure 5-11**).

c) Transformed areas

The study area has been heavily transformed in places, mostly through industrial infrastructure and alien tree infestation, which has formed dense stands in places. This habitat is generally not very attractive to Red data species, but raptors such as Martial Eagle may occasionally use the trees for perching. Non-Red data power line sensitive species that could utilise this habitat include:

- Black-shouldered Kite (*Elanus caeruleus*)
- Jackal Buzzard (*Buteo rufofuscus*)
- Spotted Eagle-Owl (*Bubo africanus*)
- Steppe Buzzard (*Buteo vulpinus*)
- Black Sparrowhawk (*Accipiter melanoleucus*)
- Rufous-chested Sparrowhawk (*Accipiter rufiventris*)
- African Fish-Eagle (*Haliaeetus vocifer*)
- African Harrier-Hawk (*Polyboroides typus*)

There is a man-made dam on substation site alternative 3, which is surrounded by dense stands of alien trees. It is unlikely that any Red Data power line sensitive species will be specifically attracted to the dam. Non-Red Data African Fish-Eagle may on occasion visit the dam, or perch in the surrounding alien trees. Immediately east of the study area, the typical Overberg mosaic of grain fields interspersed with pastures, known as the Overberg Wheatbelt, starts and continues eastwards for about 200km. This habitat is of specific importance to Blue Crane and Denham's Bustard (Young, *et al.*, 2003). It is unlikely that the latter two species will regularly occur in the study area, except as vagrants, as the habitat is not suitable. Substation site alternatives 2 and 3 fall within the transformed habitat.

Figure 5-11 shows the habitat composition in the study area. Appendix 1 contains photographic records of the avifaunal habitat at the site.

5.6.2 Relevant Bird Populations

SABAP2 recorded a total of 187 species (13 Red Data) in the 3419AA Quarter-Degree Grid Cell (QDGC) (Barnes, 2000). Reporting rates are an indication of the relative density of a species on the ground in that it reflects the number of times that a species was recorded relative to the total amount of cards that were completed for the QDGC. In this instance, due to the relatively ample amount of checklists that have been completed, the reporting rate was regarded as a reliable reflection of densities on the ground.

Table 5-2 provides a guideline of the power line sensitive Red Data species that could potentially be encountered anywhere within the QDGC where suitable habitat is available. It also contains an assessment of the potential for a species to occur at the site.

Table 5-2: Species of Conservation Concern Recorded in 3419AA by SABAP2

Species	Conservation Status (Barnes, 2000)	Preferred Habitat ((Harrison, *et al.*, 1997), (Barnes, 2000), (Hockey, *et al.*, 2005), personal observations)	SABAP2 Reporting Rate 3419AA (%)
Peregrine Falcon (*Falco peregrinus*)	Near Threatened	Mostly restricted to mountainous, riparian or coastal habitats, where high cliffs provide breeding and roosting sites. Breeding pairs prefer habitats that favour specialised, high-speed, aerial hunting, eg high cliffs overlooking vegetation with raised and/or discontinuous canopy (e.g. forest, Fynbos, woodland), or expanses of open water. Also uses quarries and dam walls, and frequents city centres where tall buildings substitute for rock faces.	2.6
Black Harrier (*Circus maurus*)	Vulnerable	In Western Cape mostly in Fynbos, especially Strandveld and Mountain Fynbos; less common in dry restios and Renosterveld remnants	2.1
Great White Pelican (*Pelecanus onocrotalus*)	Near Threatened	Shallow lakes, flood plain pans, estuaries and dams; also sheltered coastal bays and lagoons	2.1
Secretarybird (*Sagittarius serpentarius*)	Near Threatened	Grassland, open shrubland and agricultural fields	1.1
Lanner Falcon (*Falco biarmicus*)	Near Threatened	Most frequent in open grassland, open or cleared woodland, and agricultural areas. Breeding pairs generally favour habitats where cliffs available as nest and roost sites, but will use alternative sites (e.g. trees, electricity pylons, buildings) if cliffs absent.	1.1
African Black Oystercatcher (*Haematopus moquini*)	Near Threatened	Coastal species – rocky, sandy and mixed shores on mainland and islands; less common in estuaries, lagoons and coastal pans.	0.5
Cape Cormorant (*Phalacrocorax capensis*)	Near Threatened	Restricted to inshore marine habitats	0.5
African Openbill (*Anastomus lamelligerus*)	Near Threatened	Wetlands, including flood plains, temporarily flooded pans, marshes, swamps, ponds, river shallows, streams, rice fields, dams, lake edges, lagoons and intertidal flats; occasionally in ploughed fields.	0.5
Blue Crane (*Anthropoides paradiseus*)	Vulnerable	In Western Cape, confined to cereal crop fields and planted pastures. In Overberg, switches seasonally between harvested cereal croplands (Nov-May), recently germinated cereals (Jun), and planted pastures (Jul-Sept); ploughed fields used year-round.	44.4
African Marsh-Harrier (*Circus ranivorus*)	Vulnerable	Almost exclusively inland and coastal wetlands.	1.1
Martial Eagle (*Polemaetus bellicosus*)	Vulnerable	In the Western Cape in open shrubland with drainage line woodland or high-tension pylons, and open farmland with clumps of trees.	1.1
Striped fluftaill (*Sarothrura affinis*)		In Western Cape, occurs very locally in vegetation dominated by sedges (*Juncus* spp) in slightly saline conditions, including estuaries. Readily colonises artificial wetlands.	0.5

Species	Conservation Status (Barnes, 2000)	Preferred Habitat ((Harrison, *et al.*, 1997), (Barnes, 2000), (Hockey, *et al.*, 2005), personal observations)	SABAP2 Reporting Rate 3419AA (%)
Denham's Bustard (*Neotis denhamii*)	Vulnerable	In the Western Cape, inhabits mosaic of cultivated dry-land pastures, incl. grasses, lucerne, clovers (*Medicago* spp), crop fields (mainly cereals) and natural vegetation (short Fynbos, Renosterveld and Strandveld shrublands). Pastures favoured during winter (Apr-Aug), and harvested crop fields during summer (Nov-Mar). Avoids recently ploughed lands and fields with growing crops. Natural vegetation favoured during breeding season (Sept-Dec) but avoided at other times of year; use of artificial habitats exceeds that of natural vegetation year-round (typically < 10%; 45% Sept-Dec).	3.2

** As at 15 October 2012*

5.7 SOCIAL ENVIRONMENT

5.7.1 General Description of the Social Environment

The Houhoek Transmission Substation is close to the town of Botrivier, which is situated off the N2 Highway, between Cape Town and Caledon. The study area thus falls within the jurisdiction of the Theewaterskloof Local Municipality (TLM) and the Overberg District Municipality (ODM) in the Western Cape Province.

The TLM, which is the largest local authority within the ODM, includes Villiersdorp, Grabouw, Botrivier, Caledon/Myddleton, Genadendal, Greyton and Riviersonderend. During 2007, it was estimated that the population total for the TLM reached approximately 86,500 individuals, with Botrivier having a population of approximately 4,000 residents.

The TLM is a rural area, with various open spaces and numerous farming activities. The majority of the land is thus occupied by agriculture, small holdings and similar land uses. Botrivier is mainly characterised by tourism-based activities, with some manufacturing activity. There is a potential for expansion of its light manufacturing sectors (Theewaterskloof Local Municipality, 2011).

5.7.2 Economic Sectors

Agricultural production in the area contributes to 36% of the local economy, with the manufacturing sector accounting for 12% of the local economy. The TLM can thus be described as an agricultural region due to its large tracts of agricultural land, with only a few small centres spread throughout the area. The economy is primarily agrarian (almost 50% including the agro-processing activities in the region), with a growing tourism, construction, financial and business services sectors. Grabouw is the largest economic centre, followed by Caledon. The area has a wealth of natural resources and excellent agri-tourism offerings.

Even though the agricultural sector in the area performed well, the sector's limited expansion potential is of concern. A multi-pronged strategy that could diversify and stimulate the local economy was recently agreed to. However, this is a long term programme, and will require increased bulk infrastructure capacity to be implemented and land to be released.

The development of the tourism sector, which contributes 13% to the local economy, also offers a secondary income base for the local farming community. It aims to attract investment into the restaurants, retail and services sectors, all of which could improve the attractiveness of the area as a residential destination for people seeking a quieter and better quality of life.

The area is however, also under pressure from the large pool of unskilled migrants from the Eastern Cape, who flock into the area in search of work and a better life. Consequently, the number of unemployed people has grown.

5.7.3 Demographic and Socio-Economic Characteristics

According to StatsSA (Community Survey of 2007), the TLM had a total population of 86,719 individuals within 23,464 households. A decline in the population was seen based on the previous total population figure of 93,276 individuals during the statistical survey of 2001 (StatsSA, 2007). Contrary to the decline, the TLM Integrated Development Plan (IDP) estimated the total population within the area at 105,875 in 2008 and 106,172 in 2009. The TLM is thus the most populous municipality in the ODM, as it hosts 44% of the total district population (Theewaterskloof Local Municipality, 2011). Botrivier falls within Ward 7 and is said to have approximately 1,085 households with an additional 412 households forming part of the informal settlement, New Frans.

The unemployment rate in the municipal area was estimated at 39%, with 31% of the households not having any income. Ward 7 has one primary health care clinic, with the main water source being groundwater. Most of the erven in Botrivier are served by a waterborne sanitation system, while the remainder of households make use of conservancy tanks or a septic tank/soak away system (Theewaterskloof Local Municipality, 2011).

5.7.4 Land-Use Profile

The study area is characterised by the town of Botrivier and the Vredendal settlement[2]. The rural landscape includes farmland (wine farms like the Wildekrans Wine Estate, and the production of wheat), Fynbos and natural mountainous areas.

The N2 Highway stretches along the west of Botrivier from the Houwhoek Pass, where after it turns in an easterly direction to the south of the town. The R43 provincial road splits from the N2 Highway, which links Botrivier with the R44 and towns such as Kleinmond and Hermanus.

The spatial vision of the TLM for Botrivier is to promote the town as one of the N2 Highway transport corridor “anchor” nodes and to stimulate growth through rail and road-based transport-linked industrial and associated development (Theewaterskloof Local Municipality, 2011).

2 Please note that this is not the Vredendal town of Matzikama Local Municipality in the northern Olifants River Valley.

5.8 VISUAL ENVIRONMENT

5.8.1 Regional Landscape Context

Landscape character is defined by the U.K. Institute of Environmental Management and Assessment as the 'distinct and recognisable pattern of elements that occurs consistently in a particular type of landscape, and how this is perceived by people. It reflects particular combinations of geology, land form, soils, vegetation, land use and human settlement.' It creates the specific sense of place or essential character and 'spirit of the place' (Spoon Press, 2002). The first step in the VIA process is determining the existing landscape context of the region and of the sites where the project is proposed.

The Overberg District is well known for the tourist value of its historical and natural features. Natural features include several rivers and water features as described in **Chapter 5.1**. The Bot River is associated with a wide valley that is encompassed by mountains on either side which form a prominent natural feature within the region.

Vegetation in the region is characterised by typical Fynbos plant species. Fynbos is a fragile resource and is very sensitive to threats, both natural and human-induced. See **Chapter 5.5.1** for the national and regional importance of Fynbos vegetation in the study area. Nature reserves are also found in the region, as described in **Chapter 1.1**.

5.8.2 Local Landscape Context

The local natural context includes the Bot River and Houwhoek Mountains as mentioned above. Manmade interventions include the town of Botrivier (see **Chapter 5.9.2** for a brief history about the town), the existing 132kV Houhoek Eskom Distribution Substation with its associated power lines, as well as other Eskom Transmission power lines. Transport infrastructure includes the N2, R43 and a railway line. Land use and activities in the area include wine farms and agricultural fields of wheat (see **Figure 5-12** for photographs of local context and **Figure 3-4** for Locality Map).

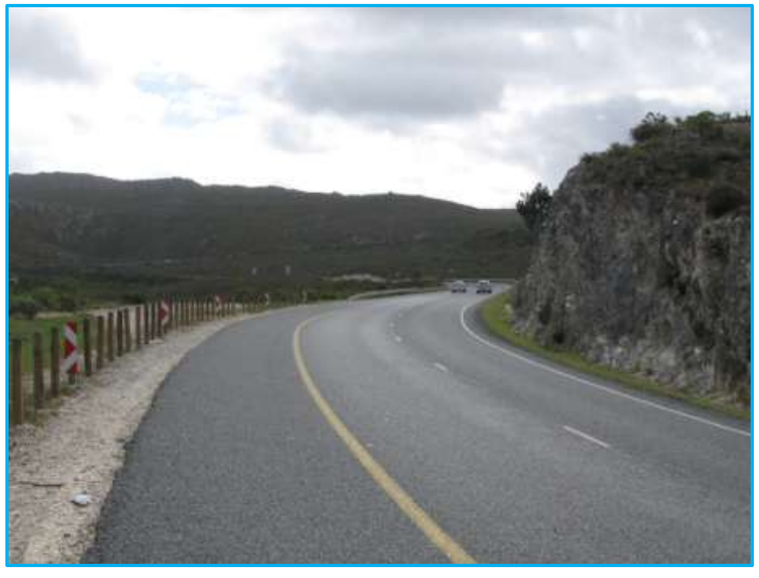
Other interesting local features include the Van der Stel mountain pass that leads to the Theewaterskloof dam. This area hosts a variety of working farms that produce flowers, wine, lavender, olive oil, apples, and milk, as well as stud farms with mountain lodges, guest farms and cottages (Overberg Online, 2012). (http://www.overbergonline.co.za/botrivier.php)

As indicated in **Figure 3-4**, the existing Houhoek substation is located to the south of the town of Botrivier. As a result of the substation, the area is strongly associated with existing transmission line infrastructure which can be clearly seen in the panoramic photograph. This main photograph in the montage below was taken from the Houwhoek pass. The smaller photographs below that show characteristic and important land-uses in the study area.

Panoramic photograph towards the east from Houwhoek Pass depicting the proposed sites and the main landscape features

Existing Houhoek Substation

Wildekrans Wine Estate



N2 Highway over Houwhoek Mountains

Figure 5-12: Local Context Photographs

5.9 HERITAGE ENVIRONMENT

Prior to the arrival of the first Dutch freeburgers, the land was settled by the Khoekhoen, who moved across the landscape, following a trans-human cycle with their livestock. It was the attraction of trade with the Khoekhoen, which prompted the establishment of a VOC outpost at Compagnies Drift (the present Beaumont Wine Estate at Botrivier) prior to 1745.

This area has been subject to generations of agriculture. The farm Botrivier, for example, was one of the earliest farms in the Overberg to obtain a licence for the sowing of wheat dating back to 1708 (Du Toit, 2004) and merino sheep were bring grazed on the farm of Boontjieskraal (midway between Botrivier and Caledon) by 1803.

There are many historic farms in the area, some with buildings dating back to the 18th Century. This area was accessed by a historic pass, which descended down the mountain towards Botrivier – this pass survived in part to this day, while the lower reaches are still driveable in an off-road vehicle.

The entire surrounding area is rural in character, with wheat and stock farming being the primary activities. This landscape has been transformed by generations of farming and represents an agricultural landscape (also termed "Rural Farmland Landscape") of cultural significance. The study area consists mainly of old re-vegetated agricultural land on the lower slopes of the Kogelberg.

Existing electrical infrastructures (132kV Houhoek Substation, 132kV and 400kV power lines) traverse the study area. The broader area is also considered to have aesthetic value with high tourism potential being situated adjacent to the N2 Highway and on the route to a number of important tourist towns such as Greyton, Genadendal and Hermanus. See **Chapter 5.8** for further details of the visual environment.

5.9.1 Palaeontology

According to (Almond, 2012), the Bokkeveld Group formations that underlie the Botrivier area are known to be richly fossiliferous elsewhere in the Western Cape. However, in the Botrivier-Caledon region, their original fossil content appears to have been almost completely destroyed by a combination of intense tectonic deformation (folding, faulting, cleavage development) and deep chemical weathering. The Table Mountain Group formations represented extreme west of the study area (Houhoekberge) are only sparsely fossiliferous, and have also suffered intense chemical weathering. The effective paleontological sensitivity of all the rock units represented within the study area is consequently low to very low.

5.9.2 Pre-Colonial and Colonial Archaeology

The study area will contain scattered Stone Age archaeological material dating from the Early, Middle and Late Stone Age periods. The survey of the Caledon Wind Energy Facility (WEF) (Webley & Halkett, 2011) and the Langhoogte WEF identified at least nine scatters of Early Stone Age material on ploughed lands. The stone tools included quartzite flakes, flaked cobbles, cores including discoid cores and some crude bifaces (hand axes). In the survey on the farms Klipheuwel and Dassiesfontein to the south of the N2 Highway, some scatters of Early Stone Age material was also identified (Hart, 2010). Another consultant (Kaplan, 2006)

has also undertaken surveys around the Botrivier area and found a number of Early Stone Age artefact scatters.

The small, picturesque village of Botrivier lies in the foothills of the Houwhoek Mountains, *en route* to Hermanus. The Bot River, after which the hamlet is named, meanders its way through a fertile valley surrounded by mountains covered in Fynbos, historical wine farms and fields of wheat. A place of crossing in the Bot River originally served as a spot where early European settlers bartered butter with the Khoi-Khoi tribes, and the river was attributed with the name 'butter' from both sides – the Afrikaans word for butter is 'botter' and the Khoi-Khoi called it 'Couga', which means 'lots of butter' (Net-Focus Interactive, 2012).

5.9.3 Cultural Landscape

The general historic context of the study area is significant (Overstrand Heritage Landscape Group, 2009). There are some historic buildings on properties in the study area, such as Boontjieskraal to the east, and Compagnies Drift (now Beaumont Wine Estate) to the west, next to the village of Botrivier and other structures that are generally protected. The study area is very localised and situated well clear of any known historic properties at this stage of the EIA process.

While the N2 highway is not strictly an historic route, it is a potentially sensitive visual receptor, which will need to be considered in terms of the placement of facilities (see the visual landscape in **Chapter 5.8**).

6 LEGISLATION AND GUIDELINE DOCUMENTS

6.1 APPLICABLE ENVIRONMENTAL LEGISLATION

A limited scoping of relevant legislation was undertaken to identify the key legal issues related to the Houhoek Transmission Substation project. The applicable key environmental legislation that Eskom must consider during the implementation of the Houhoek Transmission Substation project is summarised in **Table 6-1**.

Table 6-1: Summary of Applicable Legislation

Legislation	Sections	Relates to:
The Constitution (No. 108 of 1996)	Chapter 2	Bill of Rights
	Section 24	Environmental rights
	Section 25	Rights in property
	Section 32	Administrative justice
	Section 33	Access to information
National Environmental Management (No. 107 of 1998) as amended[3]	Section 2	The national environmental management principles is in Chapter 1 of the Act, essentially guide the interpretation and administration and implementation of the Act and any other law concerned with the protection of the environment. An overarching emphasis of the principle that development must be environmentally, socially and economically sustainable. Applies throughout the Republic to the actions of all organs of state that may significantly affect the environment.
	Section 24	Chapter 5 of the Act deals with integrated environmental management, including environmental impact assessments. Section 24 requires the applicant of an environmental authorisation to consider, investigate, assess and report the consequences for or impacts on the environment of the listed activity or specified activity to the competent authority.
	Section 28	Section 28 imposes a duty of care on every person who causes, has caused, or may cause significant pollution or environmental degradation to take reasonable measures to prevent such pollution or degradation from occurring, continuing or recurring. The scheme owner has a general duty to care for the environment and to institute such measures as may be needed to demonstrate such care.

3 The EIA Regulations (2010) R543, R544, R545 and R546 may be relevant for certain construction and maintenance activities, such as those that may need to take place in or close to water resources.

Legislation	Sections	Relates to:
		The duty of care has been amended to include significant pollution or degradation that occurred before the commencement of the NEMA that arises or is likely to arise at a different time from the actual activity that caused the contamination or that arises through an act or activity of a person that results in a change to pre-existing contamination.
	Section 30	Control of emergency incidents. Responsible person's duties relating to reporting and remediation actions regarding emergency incidents. A criminal sanction may be imposed on the responsible person for failure to comply with the reporting requirements and obligations to address any emergency incidents.
Environment Conservation Act (No. 73 of 1989) and regulations	The Act has been substantially repealed by the NEMA. However, there are certain regulations under the Act which are still in operation, such as the National Noise Control Regulations.	
National Environmental Management: Protected Areas Act (No. 57 of 2003)	The Protected Areas Act No. 57 of 2003 was signed into law on 18 February 2004, and came into operation on 01 November 2004. The aim of the Act is to provide for the protection and conservation of ecologically viable areas representative of South Africa's biological diversity, natural landscapes and seascapes. The Act repeals sections 16, 17 & 18 of the ECA. In 2004, the National Environmental Management: Protected Areas Amendment Act No. 31 of 2004 was promulgated to amend Act 57 of 2003 with regard to the application of that Act to national parks and marine protected areas. The amendment Act came into operation on 01 November 2005 and it also repeals the National Parks Act with the exception of section 2(1) and Schedule 1. The Act operates in conjunction with the National Environmental Management: Biodiversity Act No. 10 of 2004.	
National Environmental Management: Biodiversity Act (No. 10 of 2004) (NEM:BA)	Sections 65-69	These sections deal with restricted activities involving alien species; restricted activities involving certain alien species totally prohibited; and duty of care relating to alien species.
	Sections 71 and 73	These sections deal with restricted activities involving listed invasive species and duty of care relating to listed invasive species.
Conservation of Agricultural Resources Act (No. 43 of 1983) and regulations	Section 5, 6	Implementation of control measures for alien and invasive plant species.

Legislation	Sections	Relates to:
National Water Act (No. 36 of 1998) and regulations	Section 19	Prevention and remedying the effects of pollution.
	Section 20	Control of emergency incidents.
	Section 21	The DWA will require water use licences for various construction-related activities.
	Section 26 and 34	Registration of water use regarding the discharging of waste or water containing waste into a water resource through a pipe, canal, sewer, sea outfall or other conduit and disposing of waste in a manner that may detrimentally impact on a water resource.
National Heritage Resources Act (No. 25 of 1999)	Section 35	No person may, without a permit issued by the responsible heritage resources authority destroy, damage, excavate, alter, deface or otherwise disturb any archaeological or paleontological site.
	Section 36	No person may, without a permit issued by the SAHRA or HWC to destroy, damage, alter, exhume, remove from its original position or otherwise disturb any grave or burial ground older than 60 years which is situated outside a formal cemetery administered by a local authority. "Grave" is widely defined in the Act to include the contents, headstone or other marker of such a place, and any other structure on or associated with such a place.
	Section 38	This section provides for a HIA, which is not covered under the ECA. The HIA will be approved by the DEA, which is required to take SAHRA's and HWC's comments into account prior to making a decision on the HIA.
Removal of Graves and Dead Bodies Ordinance 7 of 1925	Authorisation for exhumation and re-internment of human remains must be obtained from the relevant local authority where the grave is situated, as well as where the grave is being relocated to.	
National Environmental Management: Air Quality Act (No. 39 of 2004)	Section 32	Control of dust
	Section 34	Control of noise
	Section 35	Control of offensive odours
	Chapter 5	Licensing of listed activities
	Schedule 2	Ambient air quality standards
National Environmental Management: Waste Act (No. 59 of 2008)	Section 16	General duty in terms of waste management
	Section 17	Reduction, re-use, recycling and recovery of waste
	Section 20	No person may commence, undertake or conduct a waste management activity, except in accordance with: • the requirements or standards prescribed by said Act and regulations; and • a waste management licence issued in respect of that activity, if a licence is required.
	Section 26	Prohibition of unauthorised disposal of waste
	Section 27	Prohibition of littering

Legislation	Sections	Relates to:
South African National Roads Agency Limited and National Roads Act, 1998 (No. 7 of 1998): **1. Damaging a National Road**	Section 5(a) and (b)	The Agency may issue a written notice demanding that the owner or occupier prevents or stops any activity that may cause damage to a national road. The demand may include, among others, the removal, filling in, alteration, relocation or establishment of any dam, canal, trench, wall, sluice, pipe, excavation, structure or other works, or the cessation of such an act, on the land.
	Section 46(3)	The owners or occupiers of land adjoining any national road must: • Take all measures on their land that are reasonably necessary to prevent the occurrence of any damage to the national road concerned. • Refrain from doing or permitting anything on or below the surface of that land which is likely to cause damage to that national road.
	Section 46(4)	The owner or occupier of any land adjoining a national road will be held liable for any damage to the national road which was or reasonably should have been foreseen.
South African National Roads Agency Limited and National Roads Act (No. 7 of 1998): **3. Structures and other works on, over or below national roads or certain other land**	Section 48(1)	No person may do any of the following without the Agency's permission: • On or over, or below the surface of, a national road erect, construct or lay, or establish any structure. • Make any structural alteration or addition to a structure situated on or over, or below the surface of a national road. • Give permission for either (a) or (b).
	Section 48(5)	The Agency may give written notice for the removal of any such structure, or may remove the structure and recover the costs from that person.
	Section 48(8)	Any person who contravenes this section is guilty of an offence and liable to one year in prison and/or a fine.
Explosives Act (No. 15 of 2003) and regulations	Provisions for the control of explosives in terms of use, disposal, storage, transportation, dealing, importation, exportation and packaging of explosives.	
Occupational Health and Safety Act (No. 85 of 1993) and regulations	General Administration Regulations GN R929 of June 2003	Material Safety Data Sheets must be made available at the request of any interested or affected party.
	Section 8	General duties of employers to their employees.
	Section 9	General duties of employers and self-employed persons to persons other than their employees.

Legislation	Sections	Relates to:
Fencing Act (No. 31 of 1963)	Section 17	Any person erecting a boundary fence may clean any bush along the line of the fence up to 1.5 metres on each side thereof and remove any tree standing in the immediate line of the fence. However, this provision must be read in conjunction with the environmental legal provisions relevant to the protection of flora.
Hazardous Substances Act (No. 15 of 1973) and regulations	Provides for the definition, classification, use, operation, modification, disposal or dumping of hazardous substances.	
Fertilisers, Farm Feeds, Agricultural Remedies and Stock Remedies Act (No. 36 of 1947) and regulations	Sections 3-10	Control of the use of registered pesticides, herbicides (weed killers) and fertilisers. Special precautions must be taken to prevent workers from being exposed to chemical substances in this regard. Workers handling these remedies must also be registered in terms of the Act.
National Road Traffic Act (No. 93 of 1996) and regulations	Section 54	Transportation of dangerous goods.
National Veld and Forest Fire Act (No. 101 of 1998)	Chapter 2	Promotes and regulates the formation of fire protection associations which aim to manage and coordinate fire protection and fire services in an area.
	Chapters 4 & 5	Organisations are required to make and maintain firebreaks and fire-fighting equipment and personnel should a risk exist that a fire may start or spread from the premises.
Subdivision of Agricultural Land Act (No. 70 of 1970)	To control the subdivision and, in connection therewith, the use of agricultural land.	
SANS 1929	Ambient air quality – limits for common pollutants.	
SANS 10103	The measurement and rating of environmental noise with respect to land use, health, annoyance and to speech communication.	
SANS 10128	Bunding of fuel storage tanks.	

6.2 NATIONAL ENVIRONMENTAL MANAGEMENT ACT

The National Environmental Management Act (No. 107 of 1998) (NEMA), provides a framework for cooperative environmental governance between the various spheres of government, by establishing principles for decision-making on matters relating to the environment. Furthermore, NEMA promotes integrated management to ensure sustainable resource utilisation and development and requires that the DEA be the lead agent in ensuring effective custodianship of the environment. It also provides that sensitive, vulnerable, highly dynamic or stressed ecosystems, such as coastal shores, estuaries, wetlands, and similar systems require specific attention in management and planning

procedures, especially where subjected to significant human resource usage and development pressure.

The NEMA principles, contained in Section 2, clearly emphasise the need to protect threatened ecosystems and are binding on all organs of state, including local authorities.

The national environmental management principles contained in Chapter 1 of NEMA apply to the actions of all organs of state that may significantly affect the environment and serve as guidelines by reference to which organs of state shall exercise their functions when taking a decision in terms of NEMA. The principles will furthermore guide the interpretation, administration and implementation of NEMA and any other law concerned with the protection of the environment.

Sections 24 and 44 of NEMA make provision for the promulgation of regulations that identify activities which may not commence without an environmental authorisation, the result being that NEMA began governing the EIA process with the promulgation of the EIA Regulations in April 2006 (Government Gazette No. 28753 of 21 April 2006). These regulations have subsequently been replaced by the NEMA EIA 2010 Regulations listed in Government Gazette No. 33306 of 18 June 2010 (GN543, 544, 545 and 546 of 18 June 2010, as amended). The NEMA EIA 2010 Regulations are contained in four Government Notices and came into effect on 2 August 2010, as amended.

Applications listed in these regulations will require an environmental authorisation (EA) from the relevant competent authority, which in this case is the DEA as Eskom SOC Limited is a state-owned company or so-called parastatal entity.

Section 24(f) of the NEMA prohibits the undertaking of identified activities except by virtue of a competent authority.

On submission of an application the competent authority must consider all the relevant information contained in the Scoping Report and EIA Report (including any pollution, environmental impacts or environmental degradation likely to be caused if the application is approved or refused) and thereafter make a decision of whether or not to grant an environmental authorisation to the proposed project.

Certain minimum conditions are attached to environmental authorisations, as required by Section 24E of NEMA, however it is at the competent authorities discretion to include additional project specific conditions. In terms of section 24F of NEMA it is an offence not to comply with any condition applicable to an environmental authorisation issued for a listed activity.

Typical conditions that may be applied by the competent authority include, but is not limited to:

- measures to prevent, manage and mitigate environmental impacts to acceptable levels;
- prevention of pollution of water bodies and groundwater;
- a rehabilitation programme for disturbed natural and/or heritage areas;
- appointment of an independent Environmental Control Officer (ECO) to oversee the construction phase and to ensure that the development phase is conducted in an environmentally responsible manner;

- conservation management and visitor management plans; and
- requirements of other authorities, such as the Department of Water Affairs (DWA), the Department of Energy (DoE), the Department of Agriculture (DoA), the Department of Mineral Resources (DMR) and the South African Heritage Resources Agency (SAHRA) and/or relevant provincial authorities.

6.3 ACTIVITIES APPLICABLE TO EIA REGULATIONS (2010)

The construction of the Houhoek 400kV Transmission Substation and associated infrastructure, falls within the ambit of the list of activities (**Table 6-2**) identified in terms of Sections 24(2)(a) and (d) of the NEMA. Note that comments on the listed activities are presented in the table, as identified by being in *italics*.

Table 6-2: Listed Activities in Terms of NEMA

Number & Date of Relevant Notice	Activity No(s)	Description of Each Listed Activity	Description of Activities Applicable to Each Listed Activity
LISTING NOTICE 1 – BASIC ASSESSMENT PROCESS			
Listing Notice 1: GN R No. 544 of 18 June 2010	10	The construction of facilities or infrastructure for the transmission and distribution of electricity: (xi) outside urban areas or industrial complexes with a capacity of more than 33kV but less than 275kV.	*The Houhoek Transmission Substation project entails the construction of a 400/132kV Substation, including 400kV Transmission and 132kV Distribution power lines and associated infrastructure, outside of an urban area / industrial complex.*
	11	The construction of: (xi) infrastructure or structures covering 50m^2 or more, where such construction occurs within a watercourse or within 32m of a watercourse, measured from the edge of a watercourse, excluding where such construction will occur behind a development setback line.	*The Houhoek Transmission Substation project entails the construction of a 400/132kV Substation, including 400kV Transmission and 132kV Distribution power lines and associated infrastructure. The associated power lines or access roads, that link to the substation, may cross drainage lines and non-perennial watercourses.*
	13	The construction of facilities or infrastructure for the storage, or for the storage and handling, of a dangerous good, where such storage occurs in containers with a combined capacity of 80m^3 but not exceeding 500m^3.	*The construction camp may store hazardous material for use in the construction of the Houhoek Transmission Substation project. The substation design will include transformer oil ponds. The combined capacities of hazardous material and the size of the ponds will be determined during the EIA process, which will inform whether this activity will apply.*
	18	The infilling or depositing of any material of more than 5m^3 into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock from: (i) a watercourse.	*The Houhoek Transmission Substation project could entail the construction of access roads for use during the construction phase and operational phase (for maintenance purposes) which may cross over drainage lines*

Number & Date of Relevant Notice	Activity No(s)	Description of Each Listed Activity	Description of Activities Applicable to Each Listed Activity
			and non-perennial watercourses occurring in the area. Note that it is considered unlikely that access roads should be required for this development. Should the planning process indicate otherwise the issues related to this infrastructure component would be considered in the remainder of the EIA process. *The installation of pylons associated with the LILO lines may also impact on any cross drainage lines and non-perennial watercourses or wetlands encountered in the study area.*
Listing Notice 1: GN R No. 544 of 18 June 2010	22	The construction of a road, outside urban areas, (i) with a reserve wider than 13,5 metres. (ii) where no reserve exists where the road is wider than 8m.	*The Houhoek Transmission Substation project could entail the construction of access roads for use during the construction phase and operational phase (for maintenance purposes). The exact characteristics of such roads will be determined through the design process which will inform the EIA process.*
	24	The transformation of land bigger than 1,000m^2 in size, to residential, retail, commercial, industrial or institutional use, where, at the time of the coming into effect of this Schedule such land was zoned open space, conservation or had an equivalent zoning.	*One of the proposed alternatives being considered falls within the existing Houhoek Nature Reserve, which is by definition "conservation" in nature. The Transmission Substation will be approximately 12ha, which is significantly larger than 1,000m^2 (i.e. 0.1ha). The land-use proposed for the Transmission Substation is industrial. The combined servitude of the LILO lines could also exceed 1,000m^2*
	26	Any process or activity identified in terms of Section 53(1) of the National Environmental Management: Biodiversity Act (No. 10 of 2004).	*The proposed Transmission and Distribution power lines fall within areas of importance in terms of NEM:BA. The position of the Transmission Substation itself will also be influenced by the biodiversity status.*
	38	The expansion of facilities for the transmission and distribution of electricity where the expanded capacity will exceed 275 kilovolts and the development footprint will increase.	*The Houhoek Transmission Substation project will link a 132kV Distribution power line from the proposed 400kV Transmission Substation to the existing 132kV Distribution Substation. The Houhoek Transmission Substation project could then entail the expansion*

Number & Date of Relevant Notice	Activity No(s)	Description of Each Listed Activity	Description of Activities Applicable to Each Listed Activity
			of the existing Eskom servitudes, which will increase the development footprint.
	40	The expansion of: (iv) infrastructure by more than 50m^2 within a watercourse or within 32m of a watercourse, measured from the edge of a watercourse.	*The Houhoek Transmission Substation project may require the placing of the Transmission and/or Distribution power lines and/or the Transmission Substation along or across a drainage or non-perennial water course.*
Listing Notice 1: GN R No. 544 of 18 June 2010	47	The widening of a road by more than 6m, or the lengthening of a road by more than 1km – (i) where the existing reserve is wider than 13.5m; or (ii) where no reserve exists, where the existing road is wider than 8m.	*The Houhoek Transmission Substation project could entail the expansion of existing roads to use as access roads for use during the construction phase and operational phase (i.e. for maintenance purposes).*
LISTING NOTICE 3 – BASIC ASSESSMENT PROCESS			
Listing Notice 3: GN R No. 546 of 18 June 2010	4	The construction of a road wider than 4m with a reserve less than 13,5m (d) in Western Cape Province: in (ii) all areas outside urban areas.	*The Houhoek Transmission Substation project could entail the construction of access roads for use during the construction phase and operational phase outside of an urban area. The exact specification of any such roads will be determined during the planning phase and will inform the EIA process.*
	10	The construction of facilities or infrastructure for the storage, or storage and handling of a dangerous good, where such storage occurs in containers with a combined capacity of 30 but not exceeding 80m^3, (e) in the Western Cape: in (ii) All areas outside urban areas.	*The construction camp may store hazardous material for use in the construction of the Houhoek Transmission Substation project and the substation design will include transformer oil ponds. The capacities of hazardous material and the size of the ponds will be determined during the EIA process, that is, the combined capacity thereof will be confirmed during the EIA and it will be determined whether this activity is in fact triggered.*
	12	The clearance of an area of 300m2 or more of vegetation where 75% or more of the vegetative cover constitutes indigenous vegetation: (a) Within any critically endangered or endangered ecosystem listed in terms of Section 52 of the NEM:BA or prior to the publication of such a list, within an area that has been identified as critically endangered in the National Spatial Biodiversity Assessment (2004).	*Clearance land of vegetation for the proposed power lines and substation areas will be required to a greater or lesser extent. The exact size of the area of indigenous vegetation to be cleared will be confirmed during the EIA phase, along with the status of the footprint in terms of its biodiversity status.*

Number & Date of Relevant Notice	Activity No(s)	Description of Each Listed Activity	Description of Activities Applicable to Each Listed Activity
		(b) Within critical biodiversity areas identified in bioregional plans.	
Listing Notice 3: GN R No. 546 of 18 June 2010	13	The clearance of an area of 1 hectare or more of vegetation where 75% or more of the vegetative cover constitutes indigenous vegetation, except where such removal of vegetation is required for (2) the undertaking of a linear activity falling below the thresholds mentioned in Listing Notice 1 in terms of GN R No. 544 of 2010. (a) Critical biodiversity areas and ecological support areas as identified in systematic biodiversity plans adopted by the competent authority. (b) National Protected Area Expansion Strategy Focus areas. (c) in Western Cape: (ii) outside urban areas, the following: (aa) A protected area identified in terms of NEMPAA, excluding conservancies. (bb) National Protected Area Expansion Strategy Focus areas. (cc) Sensitive areas as identified in an environmental management framework as contemplated in Chapter 5 of the Act and as adopted by the competent authority. (ee) Core areas in biosphere reserves. (ff) Areas within 10km from national parks or world heritage sites or 5km from any other protected area identified in terms of NEM:PAA or from the core area of a biosphere reserve.	*Clearance land of vegetation for the proposed power lines and substation areas will be required to a greater or lesser extent. The exact size of the area of indigenous vegetation to be cleared will be confirmed during the EIA phase, along with the status of the footprint in terms of its biodiversity status.*
Listing Notice 3: GN R No. 546 of 18 June 2010	14	The clearance of an area of 5 hectares or more of vegetation where 75% or more of the vegetative cover constitutes indigenous vegetation: (a) in the Western Cape: in (i) all areas outside urban areas.	*Clearance land of vegetation for the proposed power lines and substation areas will be required to a greater or lesser extent. The exact size of the area of indigenous vegetation to be cleared will be confirmed during the EIA phase, along with the status of the footprint in terms of its biodiversity status.*
	16	The construction of: (xi) infrastructure or structures covering 10m^2 or more, where such construction occurs within a	*The Houhoek Transmission Substation project may have an impact on biodiversity rich areas, and will have an*

Number & Date of Relevant Notice	Activity No(s)	Description of Each Listed Activity	Description of Activities Applicable to Each Listed Activity
		watercourse or within 32m of a watercourse, measured from the edge of a watercourse, excluding where such construction will occur behind a development setback line (d) in Western Cape (ii) Outside urban areas, in: (aa) A protected area identified in terms of NEMPAA, excluding conservancies. (bb) National Protected Area Expansion Strategy Focus areas. (dd) Sensitive areas as identified in an environmental management framework as contemplated in Chapter 5 of the Act and as adopted by the competent authority. (ff) Critical biodiversity areas or ecosystems service areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans. (gg) Core areas in biosphere reserves. (hh) Areas within 10km from national parks or world heritage sites or 5km from any other protected area identified in terms of NEMPAA or from the core areas of a biosphere reserve.	*impact (direct/indirect) on the adjacent Houwhoek Nature Reserve.*
Listing Notice 3: GN R No. 546 of 18 June 2010	19	The widening of a road by more than 4m, or the lengthening of a road by more than 1km (d) in the Western Cape: in (ii) all areas outside urban areas.	*The Houhoek Transmission Substation project could entail the construction of access roads for use during the construction phase and operational phase (for maintenance purposes) – the specifications thereof will be determined during planning and will inform the EIA process.*
	23	The expansion of facilities or infrastructure for the storage, or storage and handling of a dangerous good, where such storage occurs in containers with a combined capacity of $30m^3$ but not exceeding $80m^3$, (d) in the Western Cape: in (ii) all areas outside urban areas.	*The construction camp will store hazardous material for use in the construction of the Houhoek Transmission Substation project. During operation hazardous substances will be stored at the Substation. The capacities of hazardous material will be determined during the planning process*

Number & Date of Relevant Notice	Activity No(s)	Description of Each Listed Activity	Description of Activities Applicable to Each Listed Activity
			and will inform the EIA process.
Listing Notice 3: GN R No. 546 of 18 June 2010	24	The expansion of: (d) infrastructure where the infrastructure will be expanded by 10m^2 or more where such construction occurs within a watercourse or within 32m of a watercourse, measured from the edge of a watercourse, excluding where such construction will occur behind a development setback line. (d) in Western Cape (ii) outside urban areas, in: (aa) A protected area identified in terms of NEMPAA, excluding conservancies. (bb) National Protected Area Expansion Strategy Focus areas. (cc) Sensitive areas as identified in an environmental management framework as contemplated in Chapter 5 of the Act and as adopted by the competent authority. (ee) Critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans. (ff) Core areas in biosphere reserves. (gg) Areas within 10km from national parks or world heritage sites or 5km from any other protected area identified in terms of NEMPAA or from the core areas of a biosphere reserve.	*The proposed power lines may cross over drainage lines and non-perennial watercourses and the study area falls within the parameters of the triggering environmental constraints.*
LISTING NOTICE 2 – SCOPING/EIA PROCESS			
Listing Notice 2: GN R No. 545 of 18 June 2010	8	The construction 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.	*The Houhoek Transmission Substation project entails the construction of infrastructure for the transmission of electricity with a capacity of 400kV, outside an urban area.*

6.4 NATIONAL WATER ACT

The National Water Act (No. 36 of 1998) (NWA) provides a framework to protect, develop, conserve and manage the nation's water resources. Water use is defined broadly in terms of NWA, and includes taking and storing water, activities which reduce stream flow, waste

discharges and disposals, controlled activities (activities which impact detrimentally on a water resource), altering a watercourse, removing water found underground for certain purposes, and recreation. In general a water use must be licensed (in terms of Section 21) unless it is listed in Schedule 1, is an existing lawful use, is permissible under a general authorisation, or if a responsible authority waives the need for a licence. Section 21 of the NWA lists the water uses for which authorisation under the Act is required.

The NWA also provides for pollution prevention measures, with particular emphasis on water resource pollution. In accordance, the licensee shall ensure that activities impacting upon water resources and effluent releases are monitored for compliance with the applicable regulations. Emergency incidents involving water resources are included in the Act, requiring the polluter to remediate and mitigate the impacts of such an emergency incident.

6.4.1 Water Use Licence Application Process

a) Application

Pre-application liaison should occur with the relevant departmental officials and a lead regional office and officer should be identified (in this instance, the Western Cape Regional Offices). Furthermore, the initial formal Water Use Licence application forms must be completed and payment of R114.00 must be made to the relevant regional office to initiate the tracking process for the application.

b) Validation

During the initial contact with the regional office and, after submitting the formal Water Use Licence application forms, the validity of the application against legal requirements, determining the type of water use authorisation, and checking the completeness of provided information, is undertaken and confirmed.

c) Pre-position Information

In this stage, the available information and its sufficiency to support the motivation and justification of the water uses applied for is evaluated.

The above phases are typically captured in an Initial Assessment Report that is submitted to the DWA. The applicant only continues with the next phases after confirmation is received from the DWA.

Based on the feedback from the DWA (and the regional office), a final Integrated Water Use Licence Application can be submitted, incorporating the results of detailed investigations of the potential impacts that the proposed water use could have on the water resources, including the factor prescribed in Section 27. If they have changed, the revised formal Water Use Licence application forms should be re-submitted.

6.4.2 Section 27(1) Requirements

The NWA includes considerations set out in section 27(1) that must be taken into account by the responsible authority in the assessment of licence application for water use. The applicant should ensure that the following minimum information is contained in the application submitted to the DWA:

- The Applicant's current water use entitlements.
- A description of the race and gender of the party that will have ownership and control of the water use license.
- An explanation of the efficient and beneficial use of water in the public interest.
- A description of the socio-economic impact of the issuing or refusal of the licence.
- The strategic importance of the water use to be authorised.
- A description of the investments related to the water use already made or to be made
- An explanation of the duration of the undertaking for which the licence is required.
- Adherence to the Broad-Based Black Economic Empowerment (BBBEE) Guideline.

6.4.3 Technical Information in Support of Integrated Water Use Licence Application

To enable the DWA to prepare a Water Use Licence, specific water use details are required and should be captured in the formal Water Use Licence application forms and elaborated on in the initial assessment and final reports. Information such as title deed numbers of the properties on which the water use is to take place, water abstraction points (co-ordinates), water discharge points (co-ordinates), volume of water abstracted per day (as an average), the peak quantity abstracted on any day, and the water quality of the final effluent to be discharged.

The quantity of water that will be consumed, as well as the general management of stormwater, storage of raw materials, disposal of waste material from the construction site and drilling liquid should be described. Best practice should be used as a norm for these management measures.

6.4.4 Activities Applicable to the NWA

Construction-related activities will impact upon water resources, thereby requiring the issue of a license for such activities in accordance to Section 21 of the NWA. The listed activity in terms of the NWA is shown in **Table 6-3**.

Table 6-3: Listed activities in terms of NWA

Number and Date of the Relevant Notice	Activity No(s)	Description of Each Listed Activity
General Authorisations in Terms of Section 39 of the National Water Act, under GN R 26187 of 26 March 2004	21 (c)	Impeding or diverting the flow of water in a watercourse.
	21 (f)	Discharging waste or water containing waste into a water resource through a pipe, canal, sewer, sea outfall or other conduit.
	21 (i)	Altering the bed, banks, course or characteristics of a watercourse.
	21 (j)	Removing, discharging or disposing of water found underground if it is necessary for the efficient continuation of an activity or for the safety of people.

6.5 NATIONAL HERITAGE RESOURCES ACT

The National Heritage Resources Act (No. 25 of 1999) (NHRA) is the primary statute regulating the protection and management of South Africa's heritage resources. The NHRA aims to promote good management of the national estate, and ensures community participation in the protection of national heritage resources and involves all three levels of government (national, provincial and local) in the management of the country's national heritage. The South African Heritage Resources Agency (SAHRA) is the enforcing authority for the NHRA. The national estate includes but is not limited to places, buildings, structures and equipment of cultural significance, places to which oral traditions are attached or which are associated with living heritage; historical settlements and townscapes, landscapes and natural features of cultural significance, geological sites of scientific or cultural importance, archaeological and paleontological sites, graves and burial grounds, and sites of significance relating to South African history and movable objects.

A variety of formal protection measures are provided for in the NHRA, ranging from national and provincial heritage sites, protected areas, provisional protection, inclusion on the heritage register of a province, heritage areas and heritage objects legal protection of paleontological and archaeological sites (including rock art) and meteorites, burial grounds and graves, and the protection of structures older than 60 years and public monuments and memorials.

Applicants must contact the SAHRA or the relevant authorised provincial agency, Heritage Western Cape (HWC), to ascertain which properties and objects are formally protected by the Act and how any future development would impact on these heritage resources. Formal permit applications or authorisations would be required from the relevant heritage resource management authority to make changes to heritage resources.

The provisions of Section 38 of the NHRA provide that the Applicant is responsible for contacting the SAHRA at the earliest stages of initiating a development and for furnishing the SAHRA with details relating to the Houhoek Transmission Substation project so that the SAHRA can determine if a Heritage Impact Assessment (HIA) is required. The following activities listed in Section 38 of the NHRA apply to the Houhoek Transmission Substation project:

*(a) The construction of a road, wall, **power line**, pipeline, canal or other similar form of linear development or barrier **exceeding 300m in length**.*

(c) Any development or other activity which will change the character of a site (i) exceeding 5 000m^2 in extent.

6.6 HAZARDOUS SUBSTANCES ACT

The Hazardous Substances Act (No. 15 of 1973) (HSA) provides for the control of substances that may cause injury, ill-health or death to humans by reason of their toxic, corrosive, irritant, strongly sensitising or flammable nature or the generation of pressure, thereby, in certain circumstances, and for the control of certain electronic products.

The Act divides such substances or products into groups in relation to the degree of danger and also to prohibit and control the importation, manufacture, sale, use, operation,

application, modification, disposal or dumping of the substances and products indicated in this Act. The Act acknowledges that these substances will lose their economic value after use, and would therefore require disposal. Section 29 of this Act therefore makes provision for the promulgation of regulations "authorising, regulating, controlling, restricting or prohibiting the storage, transportation, or dumping and other disposal" of any grouped hazardous substances or class of grouped hazardous substances.

6.7 POLICIES AND EIA GUIDELINES

The EIA process must consider the planning policies that govern the study area to ensure that the scale, density and nature of activities/developments are harmonious and in keeping with the sense of place and character of the area. The proposed environmental and infrastructure modifications must be viewed in the context of the planning policies from the following organisations:

- Western Cape Provincial Spatial Development Framework (2005) of the DEA&DP.
- Western Cape Provincial Land Use Planning Ordinance (No. 15 of 1985), which is the legislation controlling town and regional planning and is also cross linked to the EIA process. This ordinance falls under the jurisdiction of the TLM.
- Overberg District Municipality: Spatial Development Framework (2005).
- Overberg District Municipality: Integrated Development Plan (2011).
- Overberg District Municipality: Integrated Transport Plan (2010).
- Critical Biodiversity Areas of the Overberg District Municipality: Conservation Planning Report (2010).

The following guideline documents were considered during the process:

- DEAT (2006a) Guideline 3: General Guide to Environmental Impact assessment Regulations 2006, Integrated Environmental Management Guideline Series, Department of Environmental Affairs and Tourism (DEAT), Pretoria.
- DEAT (2006b) Guideline 4: Public Participation, in support of the EIA Regulations 2006, Integrated Environmental Management Guideline Series, Department of Environmental Affairs and Tourism (DEAT), Pretoria.
- DEAT (2006c) Guideline 5: Assessment of Alternatives and Impacts in support of the Environmental Impact Assessment Regulations 2006, Integrated Environmental Management Guideline Series, Department of Environmental Affairs and Tourism (DEAT), Pretoria.
- DEAT (2004) Guideline 12: Environmental Management Plans, Integrated Environmental Management Guideline Series, Department of Environmental Affairs and Tourism (DEA), Pretoria.
- Brownlie, S (2005) Guidelines for involving biodiversity specialists in EIA. Edition 1. CSIR Report No ENV-S-C 2005 053 C. Provincial Government of Western Cape: Department of Environmental Affairs and Development Planning. Cape Town.
- De Villiers C., Driver A., Clark B., Euston-Brown D., Day L., Job N., Helme N., Holmes P., Brownlie S. And Rebelo T. (2005) Fynbos Forum Ecosystem Guidelines for Environmental Assessment in the Western Cape. Fynbos Forum and Botanical Society of South Africa: Kirstenbosch. Cape Town.

- Section 10 of the "Minimum Requirements for Storage, Handling and Disposal of Hazardous Waste" (DWAF Guidelines, 1998) refers to the temporary storage of hazardous waste related to time, volume and other requirements.

6.8 AUTHORITY CONSULTATION

An application form for an EA was submitted to the DEA on 15 August 2012. The application included a declaration of interest from the EAP, landowner consents, a locality map and a project schedule. The acknowledgement of receipt of these documents was sent by the DEA on 30 August 2012. See **Appendix A** for further details.

7 DESCRIPTION OF ANTICIPATED ISSUES

The purpose of this section is to provide a description of the environmental issues and anticipated impacts as required by Section 28(1)(g) of the EIA Regulations (2010). This enables the EIA Report to be clearly focused and provides a framework for the impact assessment of the Houhoek Transmission Substation project on the environment, and of the environment on the Houhoek Transmission Substation project.

From these various sources, environmental (biophysical, social, cultural-historic and economic) issues have been identified and will be investigated during the EIA phase. Specialist studies will address some additional issues for completeness.

7.1 CONSTRUCTION-RELATED IMPACTS

The impacts from the construction of the Houhoek Transmission Substation project will only be for the duration of the construction phase and should be limited to daylight hours. During the construction phase, overall activity within the study area will be increased. The placement of the construction site office will be within the site demarcated for the Houhoek Transmission Substation project and access will be gained from designated and existing routes only. Investigations will be made into the placement of a construction camp to accommodate the construction workers. The contractor(s) will need to comply with all security measures detailed by Eskom and in the EMPr.

Activities during construction, such as driving on gravel roads, the clearing of vegetation, construction of access roads and the excavations for the towers will generate windblown dust. Other activities involving heavy machinery could cause a noise disturbance. For all the afore-mentioned, however, the construction period is for a relatively short time and any potential impacts associated with construction will be temporary.

7.2 TRAFFIC IMPACTS

Potential traffic impacts relate primarily to the anticipated increase in vehicle usage of provincial and district roads, in particularly by heavy vehicles during the construction phase. This includes material delivery vehicles and vehicles that will travel daily to and from the construction camp to the sites being worked on at any given time. The numbers and types of vehicles that will be needed for the construction of the Houhoek Transmission Substation project are known and potential effects are anticipated to be negligible (particularly considering the method of construction over time – see **Table 3-1**). This will need to be confirmed in the EIA Phase.

7.3 AIR QUALITY

Air pollution in the study area is mostly caused by the burning of fuel wood for heating and cooking purposes in the residential areas. The addition of diesel fumes during the construction period is considered to be negligible and does not warrant an air quality specialist study.

7.4 GEOTECHNICAL IMPACTS

The following impacts related to specific sites are anticipated:

- **Site Alternative 1 Layout 1:** There was no sandstone outcrop observed on site, only light vegetation that would have to be cleared during construction. The area is generally flat (slope of 4%), there will be no major excavations during constructions.
- **Site Alternative 1 Layout 2:** The Sandstone outcrop observed on Site 2 could be evidence of shallow rock profile and this could have a negative impact on excavations as the proposed substation footprint would have to be cut into the steeply graded slope.

The geotechnical impacts anticipated on Site Alternatives 2 and 3 have not yet been determined and will be investigated during the EIA Phase. Those geotechnical impacts already anticipated will also be confirmed during the EIA Phase.

7.5 SOIL & AGRICULTURE IMPACTS

The following perennial crops, with a medium to high area suitability, were considered in terms of changes to the agricultural potential: grape vines, deciduous fruit (e.g. peaches), citrus and olives.

Annual dry-land winter growing crops that were taken into consideration were medics, clover, lucerne and small grain. It must be kept in mind that this is a very broad agricultural potential rating because of the limited soil information.

Table 7-1: Agricultural Potential Ratings (according to Soil Classification Working Group, 1991)

Map Units	Perennial crops	Annual crops
Cf 1	Low	Low
Cf 2	Low – Medium	Low – Medium
Ct 1	Medium – Low	Low – Medium
Es 1	Low – Medium	Medium – Low
Es 2	Low – Medium	Medium – Low
Pn 1	Medium	Low – Medium
Ss 1	Low	Medium – Low

The preliminary findings indicate that Site alternative 1 (both layouts) has slightly higher agricultural potential in terms of its soils than either Site alternative 2 or Site alternative 3 (both layouts). The indication is thus that Site alternative 1 would be the least preferred from a loss of a site with agricultural potential, based on the desk-top soil information used for this report.

This will however need to be considered in terms of the current and past use of the site as the site appears to have lain fallow for over a decade, as well as detailed site-specific considerations of each site.

7.6 WETLANDS IMPACTS

The following wetland impacts were identified for the alternative site locations of the proposed Houhoek Transmission Substation:

- Only Alternative Layout 1 of Site Alternative 1 does not infringe on a freshwater ecosystem. Alternative Layout 2 of Site Alternative 1 would infringe on an ephemeral river channel.
- Site Alternative 2 has marginal infringement on a non-perennial river at its south-west corner
- Site Alternative 3 (both layout alternatives) would lead to the infilling of a dam of potential conservation importance due to the presence of wetland habitat. Layout Alternative 2 would further infringe on the artificial channel leading into the dam.

On the basis of the existing information about the study area and its biophysical characteristics, and the scale and nature of the proposed development, the following potential impacts on freshwater ecosystems have been identified for consideration in the EIA phase:

- **Infilling of wetlands and other freshwater ecosystems.** The preliminary mapping suggests that there are only a few cases (on Alternative Layout 2 of Site Alternative 1 and on Site Alternative 2) where non-perennial rivers may be directly affected by infilling associated with the construction of the proposed new substation, and in one case a dam of potential conservation importance (on Site Alternative 3, as described above) could be affected by this impact. In the case of Alternative Layout 1 of Site Alternative 1, no freshwater ecosystems were identified that could be directly affected by the construction of the proposed new substation on this site. The proposed 400kV Transmission LILO power line could also result in the infilling of wetlands and other freshwater ecosystems if the proposed route alignment crosses over freshwater ecosystems. However, the proposed route alignment will only be determined during the EIA Phase.
- **Loss of vegetation in or adjacent to freshwater ecosystems.** During the establishment of the proposed Houhoek Transmission Substation Project, vegetation will need to be cleared for the creation of servitude areas and any associated roads for access to servitudes and power lines. Such activities could lead to the loss of vegetation in wetlands and other freshwater ecosystems or to the erosion of freshwater ecosystems if such vegetation loss is adjacent to wetlands or other freshwater ecosystems. Further information on the layout of the proposed infrastructure for the new substation within each site alternative and the routing of the proposed Transmission LILO and Distribution power lines will need to be gathered during the EIA phase of this project to allow for a more suitable evaluation of this potential impact.
- **Localised impacts to surface and groundwater quality as a result of contamination during construction.** The major contaminants likely to be on site would be cement, gravel and sands required for concrete structures; road surfacing materials, oils and fuel used for vehicles and machinery; and waste from construction workers. These contaminants could result in pollution of freshwater ecosystems during the construction phase if inadequate control measures are put in place.

- **Long-term, localised, operational-phase changes in drainage patterns** as a result of concentration of flows off hardened substation areas and associated roads into drainage lines.
- **Ongoing disturbance to fauna associated with freshwater ecosystems.** Localised noise-related and possible lighting-related disturbance to fauna associated with rivers, wetlands and other freshwater ecosystems located close to the proposed Houhoek Transmission Substation project could result from the operation of the substation and / or the power lines.

7.7 ECOLOGICAL IMPACTS

The construction of the proposed Houhoek MTS would effectively result in the permanent loss of all existing natural or partly natural vegetation in the development footprint. This would mean loss of up to 12ha of currently natural or partly natural vegetation (of a Critically Endangered vegetation type). Construction of the new Distribution and Transmission power lines would also require new temporary access roads (at least for the latter), and new servitudes, which are likely to be bushcut in order to reduce fire risk. Construction of the pylons for these lines would also have a minor direct negative impact on any natural vegetation present, particularly in the case of the Transmission power lines, which would have to cross an area of High botanical sensitivity.

Indirect impacts will take effect as soon as the construction phase has started, and will persist as long as the infrastructure is in place. Indirect impacts include:

- Loss of current ecological connectivity across the site (likely to be of significance, and not possible to mitigate).
- Habitat fragmentation (of significance, and not possible to mitigate).
- Possible disruption of optimal fire regime (associated with proximity to Eskom infrastructure; of significance, and not easily mitigated).
- Possible introduction or facilitated spread of alien invasive plant species (of minor significance, and easily mitigated).

7.8 AVIFAUNA IMPACTS

Because of their size and prominence, electrical infrastructures constitute an important interface between wildlife and man. Negative interactions between wildlife and electricity structures take many forms but two common problems in southern Africa are (a) electrocution of birds and other animals and (b) birds colliding with power lines (Ledger & Annegarn 1981; Ledger 1983; Ledger 1984; Hobbs & Ledger 1986a; Hobbs & Ledger 1986b; Ledger *et al.* 1992; Verdoorn 1996; Kruger & Van Rooyen 1998; Van Rooyen 1998; Kruger 1999; Van Rooyen 1999; Van Rooyen 2000, Anderson 2001). Other problems include electrical faults caused by bird excreta when roosting or breeding on electricity infrastructure (Van Rooyen *et al.* 2002), and displacement due to disturbance and habitat destruction during construction and maintenance activities.

7.8.1 Electrocutions

Large birds of prey are the most commonly electrocuted on power lines. The large transmission lines from 220kV to the massive 765kV structures usually do not pose an

electrocution threat to large birds, because the pylons are designed in such a manner that the birds do not perch in close proximity to the potentially lethal conductors. In fact, these power lines have proved to be beneficial to birds such as Martial Eagles, Tawny Eagles *Aquila rapax*, White-backed Vultures *Gyps africanus*, and even occasionally Verreauxs' Eagles by providing safe nesting and roosting sites in areas where suitable natural alternatives are scarce (Van Rooyen, *personal observation*). Cape Vultures *Gyps coprotheres* have also taken to roosting on power lines in large numbers, while Lappet-faced Vultures *Torgos tracheliotis* also uses power lines as roosts, especially in the Northern Cape (pers. obs.).

Unfortunately the same cannot be said of the smaller sub-transmission and reticulation lines of 11kV to 132kV (Van Rooyen 1998; 2000). Raptors and vultures often seek out the highest vantage point as suitable perches from where they scan the surrounding area. In flat, treeless habitat power pylons often provide ideal vantage points for this purpose. The vast majority of electrical structures were designed and constructed at a time when the awareness of the danger that they pose for raptors was very limited or totally absent. Depending on the design of the pole, a large raptor can potentially touch two live components or a live and earthed component simultaneously, almost inevitably resulting in instant electrocution and a concomitant disruption in the electrical supply (Van Rooyen 1998).

Electrocution is not foreseen as an impact associated with the proposed new substation and associated power lines. The 400kV LILO lines pose no electrocution risk. The planned 132kV line will use the single steel pole design, which will hold no electrocution risk to any of the Red Data power line sensitive species that could occur on the site. Electrocution on single steel pole designs has only been recorded in very specific circumstances, namely where several vultures drawn to a carcass presumably attempted to perch on the insulators and caused a phase-earth short circuit (Van Rooyen 2007). This scenario should never happen at Houhoek.

7.8.2 Collisions

Anderson (2001) summarizes collisions as a source of avian mortality as follows:

"The collision of large terrestrial birds with the wires of utility structures, and especially power lines, has been determined to be one of the most important mortality factors for this group of birds in South Africa (Herholdt 1988; Johnsgard 1991; Allan 1997). It is possible that the populations of two southern African endemic bird species, i.e., the Ludwig's Bustard *Neotis ludwigii* and Blue Crane *Anthropoides paradiseus*, may be in decline because of this single mortality factor (Anderson 2000; McCann 2000).

The Ludwig's Bustard (Anderson 2000) and Blue Crane (McCann 2000) are both listed as "vulnerable" in The Eskom Red Data Book of Birds of South Africa, Lesotho & Swaziland (Barnes 2000) and it has been suggested that power line collisions is are one of the factors responsible for these birds' present precarious conservation status.

Collisions with power lines and especially overhead earth-wires have been documented as a source of mortality for a large number of avian species (for example, Beaulaurier *et al.* 1982; Bevanger 1994, 1998). In southern Africa, this problem has until recently received only limited attention. Several studies however have identified bird collisions with power lines as

a potentially important mortality factor (for example, Brown & Lawson 1989; Longridge 1989). Ledger *et al.* (1993), Ledger (1994) and Van Rooyen & Ledger (1999) have also provided overviews of bird interactions with power lines in South Africa. Bird collisions in this country have been mainly limited to; Greater and Lesser Flamingos, various species of waterbirds (ducks, geese, and waders), Stanley's *Neotis denhami*, Ludwig's Bustards, White Storks *Ciconia ciconia*, Wattled Crane *Grus carunculatus*, Grey Crowned Crane *Balearica regulorum* and Blue Cranes (for example, Jarvis 1974; Johnson 1984; Hobbs 1987; Longridge 1989; Van Rooyen & Ledger (1999).

Certain groups of birds are more susceptible to collisions, namely the species which are slow fliers and which have limited manoeuvrability (as a result of high wing loading) (Bevanger 1994), and birds which regularly fly between roosting and feeding grounds undertake regular migratory or nomadic movements. Birds flying in flocks or that fly during low-light conditions are also vulnerable.

Other factors which can influence collision frequency include; the age of the bird (younger birds are less experienced fliers), weather factors (decreased visibility, strong winds, etc.), terrain characteristics and power line placement (lines that cross the flight paths of birds), power line configuration (the larger structures are more hazardous [for collisions; with electrocutions the opposite is the case]), human activity (which may cause birds to panic and fly into the overhead lines), and familiarity of the birds with the area (therefore nomadic Ludwig's Bustards would be more susceptible) (Anderson 1978; APLIC 1994).

Although collision mortality rarely affects healthy populations with good reproductive success, collisions can be biologically significant to local populations (Beer & Ogilvie 1972) and endangered species (Thompson 1978; Faanes 1987). The loss of hundreds of Northern Black Korhaans *Eupodotis afraoides* due to power line collisions would probably not affect the success of the total population of this species and would probably not be biologically significant, but if one Wattled Crane was killed due to a collision, that event could have an effect on the population that would be considered biologically significant. Biological significance is an important factor that should be considered when prioritizing mitigation measures. Biological significance is the effect of collision mortality upon a bird population's ability to sustain or increase its numbers locally and throughout the range of the species.

There are many methods that can be used to **mitigate avian power line interactions** (for example, Avian Power Line Interaction Committee (APLIC), 1994) and several investigations dealing with the collision problem have recently focused on finding suitable mitigation measures (see APLIC 1994 for an overview). The most proactive measures are; power line route planning (and the subsequent avoidance of areas with a high potential for bird strikes) and the modification of power line designs (this option includes line relocations, underground burial of lines, removal of over-head ground wires, and the marking of ground wires to make them more visible to birds in flight). In many instances, decisions on power line placement and possible mitigation measures are however eventually based on economic factors. The relocation of an existing line is the last option that is usually considered when trying to mitigate avian collisions. The huge expense of creating a new line and servitude usually cannot be justified unless there are biologically significant mortalities. Underground burial of power lines is another option available to managers in areas of high collision risk.

This will obviously eliminate collisions, but the method has many drawbacks. The costs of burying lines can be from 20 – 30 times (or more) higher than constructing overhead lines (Hobbs 1987), and such costs are related to the line voltage, type and length of cable, cable insulation, soil conditions, local regulations, reliability requirements, and requirement of termination areas. Limitations of cable burial include: no economically feasible methods of burying extra high voltage lines have been developed, there is a potential to contaminate underground water supplies if leakage of oil used in insulating the lines occurs, and extended outage risks due to the difficulty in locating cable failures (APLIC 1994).

Since most strikes involve earth-wires (more than 80% of observed bird collisions) (for example, Beaulaurier 1981; Faanes 1987; Longridge 1989), the removal of these wires would decrease the number of collisions (Beaulaurier 1981; Brown *et al.* 1987). Faanes (1987) has argued that the large number of earth-wire collisions is because birds react to the more visible conductors by flaring and climbing and then collide with the thinner earth-wires. Earth-wire removal is however, not a simple matter. Due to the need for lightning protection and other types of electricity overload, it is only possible on lower-voltage power lines (where polymer lightning arresters can be used).

The marking of overhead earth-wires to increase their visibility is usually considered to be the most economical mitigation option for reducing collision mortality (Morkill & Anderson 1991; Brown & Drewien 1995). This is particularly so for the thousands of kilometres of established power lines through areas of high potential for avian interaction which cannot be rerouted."

The potential for Red Data power lines sensitive species to collide with the proposed LILO power lines is always there. However, this is likely to be a rare occurrence, because the majority of the site is either transformed or semi-transformed in such a way that these species are unlikely to be attracted to the site. The biggest risk of collisions will be in the untransformed area on the slopes of the mountains, where power line sensitive Red Data species are most likely to be occasionally encountered, especially raptors using the updrafts on the slopes. Overall, due to the short length of the proposed power lines, the risk is likely to be **low**. The collision risk will again be assessed once the alternative alignments have been finalised.

7.8.3 Displacement Due to Habitat Destruction

During the construction phase and maintenance of power lines and substations, some habitat destruction and transformation inevitably takes place. This happens with the construction of access roads and the clearing of servitudes. Servitudes have to be cleared of excess vegetation at regular intervals in order to allow access to the line for maintenance, prevent vegetation from intruding into the legally prescribed clearance gap between the ground and the conductors, and to minimize the risk of fire under the line which can result in electrical flashovers. These activities could have an impact on birds breeding, foraging and roosting in or in close proximity of the servitude, through transformation of habitat, and resultant displacement.

Historically the area where the proposed substation sites are located probably comprised entirely of pristine fynbos. However these areas have since been transformed by urbanisation, industrial development and the uncontrolled increase of alien trees (both

uncontrolled invasive aliens and cultivated plantations), which would have reduced the number and variety of Red Data species originally inhabiting the area, on account of the loss of habitat and decline in food availability. Few Red Data species would specifically be attracted to the transformed habitat, although raptors may on occasion perch or roost in the alien trees. The habitat at all the proposed alternative **Houhoek substation sites** does not contain unique features that will make it critically important for Red Data species (see **Chapter** 5 Description of Affected Environment above). The species that are most likely to be affected by the loss of habitat are the smaller, non-threatened passerines that are currently potentially resident in the 12 hectares of habitat that will be taken up by the substation. It is not envisaged that any Red Data species will be permanently displaced by the habitat transformation that will take place.

The potential impact of access roads associated with the 400kV LILO lines will be assessed in the next stage of the investigation once the potential alignment of these lines has been determined.

7.8.4 Displacement Due to Disturbance

The construction of a power line and/or substation can be highly disturbing to birds breeding in the vicinity of the construction activities. Many birds are highly susceptible to disturbance and should this disturbance take place during a critical time in the breeding cycle, for example, when the eggs have not hatched or just prior to the chick fledging, it could lead to temporary or permanent abandonment of the nest or premature fledging. In both instances, the consequences are almost invariably fatal for the eggs or the fledgling. Such a sequence of events can have far reaching implications for certain large, rare species that only breed once a year or once every two years.

7.9 SOCIO-ECONOMIC IMPACTS

The following potential socio-economic impacts are expected to come about during the construction phase of the project and should thus be considered during the EIA phase of the project:

- Limited employment opportunities would be created during the construction phase of the project due to the technical nature of the construction of the substation and construction of the LILO Transmission power line.
- An inflow of outside workers to the area and the associated construction activities (vehicle movement, noise, dust) could result in temporary intrusion impacts.
- Potential safety and security impacts always remain a concern and would include:
    - the increased risks of veld fires in the open space areas due to possible cooking practices during construction or the flash over of electricity during operation.
    - the increased risk of vehicular and pedestrian accidents because of construction vehicle movements near the N2 and R43.
    - General risks related to construction activities (for example, electrocution, risks of falling from working heights and so forth).
    - Perceived increase in crime because of outsiders being in the area.
    - Escalation of the protests that have plagued the Botrivier town in the last couple of years.

- An influx of jobseekers to the construction site cannot be excluded and some subsequent negative impacts in this regard would have to be considered.
- Temporary disruptions in the daily living and movement patterns of affected and neighbouring private property owners could be foreseen, although it is, at this stage, anticipated that the negative impacts associated with this aspect would be minimal and could be successfully mitigated. This would again be considered during the EIA phase of the project.
- General intrusion impacts foreseen include noise and possible dust creation.
- Health related impacts during the construction phase of the Houhoek Transmission Substation project are possible.
- Inadequate accommodation for job seekers and workers could also result in health risks because of pollution of water, improper waste management and so forth.

During the operational phase more limited socio-economic impacts are usually associated with a power line and substation. Expected impacts could include the following:

- Very limited or no job opportunities for locals.
- Visual impact of the additional Transmission lines (LILO) and Distribution connection lines as well as the new MTS.
- Maintenance of the power line could result in intermittent intrusion impacts on private properties.
- Concerns are usually raised that the construction of a Transmission line, irrespective of its specific location, could lead to the decrease of property values mainly due to the visual impact associated with these lines. The intensity and significance of the impact would thus depend on the size of the property, the activities undertaken on the property (land-use) and the final LILO alignment. These aspects would be further considered during the EIA phase of the project.
- As there would not be locals that could secure full time employment during the operational phase of the project, it is clear that no economic spin-offs would be created due to employment creation and increased income levels.
- The possible negative impact on the tourism industry in the area should be considered and further investigated.

7.10 VISUAL IMPACTS

In the EIA process it is necessary to make a broad assessment of the potential of significant impacts at the scoping stage, based upon the nature, size, location of the proposed activity, and the scale of its likely environmental effects. For this initial stage it can be assumed that formally designated landscapes (such as protected areas and scenic landscapes such as ridges) are deemed to be most sensitive to change than many other areas. Similarly, certain development and activity types are considered more likely to give rise to significant impacts, such as particular processes or operations, or particularly large in nature (physical extent or continuous nature of the activity such as roads and power lines). Within the EIA process the specific impacts of development activities on landscape considers each situation likely to impact on the landscape elements, characteristics and character is assessed and its significance evaluated on the basis of the nature and magnitude of impact and the sensitivity

(including value or importance) of those elements, characteristics and character. The use of tools such as view shed analysis and line of sight profiles allows the spatial context to be determined.

The various phases of a development activity are characterised by different physical elements and activities. The duration of the potential impact is also important, as a lesser effect may be less tolerable if it continues for a significant period of time. Typical impacts and influences on landscape and visual quality during the various phases of a project lifecycle include the following:

- Construction Phase:
    - Site and access roads;
    - Cut and fill areas, including borrow and disposal areas;
    - Material stockpiles;
    - Staging areas;
    - Construction camps, equipment and plant;
    - Engineering support infrastructure;
    - Parking, on-site accommodation and working areas;
    - Temporary screening measures;
    - Protection measures; and
    - Lighting.
- Operational Phase:
    - Access;
    - Infrastructure;
    - Building and structures;
    - Delivery, maintenance;
    - Outdoor activities;
    - Materials storage;
    - Utilities;
    - Lighting of roads and buildings;
    - Car parks;
    - Vehicle lights and movements;
    - Landform, structure planting, and hard landscape features;
    - Entrances, signs and boundary treatments; and
    - Areas of possible future extension.
- Decommissioning and Rehabilitation Phase:
    - Access;
    - After-use potential;
    - Residual buildings and structures;
    - Disposal of waste and rubble; and
    - Rehabilitation activities, including movement of material and construction plant.

7.11 HERITAGE IMPACTS

7.11.1 Palaeontological Impacts

Palaeontological material is destroyed by bulk earth moving, cutting and mining operations; however, palaeontological resources tend to be extensive (depending on the resource) and may therefore be more resistant to impact than archaeological material. Because palaeontological material is often very deeply buried, palaeontologists often rely on human intervention into the land surface to collect data. Natural exposures e.g. due to erosion, open cast mines, quarries and deep road cuttings often present the only opportunities for palaeontologists to examine deep sediments.

7.11.2 Pre-Colonial and Colonial Impacts

The main cause of impacts to archaeological sites is physical disturbance of the material and its context. The heritage and scientific potential of an archaeological site is highly dependent on its geological and spatial context. This means that even though, for example, a deep excavation may expose archaeological artefacts, the artefacts are relatively meaningless once removed from the area in which they are found. Large scale excavations may damage archaeological sites, and construction of roads and laydown areas, injudicious use of off-road vehicles can also contribute to high levels of impact.

7.11.3 Cultural Landscape Impacts

Historic farm structures (and these include old sheds, stone kraals and family cemeteries) have not been identified in the immediate areas of the proposed activities. Historic places, even if they are not directly impacted are context sensitive, in that changes to the surrounding landscape will affect their significance. The impacts to the built environment are likely to be of a visual nature and this will need to be assessed during the site inspection by the heritage and visual specialist. Important historic sites in the area should be considered visual receptors.

8 ENVIRONMENTAL IMPACT ASSESSMENT PROCESS

8.1 STUDY APPROACH

The EIA process is a planning and a decision making tool that identifies the potential negative and positive impacts of the proposed 400kV Transmission substation and associate infrastructure for the Houhoek Transmission Substation project. It also recommends ways to enhance the positive impacts and minimise the negative ones.

The environmental studies that will be undertaken will address the impacts associated with the Houhoek Transmission Substation project and provide an assessment in terms of the biophysical, social, cultural-historic and economic environments. This will assist the DEA and Eskom in their decision-making regarding the implementation of the proposed development.

The environmental assessment will be undertaken in compliance with the NEMA, specifically EIA Regulations (GN R543, 544, 545 and 546 of 18 June 2010, as amended). Cognisance has also been taken of related guideline documents and other relevant legislation.

The EIA process consists of three phases: the scoping phase, the impact assessment phase and the decision-making phase. This section outlines the study approach taken to meet the legislative framework requirements as outlined in **Chapter 6** of this report.

8.2 SCOPING PHASE

The aim of the scoping phase of the project is to identify and define the issues that need to be addressed in the impact assessment phase.

During the Public Participation Process (PPP), the interested and affected parties (I&APs) are identified and are given the opportunity to identify issues and concerns that are related to the study area. A first round of public participation has been undertaken as documented in **Section 8.3**.

The Draft Scoping Report will be made available to I&APs for review and the Final Scoping Report will incorporate all comments that have been received before being submitted to the DEA for consideration.

8.3 PUBLIC PARTICIPATION PROCESS (SCOPING PHASE)

The Public Participation Process (PPP) is an integral requirement of the NEMA. Under the supervision and guidance of the DEA, BKS recommends the PPP for the Houhoek Transmission Substation project be in accordance with the requirements of Section 54 of the EIA Regulations (2010). This is due to the scale, nature and affected footprint of the Houhoek Transmission Substation project.

The purpose of this initial PPP will be to inform the I&APs about the EIA process to be followed. This initial interaction with the I&APs would also include requesting their input into the manner in which the proposed PPP will be conducted.

8.3.1 Objectives and General Approach

The main objectives of the PPP are to:

- inform identified interested and affected parties (I&APs) of and provide sufficient background and technical information on the Houhoek Transmission Substation project;
- create networks and feedback mechanisms so I&APs could participate and raise their viewpoints (issues, comments and concerns) on the Houhoek Transmission Substation project; and
- assist in identifying potential environmental (biophysical, cultural-historical, social and economic) impacts using on-the-ground information through the I&APs' available experience.

The PPP thus ensures that I&APs' views are reflected and considered by the Applicant. The approach to any PPP depends on the details of the project, as each project has a particular geographic and technical nature. Thus, the PPP should be structured accordingly. Where possible, and within the required statutory frameworks, such a process should be structured to address the needs of project-specific I&APs. All I&APs shall be given an equal opportunity to comment and raise any issues relating to the impact of the Houhoek Transmission Substation project on the biophysical, social and economic environment.

8.3.2 Identification and Registration of I&APs on a Database

The following key stakeholders were identified for engagement on any issues that may transpire during the EIA process:

- Landowners and occupiers of land affected by the 3 alternative site locations of the proposed Houhoek Substation.
- Western Cape Department of Environmental Affairs and Development Planning (DEA&DP), as the commenting authority.
- Regional Office of the Department of Water Affairs (DWA).
- National Department of Agriculture (DoA).
- South African Heritage Resources Agency (SAHRA) and the provincial office, Heritage Western Cape (HWC).
- The South African National Roads Authority Limited (SANRAL).
- Western Cape Department of Roads and Transportation.
- Theewaterskloof Local Municipality (including Councillors).
- Cape Nature.

A database has been compiled and will be updated throughout the EIA process as and when new stakeholders are identified.

8.3.3 Project Announcement Phase

Phase 1 of the PPP entailed the announcement of the project to the identified key stakeholders during the designated timeframe. The project was announced on **25 September 2012**. Consultations with I&APs and relevant stakeholders were according to the following methods (see **Appendix B** for further details):

- A Background Information Document (BID) was circulated to I&APs and stakeholders that registered and were identified for registration.
- Advertisements were placed in the main section of the following newspapers on Tuesday, 25 September 2012:
  - Cape Times; and
  - Theewaterskloof Gazette – English and Afrikaans versions.
- 106 e-mail notifications, registered mails and faxes (including several phone calls) on 25 September 2012.
- Flyers in English and Afrikaans were distributed in the study area.
- Site notices were placed at **12** strategic locations (see **Appendix B**) within the study area.
- A public open day has been scheduled for Thursday, 6 December 2012 from 17:00 – 19:00 at the Botrivier Advice & Development Centre (12 Fontein Street, Botrivier).

8.3.4 Draft Scoping Report Review

The purpose of this Draft SR is to enable the registered I&APs to verify that their contributions have been captured, understood and interpreted correctly. The Draft SR is available for review by registered I&APs from **29 November 2012 to 25 January 2013**.

Advertisements have been placed in the newspapers indicated above to announce the availability of the Draft SR for review on 22 November 2012.

If I&APs wish to register during this period, they will be allowed to. However, only the comments and issues raised up to 24 January 2013 will be incorporated in the Final SR, for submission to the DEA. Comments and issues raised after the end date will be taken into consideration during the EIA Phase.

I&APs can comment on the Draft SR in various ways, such as completing the comment sheet, submitting individual comments in writing, by facsimile or by e-mail and through one-on-one discussions with members of the EIA team during meetings.

8.4 Environmental Impact Assessment Phase

The EIA for the Houhoek Transmission Substation project is being conducted in accordance with the process described in regulation 26 to 35 of the EIA Regulations (GN R543 of 18 June 2010, as amended) promulgated in terms of section 24(5) of the NEMA. BKS is responsible for the processing and collation of information from the specialist reports, including the issues raised from the PPP.

8.5 Post Environmental Authorisation Processes

8.5.1 Servitude Negotiation Process

The PPP undertaken for the EIA does not include the final servitude negotiations with the landowners that will be directly affected by the final route alignment of the power lines and the location of the Houhoek Substation. It is important that the aims of the EIA and servitude negotiation processes are seen as separate. They share a common cause (the construction and operation of a Transmission power line) and may share common landowner databases, but they have different aims.

The servitude negotiations task will be undertaken by a negotiator from Eskom, if a positive environmental authorisation for the project is received. The Eskom negotiator has, however, been involved in the project team site visit and will be involved in discussions regarding the selection of a recommended route for the proposed power LILO and the proposed substation site. An extensive effort is being made to identify and involve all possibly affected landowners through representative organisations, such as the municipalities and farmers' organisations and as far as possible, with individual landowners.

Servitude Negotiation and the EIA Process

Transmission power lines are constructed and operated within a servitude (up to 55m wide for 400kV lines) that is established along its entire length. The servitude allows Eskom Transmission certain rights and controls that support the safe and effective operation of the line. The process of achieving the servitude agreement is referred to as the Servitude Negotiation Process, or the negotiation process, and is undertaken by Eskom Transmission. Important points relating to the EIA process are:

- Servitude negotiation is a private matter between Eskom Transmission and the landowner concerned.
- The negotiation process involves a number of stages (see text box below), and culminates in the signing of a servitude. Here, Eskom Transmission enters into a legal agreement with the landowner.
- The agreements detail aspects such as the exact location and extent of the servitude, access arrangements and maintenance responsibilities.
- Compensation measures are agreed in each case.
- It may take place at any time in the planning of a new line.
- It must be completed (i.e. the agreement must be signed) before construction starts on that property.
- The servitude negotiation process is independent of the EIA process.

The EIA process has become important in the initial planning and route selection of a new Transmission power line, and it is preferable that the negotiation process begins after the EIA has been completed. At this stage, there is greater confidence in the route alignment to be adopted, and it would be supported by an environmental authorisation.

However, the negotiation process may have to start earlier, and may begin before or run parallel to the EIA process due to tight timeframes, knowledge of local conditions and constraints, for example. Eskom Transmission has the right to engage with any landowner at any time, although it does so at risk if environmental authorisation has not been awarded.

Source: Eskom Transmission, Gamma-Omega 765kV Transmission Line, Draft Environmental Impact Report, Main Report, March 2002

The Negotiation Process

The negotiation process can be extensive, and often takes years on the longer lines. It is thus critical that it is correctly programmed into the planning of a new line. The negotiation process involves:

- Initial meeting with the landowner.
- The signing of an option to secure a servitude (indicates that the owner will accept that the line will cross his property, subject to conditions to be finalised in the negotiation of the servitude agreement). An option is valid for one year.
- Once the route is confirmed (i.e. options signed with the upstream and downstream landowners) the servitude agreement is finalised with the individual landowners. This agreement sets out the conditions for the establishment and operation of the servitude, and is site specific (different landowners may have different requirements). Compensation payments are made when the servitude is registered at the Deeds office.
- Once construction is complete and the land is rehabilitated to the landowner's satisfaction, the landowner signs a Final Release certificate. Until such time, Eskom Transmission remains liable for the condition of the land.
- Once the clearance certificate is signed, the responsibility for the line and servitude is handed over to the regional Eskom Transmission office. Prior to this, the Eskom national office is responsible for the process.

Source: Eskom Transmission, Gamma-Omega 765kV Transmission Line, Draft Environmental Impact Report, Main Report, March 2002

8.5.2 Rezoning Process

The rezoning of properties that the servitude will cross occurs after the servitude has been negotiated. The rezoning process is independent of this EIA process for the substation site and the power lines.

8.6 Assumptions and Limitations

The following assumptions and limitations have been identified for this Scoping Phase of the EIA process:

- EIA Process:
  - The EIA process is multi-disciplinary, which is informed by the project team (**Table 2-1**). It is thus necessary to assume that the information provided by the project team is accurate and true, at the time.
  - Data shown in the maps were supplied by various sources and was used as received. The data was not verified.
  - A preliminary site investigation was undertaken on 26 June 2012 to identify the alternative sites and consider which alternatives to be considered within the EIA process.

- Public Participation Process: every effort was made to contact all stakeholders within the study area and within 100m of the study area. Information presented by the stakeholders is presumed to be accurate and has been presented timeously in the study.
- Gaps in knowledge and limitations were identified during the scoping phase in accordance with Regulation 24(4)(b) of the EIA Regulations (GN R543 of 18 June 2010). Attempts will be made during the EIA phase to close the following known gaps in knowledge:
    - The route alignments for the 400kV Transmission power line LILO and the 132kV Distribution power line have not been determined during the Scoping Phase.
    - The pylon positions for the 400kV Transmission power line LILO and the 132kV Distribution power line have not been determined during the Scoping Phase.
    - The information available for Site Alternative 2 is limited due to the limitation on access to the property, as imposed by the property owner. A focus group meeting will be arranged with the landowner in order to obtain access to undertake detailed studies for this site alternative.
- Ecological Assessment:
    - In-depth surveys of the study area were not undertaken for this SR, but the sensitive sections were examined in more detail.
    - Accurate development footprints (e.g. actual footing positions) were not provided by Eskom for the power line routing as this will come later, but as this is one of the primary development impacts this means that from a vegetation point of view only an overview is appropriate at this stage.
    - Many plants are only seasonally evident or identifiable, and it is thus best to use a habitat approach, where habitat type (e.g. rarity, threat, etc.) and quality is used as a surrogate for species data.
    - There are a number of limitations imposed by Eskom, such as a pre-defined alien clearing methodology, and very often a non-negotiable construction period and physical envelope (i.e. substations are extant and therefore there is limited potential to change turn-in layout for the lines).
    - The study area as shown in **Figure 3-4** is shown to be accurate to within approximately 20m. Most of Site Alternative 3 had been burnt approximately 6 months before the preliminary site inspection (on 26 June 2012), making it difficult to assess the vegetation accurately. Whereas, Site Alternative 1 and Site Alternative 2 contained more mature vegetation to assess. It is noted that less than a 20% portion of Site Alternative 1 was burnt in the previous year.
    - Characteristic plant species were noted in the field, as well any rare or threatened plan species / habitats. Voucher specimens were taken, where necessary.
    - The professional experience of the Ecologist on the project team of work undertaken in the area, and the following sources were consulted to draw conclusions:
        - GIS-based South African National Biodiversity Institute (SANBI) vegetation map of South Africa (Mucina & Rutherford, 2006).
        - National Spatial Biodiversity Assessment (NSBA) (Rouget, *et al.*, 2004).
        - National List of Threatened Ecosystems (DEA, 2011).

  - Overberg CBA Maps (Holness & Bradshaw, 2010).

- Wetland Delineation and Assessment:
  - An initial, desktop-based map of freshwater ecosystems in relation to the study area and the proposed substation sites was compiled. This initial map was ground-truthed during a site visit to the study area on 16 November 2012. The positions of any additional freshwater ecosystems identified during the site visit were captured using a hand-held GPS unit and the initial GIS map was updated to include these ecosystems.
  - Rivers or wetlands that were incorrectly mapped by the NFEPA project or on the 1:50 000 scale map for the area (map sheet 3419AA) were noted and demarcated as non-aquatic on the preliminary map.
- Avifauna Assessment:
  - In this instance, the 3419AA QDGC has been well covered by SABAP2, with data being recorded on 189 checklists to date. The SABAP2 data was therefore regarded as reliable and representative of the avifauna. For purposes of completeness, the list of species that could be encountered was supplemented with observations and general knowledge of the area by the avifauna specialist, by consulting species lists for adjacent QDGCs with similar habitat, and by consulting local bird experts.
  - Predictions in this study are based on experience of these and similar species in different parts of South Africa. Bird behaviour can never be entirely reduced to formulas that will hold true under all circumstances. Therefore, professional judgement played an important role in this assessment.
  - It is important to note that, although the predicted impacts are mostly concerned with Red Data species, the non-Red Data species should also benefit from the proposed mitigation measures as they share the same habitat and face the same potential impacts as the Red Data species.
- Social Impact Assessment:
  - A SIA aims to identify possible social impacts that could occur in the future. These impacts are based on existing baseline information. There is thus always an uncertainty with regard to the anticipated impact actually occurring, as well as the intensity thereof. Impact predictions have been made as accurately as possible based on the information available at the time of the study.
  - The SIA relied on the information received during the PPP undertaken as part of the EIA process. Additional data gathering, research and consultation were undertaken. Sources consulted are not exhaustive and additional information can still come to the fore to influence the contents, findings, ratings and conclusions made.
  - Information on possible future developments included all the information gathered during the SIA study timeframe. Additional information may become known or available during a later stage, which could not have been allowed for at the time of the study.
  - Technical and other information provided by the Applicant are assumed correct.

- Individuals view possible social impacts differently due to their association with the anticipated impact. Therefore, impacts could be perceived and rated differently than those contained in the SIA Report.

- Visual Impact Assessment:
  - The use of Google Earth Pro for mapping is licensed for use in the VIA Report.
  - The information for the terrain used in the 3D computer model on which the visibility analysis is based on is 1:50 000 contour data, South African Provincial Survey General Data.
  - Determining visual resources is a subjective process where absolute terms are not achievable. Evaluating a landscape's visual quality is complex, as assessment of the visual landscape applies mainly qualitative standards. Therefore, subjectivity cannot be excluded in the assessment procedure (Lange 1994). The project deliverables, including electronic copies of reports, maps, data, shape files and photographs, are based on the authors' professional knowledge, as well as available information. The study is based on assessment techniques and investigations that are limited by time and budgetary constraints applicable to the type and level of assessment undertaken. VRM Africa reserves the right to modify aspects of the project deliverables if and when, new/ additional information may become available from research or further work in the applicable field of practice, or pertaining to this study.
  - In terms of best practice, the following guidelines were referred to:
    - Internationally, the U.K. Institute of Environmental Management and Assessment's (IEMA) 'Guidelines for Landscape and Visual Impact Assessment'
    - the 'Guideline for Involving Visual and Aesthetic Specialists in EIA Processes' (Oberholzer, 2005).
  - 'Principles that influence (development) within a receiving environment include:
    - The need to maintain the overall integrity (or intactness) of the particular landscape or townscape.
    - The need to preserve the special character or sense of place of a particular area.
    - The need to minimize visual intrusion or obstruction of views within a particular area' (Oberholzer, 2005).

9 PLAN OF STUDY FOR THE EIA PHASE

A Plan of Study for the EIA has been prepared according to the process described in regulations 26-35 of the EIA Regulations (GN R543 of 18 June 2010, as amended) promulgated in terms of Section 24(5) of the NEMA, to provide the DEA with adequate information to obtain authorisation, and proceed with the proposed activity.

The Plan of Study for EIA includes a description of the environmental issues that have been identified during the Scoping phase and which will require further investigation and assessment.

9.1 METHODOLOGY OF SPECIALIST STUDIES

The specialist studies will be undertaken in compliance with regulation 32(3) of the EIA Regulations (GN R543 of 18 June 2010, as amended), and include:

a. details of:
   i. the person who prepared the report; and
   ii. the expertise of that person to carry out the specialist study or specialised process;
b. a signed declaration that the person is independent in a form as may be specified by the competent authority;
c. an indication of the scope of, and the purpose for which, the report was prepared;
d. a description of the methodology adopted in preparing the report or carrying out the specialised process;
e. a description of any assumptions made and any uncertainties or gaps in knowledge;
f. a description of the findings and potential implications of such findings on the impact of the proposed activity, including identified alternatives, on the environment;
g. recommendations in respect of any mitigation measures that should be considered by the Applicant and the competent authority;
h. a description of any consultation process that was undertaken during the course of carrying out the study;
i. a summary and copies of any comments that were received during any consultation process; and
j. any other information requested by the competent authority.

The following specialist studies will be undertaken for the EIA Phase:

- Geotechnical Assessment by Surita Madsen-Leibold (BKS).
- Soil and Agricultural Potential Assessment by Garry Paterson (Institute of Soil, Climate and Water of the Agricultural Research Council).
- Wetland Delineation and Assessment by Dean Ollis (The Freshwater Consulting Group).
- Ecological Assessment by Nick Helme (Nick Helme Botanical Surveys).
- Avifauna Assessment by Chris van Rooyen (Chris van Rooyen Consulting).
- Social Impact Assessment by Ingrid Snyman (Ingrid Snyman Development Consultants).
- Visual Assessment by Stephen Stead (VRM Africa).
- Heritage Assessment by Tim Hart (Archaeological Contracts Office, University of Cape Town).

9.1.1 Terms of Reference: Geotechnical Investigation

A Geotechnical Investigation will be undertaken by Ms Surita Madsen-Leibold of BKS. The methodology of the Geotechnical Investigation used for this process is described in this section.

The purpose of the investigation will be to provide technical advice on:

- The expected bedrock geology and soil cover within the study area, based on the available data.
- Recommendations on the foundation trench stability, founding masts and poles, and seismicity.
- Information on excavation potential together with the presence of active soil layers and any slope stability problems.

9.1.2 Terms of Reference: Soil and Agricultural Potential Assessment

The Soil and Agricultural Potential Assessment will be undertaken by Mr Garry Paterson of the Agricultural Research Council. The methodology of the Soil & Agricultural Potential Assessment for this process is described in this section.

The 1:50,000 scale soil map will be analysed to determine the soil information for the study area. The soils are then classified according to the South African Soil Classification System. The classification of the different soils would represent the dominant soil within the specific land type that is identified.

On-site verification of the specifics of the various alternatives and their layout alternatives will be carried out by the specialists; this information will be confirm information from other sources and will be linked in to the information gathered.

The soil information will be considered in terms of the agricultural potential, specifically in terms of the existing agricultural land-uses in the wider area, and the potential lost will be considered in the final specialist report.

This information will then be plotted on a GIS format map and integrated into the EIA Report.

9.1.3 Terms of Reference: Wetland Delineation and Assessment

The Wetland Delineation & Assessment will be undertaken by Mr Dean Ollis of the Freshwater Consulting Group. The methodology of the Wetland Delineation & Assessment for this process is described in this section.

The wetland sensitivity map will be compiled as follows:

- The boundary of the study area ('corridor' as referred to in **Figure 3-4**) and the proposed substation layouts will be overlaid as GIS shapefiles onto existing geo-referenced 1:10,000 scale aerial photographs of the area obtained from Chief Directorate: National Geo-spatial Information.
- Currently mapped rivers (perennial and non-perennial), as shown on the 1:50,000 scale digital map layer for rivers obtained from Chief Directorate: National Geo-spatial Information (map sheet 3419AA), will be overlaid onto the GIS map. A 50m wide 'no-go' buffer zone will be allocated to rivers in the study area that fall within a Protected Area

(e.g. a formal nature reserve) or a terrestrial Critical Biodiversity Area (CBA), according to the Overberg CBA Map (Holness & Bradshaw, 2010)[4].

- Currently mapped dams, as shown on the 1:50 000 scale digital map layer for 'Inland Water Areas' obtained from Chief Directorate: National Geo-spatial Information (map sheet 3419AA), will be overlaid onto the GIS map.
- Wetlands mapped by the NFEPA project will be overlaid onto the GIS map of the area. Two categories will be distinguished in the map legend, namely FEPA wetlands and non-priority wetlands. Following (Driver, *et al.*, 2011), a 100m wide 'no go' buffer zone will be allocated to all FEPA wetlands in the study area.
- Critical Biodiversity Areas and Protected Areas, as shown on the CBA map for the ODM (Holness & Bradshaw, 2010), were intersected with the existing wetlands layer for the Overberg (mapped by Nancy Job as part of the C.A.P.E. Fine-Scale Biodiversity Planning project) in order to identify wetlands occurring in areas of high conservation importance, thus warranting specific protection. A 50m wide 'no-go' buffer zone will be allocated to these wetlands, given their ecological importance.
- Recent colour aerial photographs (from Chief Directorate: National Geo-spatial Information) and Google Earth satellite images of the site will be examined, to ascertain whether any visible signs of wetland presence could be discernible in the study area. Additional aquatic ecosystems in the study area will be manually digitised using GIS software, based on visual cues in the background imagery.
- The study area for the proposed power lines and the development footprint of each of the proposed substation sites will be overlaid onto the GIS map.

The Wetland Delineation & Assessment will be undertaken based on the following terms of reference:

- Conduct a desktop assessment to identify and map the freshwater ecosystems that are likely to be present on site, based on examination of existing 1:50,000 topographical maps, colour aerial photographs, satellite imagery and fine-scale conservation plans.
- Field-based assessment of Site Alternative 2 if this is to be retained as one of the alternatives for the establishment of the proposed substation, specifically to ground-truth the presence of rivers and wetlands on the site.
- The terrestrial area surrounding the dam in Site Alternative 3 is highly disturbed by alien plant invasion and general transformation of the landscape for human activities. A more thorough assessment of the conservation importance of this dam needs to be undertaken to determine what the ecological significance of the loss of this dam through the proposed development would be.
- Field-based assessment of the proposed power line route alignments, once these have been determined, to confirm whether there are any freshwater ecosystems located along the proposed routes.
- Ground-truth and update the desktop-based map of freshwater ecosystems, based on the information obtained during the site visit.

4 Most of the land within the study area is categorised as a Protected Area or terrestrial CBA on the Overberg CBA Map

- Collection of sufficient information / data to determine the present ecological condition and conservation importance of potentially affected freshwater ecosystems.
- Refinement of recommended buffer areas for protection of freshwater ecosystems.
- Formal assessment of the significance of potential impacts on freshwater ecosystems, using appropriate criteria.
- Recommendation of specific mitigation measures for the protection of freshwater ecosystems, which could be incorporated into the Environmental Management Programme (EMPr).

The following broad development guidelines, which should be taken into consideration in the planning stages of the project, are recommended to ensure the protection of freshwater ecosystems that could be affected by the proposed substation development and associated power lines:

- Encroachment into freshwater ecosystems and their recommended buffer areas should be avoided as far as possible.
- Where the crossing of rivers by infrastructure such as roads is necessary, this should be located at existing road crossings as far as possible.
- Land that has already been substantially disturbed and / or transformed from its natural state (e.g. through long-term farming activities or prior infilling) should be targeted for the establishment of structures and infrastructure associated with the proposed development, as far as possible, because this would lower the risk of impacting on freshwater ecosystems that are in a good present ecological condition.
- Effective measures should be designed for the management of stormwater runoff from the substation and other hardened surfaces (including new roads), so as to minimise the hydrological changes to freshwater ecosystems in the study area as far as possible.
- Provision should be made for the establishment of ecological corridors through the study area, which should be located and designed through a consultative process including all the biophysical specialists involved in the environmental assessment for the project.

9.1.4 Terms of Reference: Ecological Assessment

The Ecological Assessment will be undertaken by Mr Nick Helme of Nick Helme Botanical Surveys. The methodology of the Ecological Assessment for this process is described in this section.

The following standard terms of reference for biodiversity specialists will be as recommended by Cape Nature, and includes:

- Produce a baseline analysis of the ecological attributes of the study areas as a whole.
- This report should clearly indicate any constraints that would need to be taken into account in considering the development proposals further.
- This report must include a map of the identified ecologically sensitive areas as well as indications of important constraints on the property. It must also:
    - Describe the broad ecological characteristics of the site and its surrounds in terms of any mapped spatial components of ecological processes and/or patchiness,

patch size, relative isolation of patches, connectivity, corridors, disturbance regimes, ecotones, buffering, viability, etc.

- In terms of biodiversity pattern, identify or describe:

  Community and ecosystem level

  - The main vegetation type, its aerial extent and interaction with neighbouring types, soils or topography.
  - The types of plant communities that occur in the vicinity of the site.
  - Threatened or vulnerable ecosystems (*cf. DEA 2011/SA vegetation map/National Spatial Biodiversity Assessment,* etc.).

  Species level

  - Plant Species of Conservation Concern (SCC) – provide location if possible.
  - The viability and estimated population size of the SCC that are present (include the degree of confidence in prediction based on availability of information and specialist knowledge, i.e. High=70-100% confident, Medium 40-70% confident, low 0-40% confident).
  - The likelihood of other SCC occurring on the site (include degree of confidence).

  Other pattern issues

  - Any significant landscape features or rare or important vegetation associations such as seasonal wetlands, alluvium, seeps, quartz patches or salt marshes in the vicinity.
  - The extent of alien plant cover of the site, and whether the infestation is the result of prior soil disturbance such as ploughing or quarrying (alien cover resulting from disturbance is generally more difficult to restore than infestation of undisturbed sites).
  - The condition of the site in terms of current or previous land uses.

- In terms of biodiversity process, identify or describe:

  - The key ecological "drivers" of ecosystems on the site and in the vicinity, such as fire.
  - Any mapped spatial component of an ecological process that may occur at the site or in its vicinity (i.e. "corridors" such as watercourses, upland-lowland gradients, migration routes, coastal linkages or inland-trending dunes, and "vegetation boundaries" such as edaphic interfaces, upland-lowland interfaces or biome boundaries).
  - Any possible changes in key processes, e.g. increased fire frequency or drainage / artificial recharge of aquatic systems.

- What is the significance of the potential impact of the Houhoek Transmission Substation project – with and without mitigation – on biodiversity pattern and process at the site, landscape, and regional scales?
- Provide a map, at suitable scale, of key conservation areas and corridors.

- Recommend actions that should be taken to prevent or mitigate impacts. Indicate how these should be scheduled to ensure long-term protection, management and restoration of affected ecosystems and biodiversity.
- Indicate limitations and assumptions, particularly in relation to seasonality.

9.1.5 Terms of Reference: Avifauna Assessment

The Avifauna Assessment will be undertaken by Mr Chris van Rooyen of Chris van Rooyen Consulting. The methodology of the Avifauna Assessment for this process is described in this section.

The following information sources will be consulted to conduct the Avifauna Assessment:

- Bird distribution data of the Southern African Bird Atlas Project 2 (SABAP2) will be obtained for the QDGC (the equivalent of a 1:50 000 topo-cadastral map) where the proposed infrastructure is located, namely 3419AA.
- The conservation status of all species considered likely to occur in the area will be determined as per the most recent iteration of the southern African Red Data list for birds (Barnes, 2000), and the most recent and comprehensive summary of southern African bird biology (Hockey, *et al.*, 2005).
- The author has travelled and worked extensively on power line projects in the Western Cape Province since 1996, and since 2010, also on renewable energy projects, including the proposed Langhoogte wind energy facility, which is situated approximately 7km east of the current study area. Personal observations of avifauna and bird/habitat associations will therefore also be used to supplement the data that is available from SABAP2.
- The power line bird mortality incident database of the Eskom - Endangered Wildlife Trust Strategic Partnership (1996 to 2007) will be consulted to determine which of the species occurring in the study area are typically impacted upon by power lines and the extent to which they are impacted on.
- A classification of the vegetation types in the 3419AA QDGC will be obtained from the Southern African Bird Atlas Project 1 (SABAP1, (Harrison, *et al.*, 1997), and the Vegetation Map of South Africa (Mucina & Rutherford, 2006).
- Information on the micro habitat level will be obtained through visiting the area and obtaining a first-hand perspective. Micro habitats will be identified using a combination of ornithological and ecological experience of avifaunal/habitat associations in the region.
- Mr Rob Martin, local bird expert with 40 years' experience of birding in the Western Cape, will be consulted on the habitat requirements of specific Red Data species recorded in 3419AA.

9.1.6 Terms of Reference: Social Impact Assessment

The Social Impact Assessment (SIA) will be undertaken by Mrs Ingrid Snyman of Ingrid Snyman Development Consultants. The methodology of the SIA is described in this section. A SIA is described as the "…systematic analysis in advance of the likely impacts a development event (or project) will have on the day-to-day life (environmental) of persons and

communities" (Burdge, 1995). A SIA, therefore, tries to predict the probable impacts of a development on how people live, work and play by:

- Appraising the social impacts resulting from the Houhoek Transmission Substation project.
- Relating the assessed social impacts of the project to future changes in the socio-economic environments that are not associated with it. This would serve to place the impacts of the project into context.
- Using the measurements (rating) to decide whether the impacts would be negative, neutral or positive.
- Determining the significance of the impacts.
- Proposing mitigation measures.

A SIA is thus concerned with the human dimensions of the environment, as it aims to balance social, economic and environmental objectives and seeks to predict, anticipate and understand the potential impacts of development.

The usefulness of an SIA as a planning tool is clear. An SIA can help the project proponent to conceptualise and implement a project in a manner which would see the identified negative social impacts addressed through avoidance or mitigation and the positive impacts optimised. It would also allow the community to plan for and deal with the social changes once they come into effect. In this sense then, the SIA is an indispensable part of the EIA and EMPr.

The aim of the SIA report is to:

- Determine the current socio-economic status of the area and the social characteristics of the receiving environment.
- Indicate the anticipated core impact categories and impact areas (possible hot spots).
- Identify anticipated positive socio-economic impacts of the Houhoek Transmission Substation project, including positive impacts and provide management measures for these impacts.
- Identify and highlight negative social impacts (social hot spots) of the Houhoek Transmission Substation project and indicate mitigation measures to deal with these impacts.
- Present the findings, recommendations and conclusions of the social study.

For the purpose of assessing the impacts associated with the Houhoek Transmission Substation project, the variables listed below will be adapted during the EIA phase. These variables would relate to the construction and operational phases of the Houhoek Transmission Substation project. The following variables will be assessed as part of the SIA (Burdge, 1995):

- Population impacts
- Community/institutional arrangements.
- Conflicts between local residents and newcomers.
- Individual and Family level impacts.
- Community infrastructure needs.
- Intrusion impacts

During the EIA phase, the anticipated social impacts would be rated according to a specific rating approach which would include the extent of the impact, the likelihood of the impact occurring, the size, the duration of the impact and its significance.

The SIA Report will comprise the following:

- Details of the site visit conducted.
- **Further literature review:** A comprehensive literature review and analysis should be undertaken during the EIA phase of the project. This would help the consultants to get further demographic and socio-economic information about the receiving environment and to build on the initial profiling of the local population's socio-economic characteristics.
- **Consultation sessions and fieldwork:** During the EIA phase, more primary data would also be gathered through consultation with the stakeholders and affected parties, and linkages with the public participation process.
- **Analysis of data compiled from parallel studies:** If available, the SIA team will study and analyse the information gathered by the biophysical studies. This information would include technical, environmental, economic and demographic aspects, land-use changes, impact on other facilities, services, and so forth. The SIA will be done in parallel with the public participation process. This would help the social team to assess the impact of the Houhoek Transmission Substation project on the direct (surrounding communities) and indirect (regional) environment.

The SIA Report will include:

- A background description of the social environment including demographic and socio-economic characteristics, land-use profile and infrastructure requirements.
- A background description of the local economy.
- Linkages with the integrated development planning processes in the area.
- An assessment of the anticipated social impacts – negative and positive (including core aspects needing attention).
- Rating of impacts.
- Formulation of specific mitigating strategies to minimise negative social impacts and increase positive impacts of the Houhoek Transmission Substation project.
- Conclusions and recommendations (also for further studies, if necessary).

9.1.7 Terms of Reference: Visual Impact Assessment

The Visual Impact Assessment (VIA) will be undertaken by Mr Stephen Stead of VRM Africa. The methodology of the VIA is described in this section.

The process that VRM Africa follows when undertaking a VIA is based on the United States Bureau of Land Management's (BLM) Visual Resource Management method. This mapping and GIS-based method of assessing landscape modifications allows for increased objectivity and consistency by using a standard assessment criteria and involves the measurement of contrast in the form, line, texture and colour of the proposed landscape modification brought about by a project, against the same elements found in the existing natural landscape.

The first step in the VIA process is determining the existing landscape context. A regional landscape survey is undertaken, which identifies defining landscape features that surround the site of a Houhoek Transmission Substation project, and sets the scene for the VIA process to follow. These features, also referred to as visual issues, are assessed for their scenic quality/ worth. A VIA also assesses to what degree people, who make use of these locations (e.g. a nearby holiday resort), would be sensitive to change(s) in their views, brought about by a Houhoek Transmission Substation project (e.g. a mine). *(Assessment undertaken up to this point falls within the ambit of the field study.)*

These people are referred to as receptors and are identified early on in the VIA process. Only those sensitive receptors who qualify as Key Observation Points (KOPs) by applying certain criteria, are used to measure the amount of contrast generated by changes caused by project activities, against the existing landscape (i.e. visual impact).

The landscape character of the Houhoek Transmission Substation project site is then surveyed to identify areas of similar land use and landscape character. These areas are evaluated in terms of scenic quality (landscape significance) and receptor sensitivity to landscape change (of the site) in order to define the visual objective for the project site. The overall objective is to maintain a landscape's integrity, but this can be achieved at varying levels, called VRM Classes, depending on various factors, including the visual absorption capacity of a site (i.e., how much of the project would be "absorbed" or "disappear", into the landscape). The areas identified on site are categorised into these Classes by using a matrix developed by BLM Visual Resource Management, which is then represented in a visual sensitivity map.

Landscapes are sub-divided into 3 distance zones based on relative visibility from travel routes or observation points. Proximity to surrounding receptors is evaluated in terms of these distance buffers: foreground zone is less than 6km, background zone is from 6 to 24km, and seldom seen has no receptors. Viewshed maps are generated that indicate the overall area where the project activities would be visible, and in which distance buffer zone the receptors fall.

The Houhoek Transmission Substation project activities are then finally assessed from the KOPs around the site to see whether the visual objectives (VRM Classes) defined for the site, are met in terms of measuring the potential change to the site's form, line, colour and texture visual elements, as a result of the Houhoek Transmission Substation project (i.e. are the expected changes within acceptable parameters to ensure that the visual character of the landscape is kept intact and, if not, what can be done by the project to ensure that it is). Photo montages are generated to represent the expected change in the views, as seen from each KOP and, if class objectives are not met, to also show how proposed mitigation measures could improve the same views.

Using the impact assessment method provided by the environmental consultant, each project activity is then assessed for its visual impact. This is based on the contrast rating which was undertaken from each of the surrounding receptors on whether the proposed activities meet the recommended visual objectives defined, to protect the landscape character of the area. Recommendations are made and mitigations are provided.

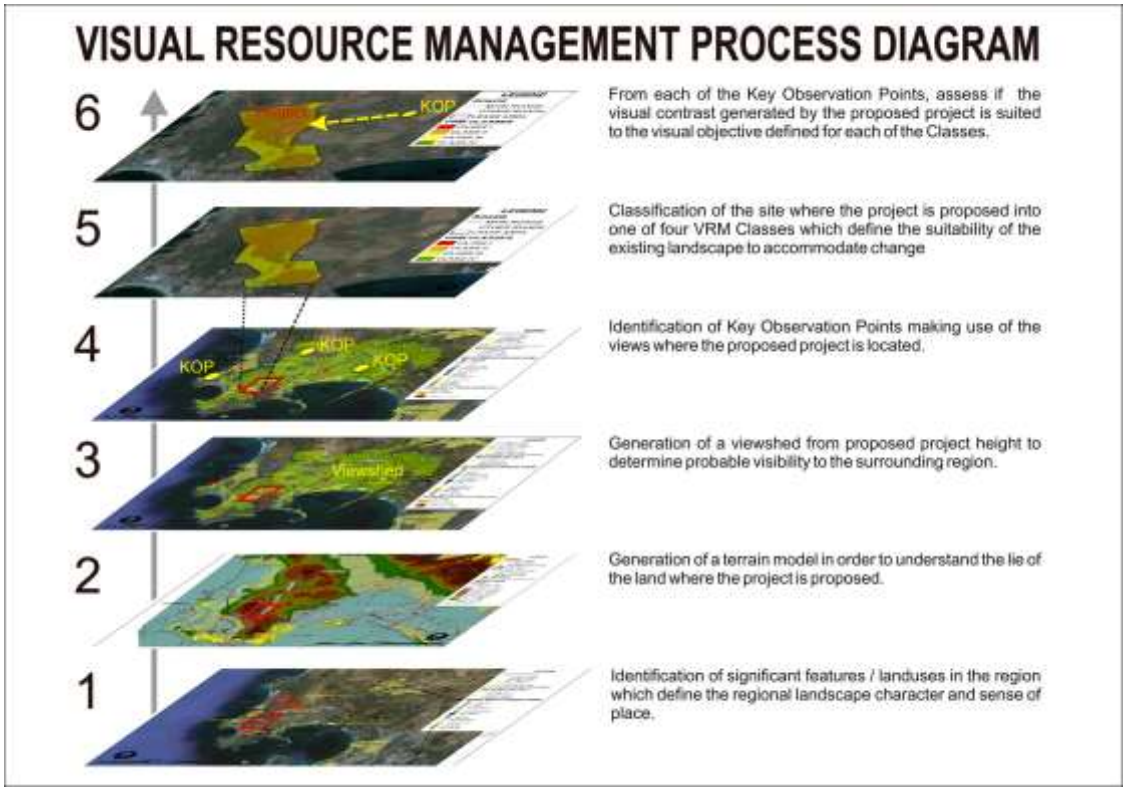


Figure 9-1: VRM Africa's Process Diagram

9.1.8 Terms of Reference: Heritage Impact Assessment

The Heritage Impact Assessment (HIA) will be undertaken by Mr Tim Hart from Archaeological Contracts Office of the University of Cape Town. The methodology of the HIA is described in this section.

Indications during the scoping phase are that impacts to palaeontological and archaeological heritage will be of low significance. However, the impacts of the proposed activities in terms of the aesthetics of the area are of concern. It is thus recommended that:

- The proposed alternative substation sites be subject to a site inspection by an archaeologist.
- Historic places, buildings and features need to be identified and assessed in terms of the possible changes to their context and setting.

9.2 TECHNICAL SPECIALISTS WORKSHOP

A Technical Specialists Workshop is planned after all the specialist studies have been completed, and after the peer reviewer, as well as I&APs have submitted their comments on the DSR (anticipated at the end of January 2013).

The purpose of the Technical Specialists Workshop is to weigh the specialists' findings according to sensitivity and integrate the findings of all specialist studies to determine which site alternative, site layout, LILO Transmission route alignment, and, Distribution power line connections to the existing Houhoek substation should be assessed in more detail during the EIA Phase.

Each specialist will assign a significance rating to each alternative site for the Houhoek Substation project, based on their visit to the site and their experience.

The following factors will also be taken into account in allocating a significance rating to the proposed infrastructure:

- The following ecologically-sensitive areas would be avoided, as far as practically possible:
  - Wetlands and stormwater dams.
  - Rivers and their floodplains.
  - Critical Biodiversity Areas (CBAs).
  - Nature Reserves.
- Existing power lines:
  - Placing a new power line next to or recycled on an existing power line reduces the potential impact of the route alignment.
  - Other Eskom Transmission and Distribution power lines running parallel to a proposed alignment should thus be treated as a risk-reducing factor.
  - Existing power lines have to be crossed as perpendicular as possible and as close as possible to the lowest height between existing pylon towers (i.e. where the line sag is the lowest).
- Roads and Railways:
  - A consolidation of linear infrastructure within a particular corridor would be preferable.
  - Railways have to be crossed as perpendicular as possible.
- Towns and industrial activity:
  - These are centres of human activity and are generally avoided by large power line sensitive bird species.
  - The presence of towns, settlements and industrial activity is therefore a risk-reducing factor from a bird collision, disturbance and habitat destruction perspective.
  - Formal and informal settlements, commercial and industrial activities need to be avoided, as far as practically possible.
- Agricultural lands and vineyards:
  - The integral value of vineyards and certain agricultural properties cannot be discarded as there could be a loss of production within its respective industry.
  - Consideration will also be carried out of existing vs. potential future agricultural potential of the proposed Site Alternatives being considered.

The significance ratings ascribed will be used as a basis to determine the recommended site for the Houhoek Substation and the recommended route alignment for the LILO Transmission and Distribution power lines.

Through Eskom's technical inputs, and the inputs of the various specialists, the recommended site alternative for the Houhoek Substation and the recommended route

alignment for the LILO Transmission and Distribution power lines will be optimally positioned to avoid impacts, where practically possible. If the impacts cannot be avoided, practical mitigation measures will be prescribed to reduce the significance of the impacts.

9.3 ASSESSMENT METHODOLOGY

9.3.1 Impact Assessment Criteria

The criteria used for the assessment of the potential impacts of the Houhoek Transmission Substation project are described in **Table 9-1**. In addition, cumulative impacts will be included as part of the Impact Assessment Process.

Table 9-1: Impact Assessment Criteria

Criteria	Description
Nature	Includes a description of what causes the effect, what will be affected and how it will be affected.
Extent	Physical and spatial scale of the impact.
Duration	Lifetime of the impact is measured in relation to the lifetime of the Houhoek Transmission Substation project.
Intensity	Examining whether the impact is destructive or benign, whether it destroys the impacted environment, alters its functioning, or slightly alters the environment.
Probability	This describes the likelihood of the impacts actually occurring. The impact may occur for any length of time during the lifecycle of the activity, and not at any given time.
Status	Description of the impact as positive, negative or neutral, and direct or indirect.
Significance	Synthesis of the characteristics described above and assessed as low, medium or high. Distinction will be made for the significance rating without the implementation of mitigation measures and with the implementation of mitigation measures.

9.3.2 Extent

The physical and spatial scale of the impact is classified below.

Description	Explanation	Scoring
Footprint	Impacted area extends only as far as the activity, such as footprint occurring within the total site area.	1
Site	Impact could affect the whole, or a significant portion of the site.	2
Regional	Impact could affect the area around the site including neighbouring farms, transport routes and adjoining towns.	3
National	Impact could have an effect that expands throughout the country (South Africa (SA)).	4
International	Impact has international ramifications that go beyond the boundaries of SA	5

9.3.3 Duration

The lifetime of the impact is measured in relation to the lifetime of the Houhoek Transmission Substation project, as shown in the following table.

Description	Explanation	Scoring
Short term	Impact will either disappear with mitigation or will be mitigated through a natural process in a period shorter than any of the development phases.	1
Short to medium term	Impact will be relevant through to the end of the construction phase	2
Medium term	Impact will last up to the end of the development phases, where after it will be entirely negated.	3
Long term	Impact will continue or last for the entire operational lifetime of the development, but will be mitigated by direct human action or by natural processes thereafter.	4
Permanent	The only impact class that is non-transitory. Mitigation by man or natural process will not occur in such a way or time span that the impact can be considered transient.	5

9.3.4 Intensity

The assessment of the intensity of the impact will be a relative evaluation within the context of all the activities and the other impacts within the framework of the project. The intensity will be measured using the criteria listed in the following table.

Description	Explanation	Scoring
Low	Impact alters the affected environment in such a way that the natural processes or functions are not affected.	2
Low-Medium	Impact alters the affected environment in such a way that the natural processes or functions are slightly affected.	4
Medium	Affected environment is altered, but functions and processes continue, albeit in a modified way.	6
Medium-High	Affected environment is altered, and the functions and processes are modified immensely.	8
High	Function or process of the affected environment is disturbed to the extent where the function or process temporarily or permanently ceases.	10

9.3.5 Probability

Probability describes the likelihood of the impact(s) occurring for any length of time during the lifecycle of the activity, and not at any given time. The following table shows the classes.

Description	Explanation	Scoring
Improbable	Possibility of the impact occurring is none, due either to the circumstances, design or experience. The chance of this impact occurring is thus zero (0%).	1
Possible	Possibility of the impact occurring is very low, either due to the circumstances, design or experience. The chances of this impact occurring is defined as 25%.	2
Likely	There is a possibility that the impact will occur to the extent that provisions must therefore be made. The chances of this impact occurring is defined as 50%.	3
Highly likely	It is most likely that the impacts will occur at some stage of the Development. Plans must be drawn up before carrying out the activity. The chances of this impact occurring is defined as 75%.	4
Definite	Impact will take place regardless of any prevention plans, and only mitigation actions or contingency plans to contain the effect can be relied upon. The chance of this impact occurring is defined as 100%.	5

9.3.6 Confidence

The level of knowledge or information that the EAP or a specialist had in their judgement is rated as shown in the following table.

Description	Explanation
Low	Judgement is based on intuition and not on knowledge or information.
Medium	Judgement is based on common sense and general knowledge.
High	Judgement is based on scientific and/or proven information.

9.3.7 Level of Significance

Based on the criteria in **Chapter 9.3.2** to **9.3.6**, the significance of issues was determined using the following formula:

Significance = (Scale + Duration + Intensity) × Probability

This is the importance of the impact in terms of physical extent and time scale, and is rated as follows:

Table 9-2: Impact Assessment Significance Rating

Significance	Description	Scoring
No Impact	There is no impact	0 – 10
Low	Impacts are less important. Some mitigation is required to reduce the negative impacts.	11 – 30
Medium	Impacts are important and require attention. Mitigation is required to reduce the negative impacts.	31 – 60
High	Impacts are of high importance. Mitigation is essential to reduce the negative impacts.	61 – 89
Fatal Flaw	Impacts present a fatal flaw, and alternatives must be considered	90 – 100

9.4 MITIGATION

Section 24(4)(b)(ii) of the EIA Regulations (2010) requires an investigation of mitigation measures. The purpose of mitigation measures is to reduce the significance level of the anticipated impact. Therefore, the reduction in the significance level after mitigation is directly related to the scores used in the impact assessment criteria.

Mitigation for significant issues will be incorporated into the EMPr. The level of significance after mitigation will indicate whether an impact can be reversed or cause irreplaceable loss of resources.

9.5 CUMULATIVE IMPACTS

A cumulative impact, in relation to an activity, is the impact of an activity that may not be significant but may become significant when added to the existing and potential impacts arising from similar or other activities in the area. The possible cumulative impacts of this project will be considered.

9.6 EIA REPORT

Once the specialist investigations have been completed and the findings and recommendations have been integrated by the team, an EIA Report will be compiled according to Government Notice R543, Section 31 (2) and will include:

- A description of the EAP that prepared the report.
- A detailed description of the proposed activity.
- A description of the properties affected by the Houhoek Substation and the route alignments of the respective power lines.
- A description of the environment that may be affected.
- A description of the PPP that was undertaken during the EIA Phase.
- A description of the need and desirability of the project and details of the alternatives that were investigated.
- Findings and recommendations of the specialist studies and EAP.
- An indication of the method used to identify significance.
- A comparative assessment of all alternatives (including the no-go alternative).
- An assessment of each potentially significant impact.

- An opinion on whether the activity should be authorised or not and, if it should be authorised, any conditions that should be made in respect of the authorisation.
- An Environmental Impact Statement.
- A draft Environmental Management Programme (EMPr) for the construction, operation and maintenance of the proposed activity.

9.7 SITE-SPECIFIC ENVIRONMENTAL MANAGEMENT PROGRAMME

A site-specific EMPr will be included as part of the EIA Report. The study area will require that a thorough management plan be prepared, with a focus on the issues identified during the EIA process.

The EMPr will outline the impacts and mitigation measures for the construction phase of the project. The EMPr will be compiled according to according to Government Notice R543, regulation 33, and will include:

- **Summary of Impacts:** A summary of the predicted negative environmental impacts for which mitigation is required. Positive impacts requiring enhancement will also be listed.
- **Description of mitigation measures:** The EMPr identifies feasible and cost-effective mitigation measures to reduce significant negative environmental impacts to acceptable and legal levels. Mitigation measures are described in detail and accompanied by designs, equipment descriptions, and operating procedures, where appropriate. The technical aspects of implementing the mitigation measures are also described.
- **Description of a monitoring programme:** Environmental performance monitoring was designed to ensure that mitigation measures are implemented. The monitoring programme clearly indicates the links between impacts, indicators to be measured, measurement methods and definition of thresholds that will signal the need for corrective actions.
- **The Emergency Action Plan:** The identification of accidents that could occur during construction and operational phases of the project, with measures on how these could be prevented and/or managed.
- **Incorporation** of the Eskom's Environmental Guidelines for bush clearing.
- **Institutional arrangements** depict and define the responsibilities for mitigation and monitoring actions.
- **Legal enforceability:** The key legal considerations with respect to the EMPr are:
- Legal framework for environmental protection; and
- Legal basis for mitigation.
- **The Implementation schedule and reporting procedures** that specify the timing, frequency, and duration of the mitigation measures.
- **A description of requirements** for record keeping, reporting, review, auditing and updating of the EMPr will be provided.

9.8 ENVIRO-LEGAL REVIEW

The enviro-legal review will largely involve review responsibilities and advice on process issues. BKS will ensure that the EIA process followed is fully compliant with the legal requirements.

The following specific input will be provided by the enviro-legal team (see **Chapter 2.7**):

- Reviews of the Draft Scoping Report and Plan of Study for EIA as well as of the Draft EIA Report and Draft EMPr with brief written comments on the legal process followed.
- *Ad hoc* telephonic/e-mail input to project team queries, including legal issues emerging from the public participation process.
- A review of the enviro-legal requirements that apply to the Houhoek Transmission Substation project.

9.9 PUBLIC PARTICIPATION PROCESS (EIA PHASE)

The objective of the PPP in the EIA phase of the project is to present the findings of the investigations to the stakeholders and to give them an opportunity to comment on these.

To achieve this, the following consultation process will be undertaken, similar to the Scoping Phase:

- The draft EIA Report will be available for review by registered I&APs for a period of 40 days (determined under the guidance of the DEA).
- Public meetings will be held at various locations in the study area to present the findings of the EIA Report to I&APs.

All of the registered I&APs on the I&AP database will be notified in writing (via e-mail/post/fax) of the abovementioned consultation process.

Comments and issues raised will be noted in an updated version of the Issues and Responses Report (**Appendix C**Appendix B). These comments will be considered and incorporated into the Final EIA Report for submission to the DEA.

All registered I&APs (including the appellant) will be informed by e-mail, facsimile or post of the outcome of the DEA's decision. In addition, the registered I&APs will be informed of the procedure to lodge a further appeal, if they still wish to do so.

9.10 PROJECT PROCESS PROGRAMME

The key dates for the EIA process of the Houhoek Transmission Substation project are presented in **Table 9-3** to follow.

Table 9-3: Key Dates in the EIA Phase

Activity	Date
Public Review of comprehensive Draft EIA Report	1 April 2013 – 10 May 2013
Anticipated dates of public meetings	15 – 18 April 2013
Submission of Final EIA Report to the DEA	22 May 2013
Authority Acceptance/Rejection of EIA Report	30 May 2013 – 18 June 2013
Environmental Authorisation Issued	22 August 2013
Appeal Notification Process	22 August 2013 – 11 September 2013
Servitude Negotiation Process (appeals dependent)	30 September 2013

10 CONCLUSION AND RECOMMENDATIONS

The key issues identified during the Scoping Phase for the construction and operational phases of the project are:

- Construction-related Impacts
- Traffic Impacts
- Air Quality
- Geotechnical Impacts
- Soil & Agricultural Impacts
- Wetland Impacts
- Ecological Impacts
- Avifauna Impacts
    - Electrocutions
    - Collisions
    - Displacement due to Habitat Destruction
    - Displacement due to Disturbance
- Socio-Economic Impacts
- Visual Impacts
- Heritage Impacts

The EAP believes that Eskom Holdings SOC Limited has followed due environmental process during the undertaking of this scoping process and associated PPP. The identification of key issues during the scoping process has not shown any negative impacts that may be considered as fatal flaws. However, a number of potentially significant issues have been highlighted for further investigation to assess their significance, and to determine the need for the implementation of mitigation measures in order for the overall project to be environmentally sustainable.

Following the review period of the Draft SR, the issues raised by I&APs and regulatory authorities will be highlighted in yellow and presented in a Final Scoping Report, which will be submitted to the competent approving authority, the DEA, for consideration and acceptance. Following which, the EIA Phase will commence.

It is, therefore, recommended that the DEA accept the Scoping Report and issue permission to undertake the EIA Phase of the EIA process as outlined in the Plan of Study for EIA (**Chapter 9**).

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National Environmental Management Biodiversity Act (No. 10 of 2004)

National Forests Act (No. 84 of 1998)

South African Heritage Resources Act (No. 25 of 1999)

GLOSSARY OF TECHNICAL TERMS

Kilovolt:	A unit of potential differences equal to 1000 volts.
No-go area:	An area in which the Houhoek Transmission Substation, Transmission or Distribution power line cannot be routed due to resulting significant environmental, social and technical impacts.
Pylon:	A large vertical steel tower-like structure supporting high-voltage electrical cables.
Route:	The exact servitude in which the Transmission power line could be built.
Route Alignment:	The alignment of the servitude within which the Transmission or Distribution power line could be built.
Route Corridor:	A passage on either side of a corridor – in this case amounts to 500m on either side of the route alignment of the Transmission or Distribution power lines.
Servitude Right:	A real right in favour of the servitude holder allowing the erection and maintenance of structures and cables to transmit electricity over portions of land and restricting any activities that could pose a hazard to the transmission of electricity, the environment and/or the safety of human and other living beings.
Study area:	The area that will be covered by the Environmental Authorisation process within which possible route alignment alternatives for the Transmission or Distribution power lines, and location and layout alternatives for the Houhoek Transmission Substation will be investigated.
Substation:	A collection of equipment for the purpose of raising, lowering and regulating the voltage of electricity.