# PROPOSED DEVELOPMENT OF A 132 KV TRANSMISSION LINE (FROM THE EXISTING HARVARD 132 KV LINE TO NOORDSTAD) AS WELL AS 6 SUB-STATIONS, BLOEMFONTEIN, MANGAUNG METROPOLITAN MUNICIPALITY, FREE STATE PROVINCE

## Draft Environmental Management Programme

May 2017

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# Table of Contents

## List of Tables

## ABBREVIATIONS

| | |
|---|---|
| BA | Basic Assessment |
| CARA | Conservation of Agricultural Resources Act (Act 43 of 1983) |
| CEL | Cost Estimate Letter |
| CIA | Cumulative Impact Assessment |
| $CO_2$ | Carbon Dioxide |
| $CO_2e$ | Carbon Dioxide Equivalent |
| CPA | Communal Property Association |
| CRR | Comments and Responses Report |
| CSP | Concentrated Solar Power |
| DAFF | Department of Agriculture, Forestry and Fisheries |
| DEA | Department of Environmental Affairs |
| DENC | Department of Environment and Nature Conservation |
| DM | District Municipality |
| DMR | Department of Mineral Resources |
| DoE | Department of Energy |
| DSR | Draft Scoping Report |
| DWS | Department of Water and Sanitation |
| EA | Environmental Authorisation |
| EAP | Environmental Assessment Practitioner |
| ECO | Environmental Control Officer |
| EIA | Environmental Impact Assessment |
| EIR | Environmental Impact Report |
| EMPr | Environmental Management Programme |
| FSR | Final Scoping Report |
| Ha | Hectares |
| HTF | Heat Transfer Fluid |
| I & Aps | Interested and Affected Parties |
| IDP | Integrated Development Plan |
| IPP | Independent Power Producer |
| kV | Kilovolt |
| LED | Local Economic Development |
| LM | Local Municipality |
| LSA | Late Stone Age |
| MAP | Mean Annual Precipitation |

| | |
|---|---|
| MASL | Metres Above Sea Level |
| MLL | Minimum living level |
| MSA | Middle Stone Age |
| MVA | Megavolt ampere |
| MW | Megawatt |
| NCPSDF | Northern Cape Provincial Spatial Development Framework |
| NDP | National Development Plan |
| NEMA | National Environmental Management Act (Act 107 of 1998) |
| NEMBA | National Environmental Management: Biodiversity Act (Act 10 of 2004) |
| NEMWA | National Environmental Management: Waste Act (Act 59 of 2008) |
| NERSA | National Energy Regulator of South Africa |
| NFA | National Forests Act (Act 84 of 1998) |
| NHRA | National Heritage Resources Act (Act 25 of 1999) |
| NIP | National Infrastructure Plan |
| NWA | National Water Act (Act 36 of 1998) |
| PFS | Pre-feasibility Study |
| PPP | Public Participation Process |
| PUC | Point of Utility Connection |
| PoSEIA | Plan of Study for Environmental Impact Assessment |
| REIPPP | Renewable Energy Independent Power Producers Procurement Programme |
| SAHRA | South African Heritage Resources Agency |
| SDF | Spatial Development Framework |
| SIA | Social Impact Assessment |
| SIP | Strategic Integrated Project |
| ToR | Terms of Reference |
| UNFCCC | United Nations Framework Convention on Climate Change |
| VIA | Visual Impact Assessment |
| WRYCM | Water Resource Yield Computer Model |
| WULA | Water Use Licence Application |

## GLOSSARY OF TERMS

**Alien species**: A plant or animal species introduced from elsewhere: neither endemic nor indigenous.

**Applicant**: Any person who applies for an authorisation to undertake an activity or undertake an Environmental Process in terms of the Environmental Impact Assessment Regulations – National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA) as contemplated in the scheduled activities listed in Government Notice (GN) No R. 543, 544 and 545.

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

**Cumulative Impact:** In relation to an activity, cumulative impact means the impact of an activity that in itself may not be significant, but may become significant when added to the existing and potential impacts eventuating from similar or diverse activities or undertakings in the area.

**Ecology**: The study of the interrelationships between organisms and their environments.

**Environment**: All physical, chemical and biological factors and conditions that influence an object.

**Environmental Impact Assessment:** In relation to an application, to which Scoping must be applied, means the process of collecting, organising, analysing, interpreting and communicating information that is relevant to the consideration of the application.

**Environmental Impact Report:** In-depth assessment of impacts associated with a proposed development. This forms the second phase of an Environmental Impact Assessment and follows on from the Scoping Report.

**Environmental Management Programme:** A legally binding working document, which stipulates environmental and socio-economic mitigation measures that must be implemented by several responsible parties throughout the duration of the proposed project.

**Heritage resources:** This means any place or object of cultural significance. See also archaeological resources above

**Precipitation:** Any form of water, such as rain, snow, sleet, or hail that falls to the earth's surface.

**Red Data species**: All those species included in the categories of endangered, vulnerable or rare, as defined by the International Union for the Conservation of Nature and Natural Resources.

**Riparian**: The area of land adjacent to a stream or river that is influenced by stream induced or related processes.

**Soil compaction:** Soil becoming dense by blows, vehicle passage or other type of loading. Wet soils compact easier than moist or dry soils.

# 1 Introduction

The main objective of the Environmental Management Programme (EMPr) is to describe the proposed mitigation measures associated with identified impacts and to identify the specific individuals/entities that will be responsible for implementation of the required mitigation measures. This is necessary in order to ensure that potential impacts identified on the environment are minimised and managed at acceptable levels during the construction and operational phases of the proposed development of a new 132 V transmission line and associated six sub-stations.

This EMPr must form part of the contractual agreement between the relevant contractor(s) and the developer.

## 1.1 NEMA Regulation 33 Report Compliance

Regulation 23 of the National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA) Environmental Impact Assessment (EIA) Regulations of 2014 makes reference to its Appendix 4 which provides the content requirements for Environmental Management Programmes. The table below lists the relevant requirements, indicates whether the relevant information is included in this report or not, and provides cross-references as to where the relevant information can be found in this report.

**Table 1: Environmental Management Programme requirements in terms of Regulation 23 of the EIA Regulations of 2014.**

| Reg. | EIA Regulations 2014 - Appendix 4 – Content of Environmental Management programme (EMPr) | Location in this EMPr |
|---|---|---|
| (a) | A environmental management programme must comply with section 24N of the Act and include -<br>details of - | |
| | (i) the EAP who prepared the EMPr; and | Section 2.1 |
| | (ii) the expertise of that EAP to prepare an EMPr, including a Curriculum Vitae | Section 2.2 |
| (b) | a detailed description of the aspects of the activity that are covered by the EMPr as identified by the project description; | Section 3 |
| (c ) | a map at an appropriate scale which superimposes the proposed activity, its associated structures, and infrastructure on the environmental sensitivities of the preferred site, indicating any areas that any areas that should be avoided, including buffers; | Appendix B |

| Reg. | EIA Regulations 2014 - Appendix 4 – Content of Environmental Management programme (EMPr) | Location in this EMPr |
|---|---|---|
| (d) | a description of the impact management objectives, including management statements, identifying the impacts and risks that need to be avoided, managed and mitigated as identified through the environmental impact assessment process for all phases of the development including- | Section 7 |
| | (i) planning and design; | Section 7 |
| | (ii) pre-construction activities; | Section 7 |
| | (iii) construction activities; | Section 7 |
| | (iv) rehabilitation of the environment after construction and where applicable post closure; and | Section 10 |
| | (v) where relevant, operation activities; | Section 7 |
| (e ) | a description and identification of impact management outcomes required for the aspects contemplated in paragraph (d); | Section 7 |
| (f) | a description of proposed impact management actions, identifying the manner in which the impact management objectives and outcomes contemplated in paragraphs (d) and (e) will be achieved, and must, where applicable, include actions to - | Section 7 |
| | (i) avoid, modify, remedy, control or stop any action, activity or process which causes pollution or environmental degradation; | Section 7 |
| | (ii) comply with any prescribed environmental management standards or practices; | Section 7 |
| | (iii) comply with any applicable provisions of the Act regarding closure, where applicable; and | Section 7 |
| | (iv) comply with any provisions of the Act regarding financial provisions for rehabilitation, where applicable; | Section 7 |
| (g) | the method of monitoring the implementation of the impact management actions contemplated in paragraph (f); | Section 5<br>Section 7 |
| (h) | the frequency of monitoring the implementation of the impact management actions contemplated in paragraph (f); | Section 7 |
| (i) | an indication of the persons who will be responsible for the implementation of the impact<br>management actions; | Section 4<br>Section 7 |
| (j) | the time periods within which the impact management actions contemplated in paragraph (f) must be implemented; | Section 7 |
| (k) | the mechanism for monitoring compliance with the impact management actions contemplated in paragraph (f); | Section 5<br>Section 7 |
| (l) | a program for reporting on compliance, taking into account the requirements as prescribed by the Regulations; | Section 5<br>Section 7 |

| Reg. | EIA Regulations 2014 - Appendix 4 – Content of Environmental Management programme (EMPr) | Location in this EMPr |
|---|---|---|
| (m) | an environmental awareness plan describing the manner in which- | Section 6 |
| | (i) the applicant intends to inform his or her employees of any environmental risk which may result from their work; and | Section 6 |
| | (ii) risks must be dealt with in order to avoid pollution or the degradation of the environment; and | Section 6 |
| (n) | any specific information that may be required by the competent authority. | N/A |

## 1.2 Report Layout

The table below summarises the content layout of this report.

**Table 2: Summary of report content layout**

| Chapter | Chapter Heading | Content Summary |
|---|---|---|
| 1 | Introduction | Provides a brief background to the proposed project, and explains the compliance of this report with regards to Regulation 33 of the NEMA. |
| 2 | Environmental Assessment Practitioner | Provides details of the EAP who prepared this EMPr, and provides information on the expertise of the EAP. |
| 3 | Project Description and Listed Activities Covered by this EMPr | Provides a description of the project and its location as well as listed NEMA activities triggered by the proposed project. |
| 4 | Existing Environmental and Impact Assessment Summary | Summarises the biophysical, social, economic and cultural aspects of the existing environment. |
| 5 | Persons Responsible for Implementing this EMPr | Provides information on the persons who will be responsible for implementing this EMPr, and explains requirements with regards to on-site communication, site instruction entries, method statements, and record keeping. |
| 6 | Monitoring, Performance | Provides information on monitoring, performance assessment and reporting on EMPr Compliance, ECO site inspection reports, and |

| Chapter | Chapter Heading | Content Summary |
|---|---|---|
| | Assessment and Reporting on EMPr Compliance | photographs. |
| 7 | Environmental Awareness Plan | Provides information on environmental awareness and risk training, and basic rules of conduct. Also provides an environmental risk plan. |
| 8 | Impacts and Mitigation Measures | Provides EMPrs for the relevant project phases. |
| 9 | Emergency Response Plan | Provides information on the emergency response plan. |
| 10 | Incident Register | Stipulates the content requirements for incident registers. |
| 11 | Rehabilitation Measures | Provides rehabilitation measures and closure plan objectives. |
| 12 | References | Lists all references referred to in this EMPr. |

# 2 Environmental Assessment Practitioner

This EMPr was prepared by Rikus Lamprecht from Enviroworks, the Environmental Assessment Practitioner (EAP) who is undertaking this BA process. The sections below provide the details of the EAP and explains the EAP's expertise and experience to prepare this EMPr.

## 2.1 Details of the EAP

Enviroworks was appointed by Metsimatala CSP Solar Energy (Pty) Ltd as the independent Environmental Assessment Practitioner (EAP) to conduct a full Scoping & EIA process for the proposed project.

Enviroworks, a Small, Medium and Micro-sized Enterprise (SMME) company, was established in November 2002. Although the formal establishment of the company took place in 2002, it is backed by over 70 years of collective professional service and experience in the environmental field. The qualifications, expertise and experience of our professional team form the backbone of the company's continued success.

The vision of Enviroworks is to provide excellent, cutting edge Environmental Management Solutions and Services, underpinned by a team of professional consultants together with our associated network of specialist partners and project managers. Through an integration of skills and expertise, it is envisioned that Enviroworks will deliver exceptional, competitive services for task execution and to meet deliverables.

Enviroworks through our years of experience and industry presence assures the seamless execution and roll out of tasks to achieve projected results on time. The company continuously engages existing and emerging legislation, guidelines and practices, to ensure the execution of qualitative and appropriate studies. Our past experience on renewable energy projects further benefits our understanding of technology-related processes and the impacts thereof.

**Table 3: Details of the EAP**

| | |
|---|---|
| Company/entity name: | Rikus Lamprecht (on behalf of Enviroworks) |
| Physical address: | 5 Walter Sisulu Street; Universitas; Bloemfontein; 9301 |
| Postal address: | PO Box X 01; Suite 116; Brandhof; 9324 |
| Contact person: | Rikus Lamprecht |
| Designation: | Senior Environmental Consultant |
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| | |
|---|---|
| Qualifications: | M.Env.Sci Ecological Remediation and Sustainable Utilisation |

## 2.2 Expertise of the EAP Representative

Rikus Lamprecht (Pr.Sci.Nat.) was employed by Enviroworks in 2016 as a Senior Environmental Consultant. Rikus was previously employed by Fraser Alexander Tailings from 2011 to 2015 as an Environmental Contracts Manager where he was responsible for the technical and operational management of all Fraser Alexander Tailings' environmental mining rehabilitation work. He was responsible for all facets of project management as well as implementation of rehabilitation and environmental strategies by planning activities, organizing physical, financial and human resources, delegating task responsibilities, leading people, controlling risks and providing technical support.

Rikus holds a B.Sc Botany and Zoology as well as an M.Env.Sci Ecological Remediation and Sustainable Utilisation degree. His environmental management knowledge and practical experience as well as his enthusiasm, disciplined goal-driven mind-set and high personal standards ensures high quality outputs during the implementation and completion of any environmental projects.

**Relevant Project Experience**

**2016**

- Completion of a specialist ecological assessment and report for the proposed 3 km Olifantshoek Bulk Water Supply and reservoir development project in Olifantshoek in the Northern Cape Province.
- Completion of two specialist ecological and wetland assessments and reports for the proposed respective 16 ha and 6 ha N8 highway gravel quarries development project near Ladybrand in the Free State Province.
- Completion of a specialist ecological assessment and report for the proposed 100 ha De Eelt vineyard development project near Prieska in the Northern Cape Province.
- Completion of two specialist ecological and wetland assessments and reports for the Lafarge cement production facility and quarry respectively near Lichtenburg in the North-West Province.
- Completion of a specialist ecological assessment and report for the proposed 12 ha Nooitgedacht Retirement Estate development project near Nelspruit in the Mpumalanga Province.
- Completion of a specialist ecological assessment and report for the proposed 42 km Ventersburg Bulk Water Supply and reservoir development project between Ventersburg and Riebeeckstad in the Free State Province.

**2017**

- Completion of a specialist ecological assessment and report for the proposed Phethogo Consulting filling station development project in Bloemfontein in the Free State Province.
- Completion of a specialist ecological assessment and report for the proposed 132 kV CENTLEC Harvard transmission line development project in Bloemfontein in the Free State Province.
- Completion of a specialist ecological assessment and report for the proposed Zevenfontein filling station development project in Johannesburg in the Gauteng Province.
- Completion of a specialist ecological assessment and report for the proposed Olifantsvlei Curro School development project in Johannesburg in the Gauteng Province.
- Completion of a specialist ecological assessment and report for the proposed 23 ha Babereki Agricultural development project in Hartswater in the Northern Cape Province.
- Completion of a specialist ecological assessment and report for the proposed Eikenhof Curro School development project in Johannesburg in the Gauteng Province.
- Completion of a specialist ecological assessment and report for the proposed 40 ha CoGHSTA residential development project in Norvalspont in the Northern Cape Province.
- Completion of a specialist ecological assessment and report for the proposed 9 ha CoGHSTA residential development project in Williston in the Northern Cape Province.
- Completion of a specialist ecological and wetland assessment and report for the proposed 100 ha Musgrave residential and commercial development in Bloemfontein in the Free State Province..

See Appendix A for Curriculum Vitae.

# 3 Project Description and Listed Activities Covered by this EMPr

## 3.1 Project Description and Location

CENTLEC (Pty) Ltd, the applicant, is a private company incorporated in accordance with the company laws of the Republic of South Africa, and was established as a municipal entity as contemplated in Section 82 (1) of the Local Government: Municipal Systems Act No 21 of 2000. The core services of the company include new electrification networks, refurbishment and maintenance of existing networks and electricity supply. The company distributes electricity in areas under the jurisdiction of the Mangaung, Kopanong, Naledi, Mantsopa and Mohokare Municipalities. CENTLEC's customer base is over 90% domestic and less than 5% commercial consumers.

CENTLEC intends to develop new infrastructure in the city of Bloemfontein Registration Division, Free State Province. The proposed development entails two main sets of developments namely a new 132 kV transmission line and secondly six associated sub-stations.

**132 kV transmission line**

**Transmission line main loop**

The proposed 132 kV transmission line to be constructed will tie into and commence from the existing Harvard transmission line which is associated with the Cecilia sub-station situated next to Koppie Road in the south-west of Bloemfontein. The commencement/tie in point of the proposed transmission line will be on the Remaining Extent of the Farm Kwaggafontein no 2300 (SG: F00300000000230000000). From the commencement point, the proposed transmission line will have a main loop which will loop around the western and northern boundaries of Bloemfontein and will be situated outside the urban edge. From the commencement point, the main loop will traverse the following farm portions:

- Remaining Extent of the Farm Kwaggafontein no 2300 (SG: F00300000000230000000)
- Portion 1 of the Farm Spitskop no 2671 (SG: F00300000000267100001)
- Portion 3 of the Farm Picton no 2264 (SG: F00300000000226400003)
- Remaining Extent of the Farm Freewater no 2505 (SG: F00300000000250500000)
- Portion 3 of the Farm Alexandria no 1746 (SG: F00300000000174600003)
- Portion 1 of the Farm Outspan no 1960 (SG: F00300000000196000001)
- Remaining Extent of the Farm Outspan no 1960 (SG: F00300000000196000000)
- Remaining Extent of the Farm Sans Souci no 1786 (SG: F00300000000178600000)
- Remaining Extent of the Farm Geerdsburg no 1961 (SG: F00300000000196100000)
- Portion 1 of the Farm Geerdsburg no 1961 (SG: F00300000000196100001)
- Remaining Extent of the Farm Highlands no 2707 (SG: F00300000000270700000)
- Remaining Extent of the Farm Bokmekier no 2711 (SG: F00300000000271100000)

- Portion 1 of the Farm Voorspoed no 1788 (SG: F00300000000178800001)
- Portion 2 of the Farm Voorspoed no 1788 (SG: F00300000000178800002)
- Remaining Extent of the Farm Voorspoed no 1788 (SG: F00300000000178800000)
- Portion 3 of the Farm Voorspoed no 1788 (SG: F00300000000178800003)
- Portion 4 of the Farm Voorspoed no 1788 (SG: F00300000000178800004)
- Portion 5 of the Farm Voorspoed no 1788 (SG: F00300000000178800005)
- Portion 6 of the Farm Voorspoed no 1788 (SG: F00300000000178800006)
- Portion 11 of the Farm Voorspoed no 1788 (SG: F00300000000178800011)
- Portion 17 of the Farm Knockacree no 1111 (SG: F00300000000111100011)
- Remaining Extent of the Farm Knockacree no 1111 (SG: F00300000000111100000)
- The new transmission line will run parallel alongside an existing Eskom transmission line for the initial 8 km portion up to where it traverses the Remaining Extent of the Farm Knockacree no 1111 (SG: F00300000000111100000). From there it will split away on its own route to the east of the existing line.
- Portion 2 of the Farm St Elmo no 2138 (SG: F00300000000213800002)
- Portion 4 of the Farm Kenilworth no 2734 (SG: F00300000000273400004)
- Portion 6 of the Farm Kenilworth no 2734 (SG: F00300000000273400006)
- Portion 20 of the Farm Kenilworth no 2734 (SG: F00300000000273400020)
- Portion 18 of the Farm Kenilworth no 2734 (SG: F00300000000273400018)
- Portion 1 of the Farm Kenilworth no 2734 (SG: F00300000000273400001)
- Remaining Extent of the Farm Josephine no 343 (SG: F00300000000034300000)
- Remaining Extent of the Farm Genoegtevrede no 2974 (SG: F00300000000297400000)
- Remaining Extent of the Farm Heeltevrede no 2685 (SG: F00300000000268500000)
- Portion 1 of the Farm Heeltevrede no 2685 (SG: F00300000000268500001)
- The new transmission line will again join up and run parallel alongside the existing Eskom transmission line from Portion 4 of the Farm Mount Pleasant no 221 (SG: F00300000000022100004).
- Portion 1 of the Farm Cumbrae no 1139 (SG: F00300000000113900001)
- Remaining Extent of the Farm Cumbrae no 1139 (SG: F00300000000113900000)
- Portion 2 of the Farm Cumbrae no 1139 (SG: F00300000000113900002)
- Remaining Extent of the Farm Georgina no 2798 (SG: F00300000000279800000)
- Remaining Extent of the Farm Fairview no 2845 (SG: F00300000000284500000)
- Portion 1 of the Farm Fairview no 1756 (SG: F00300000000175600001)
- Portion 7 of the Farm Mimosa Glen no 885 (SG: F00300000000088500007)
- Portion 2 of the Farm Fairview no 1756 (SG: F00300000000175600002)

- Portion 7 of the Farm Fairview no 2845 (SG: F00300000000284500007)
- Remaining Extent of the Farm Olrig no 1710 (SG: F00300000000171000000)
- Portion 2 of the Farm Annex Wildealskloof no 1205 (SG: F00300000000120500002)
- Portion 3 of the Farm Annex Wildealskloof no 1205 (SG: F00300000000120500003)
- Portion 8 of the Farm Annex Wildealskloof no 1205 (SG: F00300000000120500008)
- Portion 11 of the Farm Annex Wildealskloof no 1205 (SG: F00300000000120500011)
- Portion 6 of the Farm Annex Wildealskloof no 1205 (SG: F00300000000120500006)
- Portion 13 of the Farm Annex Wildealskloof no 1205 (SG: F00300000000120500013)
- Portion 5 of the Farm Annex Wildealskloof no 1205 (SG: F00300000000120500005)

The new transmission line will then join up with an existing CENTLEC 33 kV transmission line on Portion 5 of the Farm Annex Wildealskloof no 1205 (SG: F00300000000120500005) from where it will run mostly parallel alongside the existing line for approximately 4.5 km up to where it reaches its final loop in point at the existing Bayswater distribution centre on Portion 8 of the Farm Hillside no 2830 (SG: F00300000000283000008) situated in the north-east of Bloemfontein.

- Portion 12 of the Farm Ribblesdale no 1506 (SG: F00300000000150600012)
- Portion 13 of the Farm Ribblesdale no 1506 (SG: F00300000000150600013)
- Portion 11 of the Farm Ribblesdale no 1506 (SG: F00300000000150600011)
- Portion 10 of the Farm Ribblesdale no 1506 (SG: F00300000000150600010)
- Remaining Extent of the Farm Mooihoek no 1078 (SG: F00300000000107800000)
- Remaining Extent of the Farm Hillside no 2830 (SG: F00300000000283000000)
- Portion 8 of the Farm Hillside no 2830 (SG: F00300000000283000008)
- The linear length of the main loop of the proposed transmission will be approximately 35.4 km.

**Transmission line first split-off**

A short 132 kV line section is proposed to split off from the main loop of the transmission line on the Remaining Extent of the Farm Genoegtevrede no 2974 (SG: F00300000000297400000) in order to reach the position where the proposed Olivier distribution centre is to be built on Portion 12 of the Farm Groenvlei no 2844 (SG: F00300000000284400012). This entire split-off section of approximately 3.5 km to where it reaches the Olivier distribution centre position will be buried underground as this is located in the vicinity of the Tempe Military Base Airstrip. The reason for the underground section will be to ensure that all the above ground components of the entire transmission line are located outside a minimum 600 m distance from the airstrip. A maximum 1.5 m wide trench will be excavated to conceal the transmission line for the stated section after which the trench will be closed up again.

Additional farm portions forming part of the first spilt off section and which are not part of the main loop list of farm portions.

- Remaining Extent of the Farm Mara no 2571 (SG: F00300000000257100000)
- Portion 1 of the Farm Oranje View no 600 (SG: F00300000000060000001)
- Portion 12 of the Farm Groenvlei no 2844 (SG: F00300000000284400012)

**Transmission line second split-off**

A second 132 kV line section is also proposed to split off from the main loop of the transmission line in order to reach the position where the proposed Hillandale distribution centre is to be built on the Remaining Extent of the Farm Bergendal no 1706 (SG: F00300000000170600000). Two line route alternatives namely Alternatives 1 and 2 are suggested by the applicant for the second section splitting off.

Additional farm portions forming part of Alternative 1 (preferred alternative) and which are not part of the main loop list of farm portions.

- Remaining Extent of the Farm Olrig no 1710 (SG: F00300000000171000000)
- Remaining Extent of the Farm Mountain View no 1707 (SG: F00300000000170700000)
- Portion 1 of the Farm Mountain View no 1707 (SG: F00300000000170700001)
- Remaining Extent of the Farm Bergendal no 1706 (SG: F00300000000170600000)

Additional farm portions forming part of Alternative 2 and which are not part of the main loop list of farm portions.

- Remaining Extent of the Farm The Kloof no 2921 (SG: F00300000000292100000)
- Portion 1 of the Farm Penrose no 2378 (SG: F00300000000237800001)
- Remaining Extent of the Farm Cerillio no 2766 (SG: F00300000000276600000)
- Remaining Extent of the Farm Penrose no 2378 (SG: F00300000000237800000)
- Remaining Extent of the Farm Cleveleys no 2990 (SG: F00300000000299000000)
- Portion 5 of the Farm Bergendal no 1706 (SG: F00300000000170600005)
- Portion 3 of the Farm Bergendal no 1706 (SG: F00300000000170600003)
- Portion 8 of the Farm Bergendal no 1706 (SG: F00300000000170600008)
- Remaining Extent of the Farm Bergendal no 1706 (SG: F00300000000170600000)

The linear length of Alternative 1 will be approximately 5.6 km.

The linear length of Alternative 2 will be approximately 2.4 km.

The proposed transmission line will consist of a linear series of pylons (towers) which will be situated approximately 100 m - 300 m apart. The exact locations and distance between the pylons will be dependent on site specific terrain and soil conditions. This will only be determined during the final design stage. The main purpose of the pylons will be to ensure the transmission line maintains a minimum ground clearance height of 6.3 m. The transmission line servitude corridor will be a maximum of 30 m wide but the centre of the new line must also maintain a minimum distance of 50 m away from the centre of the existing Eskom line.

The tower type to be used will be determined during the final design stages of the powerline (based on load and other calculations). It is however envisaged that the bird friendly Steel Monopole tower type (e.g. ESKOM D-DT 7641, D-DT 7649) will mainly be used rather than the Steel Lattice tower type. The Steel Monopole tower type is also to be implemented in any identified environmentally sensitive or important areas such as Critical Biodiversity Areas (CBA) or heritage sites. The maximum surface area footprint per pylon of the Steel Monopole tower type will be 2 m x 2 m/4 m² while that of the Steel Lattice tower type will be 10 m x 10 m/100 m². Both the potential pylon designs will have a maximum height of 30 m.

The anticipated duration of the construction phase of the proposed transmission line will be a maximum of 6 months.

**Six 132 kV sub-stations**

The six individual 132 kV sub-stations to be constructed will be associated with the new transmission line and will assist with the transmission and distribution of the transmission line's electricity. They will be situated on the following farm portions:

- Outspan distribution centre
  - Remaining Extent of the Farm Outspan no 1960 (SG: F00300000000196000000)
- Rooidam distribution centre
  - Remaining Extent of the Farm Knockacree no 1111 (SG: F00300000000111100000)
- Olivier distribution centre
  - Portion 12 of the farm Groenvlei no 2844 (SG: F00300000000284400012)
- Tevrede distribution centre
  - Remaining Extent of the Farm Genoegtevrede no 2974 (SG: F00300000000297400000)
- Mimosa distribution centre
  - Portion 7 of the Farm Fairview no 2845 (SG: F00300000000284500007)
- Hillandale distribution centre

- Remaining Extent of the Farm Bergendal no 1706 (SG: F00300000000170600000)

The maximum footprint sizes of each of the six sub-stations are indicated under section 1.3 of this report. It will include transformer bays which will contain transformer oils. Bunded racking will be constructed to ensure that any oil spills will be adequately attenuated and prevented from release into the environment. For health and safety purposes, the sub-station shall be securely fenced to prevent unauthorized access.

Only the Outspan distribution centre is intended to be constructed initially along with the transmission line construction. The anticipated construction time periods for the other distribution centres are as follow:

- Hillandale distribution centre
  - Year 2019/2020
- Rooidam distribution centre
  - Year 2020/2021
- Tevrede & Olivier distribution centre
  - Year 2021/2022
- Mimosa distribution centre
  - Year 2023/2024

**Management objectives**

- Construction activities must be restricted to the proposed footprint area for which environmental authorisation is obtained.
- An environmental authorisation amendment request must first be submitted to the competent authority and approved if any proposed deviation or expansion of footprint area during the construction phase is required.
- Areas surrounding the footprint need to be adequately managed.

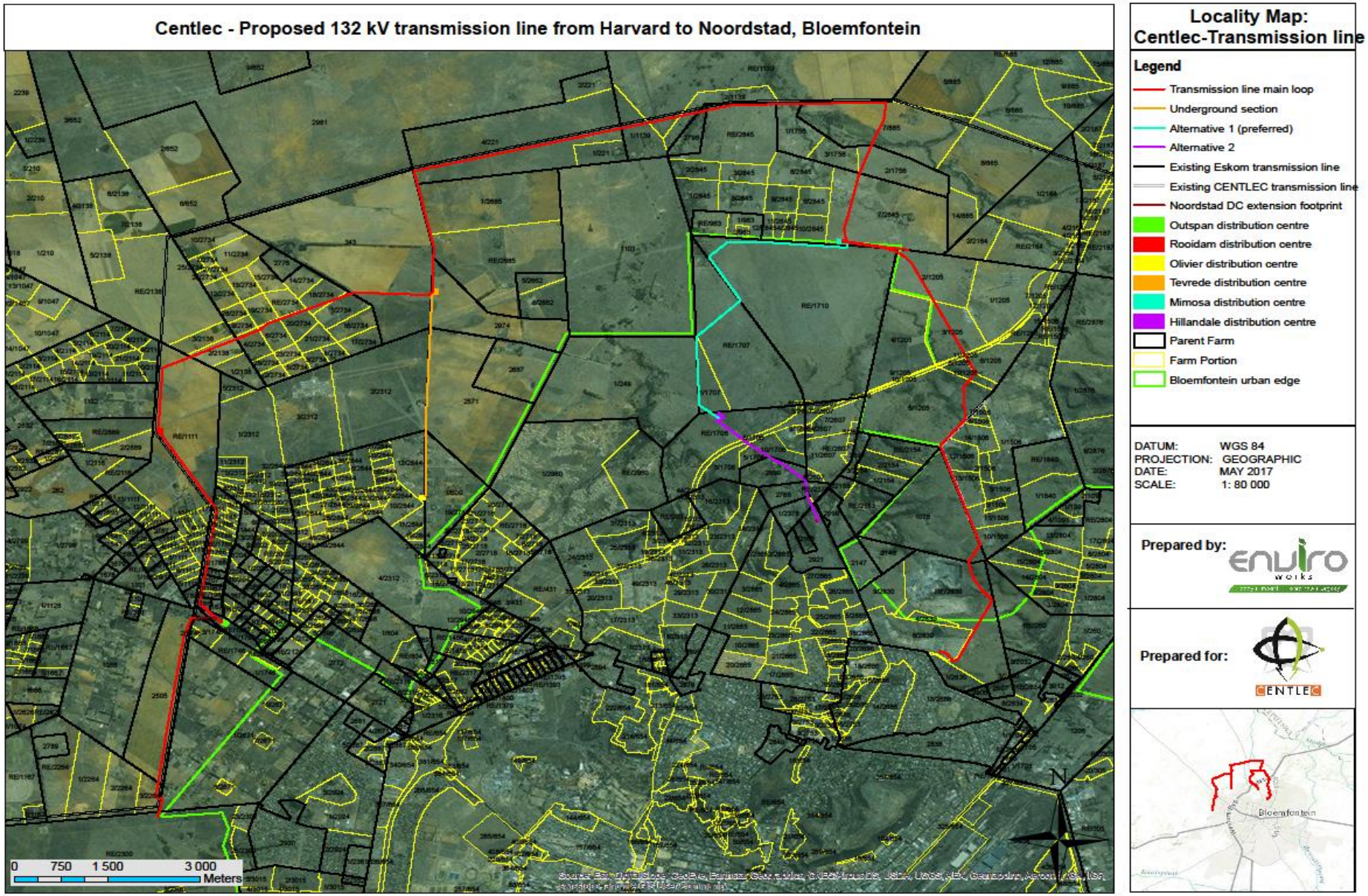


**Figure 1: Locality map illustrating the location of the proposed powerline development**

## 3.2 Project Phases

**Two phases:**

- Construction Phase (includes planning, design, pre-construction and construction activities)
- Operational Phase

## 3.3 NEMA Listed Activities Triggered

The proposed project triggers the following listed activities as per the National Environmental Management Act (Act 107 of 1998) Environmental Impact Assessment Regulations, 2014 (Government Notices R983, R984 and R985 in Government Gazette No. 38282 of 04 December 2014):

**Table 4: Environmental Impact Assessment Regulations, 2014 listed activities triggered by the proposed project**

| Listed activity as described in GN 983, 984 and 985 | Description of the relevant project activity |
|---|---|
| **GN R983 (LN 1), Activity 11:**<br><br>The development of facilities or infrastructure for the transmission and distribution of electricity –<br>(i) outside urban areas or industrial complexes with a capacity of more than 33 but less than 275 kilovolts. | **Transmission line main loop**<br>The proposed project entails the development of a 132 kV transmission line of which the main loop will be approximately 35.4 km in length and will fall outside the urban edge of Bloemfontein, Free State Province.<br><br>**Transmission line first split-off**<br>A short 132 kV line section is proposed to split off from the main loop of the transmission line. The proposed split-off section will be approximately 3.5 km in length and will fall outside the urban edge of Bloemfontein, Free State Province.<br><br>**Transmission line second split-off**<br>A second 132 kV line section with two alternatives is also proposed to split off from the main loop of the transmission line. The proposed split-off sections will be approximately 5.6 km (Alternative 1) or 2.4 km (Alternative 2) in length, depending on which alternative is approved, and will fall inside the urban edge of Bloemfontein, Free State Province. It is however less than 275 kilovolts in size therefore not triggering part (ii) of this listed activity.<br><br>**Six 132 kV sub-stations**<br>The proposed project also entails the construction of six individual 132 kV sub-stations which will be associated with the new transmission line. These |

| | |
|---|---|
| | proposed sub-stations will assist with the transmission and distribution of the transmission line's electricity. |
| **GN R983 (LN 1), Activity 12:**<br><br>The development of –<br>(ii) infrastructure or structures with a physical footprint of 100 square metres or more;<br><br>where such development occurs –<br>(a) within a watercourse<br>(c) if no development setback exists, within 32 metres of a watercourse, measured from the edge of a watercourse. | **Transmission line**<br>The proposed transmission line will be located in close proximity to and will cross various watercourses. Pylons will not be constructed within watercourses but may need to be placed within 32 metres of watercourses. The combined total of such pylon placement area footprints could exceed 100 m². The proposed transmission line servitude corridor will be 30 m wide and the area footprint sizes of the line at watercourse crossings will therefore exceed 100 m².<br><br>**Six 132 kV sub-stations**<br>The associated six individual sub-station footprints will not fall within 32 metres of any watercourses. |
| **GN R983 (LN 1), Activity 27:**<br><br>The clearance of an area of 1 hectares or more, but less than 20 hectares of indigenous vegetation | **Transmission line**<br>No significant clearance of natural vegetation will take place during pylon construction for the transmission line.<br><br>**Six 132 kV sub-stations**<br>The combined footprint area size of the six sub-stations associated with the transmission line will be a maximum of 5.1 ha. |
| **GN R985 (LN 3), Activity 12:**<br><br>The clearance of an area of 300 square metres or more of indigenous vegetation except where such clearance of indigenous vegetation is required for maintenance purposes undertaken in accordance with a maintenance management plan.<br><br>(b) In the Free State Province:<br>ii. Within critical biodiversity areas identified in bioregional plans.<br>iv. Areas within a watercourse or wetland; or within 100 metres from the edge of a watercourse or wetland. | **Transmission line**<br>An approximately 3.3 km portion of the proposed transmission line will traverse a Critical Biodiversity Area (CBA). Pylons will have to be constructed within the CBA. The combined total of such pylon placement area footprints will exceed 300 m². Although the proposed transmission line servitude corridor will be 30 m wide and the area footprint sizes of the line inside the CBA will exceed 300 m², no significant vegetation clearance will be conducted.<br><br>The proposed transmission line will be located in close proximity to and will cross various watercourses. Pylons will not be constructed within watercourses but may need to be placed within 32 metres of watercourses. The combined total of such pylon placement area footprints could exceed 300 m². The proposed transmission line servitude corridor will be 30 m wide and the area footprint sizes of the line at watercourse crossings will therefore exceed 300 m². |

| | |
|---|---|
| | **Six 132 kV sub-stations**<br>The associated six individual sub-station footprints will not fall within any CBA's. |
| **GN R985 (LN 3), Activity 14:**<br><br>The development of –<br>(ii) infrastructure or structures with a physical footprint of 10 square metres or more;<br><br>Where such development occurs –<br>(a) within a watercourse;<br>(c) if no development setback exists, within 32 metres of a watercourse, measured from the edge of a watercourse.<br><br>(b) In the Free State Province:<br>ii. outside urban areas:<br>(ff) critical biodiversity areas or ecosystem service areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans. | **Transmission line**<br>The proposed transmission line will be located in close proximity to and will cross various watercourses.<br><br>An approximately 3.3 km portion of the proposed transmission line will traverse a Critical Biodiversity Area (CBA). Pylons will be constructed within the CBA. Pylons will not be constructed within watercourses but may need to be placed within 32 metres of watercourses. The combined total of such pylon placement area footprints could exceed 10 m².<br><br>The proposed transmission line servitude corridor will be 30 m wide and the area footprint sizes of the line at watercourse crossings inside the CBA will therefore exceed 10 m².<br><br>**Six 132 kV sub-stations**<br>The associated six individual sub-station footprints will not fall within any CBA's. |

# 4 Individuals/entities Responsible for Implementing the EMPr

The "Responsibility" columns in the impact and mitigation tables provided below indicate the individuals/entities which are responsible for implementation of the identified mitigation measures. These individuals/entities include the following:

- Construction contractor manager and team
- Technical consultant
- Applicant/Developer representative;
- Environmental Control Officer (ECO)

The section below lists additional measures, which should be implemented by the relevant individuals/entities.

During the **construction phase**, the **construction contractor manager and team** will:

- Be responsible to have the environmental authorisation, all necessary permits and EMPr available on site at all times
    - The contractor manager must ensure and enforce compliance with all conditions and requirements stipulated in the environmental authorisation, permits and EMPr
    - Ensure that all mitigation measures for which the contactor team are responsible, are adequately implemented as described in the EMPr
    - Ensure that all documentation/filing in terms of environmental information is adequately maintained/updated and readily available on site.
    - Ensure adequate training and awareness of all relevant employees/team members on the environmental authorisation, permits and EMPr
- Provide the applicant and Environmental Control Officer (ECO) with Method Statements for all significant work/tasks to be performed on site. This will indicate the systematic procedures that will be applied for work/tasks in order to meet the requirements of any aspect of the EMPr
- Ensure that all findings/issues/problems identified during ECO environmental inspections, are addressed and rectified as soon as practicably possible
- Appoint a suitably qualified, skilled and experienced Environmental Officer on site

During the **construction phase**, the **applicant, construction contractor manager & technical consultant** will:

- Manage and oversee the construction phase of the project from a civils and environmental management perspective in order to ensure legal compliance

- Monitor and enforce contractor obligations regarding the environmental authorisation, permits and EMPr
- Have the authority to stop work and issue fines in the event of environmental non-compliance;
- Appoint a suitably qualified, skilled and experienced ECO on site to conduct bi-monthly (twice a month) site visits during the construction phase.
- Receive inspection/compliance reports from the ECO and adequately report to the applicant/client on a continual basis;
- Support the ECO in his/her roles and responsibilities.

During the **construction phase**, the **Environmental Control Officer (ECO)** will:

- Conduct a handover of the environmental authorisation and EMPr with the project manager and contractor and ensure they are made aware of the content, requirements and conditions. Ensure that the all roles and responsibilities are understood by all relevant parties.
- Conduct environmental monitoring and auditing activities on a continual basis to ensure compliance with the EA and EMPr. Conduct bi-monthly (twice a month) site visits during the construction phase.
    - Complete an ECO checklist after each site inspection and incorporate and distribute this to the project team within 5 days; and
- Provide feedback on auditing activities in the form of site meetings and site inspection reports to the applicant and contractor
- Work collectively with significant role-players on site to achieve desired environmental objectives, but not be influenced in opinion and must report to the applicant only
- May/must, in the event of there being a serious threat to or impact on the environment, correspond with the contract project manager to stop works and address situation adequately prior to continuation
- Conduct a final environmental audit of the project on completion of construction and rehabilitation, for submission to the Department of Environmental Affairs (DEA) to review.

During the **operational phase** the **applicant/developer**, will be responsible to prevent negative environmental impacts, and as such will be responsible to:

- Have the environmental authorisation, permits and EMPr available at all times;
    - Ensure and enforce compliance with all conditions and requirements stipulated in the environmental authorisation, permits and EMPr

  - Ensure that all mitigation measures for which they are responsible, are implemented as described in this EMPr
  - Ensure that all documentation/filing in terms of environmental information is adequately maintained/updated and readily available
  - Ensure adequate training and awareness of all relevant employees involved with operational maintenance on the environmental authorisation and EMPr
- Set aside a budget for maintenance
- Maintain and manage all facilities and infrastructure in good working order to effectively fulfil its intended purpose and to prevent negative environmental impacts
- Not construct or modify any additional buildings or infrastructure contrary to the approved environmental authorisation, without performing an environmental impact assessment where listed activities of the 2014 NEMA EIA Regulations are triggered
  - An environmental authorisation amendment request must first be submitted to the competent authority and approved if any proposed deviation from the environmental authorisation area during the construction or operational phase is required.
- May/must, in the event of there being a serious threat to or impact on the environment due to operational works, address the situation adequately and as soon as practicably possible prior to continuation

## 4.1 On-site Communication and Document control

The following sections describe the site communication measures that will need to be implemented.

### 4.1.1 Site Instruction Entries

The Site Instruction book should be used for the recording of general site instructions as they relate to the works on site. It should also be used for the issuing of **stop work orders** for the purposes of immediately halting any particular activities of the contractor which causes or might reasonably cause environmental risk or damage.

### 4.1.2 Method Statements

Method Statements for all significant work/tasks to be performed on site. This will indicate the systematic procedures that will be applied for work/tasks in order to meet the requirements of any aspect of the EMPr. Such a method statement forms the baseline information on which work in sensitive environments takes place. This is an interactive “live document” which allows for modifications to be negotiated between the contractor, ECO & technical consultant, as circumstances unfold.

A method statement systematically describes the scope of the intended work, step-by-step, in order for the ECO and technical consultant to understand the Contractor's intentions. This will enable them to determine potential environmental impacts and assist in devising any mitigation measures, which would minimise environmental impact during these tasks. For each instance wherein it is requested that the Contractor submit a method statement to the satisfaction of the ECO, the format should clearly indicate the following:

- **What** - a brief description of the work to be undertaken;
- **How -** a detailed description of the process of work, methods and materials;
- **Where -** a description/sketch map of the locality of work (if applicable); and
- **When -** the sequencing of actions with due commencement dates and completion date estimates.

All method statements will form part of the EMPr documentation and are subject to all terms and conditions contained within the EMPr main document. The contractor must submit the method statements to the ECO prior to the commencement of any significant construction activities. Work may not commence until the method statement has been approved by the ECO and relevant parties.

#### 4.1.3 Documentation control and record keeping

All records related to the implementation of the environmental authorisation and EMPr must be adequately managed and kept together in a filing system on site where it is safe and can be readily accessed if necessary. These records should be kept for a minimum of two years and should at any time be available for inspection by any relevant authorities.

The main categories of records to be kept on site include the following:

- All documentation related to the EA and EMPr acceptance
- Weekly Environmental Checklists
- Environmental Audit Reports
- Environmental Site meetings
- Required Method Statements
- Environmental Incident Log (Diary)
- Non-compliance register
- Corrective Action records
- Contractor Environmental Agreements
- Photographic Record
- Complaints Register
- Claims for Damages
- Interaction with affected parties register

- Environmental Audits
- Final Environmental Audit Report

# 5 Monitoring, Performance Assessment and Reporting on EMPr Compliance

Several monitoring actions are proposed which would be undertaken by various project role players.

For detail on these actions, Responsible Person/Party and Monitoring Frequency associated with the identified mitigation measures, refer to the Monitoring column in the impact assessment tables below.

## 5.1 Performance Assessment and Reporting on EMPr Compliance

An independent suitably qualified skilled and experienced Environmental Control Officer (ECO) should be appointed by the Applicant/Developer to oversee the commencement, duration and conclusion of the construction phase. The ECO will be responsible for ensuring implementation of mitigation measures and compliance as described in the EA and EMPr.

The ECO should have relevant proven experience as an ECO, or be supported by a qualified ECO. He/she may not be someone appointed by the contractor, engineer or other party involved with this project, other than the Applicant/Developer.

The following applies, amongst others, to the ECO's role:

- The ECO should undertake **bi-monthly (twice a month) site visits** during the **construction phase to ensure environmental authorisation and EMPr compliance or stop any potentially significant non-compliance**,
- The ECO must **report on site visits and compliance audits** to the Applicant/Developer only.
- Environmental Audit Reports must be sent to the applicant representative.
- The ECO should present an **environmental site induction/awareness training session** to all personnel before work on site commences, as are also described below; and
- After completion of the construction activities, a **final environmental audit** should be undertaken by the ECO, before commencement of the operational phase, in order to determine compliance with the environmental authorisation and EMPr outcomes. The audit report must also be submitted to the competent authority.
- The ECO has the authority to stop work if in his/her opinion that there is a serious threat to or impact on the environment, caused directly from the construction operations and address situation adequately prior to continuation. This authority is to be limited to emergency situations where consultation with the engineer or applicant is not immediately available. In all such work stoppage situations the ECO is to inform the technical consultant and applicant of the reasons for the stoppage as soon as possible.

Upon failure by the contractor or his employee(s) to show adequate consideration to the environmental aspects of this contract, the ECO may recommend to the technical consultant to have the contractor's representative or any employee(s) removed from the site or work suspended until the matter is remedied. No extension of time will be considered in the case of such suspensions and all costs will be borne by the contractor.

### 5.1.1 ECO Site Inspection Reports

The ECO site inspection reports (also called “ECO checklists”) will report on the compliance of the construction phase with the conditions and mitigation measures contained in the EA and EMPr. The report should be submitted to the applicant, within five (5) days of the ECO site inspection, and should also be made available to the construction contractor. Copies of the inspection reports should be kept on site.

The contractor’s meeting minutes must reflect environmental queries, agreed actions and dates of eventual compliance. These minutes form part of the official environmental record.

### 5.1.2 Photographs

It is recommended that continual photographs be taken of the site prior to, continually during and immediately after construction as a visual reference. These photographs should be stored along with other records related to this EMPr. If captured in digital format, hard copies, in colour, must be kept with all other records relevant to the implementation of this EMPr.

### 5.1.3 Conclusion

The main role of the ECO on site is therefore to assist in ensuring the project is managed and operated in an environmentally sustainable and responsible manner in in accordance with the environmental authorisation, permits and EMPr conditions and recommendations.

# 6 Environmental Awareness Plan

## 6.1 Environmental Awareness and Risk Training

All contractor employees and other relevant individuals on site involved with the project are to be adequately trained on their obligations towards sufficient environmental management/controls and methodologies with regards to the EA and EMPr conditions, prior to work commencing. Continual training interventions and update discussions surrounding the environmental risk management and mitigation on site must also occur. Daily environmental aspects related to the specific task assigned for a day must be conducted in the form of toolbox talks on a daily basis prior to the commencement of any work. A continual systematically structured environmental education and awareness programme should be developed and aimed at all levels of management within the contractor team. This is required in order to include and inform all employment levels of the legal obligations towards site specific environmental management on site as per the EA and EMPr requirements.

All new employees must attend an initial environmental awareness/induction presentation prior to commencing with their new work and must then fall into the continual awareness updating structures.

### 6.1.1 Basic employee rules of conduct

The following list represents the basic *Do's* and *Don'ts* towards environmental awareness and responsibility, which all participants in this project must consider whilst carrying out their tasks. These are not exhaustive and serve as a quick reference aid.

**DO:**

- Clear your work areas of litter and building rubble at the end of each day – use the waste bins provided and prevent litter from being blown away by wind.
- Report all fuel or oil spills immediately and stop the spill from continuing.
- Dispose of cigarettes and matches carefully, so to prevent veld fires (arson and littering is an offence).
- Confine work and storage of equipment to within the immediate work area.
- Use all safety equipment and comply with all safety procedures.
- Ensure a working fire extinguisher is immediately at hand if any "HOT WORK" is undertaken e.g. welding, grinding, gas cutting etc.
- Prevent excessive dust and noise.
- Practice environmental responsibility and vigilance

**DO NOT:**

- Do not litter - report dirty or full facilities, i.e. full dustbins and dirty or blocked toilets.
- Do not make any fires.
- Do not enter any fenced off or demarcated areas.
- Do not allow waste, litter, oils or foreign materials into any storm water channels or drains or watercourses.
- Do not interact with wild animals.
- Do not cause damage to the environment or vegetation.
- Do not increase the authorised project footprint at any stage.

# 7 Impacts and Mitigation Measures

The following section provides descriptions of the potential environmental impacts which the proposed project will have as well as the recommended mitigation measures to be implemented for each impact as identified during the Basic Assessment process.

## 7.1 Construction Phase

### 7.1.1 Ecological Impacts

**Destruction/transformation of vegetation of pre-existing transformed and disturbed cultivated lands and road servitudes within the transmission line route corridor associated with the endangered Bloemfontein Dry Grassland (Gh 5) vegetation type**

The development of the proposed transmission line through transformed and disturbed cultivated lands and road servitudes as identified per heading 8.1 and Figure 12 (see Specialist Report) could result in the transformation and destruction of surface vegetation. The physical impacts will however be localised in extent and mainly restricted to the actual proposed pylon footprint areas. Due to the pre-existing transformed and disturbed nature of such areas, the significance of these potential impacts on vegetation will be very low.

Mitigation measures to reduce potential impacts:

- It is recommended that pylons, as far as practicably possible, be placed within such already transformed areas in order to minimise the impacts on remaining semi-natural and natural vegetation.
- Existing roads, farm tracks and service roads of existing lines running in close proximity to the proposed transmission line route must be used as far as practicably possible.

**Destruction/transformation of vegetation of pre-existing transformed and disturbed cultivated lands and road servitudes within the sub-station footprints associated with the endangered Bloemfontein Dry Grassland (Gh 5) vegetation type**

The footprints of Outspan, Rooidam, Olivier and Tevrede distribution centres will all be situated within pre-existing transformed and disturbed areas. The development of these proposed sub-stations on transformed and disturbed cultivated lands and road servitudes as identified per heading 8.1 and Figure 12 (see Specialist Report) will result in the transformation and destruction of surface vegetation. The physical impacts will however be localised in extent and restricted to the actual proposed sub-station footprint areas. Due to the pre-existing transformed and disturbed nature of such areas, the significance of these potential impacts on vegetation will be very low.

Mitigation measures to reduce potential impacts:

- The construction footprint of the sub-stations must be kept as small as practicably possible to reduce the actual surface impact on vegetation and no unnecessary/unauthorised footprint expansion should take place.
- Existing roads, farm tracks and service roads in close proximity to the proposed sub-station locations must be used as far as practicably possible.
- The construction and subsequent operation of the sub-stations must be continually managed in terms of an adequate and approved Environmental Management Programme (EMPr).

**Destruction/transformation of semi-natural and natural vegetation within the transmission line route corridor associated with the endangered Bloemfontein Dry Grassland (Gh 5) vegetation type and the Winburg Grassy Shrubland (Gh 7) vegetation type**

The development of the proposed transmission line through semi-natural and natural areas as identified per headings 8.2 & 8.3 and Figure 12 (see Specialist Report) could result in the transformation and destruction of surface vegetation. The physical impacts will however be localised in extent and mainly restricted to the actual proposed pylon footprint areas. These remaining semi-natural and natural areas form part and play significant roles in larger surrounding continual natural corridors. They are therefore subsequently also very important to the habitat persistence and ecological functionality of the surrounding ecosystem. The significance of these potential impacts on the vegetation will therefore be medium.

Mitigation measures to reduce potential impacts:

- It is recommended that the amount of pylons to be placed within these natural areas be restricted and pylons rather be placed in transformed areas, as far as practicably possible. This must be done in order to minimise impacts on the habitat and ecological functionality of the natural areas.
- It is recommended that the Steel Monopole tower type be implemented in the natural areas as far as practicably possible due to its smaller physical surface footprint size and subsequent reduced impact on the vegetation.
- Pylon construction footprints must be kept as small as practicably possible to reduce the actual surface impact on vegetation and no unnecessary/unauthorised pylon footprint expansion should take place.
- Once the proposed transmission line layout designs have been finalised by the applicant, an ecological walkthrough of the final pylon footprint positions must be conducted in order to identify any potentially significant species individuals which would require relocation. These walkthrough and

potential relocation activities must be completed prior to the commencement of and construction processes.

- No physical maintenance (removal or defoliation by means of cutting or burning) is allowed on the natural vegetation present inside the proposed transmission line route servitude.
- Existing roads, farm tracks and service roads of existing lines running in close proximity to the proposed transmission line route must be used as far as practicably possible.
- Significant care must be taken to ensure that no significant woody shrubs or trees are removed from the route corridor during the construction or operational/maintenance phase of the proposed project development. If any removal of woody shrubs or trees individuals is required, a suitably qualified, registered and experienced ecologist must be assigned to firstly inspect the individuals and provide recommendations on their management or potential removal or the possibility of relocation.
- It is recommended that Alternative 2 for the proposed transmission line route corridor rather be followed in order to minimise the impact on remaining natural area of the endangered Bloemfontein Dry Grassland (Gh 5) vegetation type.

**Destruction/transformation of natural vegetation within the sub-station footprints associated with the endangered Bloemfontein Dry Grassland (Gh 5) vegetation type**

The footprints of Mimosa & Hillandale distribution centres will all be situated within natural areas associated with the Bloemfontein Dry Grassland (Gh 5) vegetation type. The development of these proposed sub-stations on natural areas as identified per heading 8.3 and Figure 12 (see Specialist Report) will unfortunately result in the transformation and destruction of surface vegetation. The physical impacts will however be localised in extent and mainly restricted to the actual proposed sub-station footprint areas. These remaining natural areas form part and play significant roles in larger surrounding continual natural corridors. They are therefore subsequently also very important to the habitat persistence and ecological functionality of the surrounding ecosystem. The significance of these potential impacts on the vegetation will therefore be medium-high.

Mitigation measures to reduce potential impacts:

- The construction footprint of the sub-stations must be kept as small as practicably possible to reduce the actual surface impact on vegetation and no unnecessary/unauthorised footprint expansion should take place.
- Once the sub-station designs have been finalised by the applicant, an ecological walkthrough of the final sub-station footprints must be conducted in order to identify any potentially significant species

individuals which would require relocation. These walkthrough and potential relocation activities must be completed prior to the commencement of any construction processes.

- Existing roads, farm tracks and service roads in close proximity to the proposed sub-station locations must be used as far as practicably possible.
- The construction and subsequent operation of the sub-stations must be continually managed in terms of an adequate and approved Environmental Management Programme (EMPr).

**Destruction/transformation of a Critical Biodiversity Area associated with the transmission line route corridor**

An approximately 3.3 km portion at the end of the proposed transmission line main loop will traverse a Critical Biodiversity Area (CBA) as identified per heading 8.4 and Figure 12 (see Specialist Report). The CBA portion of the line route corridor is situated within an undisturbed, naturally vegetated area consisting of numerous hills associated with the Winburg Grassy Shrubland (Gh 7) vegetation type and which are intertwined with a mosaic of rocky outcrops of the Bloemfontein Karroid Shrubland (Gh 8) vegetation type. The development of the proposed transmission line through the CBA could result in the transformation and destruction of surface vegetation. The majority of the transmission line will however have a small actual surface footprint impact on the vegetation of the CBA; impact will mainly be restricted to pylon construction footprints. The presence of an existing line has also slightly reduced the local pristineness in its immediate vicinity. The significance of the impact on the CBA will thereof be lower than it would have been if the line had to traverse another portion of the CBA on its own.

The natural, undisturbed vegetation of the CBA forms part of a larger natural corridor which plays a very significant role in faunal and floral migration and dispersion activities. It is therefore extremely important that the structural integrity, species diversity and subsequent ecological connectivity and functionality as part of the larger natural corridor be maintained and not be significantly impacted upon by any proposed development. The significance of these potential impacts on the CBA will therefore be medium-high.

Mitigation measures to reduce potential impacts:

- It is recommended that the amount of pylons to be placed within the CBA be restricted, as far as practicably possible, in order to minimise impacts on the habitat and ecological functionality of the natural areas.
- It is instructed that only the Steel Monopole tower type be implemented in the CBA due to its smaller physical surface footprint size and subsequent reduced impact on the vegetation.

- Pylon construction footprints must be kept as small as practicably possible to reduce the actual surface impact on vegetation and no unnecessary/unauthorised pylon footprint expansion should take place.
- Pylon placement within any significant rocky outcrops of the Bloemfontein Karroid Shrubland (Gh 8) vegetation type to be prevented as far as practicably possible.
- No site camp footprint to be established within the CBA and the entire construction phase planning and layout which is to occur within the CBA to firstly be reviewed and approved by a suitably qualified, registered and experienced ecologist in order to ensure minimal impact is achieved.
- Once the proposed transmission line layout designs have been finalised by the applicant, an ecological walkthrough of the final pylon footprint positions within the CBA must be conducted in order to ensure that no Bloemfontein Karroid Shrubland (Gh 8) vegetation type rocky outcrops will be significantly impacted upon and to identify any potentially significant species individuals which would require relocation. These walkthrough and potential relocation activities must be completed prior to the commencement of and construction processes.
- No physical maintenance (removal or defoliation by means of cutting or burning) is allowed on the natural vegetation present inside the proposed transmission line route servitude.
- Existing roads, farm tracks and service roads of existing lines running in close proximity to the proposed transmission line route must be used as far as practicably possible. An existing CENTLEC 33 kV transmission line already runs through a portion of the CBA and the proposed transmission line will be developed directly adjacent to it. This could enable the utilisation of exiting service roads.
- Significant care must be taken to ensure that no significant woody shrubs or trees are removed from the route corridor during the construction or operational/maintenance phase of the proposed project development. If any removal of woody shrubs or trees individuals is required, a suitably qualified, registered and experienced ecologist must be assigned to firstly inspect the individuals and provide recommendations on their management or potential removal or the possibility of relocation.
- The noise impact and disturbance of wild animals and game must be adequately managed and kept to a minimum during construction.

**Destruction/damage to Red Data Listed or protected species individuals associated with the transmission line route corridor and sub-station footprints**

Only one Red Data Listed species (*Boophone disticha*; Declining) and number of provincially protected species were identified within the proposed transmission line route corridor and associated sub-station footprints (see heading 8 in Specialist Report). The development of the transmission line and associated sub-stations will inevitably destroy or damage such individuals. The physical impacts relating to the

transmission line will however be localised in extent and mainly restricted to the actual proposed pylon footprint areas. Although a Red Data Listed species was identified, the presence and distribution extent is low. The significance of these potential impacts on the species individuals will therefore be medium.

Mitigation measures to reduce potential impacts:

- Pylon construction footprints must be kept as small as practicably possible to reduce the actual surface impact on vegetation and no unnecessary/unauthorised pylon footprint expansion should take place.
- Once the proposed transmission line layout designs have been finalised by the applicant, an ecological walkthrough of the final pylon footprint positions must be conducted in order to identify any potentially significant species individuals which would require relocation. These walkthrough and potential relocation activities must be completed prior to the commencement of any construction processes.
- The construction footprint of the sub-stations must be kept as small as practicably possible to reduce the actual surface impact on vegetation and no unnecessary/unauthorised footprint expansion should take place.
- Once the proposed sub-station designs have been finalised by the applicant, an ecological walkthrough of the final sub-station footprints must be conducted in order to identify any potentially significant species individuals which would require relocation. These walkthrough and potential relocation activities must be completed prior to the commencement of any construction processes.
- Existing roads, farm tracks and service roads of existing lines running in close proximity to the proposed transmission line route must be used as far as practicably possible.

**Surface material erosion**

Areas around established pylon footprints could potentially be prone to significant surface soil erosion due to the loosening of materials and potential removal of vegetation during construction which usually binds surface material. Due to the large number of pylons to be constructed, the significance of this potential impact will be medium.

Mitigation measures to reduce potential impacts:

- Implement suitable erosion prevention measures at all construction footprints.
- Areas around pylon footprints must be adequately rehabilitated to prevent significant erosion.

**Alien invasive species establishment**

Areas around established pylon footprints could potentially be prone to significant alien invasive species establishment due to disturbances caused by construction activities. Due to the large number of pylons to be constructed, the significance of this potential impact will be medium.

Mitigation measures to reduce potential impacts:

- Implement suitable alien invasive species prevention measures at all construction footprints.
- Areas around pylon footprints must be adequately rehabilitated to prevent significant alien invasive species establishment.

**Damage to or impeding of watercourses**

The proposed transmission line route corridor traverses a number of seasonal drainage lines and perennial watercourses. The development of the proposed transmission line over identified watercourses could result in the alteration of watercourse structures or impediment or diversion of flow. The identified drainage lines and watercourses cumulatively contribute in a significant manner towards adequate water drainage of the larger surrounding local catchment areas and are therefore vitally important to the ecological functionality of the surrounding ecosystem. The significance of these potential impacts on the watercourses will therefore be medium.

Mitigation measures to reduce potential impacts:

- Any impact on the vegetation and watercourse structures or impediment or diversion of flow must be completely avoided. Transmission line design and layout must therefore ensure the continued ecological functionality and unimpeded flow of the watercourse after construction completion.
    - Care must be taken to ensure that no woody shrubs or trees are removed from the watercourse areas during the construction or operational/maintenance phase of the proposed project development. If any removal of woody shrubs or trees individuals is required, a suitably qualified, registered and experienced ecologist must be assigned to firstly inspect the individuals and provide recommendations on their management or potential removal or the possibility of relocation.
- Adequate buffer areas to be implemented around identified watercourses.
    - No access or construction routes or any physical footprint impacts are to be made within the recommended buffer areas without the prior inspection and approval by a suitably qualified, registered and experienced ecologist.

- No pylons to be constructed within the recommended buffer areas. If any pylon construction is required within the buffer areas, a suitably qualified, registered and experienced ecologist must be assigned to firstly inspect the proposed footprint areas and provide recommendations on their management.

- Any areas around the watercourses potentially impacted by the construction of the transmission line must be to be adequately rehabilitated.

### 7.1.2 Avifaunal Impacts

**Avifaunal habitat destruction and displacement caused by sub-station development**

Construction of the proposed substations will entail land levelling and complete destruction of the existing habitat. During the process it is possible that active nests could be destroyed or that birds breeding in the area could experience disturbance. However, the impacted area is relatively small and if the footprint of all construction related activities are restricted to designated areas and minimized wherever practically possible, the probability of negative impact would be very low. The non-threatened status of the taxa involved does not warrant any other mandatory mitigation measures. At present the habitat at the sites of the proposed substations includes woodland (Outspan), agricultural fields (Tevrede) and grassland (Rooidam, Olivier, Mimosa and Hillandale).

Mitigation measures to reduce potential impacts:

- The footprint of all construction related activities should be restricted to designated areas and minimized wherever practically possible.

**Avifaunal disturbance and displacement caused by transmission line development**

During construction there will be movement of personnel and vehicles along the route of the proposed overhead power lines. Building materials and other building equipment will also be stored temporarily on the ground along this route. These activities will lead to local habitat transformation and disturbance, including disruption of breeding activity, of bird species present. While none of the Red Data species are expected to be impacted by this, many non-threatened taxa are. These disturbances would be most likely when construction coincides with breeding activity. Apart from minimising the footprint of construction activities, the non-threatened status of the taxa involved does not warrant any other mandatory mitigation measures. However, the impact could be minimised by scheduling construction to occur during the non-breeding season of most of the species involved. Examination of the Median Breeding Index indicates that the best period for construction would be between April and July (inclusive) and the worst period from October to January.

Mitigation measures to reduce potential impacts:

- The footprint of all construction related activities should be restricted to designated areas and minimized wherever practically possible.

### 7.1.3 Heritage Impacts

**Damage or destruction of archaeological and palaeontological heritage**

The powerline footprint traverses existing road reserves, degraded farmland and areas formerly disturbed by the residential developments. The associated distribution centre footprints are located on degraded farmland, areas formerly disturbed by the residential developments and relatively undisturbed patches of open veld. The Rayton, Lilyvale Hillandale and Bayswater farms north of Bloemfontein represent historically as well as archaeologically significant landscapes. The proposed route options however circumvent these areas, which also include the Seven Dams Conservancy and the Botanical Gardens.

A pedestrian survey revealed no evidence of in situ Stone Age archaeological material, capped or distributed as surface scatters on the landscape. There are also no indications of rock art, graves or historically significant structures older than 60 years within the proposed footprints. It is advised that both options for the Hillandale loop-in represents low potential impact for underground finds because it largely traverses previously disturbed areas. As far as the archaeological heritage is concerned, the power line and distribution centre footprints are considered to be of low archaeological significance and are assigned a site rating of Generally Protected C. The proposed development may proceed with no further assessments required.

Mitigation measures to reduce potential impacts:

- Restrict all development work to the proposed project footprint as this was the area assessed during the site inspection.
- If any evidence of archaeological sites or remains (e.g. remnants of stone-made structures, indigenous ceramics, bones, stone artefacts, ostrich eggshell fragments, charcoal and ash concentrations), fossils or other categories of heritage resources are found during the proposed development, SAHRA APM Unit (Natasha Higgitt/John Gribble 021 462 5402) must be alerted. If unmarked human burials are uncovered, the SAHRA Burial Grounds and Graves (BGG) Unit (Itumeleng Masiteng/Mimi Seetelo 012 320 8490), must be alerted immediately. A professional archaeologist or palaeontologist, depending on the nature of the finds, must be contracted as soon as possible to inspect the findings. If the newly discovered heritage resources prove to be of archaeological or palaeontological significance, a Phase 2 rescue operation may be required.

### 7.1.4 Visual Impact Assessment

**Potential visual impact on sensitive visual receptors, located within a 5 km radii of the Harvard Powerline**

It is envisaged that the structures, will be highly visible from a two kilometre (2 km) radius especially for commuters and residence within this radius. The study area contains elevated areas and built up environments minimizing the visual impact to 5 km. Beyond the five kilometre buffer the proposed project will be visible from elevated areas such as koppies. It is anticipated that should the applicant decide to implement the recommended mitigation measures the overall visual impact of the Harvard Powerline will be moderate. The Visual Impact of Layout Alternative 1 and 2 is more or less the same; however, Alternative one is less visible within a two kilometre (2 km) radius. The Specialist would thus recommend that the Applicant construct Alternative 1.

Mitigation measures to reduce potential impacts:

- Minimise vegetation clearance to ensure that visual absorption capacity is not destroyed;
- A site layout plan must be submitted prior to construction to ensure infrastructure is placed in such a manner that minimum vegetation is cleared;
- Consolidate infrastructure as much as possible and make use of already disturbed areas rather than pristine sites, wherever possible;
- Lighting:
    - Make use of downward directional lighting fixtures;
    - Make use of minimum lumen or wattage in fixtures;
    - Make use of down-lighters, or shielded fixtures;
    - Make use of motion detectors on security lighting. This will allow the site to remain in relative darkness, until lighting is required for security or maintenance purposes.

Construction Phase Mitigation:

- Ensure vegetation is not unnecessarily cleared or removed during the construction period;
- Reduce the construction period through careful logistical planning and productive implementation of resources;
- Restrict the activities and movement of construction workers and vehicles to the immediate construction site and existing access roads;
- Ensure that rubble, litter, and disused construction materials are appropriately stored and then disposed regularly at licensed waste facilities;
- Reduce and control construction dust through the use of approved dust suppression techniques as and when required;

- Restrict construction activities to daylight hours in order to negate or reduce the visual impacts associated with lighting;
- Ensure that all areas are properly rehabilitated.

## 7.2 Operational phase

Once the construction of the transmission line and associated sub-stations has been completed, the following potential impacts will be associated with to the operational phase.

### 7.2.1 Ecological Impacts

**Continued destruction/transformation of semi-natural and natural vegetation within the transmission line route corridor associated with the endangered Bloemfontein Dry Grassland (Gh 5) vegetation type and the Winburg Grassy Shrubland (Gh 7) vegetation type**

Once the construction of the proposed transmission line has been completed, management and maintenance processes required by the applicant could result in additional undesired surface impacts on the semi-natural and natural areas. As these remaining semi-natural and natural areas are very important to the habitat persistence and ecological functionality of the surrounding ecosystem, the significance of these potential impacts on the vegetation will be medium.

Mitigation measures to reduce potential impacts:

- No physical maintenance (removal or defoliation by means of cutting or burning) is allowed on the natural vegetation present inside the proposed transmission line route servitude.
- Existing roads, farm tracks and service roads of existing lines running in close proximity to the proposed transmission line route must be used as far as practicably possible.
- Significant care must be taken to ensure that no significant woody shrubs or trees are removed from the route corridor during the construction or operational/maintenance phase of the proposed project development. If any removal of woody shrubs or trees individuals is required, a suitably qualified, registered and experienced ecologist must be assigned to firstly inspect the individuals and provide recommendations on their management or potential removal or the possibility of relocation.
- It is recommended that Alternative 2 for the proposed transmission line route corridor rather be followed in order to minimise the impact on remaining natural area of the endangered Bloemfontein Dry Grassland (Gh 5) vegetation type.

**Continued destruction/transformation of a Critical Biodiversity Area associated with the transmission line route corridor**

Once the construction of the proposed transmission line has been completed, management and maintenance processes required by the applicant could result in additional undesired surface impacts on the Critical Biodiversity Area (CBA). As this natural, undisturbed vegetation of the CBA plays a very

significant role in faunal and floral migration and dispersion activities, the significance of these potential impacts on the CBA will be high.

Mitigation measures to reduce potential impacts:

- No physical maintenance (removal or defoliation by means of cutting or burning) is allowed on the natural vegetation present inside the proposed transmission line route servitude.
- Existing roads, farm tracks and service roads of existing lines running in close proximity to the proposed transmission line route must be used as far as practicably possible. An existing CENTLEC 33 kV transmission line already runs through a portion of the CBA and the proposed transmission line will be developed directly adjacent to it. This could enable the utilisation of exiting service roads.
- Significant care must be taken to ensure that no significant woody shrubs or trees are removed from the route corridor during the construction or operational/maintenance phase of the proposed project development. If any removal of woody shrubs or trees individuals is required, a suitably qualified, registered and experienced ecologist must be assigned to firstly inspect the individuals and provide recommendations on their management or potential removal or the possibility of relocation.

**Continued destruction/damage to Red Data Listed or protected species individuals associated with the transmission line route corridor and sub-station footprints**

Once the construction of the proposed transmission line has been completed, management and maintenance processes required by the applicant could result in additional undesired surface impacts which could destroy/damage important species individuals. Although a Red Data Listed species was identified, its presence and distribution extent is low. The significance of these potential impacts on the species individuals will therefore be medium.

Mitigation measures to reduce potential impacts:

- No physical maintenance (removal or defoliation by means of cutting or burning) is allowed on the natural vegetation present inside the proposed transmission line route servitude.
- Existing roads, farm tracks and service roads of existing lines running in close proximity to the proposed transmission line route must be used as far as practicably possible.
- Significant care must be taken to ensure that no significant species individuals are destroyed or damaged during the operational/maintenance phase of the proposed project development. If any removal of significant species individuals is required, a suitably qualified, registered and experienced ecologist must be assigned to firstly inspect the individuals and provide recommendations on their management or potential removal or the possibility of relocation.

**Continued surface material erosion**

Areas around established pylon footprints and service roads could potentially be prone to significant surface soil erosion due to continued disturbances caused by management/maintenance activities. Due to the large number of pylons to be constructed, the significance of this potential impact will be medium.

Mitigation measures to reduce potential impacts:

- Implement suitable erosion prevention measures at all construction footprints.
- Areas around pylon footprints must be adequately rehabilitated to prevent significant erosion.

**Continued alien invasive species establishment**

Areas around established pylon footprints and service roads could potentially be prone to significant alien invasive species establishment due to continued disturbances caused by management/maintenance activities. Due to the large number of pylons to be constructed, the significance of this potential impact will be medium.

Mitigation measures to reduce potential impacts:

- Implement suitable alien invasive species prevention measures at all construction footprints.
- Areas around pylon footprints must be adequately rehabilitated to prevent significant alien invasive species establishment.

**Continued damage to or impeding of watercourses**

Once the construction of the proposed transmission line has been completed, management and maintenance processes required by the applicant could result in additional undesired alteration of watercourse structures or impediment or diversion of flow. The significance of these potential impacts on the watercourses will therefore be high.

Mitigation measures to reduce potential impacts:

- Any impact on the vegetation and watercourse structures or impediment or diversion of flow during management/maintenance processes must be completely avoided.
- No service roads are to be constructed through any watercourses or within the recommended buffer areas.

### 7.2.2 Avifaunal Impacts

**Avifaunal habitat destruction and displacement caused by sub-station development**

Construction of each sub-station will entail permanent transformation of existing habitat which include woodland, grassland or agricultural fields into a relative sterile habitat consisting of fences, buildings, steel structures, etc., and the consequent permanent displacement of species which currently utilise the impacted area. Factors potentially contributing to the risk of bird fatalities at the substations include the following.

- Fences may pose a collision risk to birds.
- Insects attracted by security lighting, which is a source of ELP, could attract birds, and this could lead to collisions with project infrastructure. Gaston et al. (2012) recently investigated options for reducing the ecological consequences of ELP. They concluded that the most effective option would probably be to maintain and increase natural unlit areas. Relevant mitigation options in this regard include the following:
    - Maintain and increase natural unlit areas;
    - Security lighting should be installed only where it is absolutely essential;
    - Avoid direct illumination of any substation structures;
    - Reduce the trespass of lighting by using luminaires that prevents light from shining beyond the intended area and eliminates light directed upwards or at the horizontal;
    - Decreasing light intensity will reduce energy consumption and limit both skyglow and the area impacted by high-intensity direct light;
    - Lighting technologies emitting a narrow spectrum of light are likely to have less ecological impact compared to broader spectrum light sources.
- The construction of the access roads could also have a negative impact on birds. Dust suppressants other than pure water should be used only as a last resort, and then only after very careful research were conducted as it could potentially have adverse environmental impacts (Lovich & Ennen 2011; Piechota et al. 2002). The access road should also be carefully designed in order to avoid erosion over the long term and minimise the occurrence of areas where water could collect to create pools.
- Wherever possible, grazing or mechanical methods should be used instead of chemical alternatives to keep the vegetation in check where necessary. In this way the possible

Mitigation measures to reduce potential impacts:

- Maintain and increase natural lit areas following the guidelines provided by Gaston et al. (2012);
- Wherever possible, grazing or mechanical methods should be used instead of chemical alternatives to keep the vegetation in check where necessary.

**Positive avifaunal impact caused by sub-station development**

New substation habitat will not be suitable for most of the species which utilise the present habitats in the respective footprint areas. The following species occurring in the area are known to build their nests on/in man-made structures and they may attempt to do so at the new substations: Speckled Pigeon R349, White-rumped Swift R415, Little Swift R417, White-throated Swallow R520, Pearl-breasted Swallow R523,Greater Striped Swallow R526, South African Cliff-Swallow R528, Rock Martin R529, Common Myna R758, Cape Glossy Starling R764, House Sparrow R801, and Cape Sparrow R803. While the swallows and martin use mud to construct their nests underneath horizontal/vertical surfaces, others use grass and other material to construct their nest. In certain cases this may interfere with the normal functioning of the used structures or create a fire risk. The Common Myna R758 and House Sparrow R801 are both Category 3 introduced invasive species (National Environmental Management: Biodiversity Act (10 of 2004): Alien and Invasive Species List (2014)).

Mitigation measures to reduce potential impacts:

- Avoid the use of lattice-type structures in order to minimize perching and nesting opportunities;
- Minimize standing water. This will make it more difficult for the swallow species to obtain mud for their nests. It will also help to minimize the risk of large congregations of birds near the substation.
- It is recommended that the new substations should be inspected for nesting activity at least once a month. This can be accomplished during routine maintenance activities.
- Observations at substations suggest that the only effective counter measure against small birds nesting in equipment is to remove the nesting material when it appears (Van Rooyen & Ledger 1999). The same strategy is recommended for the new substation, but only if the nest belongs to one of the species indicated above, and if it interferes with the substation's operation and/or creates a fire risk. In cases where a species other than those indicated above are involved, permission should first be obtained from the local nature conservation authorities. If the surveys for nests are done regularly as recommended above (at least once a month), then it would help minimize the risk of eggs or nestlings being involved.

**Avifaunal collision and electrocution caused by transmission line development**

Power lines represent a permanent collision hazard to birds. Cases of collisions with electrical infrastructure are known for 20 of the 37 Red Data species occurring in the SAC9Q-block. Most of these species are presently at best transient visitors to the project site and or their risk of colliding with new power lines at the site is considered to be low. The risk is considered to be moderate for the following two species:

- Secretarybird R118 (Vulnerable): Breeding resident. There is at least one breeding pair which utilise the area of the proposed power line. Fatal collision incidents involving power lines have been recorded for this species (Brown & Lawson 1989; Diamond 2008; Diamond et al. 2010; Prinsen et al. 2011; Van Niekerk 2013a; Van Rooyen & Ledger 1999; Vosloo & Van Rooyen 2009b).
- Lanner Falcon R172 (Vulnerable): Breeding resident. This species possibly breed in the study area. They forage over a wide area. Fatal collision and electrocution incidents are known for this species (Anderson 2000; Prinsen et al. 2011; Shaw et al. 2010).

In addition to the above, there are 18 non-threatened species which have a moderate or high risk of colliding with the new power lines. On a daily basis hundreds of doves and pigeons will fly across the lines as they move between urban areas and agricultural land further afield. These movements are expected to occur over most of the length of the power line.

Ducks and geese is another group of birds which is likely to collide with the proposed power line infrastructure, in part because they frequently move about between dusk and dawn. The major drainage lines represent linear movement corridors for these and other species. Where a power line transverses such a feature it represents a collision risk zone. Risk level is a function of site specific characteristics, such as the location of the crossing area relative to feeding and resting areas of these waterbirds. A relatively high collision risk is predicted for the following areas**:**

- Wetlands WL1 and WL2 are isolated wetlands which would retain water for an extended period of time. The current route places the proposed new line dangerously close;
- Where the proposed power line will cross tributaries of the Stinkhoutspruit;
- Where the line transverse the upper catchment of the Renosterspruit tributary at the Noordstad dumping site.
- The area around the proposed Hillandale substation (Northern & Southern Alternatives;)
- Southern Alternative: The area south of the Shell Ultra City.

In addition, frequent waterbird movement is expected across the development zone when ephemeral wetlands in the area are inundated.

There is general agreement amongst researchers that “vertically separated arrays of lines should be avoided as much as possible” (Jenkins et al. 2010). Horizontal designs where conductors are all on the same height is regarded to be saver as it presents a smaller vertical collision zone (Bevanger 1994; Drewitt & Langston 2008).

The removal of earth wires has been shown to reduce collision incidents substantially (Bevanger 1994; Bevanger & Brøseth 2001; Brown et al. 1987). However, Bloemfontein is located in a "severe" lightning strike risk zone (Gijben 2012), which would necessitate the use of earth wires.

Another option is to mark earth wires and/or conductors in order to make them more visible to birds, e.g. by using bird flight diverters. Dynamic (including most "suspended") devices ("bird flappers") have moving parts and is more visible to birds, but unfortunately they are also less durable than static devices and may damage the power line to which it is attached (Vosloo & Van Rooyen 2009b).

In terms of the two Hillandale alternatives, the Southern Alternative is preferred as it is much shorter than the Northern Alternative. The only way to mitigate the situation at wetlands WL1 and WL2 is to reroute the power line in such a way that it will be at least 100 m from these isolated wetlands;

Mitigation measures to reduce potential impacts:

- The proposed new power line should be of a horizontal design where conductors are all on the same height.
- In addition, bird flight diverters or other suitable devices should be fitted to the earth wires of power line sections crossing major drainage lines following the guidelines provided by Jenkins et al. (2010).
- The Southern Alternative is preferred to the Northern Alternative.
- With regards to wetlands WL1 and WL2, reroute the proposed power line in a way that it does not approach them closer than 100 m.
- Electrocution risk is primarily a function of power line tower design and bird body size and behaviour (Guil et al. 2011; Lehman et al. 2007; Van Rooyen 2003). Since the best strategy for avoiding bird electrocution is to use low risk power line tower designs (Van Rooyen 2003), it is recommended that such designs must be used for the proposed project following available guidelines (e.g. Ferrer 2012; Guil et al. 2011; Van Rooyen 2003).

**Positive avifaunal impact caused by transmission line development**

At least 19 of the species occurring in the SACQ9-block are known to breed on power line pylons and wires. Nesting activity on pylons can potentially cause flash-overs. Removal of nests is only recommended as a last resort because the nest owners will frequently return and rebuild the nest (Anderson 2013). Alternative mitigation strategies include trimming of excessive nesting material, insulation of conductors, and the provision of an artificial nest platform (Anderson 2013).

## 7.3 Cumulative Impacts

A number of transmission lines are present within the broader area as this is required for adequate electricity distribution within the metropolitan municipal area. The new transmission line will run parallel alongside an existing Eskom transmission line for the large majority of the proposed route. As discussed earlier, it will also then join up with an existing CENTLEC 33 kV transmission line inside the CBA from where it will run parallel alongside the existing line for virtually the entire route section until it exits the CBA.

None of the identified potential ecological impacts are rated as significantly high after mitigation measures have been implemented and due to the proposed transmission line being situated in close proximity to already existing lines at various sections, it should not significantly contribute in a cumulative way to the identified potential ecological impacts.

Destruction of natural vegetation within the sub-station footprints will add cumulatively to development footprint destruction of the endangered vegetation types and is assigned a medium rating.

Earlier surveys for dead birds under an existing 132 kV power line running parallel to the Havard-Cecilia power line revealed the carcasses of several species, including Red Data taxa (Van Niekerk 2013a). It is likely that the proposed new power line would moderately increase the potential for collision incidents due to it running mostly parallel to an existing line.

## 7.4 Construction Phase Environmental Management Programme

The intention of providing EMPr's for the planning, design and construction phase, is to provide the responsible parties and monitoring agents with guidelines to be used during the planning, design and construction phases of the proposed facility, to safeguard the environment against negative environmental impacts.

| **CONSTRUCTION PHASE:PROPOSED DEVELOPMENT OF A 132 KV TRANSMISSION LINE AND ASSOCIATED SIX SUB-STATIONS** | | **RESPONSIBLE PARTY/PERSON (implementation of mitigation measures)** | **MONITORING: ACTION, RESPONSIBLE PERSON/PARTY AND FREQUENCY** | **COMPLIANT ? (for use by ECO)** |
|---|---|---|---|---|
| **GENERAL** | | | | |
| 1. **Activity:** Permits and authorisations | | | | |
| 1.1 | **Aspects:** Legislative compliance<br>**Impact:** Non-compliance with South African environmental legislation.<br>**Objective:** Ensure compliance with all triggered environmental legislation.<br>**Target:** Commence site establishment with all permission and approvals received and on hand. | Applicant<br>Technical consultant<br>Contractor manager | **Monitoring Action:**<br>Obtain copies of all required documents and ensure they are filed and readily available on site;<br>Adequate record keeping<br><br>**Responsible party:**<br>Applicant<br>Technical consultant<br><br>Contractor manager<br>**Monitoring Frequency:**<br>Once off | |
| | **Mitigation/Management Measures:**<br>a. The Developer is to have the following permits on commencement:<br>• Environmental Authorisation<br>• Environmental Management Program<br>• Permits for protected species | | | |

| CONSTRUCTION PHASE:PROPOSED DEVELOPMENT OF A 132 KV TRANSMISSION LINE AND ASSOCIATED SIX SUB-STATIONS | | RESPONSIBLE PARTY/PERSON (implementation of mitigation measures) | MONITORING: ACTION, RESPONSIBLE PERSON/PARTY AND FREQUENCY | COMPLIANT ? (for use by ECO) |
|---|---|---|---|---|
| | | | Keep on site | |
| 2. **Activity:** Site Layout Planning and site establishment | | | | |
| 2.1 | **Aspects:** Site Layout Plan<br>**Impact:** Negative impact of inadequate planning placement of infrastructure on the environment. Increase in footprint.<br>**Objective:** To ensure acceptable impact and management of environmental issues at main site and storage site during construction by proper planning of layout of infrastructure placement. No unplanned/unmanaged increase in project footprint.<br>**Target:** All areas not demarcated for construction should remain unimpaired and vegetated and impacts should be minimised. No unplanned/unmanaged increase in project footprint.<br>**Mitigation/Management Measures:**<br>a. Develop and draw up and submit for approval a Site Layout Master Plan. This plan must show the final positions and extent of all permanent and temporary site structures and infrastructure and laydown areas. This must be approved by all relevant parties.<br>b. The planning for layout must be done in consultation with the ECO. | Applicant<br>Technical consultant<br>Contractor manager<br>ECO | **Monitoring Action:** Record Keeping.<br>Adequate and detailed site layout planning with all relevant parties prior to commencement.<br>Layout plan to be drawn up and approved on site by all relevant parties.<br>**Responsible Person/Party:**<br>Applicant<br>Technical consultant<br>Contractor manager<br>ECO<br>**Monitoring Frequency:**<br>Once off. Prior to | |

| CONSTRUCTION PHASE:PROPOSED DEVELOPMENT OF A 132 KV TRANSMISSION LINE AND ASSOCIATED SIX SUB-STATIONS | | RESPONSIBLE PARTY/PERSON (implementation of mitigation measures) | MONITORING: ACTION, RESPONSIBLE PERSON/PARTY AND FREQUENCY | COMPLIANT ? (for use by ECO) |
|---|---|---|---|---|
| | | | commencement of any construction.<br>Updated as construction continues. | |
| 3. **Activity:** Construction Programme/Schedule | | | | |
| 3.1 | **Aspects:** Project construction management<br>**Impact:** Environmentally unfriendly, high impact construction process following orders and undesired extended time periods which prolong environmental impacts.<br>**Objective:** To Provide a clear indication of the order by which key construction activities will occur as well as anticipated timeframes involved.<br>**Target:** Ensure efficiency and environmental responsibility of construction processes and order of events in order to reduce impact durations and subsequent significances. Coordinate the availability of any required specialists into the anticipated program in order to enable them to adequately fulfil their advisory duties. | Applicant<br>Technical consultant<br>Contractor manager<br>ECO | **Monitoring Action:**<br>Layout plan to be drawn up and approved on site by all relevant parties.<br>Meetings; Risk Register; ECO Audit Checklist; Photographs<br><br>**Responsible Person/Party:** Applicant<br>Technical consultant<br>Contractor manager<br>ECO<br><br>**Monitoring Frequency:**<br>Once off<br>Prior to commencement | |
| | **Mitigation/Management Measures:**<br>a. Draw up and sign off a project schedule with all relevant parties and service providers to commit to a timeline during which time construction milestones will be completed;<br>b. Communicate any deviation from this schedule with all parties, so as to provide parties with sufficient opportunity for alternative arrangements to be made; Continually update program accordingly<br>c. Establish a risk register to identify and monitor potential factors which may result in setbacks/ delays on tasks within the project schedule;<br>d. Hold management meetings with representatives of the project manager, contractor, engineer and other contributing parties to monitor and anticipate changes; | | | |

| CONSTRUCTION PHASE:PROPOSED DEVELOPMENT OF A 132 KV TRANSMISSION LINE AND ASSOCIATED SIX SUB-STATIONS | RESPONSIBLE PARTY/PERSON (implementation of mitigation measures) | MONITORING: ACTION, RESPONSIBLE PERSON/PARTY AND FREQUENCY | COMPLIANT ? (for use by ECO) |
|---|---|---|---|
| e. Should circumstances/ incidents arise which may pose a risk to the project schedule, the construction contractor, engineer and ECO are to keep records of this and the latter communicate this in the ECO Bi-monthly Audit Checklist. | | of any construction. Updated as construction continues. | |
| 4. **Activity:** Communication with land-owners | | | |
| **Aspects:** Landowner Consent and communication<br>**Impact:** Disturbance of existing land use (unexpected by owners)<br>**Objective:** Maintain a conflict-free relationship with landowners/users.<br>**Target:** No complaints received from landowners/users of affected property. | Applicant<br>Technical consultant<br>Contractor manager | **Monitoring Action:** Engage in wayleave consent negotiations with land owners prior to project commencement<br><br>Continual communication with landowners during the construction phase<br><br>**Responsible Person/Party:**<br>Applicant<br>Technical consultant<br>Contractor manager<br><br>**Monitoring Frequency:**<br>Once off wayleave consent negotiations | |
| **Mitigation/Management Measures:**<br>a. Landowners are to be aware and in agreement of site access arrangements; (Part of wayleave consent negotiations and continual commination)<br>b. The landowner has to be requested to liaise with the site supervisor of the construction contractor prior to entering the construction footprint area for safety purposes and vise versa;<br>c. All property gates are to be kept closed when not in use (or kept in the open/closed state in which it was found);<br>d. Any complaint or liaison with regard to environmental aspects, compensation or disorder to economic activities, must not be addressed by the contractor. A public complaint register must be kept on site and the contract project manager must inform the Developer and/or ECO to take further action.<br>e. Continual monthly communication with land owners | | | |

| CONSTRUCTION PHASE:PROPOSED DEVELOPMENT OF A 132 KV TRANSMISSION LINE AND ASSOCIATED SIX SUB-STATIONS | | RESPONSIBLE PARTY/PERSON (implementation of mitigation measures) | MONITORING: ACTION, RESPONSIBLE PERSON/PARTY AND FREQUENCY | COMPLIANT ? (for use by ECO) |
|---|---|---|---|---|
| | | | Continual monthly communication with land owners | |
| 5. **Activity:** Site Establishment | | | | |
| 5.1 | **Aspects:** Demarcation of the site, vegetation removal/clearance and subsequent establishment of required infrastructure<br>**Impact:** Destruction/transformation of natural vegetation and faunal habitat<br>**Objective:** Prevent unnecessary habitat destruction. Ensure compliance with approved layout planning, Prevent unmanaged increase in project footprint. Footprints to as far as practicably possible be placed on transformed/disturbed areas.<br>**Target:** All areas not demarcated for construction should remain vegetated and impacts should be minimised.<br>**Mitigation/Management Measures:**<br>a. No natural surfaces are to be marked other than using droppers, beacons or other artificial object;<br>b. Ensure the upkeep of demarcation boundaries throughout the period of construction until rehabilitation has been completed;<br>c. Construction areas must be adequately fenced; this will prevent unmanaged increase of the footprint as well as assist with access control management.<br>d. Ensure all required national and provincial permits are obtained for protected species prior to site establishment commencement<br>e. The contractor may only clear vegetation within the construction area. Furthermore, a phased approach should be adopted in the clearing of vegetation where possible; only clear areas as construction development goes along and can keep up<br>f. No vegetation material may be used for firewood; Cleared material to be adequately and safely disposed of.<br>g. No fires may occur at or outside of the construction site;<br>h. Restrict construction activities to the boundaries of the development;<br>i. Restrict movement of vehicles and personnel to the footprint of the construction site; | Applicant<br>Technical consultant<br>Contractor manager<br>ECO | **Monitoring Action:** ECO to take photographs and note environmental conditions of site before clearance; ECO Audit Checklist.<br>**Responsible Person/Party:**<br>Applicant<br>Technical consultant<br>Contractor manager<br>**Monitoring Frequency:**<br>Prior to establishment<br>Bi- Monthly | |

| CONSTRUCTION PHASE:PROPOSED DEVELOPMENT OF A 132 KV TRANSMISSION LINE AND ASSOCIATED SIX SUB-STATIONS | | RESPONSIBLE PARTY/PERSON (implementation of mitigation measures) | MONITORING: ACTION, RESPONSIBLE PERSON/PARTY AND FREQUENCY | COMPLIANT ? (for use by ECO) |
|---|---|---|---|---|
| 5.2 | **Aspects:** Topsoil stripping and conservation (if necessary for the project)<br>**Impact:** Deterioration of important topsoil<br>**Objective:** Conserve and protect topsoil from erosion and deterioration for adequate use during rehabilitation processes.<br>**Target:** Original topsoil condition/quality maintained.<br><br>**Mitigation/Management Measures:**<br>a. In the absence of a distinguishable topsoil layer, strip the uppermost 300 mm of soil;<br>b. Stockpile topsoil separately from subsoil, in heaps no higher than 2m;<br>c. Topsoil stockpiles are to be kept free of alien and invasive species;<br>d. Limit unnecessarily prolonged exposure of stripped areas and stockpiles; (this will be linked with the phased vegetation clearance and construction approach)<br>e. Topsoil stockpiles to be placed on a levelled area and erosion control measures are to be implemented to prevent wash away and topsoil loss in the event of heavy rains/storm water;<br>f. Topsoil needs to be stored on designated areas only. This needs to be adequately planned and indicated on the approved site-layout plan;<br>g. Retain vegetation and soil in position for as long as possible, removing it immediately ahead of construction/ earthworks in that area; (phased approach)<br>h. Strip and stockpile herbaceous vegetation, overlying grass and other fine organic matter along with the topsoil;<br>i. Do not strip topsoil when it is wet;<br>j. Do not mix topsoil obtained from different sites, unless the ECO gives permission.<br>k. ECO to be actively involved in advise and recommendation provision during topsoil stripping processes | Applicant<br>Technical consultant<br>Contractor manager<br>ECO | **Monitoring Action:** ECO Audit Checklist; Photographs;<br><br>Stripping plans to be drawn up and approved<br><br>**Responsible Person/Party:**<br>Applicant<br>Technical consultant<br>Contractor manager<br>ECO<br><br>**Monitoring Frequency:**<br>Bi-monthly<br>Continually during significant stripping events | |

| CONSTRUCTION PHASE:PROPOSED DEVELOPMENT OF A 132 KV TRANSMISSION LINE AND ASSOCIATED SIX SUB-STATIONS | | RESPONSIBLE PARTY/PERSON (implementation of mitigation measures) | MONITORING: ACTION, RESPONSIBLE PERSON/PARTY AND FREQUENCY | COMPLIANT ? (for use by ECO) |
|---|---|---|---|---|
| 5.3 | **Aspects:** Cleared materials<br>**Impact:** Inadequate disposal of cleared materials.<br>**Objective:** Optimise the disposal and reuse of cleared materials.<br>**Target:** All cleared materials should be adequately disposed of or reused. | Technical consultant<br>Contractor manager<br>ECO | **Monitoring**<br>ECO and applicant project manager to audit adequate storage and disposal of cleared materials.<br>**Responsible Party:**<br>Technical consultant<br>Contractor manager<br>ECO<br>**Monitoring Frequency:**<br>Monthly<br>Continually during construction processes. | |
| | **Mitigation/Management Measures:**<br>a. Storage and disposal of cleared materials should be adequately handled in order not to increase the proposed project footprint and environmental impacts into surrounding areas. Areas must be designated for storage and removal.<br>b. If no adequate on-site disposal or reuse opportunities exist, cleared materials must be disposed of at the nearest registered solid waste disposal facility. | | | |

| **CONSTRUCTION PHASE:PROPOSED DEVELOPMENT OF A 132 KV TRANSMISSION LINE AND ASSOCIATED SIX SUB-STATIONS** | | **RESPONSIBLE PARTY/PERSON (implementation of mitigation measures)** | **MONITORING: ACTION, RESPONSIBLE PERSON/PARTY AND FREQUENCY** | **COMPLIANT ? (for use by ECO)** |
|---|---|---|---|---|
| 6. **Activity:** Earth-works | | | | |
| 6.1 | **Aspects:** Excavations; cut and fill; shaping and trimming (if necessary for the project).<br>**Impact:** Alteration of the terrain surface shaping and water flow by civil works<br>**Objective:** Minimise impact to the physical terrain, surface shaping and water flow features of the site.<br>**Target:** Maintain Civil Works to within the construction footprint area.<br>**Mitigation/Management Measures:**<br>a. Cut and fill areas must be identified by the Engineer and protection measures provided through an appropriate method and technology;<br>b. The final surface profile which would enable sufficient water drainage must be determined/modelled<br>c. Dispose of excess material at a registered solid waste landfill site;<br>d. Shaping and trimming operations are to be planned to allow for topsoil application, with provision for the specified depth of reapplied topsoil made.<br>e. Cut and fill plans to be drawn up and approved | Applicant<br>Technical consultant<br>Contractor manager<br>ECO | **Monitoring Action:**<br>ECO Audit Checklist<br>Cut and fill plans to be drawn up and approved<br>**Responsible Person/Party:**<br>Applicant<br>Technical consultant<br>Contractor manager<br>ECO<br>**Monitoring Frequency:**<br>Bi-monthly<br>Continually during significant shaping events | |

| **CONSTRUCTION PHASE:PROPOSED DEVELOPMENT OF A 132 KV TRANSMISSION LINE AND ASSOCIATED SIX SUB-STATIONS** | | **RESPONSIBLE PARTY/PERSON (implementation of mitigation measures)** | **MONITORING: ACTION, RESPONSIBLE PERSON/PARTY AND FREQUENCY** | **COMPLIANT ? (for use by ECO)** |
|---|---|---|---|---|
| 7. **Activity:** Site Infrastructure placement and operation | | | | |
| 7.1 | **Aspects:** Structures and lay-down areas<br>**Impact:** Deterioration of site features and surrounding areas<br>**Objective:** Prevent the deterioration of site features like soil, rainwater runoff and erosion.<br>**Target:** The preservation of site conditions evident on establishment of structures and lay-down areas.<br>**Mitigation/Management Measures:**<br>a. Construct all required structures and storage areas, including potential offices, workshops and stores in approved locations as per the Site Layout Plan;<br>b. The camp with storage and laydown areas are to be kept secure and neat with access control measures adopted during construction;<br>c. Clearly define which activities are to occur within which areas of the site by erecting signage.<br>d. All hazardous substances, such as fuel, oil, diesel, paint, etc., must be stored in a secondary containment system (trays or bund) which is capable of storing at least 110% of the liquid capacity. If bund areas are used, bund areas should be sealed on the inside to avoid seepages.<br>e. A vehicle service area should be in place (if required), for vehicle repairs, in such a way that no spillages will occur into the environment.<br>f. No site camps to be established in the CBA as far as practicably possible. | Applicant<br>Technical consultant<br>Contractor manager<br>ECO | **Monitoring Action:** Photographs; ECO Audit Checklist<br>Approved layout plan development<br><br>**Responsible Person/Party:** Developer<br>Contractor manager<br><br>**Monitoring Frequency:** Bi-monthly | |

| **CONSTRUCTION PHASE:PROPOSED DEVELOPMENT OF A 132 KV TRANSMISSION LINE AND ASSOCIATED SIX SUB-STATIONS** | | **RESPONSIBLE PARTY/PERSON (implementation of mitigation measures)** | **MONITORING: ACTION, RESPONSIBLE PERSON/PARTY AND FREQUENCY** | **COMPLIANT ? (for use by ECO)** |
|---|---|---|---|---|
| 8. **Activity:** Construction site operations | | | | |
| 8.1 | **Aspects:** Security and fencing (sub-stations)<br>**Impact:** Danger to the public. Increase of development footprint if not barricaded.<br>**Objective:** Keep the site secure from trespassing or theft and keep animals out. Prevent unmanaged increase of the footprint.<br>**Target:** Site remains secure during construction with no incidences of trespassing, theft and injury or death to animals. No increase in development footprint. | Applicant<br>Technical consultant<br>Contractor manager<br><br>ECO | **Monitoring Action:**<br><br>Photographs; ECO Audit Checklist<br><br>Ensure compliance with layout plan<br><br>**Responsible Person/Party:**<br>Applicant<br>Technical consultant<br>Contractor manager<br>ECO<br><br>**Monitoring Frequency:**<br>Continual during initial fence erection<br>Bi-monthly | |
| | **Mitigation/Management Measures:**<br>a. Be responsive to open or closed status of gates;<br>b. New or the upkeep/maintenance of fences should be adequately and continually managed to establish a sufficient boundary ;<br>c. Limit clearing of vegetation for fencing to the removal of trees and shrubs within 1 m of the fence line. All undergrowth should be maintained;<br>d. Should construction activity require the removal of fences or gates to execute tasks, this must be replaced as soon as possible following completion;<br>e. In all cases, the landowners on whose property any use of fences or gates is being made must be consulted, to ensure that parties are informed of construction activity, schedules and vehicle movement. | | | |
| 8.2 | **Aspects:**Existing Services and Infrastructure<br>**Impact:**Damage to existing services and infrastructure<br>**Objective:**No damages to existing services and infrastructure | Technical consultant<br>Contractor manager | **Monitoring Action:**<br>Photographs; ECO Audit Checklist | |

| CONSTRUCTION PHASE:PROPOSED DEVELOPMENT OF A 132 KV TRANSMISSION LINE AND ASSOCIATED SIX SUB-STATIONS | | RESPONSIBLE PARTY/PERSON (implementation of mitigation measures) | MONITORING: ACTION, RESPONSIBLE PERSON/PARTY AND FREQUENCY | COMPLIANT ? (for use by ECO) |
|---|---|---|---|---|
| | **Target:**No damages to existing services and infrastructure | | **Responsible Person/Party:** Technical consultant Contractor manager<br><br>**Monitoring Frequency:** Bi-monthly | |
| | **Mitigation/Management Measures:**<br>a. Take cognisance of the position of existing services and infrastructure (e.g. roads, pipelines, power lines and telephone services) that may get damaged due to construction activities.<br>b. Ensure that existing services are not damaged or disrupted unless required by the contract and with the permission of the project manager.<br>c. In the event that infrastructure is damaged or services interrupted during construction, it will be done at the expense of the Contractor and shall receive top priority over all other activities.<br>d. Use existing roads as far as practicably possible. | | | |
| 8.3 | **Aspects:**Traffic<br>**Impact:** Traffic capacity increase and overload. Unregulated movement of machinery during construction phase.<br>**Objective:**Minimise the disruption of road users. Safe and efficient traffic regulation during the construction phase.<br>**Target:**Minimal disruption of road users | Technical consultant Contractor manager | **Monitoring Action:** Incident Register; Photographs; ECO Audit Checklist In accordance with Traffic Management Plan<br><br>**Responsible Person/Party:** Contractor manager | |
| | **Mitigation/Management Measures:**<br>a. Adhere to traffic management plan recommendations<br>b. Use sufficient access area from main roads<br>c. All vehicles must be road-worthy and drivers must be qualified, made aware of the potential road safety issues, and need for strict speed limits;<br>d. Only authorised roads and access routes may be used by construction personnel and equipment.<br>e. Construction vehicles may not leave the designated roads and tracks and turnaround points must be limited to specific sites. | | | |

| CONSTRUCTION PHASE:PROPOSED DEVELOPMENT OF A 132 KV TRANSMISSION LINE AND ASSOCIATED SIX SUB-STATIONS | | RESPONSIBLE PARTY/PERSON (implementation of mitigation measures) | MONITORING: ACTION, RESPONSIBLE PERSON/PARTY AND FREQUENCY | COMPLIANT ? (for use by ECO) |
|---|---|---|---|---|
| | f. Traffic deviations around the construction area must be planned in conjunction with the local authority to ensure safe and free flow of traffic. Safety signs must be utilised. | | **Monitoring Frequency:** Continual during initial access development phase<br>Bi-monthly | |
| 8.4 | **Aspects:** Erosion Control<br>**Impact:** Loss of topsoil and formation of gullies through wash away<br>**Objective:** Manage and prevent any significant soil erosion<br>**Target:** No signs of significant soil erosion and loss of topsoil should be evident on site. | Technical consultant<br>Contractor manager<br>ECO | **Monitoring**<br>Applicant project manager manage potential erosion.<br>**Responsible Party:**<br>Technical consultant<br>Contractor manager<br>ECO<br>**Monitoring Frequency:**<br>Continually. | |
| | **Mitigation/Management Measures:**<br>a. Ensure adequate erosion control measures are implemented and maintained to reduce the risk of soil erosion.<br>a. Apply erosion control measures before the rainy season begins preferably immediately following construction. Ensure maintenance of implemented erosion management structures and measures.<br>b. Adequately and concurrently rehabilitate surrounding areas after construction completion of specific areas. | | | |
| 8.5 | **Aspects:** Solid Waste Handling<br>**Impact:** Pollution and site contamination by solid waste<br>**Objective:** Minimise the generation of solid waste. Dispose of solid waste in the appropriate manner to a landfill site.<br>**Target:** No record of pollution or site contamination by solid waste. | Technical consultant<br>Contractor manager<br>ECO | **Monitoring Action:**<br>Contractor manager to manage waste management and | |
| | **Mitigation/Management Measures:** | | | |

| CONSTRUCTION PHASE:PROPOSED DEVELOPMENT OF A 132 KV TRANSMISSION LINE AND ASSOCIATED SIX SUB-STATIONS | | RESPONSIBLE PARTY/PERSON (implementation of mitigation measures) | MONITORING: ACTION, RESPONSIBLE PERSON/PARTY AND FREQUENCY | COMPLIANT ? (for use by ECO) |
|---|---|---|---|---|
| | a. Adequate waste containers to be provided on site during harvesting time.<br>b. Waste Management Plan to assist in adequate management.<br>c. Keep the footprint area litter free and tidy.<br>d. Dedicate a demarcated and signposted storage area on site for the collection of construction waste;<br>e. All domestic waste is to be removed from site as and when required and disposed of at a registered solid waste landfill site.<br>f. A suitably registered waste removal contactor must be appointed if necessary.<br>g. Care should be taken to ensure that no waste is lost off disposal vehicles on route to the landfill. If needed, a tarpaulin can be utilised.<br>h. Waste sorting, separation and recycling should form part of the environmental induction and awareness programme, to encourage personnel to collect waste paper, glass and metal waste separately;<br>i. Do not dump waste of any nature, or any foreign material in any drainage lines.<br>j. The burning or burial of solid waste on site is prohibited. | | removal during harvesting times.<br><br>**Responsible Party:**<br>Technical consultant<br>Contractor manager<br>ECO<br>**Monitoring Frequency:**<br>During harvesting times | |
| 8.7 | **Aspects:** Sewage waste<br>**Impact:** Pollution and site contamination by sewage.<br>**Objective:** Provide facilities for appropriate management collection and disposal of sewage. Sewage containment sizes and removal frequencies should be appropriate in order to prevent any potential chances of overflow and environmental contamination.<br>**Target:** No record of pollution or site contamination by sewage. | Technical consultant<br>Contractor manager<br>ECO | **Monitoring Action:**<br>ECO to take photographs of site before clearance; ECO Audit Checklist<br>Sewage removal proof to be provided by contractors.<br><br>**Responsible Person/Party:**<br>Technical consultant | |
| | **Mitigation/Management Measures:**<br>a. Sufficient portable chemical toilets will be supplied on site for the manual labourers during the construction. These toilets will be cleaned and waste removed by an appropriate contractor on a regular basis as and when required.<br>b. A suitably registered waste removal contactor must be appointed if necessary.<br>c. Do not establish a site toilet within the 1:100 year floodline, or within a distance of 100 m of any drainage lines;<br>d. Toilets are to be maintained and cleaned regularly to ensure functionality and an adequate level of hygiene. This will assist with | | | |

| CONSTRUCTION PHASE:PROPOSED DEVELOPMENT OF A 132 KV TRANSMISSION LINE AND ASSOCIATED SIX SUB-STATIONS | | RESPONSIBLE PARTY/PERSON (implementation of mitigation measures) | MONITORING: ACTION, RESPONSIBLE PERSON/PARTY AND FREQUENCY | COMPLIANT ? (for use by ECO) |
|---|---|---|---|---|
| | disease prevention.<br>e. Removal of sewage from sight should be conducted on an adequate and frequent basis by an accredited contractor.<br>f. Only toilet paper is to be flushed down the chemical toilets. Personnel are to be informed on sanitary implementation as part of the environmental awareness.<br>**g.** Drinking water facilities, comprising a water tank with a manual tap can be combined with hand washing facilities near site toilets; This will assist with disease prevention. | | Contractor manager<br>ECO<br><br>**Monitoring Frequency:**<br>As per adequate frequency and storage size determinations by removal contractor<br>Bi-monthly | |
| 8.8 | **Aspects:** Dust Generation<br>**Impact:** Dust emissions and nuisance from construction operations<br>**Objective:** To avoid excessive dust generation during and after construction activities.<br>**Target:** Minimise the incidence of dust generation and no public complaints of dust generation. | Technical consultant<br>Contractor manager<br>ECO | **Monitoring Action:**<br><br>ECO to audit and report on dust generation management and implementation of mitigation measures if necessary. A public complaints register to be present on site and checked during each monthly ECO inspection.<br><br>**Responsible Party:**<br>Technical consultant | |
| | **Mitigation/Management Measures:**<br>a. Dust Management measures must be implemented specifically during the construction phase in order to manage and minimize undesired dust emissions. Leaving of vegetation material on the surface after ripping actions will assist with reduction in dust emissions.<br>b. Ensure all vehicles remain on designated roads.<br>c. Dust masks are to be supplied to workers if required.<br>d. Access roads are to be kept clean.<br>e. The minimum amount of vegetation should be removed during construction, and should be conserved for use as organic matter in the soil and dust generation surface cover. | | | |

| CONSTRUCTION PHASE:PROPOSED DEVELOPMENT OF A 132 KV TRANSMISSION LINE AND ASSOCIATED SIX SUB-STATIONS | | RESPONSIBLE PARTY/PERSON (implementation of mitigation measures) | MONITORING: ACTION, RESPONSIBLE PERSON/PARTY AND FREQUENCY | COMPLIANT ? (for use by ECO) |
|---|---|---|---|---|
| | f. Implement a public complaints register in order to be made aware of any potential dust impacts on surrounding areas. | | Contractor manager<br>ECO<br><br>**Monitoring Frequency:**<br>Monthly | |
| 8.9 | **Aspects:** Noise Generation<br>**Impact:** Noise nuisance from site operations<br>**Objective:** To avoid excessive noise generation from site operations.<br>**Target:** Minimise the incidence of noise generation and no public complaints of noise generation.<br>**Mitigation/Management Measures:**<br>a. Should multiple activities result in the excessive generation of noise, it should be strived to coordinate the incidence of these at the same time.<br>b. Fit machinery with silencers in necessary to prevent excessive noise generation.<br>c. All stationary noisy equipment such as compressors and pumps should be contained behind acoustic covers, screens or sheds where necessary.<br>d. The regular inspection and maintenance of equipment must be undertaken to ensure that all components function optimally;<br>e. Vehicles are to abide by speed restrictions on access roads and limit trip generation so as to minimise disturbance to surrounding land users.<br>f. Implement a public complaints register in order to be made aware of any potential noise impacts on surrounding areas. | Technical consultant<br>Contractor manager<br>ECO | **Monitoring Action:**<br><br>ECO to audit and report on noise generation management and implementation of mitigation measures if necessary. A public complaints register to be present on site and checked during each monthly ECO inspection.<br><br>**Responsible Party:**<br>Technical consultant<br>Contractor manager<br>ECO<br>**Monitoring Frequency:**<br>Monthly | |

| CONSTRUCTION PHASE:PROPOSED DEVELOPMENT OF A 132 KV TRANSMISSION LINE AND ASSOCIATED SIX SUB-STATIONS | | RESPONSIBLE PARTY/PERSON (implementation of mitigation measures) | MONITORING: ACTION, RESPONSIBLE PERSON/PARTY AND FREQUENCY | COMPLIANT ? (for use by ECO) |
|---|---|---|---|---|
| 8.10 | **Aspects:** Fire Prevention<br>**Impact:** Uncontrollable fire damage to areas<br>**Objective:** Prevent the outbreak of fires emanating during construction activities.<br>**Target:** No incidences of uncontrollable fires must take place on site. | | | |
| | **Mitigation/Management Measures:**<br>a. No open fires allowed on the project footprint.<br>b. The potential risk of veld fires is heightened by windy conditions in the area, specifically during the dry, windy winter months.<br>c. Assume acceptable precautions to guarantee that fires are not started as a result of works on site. The construction contractor will be held responsible for any damage to structures or property on or neighbouring the site as a result of any fire caused by employees.<br>d. Construction contractor manager should ensure that construction related activities that pose a potential fire risk are properly managed and confined to areas where the risk of fires has been reduced. In this regard special care should be taken during the high risk dry, windy winter months.<br>e. The construction contractor should have a trained fire-fighting construction staff member and take cognisance of the Veld and Forest Fire Act, Act No. 101, 1998;<br>f. As per the conditions of the Code of Conduct, in the advent of a fire being caused by construction workers and or construction activities, the appointed contractors must compensate farmers for any damage caused to their farms. The contractor should also compensate the fire-fighting costs borne by farmers and local authorities.<br>g. Equip vehicles and site structures with fire extinguishers. Rubber beaters should also be stored on site;<br>h. Storage of fuel or chemicals under trees is not permitted. Fuel storage areas must be clear of any significant burning fuel.<br>i. Gas and liquid fuel is not to be stored in the same place.<br>j. Cigarettes and matches to be adequately disposed of.<br>k. Material Safety Data Sheets (MSDS) of all flammable products to be readily available. | Technical consultant<br>Contractor manager | **Monitoring Action:**<br>ECO to audit and report on fire prevention measures if necessary.<br>Check incident register for any recordings of accidental fires.<br>**Responsible Party:**<br>Technical consultant<br>Contractor manager<br>ECO<br>**Monitoring Frequency:**<br>Monthly | |

| CONSTRUCTION PHASE:PROPOSED DEVELOPMENT OF A 132 KV TRANSMISSION LINE AND ASSOCIATED SIX SUB-STATIONS | | RESPONSIBLE PARTY/PERSON (implementation of mitigation measures) | MONITORING: ACTION, RESPONSIBLE PERSON/PARTY AND FREQUENCY | COMPLIANT ? (for use by ECO) |
|---|---|---|---|---|
| 8.11 | **Aspects:** Local communities<br>**Impact:** Local job creation<br>**Objective:** Create new jobs and provide a manner of income to local communities.<br>**Target:** Implement the principle of local employment as far as possible.<br>**Mitigation/Management Measures:**<br>a. Implement the principle of local employment as far as practicably possible in order to provide job opportunities and a manner of income to the local communities.<br>b. If this is not possible, sufficient motivation must be provided. | Applicant<br>Technical consultant<br>Contractor manager | **Monitoring Action:**<br>ECO to inspect implementation of local employment principle.<br>**Responsible Party:**<br>Applicant<br>Technical consultant<br>Contractor manager<br>ECO<br>**Monitoring Frequency:**<br>Prior to the commencement of the construction phase. | |
| 8.12 | **Aspects:** Soil and water contamination<br>**Impact:**Pollution of soil and watercourses by hazardous or other waste products<br>**Objective:** Provide facilities for appropriate management, collection and disposal of hazardous waste to prevent contamination. No significant hazardous to be generated on site.<br>**Target:** No record of pollution or site contamination by hazardous waste.<br>**Mitigation/Management Measures:**<br>a. Implement adequate stormwater and erosion management actions. | Technical consultant<br>Contractor manager<br>ECO | **Monitoring Action:**<br>Incident Register; Photographs; ECO Audit Checklist<br>Implement adequate stormwater management actions. | |

| CONSTRUCTION PHASE:PROPOSED DEVELOPMENT OF A 132 KV TRANSMISSION LINE AND ASSOCIATED SIX SUB-STATIONS | | RESPONSIBLE PARTY/PERSON (implementation of mitigation measures) | MONITORING: ACTION, RESPONSIBLE PERSON/PARTY AND FREQUENCY | COMPLIANT ? (for use by ECO) |
|---|---|---|---|---|
| | b. Protect surface and ground water bodies from direct or indirect spills of pollutants such as garbage, sewage, cement, concrete wash out water, oils, fuels, or organic material or any hazardous substances resulting from the Contractor's activities. This must be done by adequate management and isolation of hazardous and other waste products through 110 % bunding as well as storage and removal of other waste products.<br>c. Soil contaminated with oil, diesel, petrol or other foreign matter must be excavated as far as contaminated and disposed of at a licensed hazardous waste disposal site. Proof of such disposal must be kept on site. A suitably qualified and registered water removal contactor must be appointed.<br>d. All equipment on site must be inspected for diesel leaks prior to operation,<br>e. Leakages must be repaired as soon as possible and drip trays must be placed underneath machinery until such leakages have been repaired,<br>f. Polluted runoff water must be isolated and not be allowed to enter drainage lines, wetland areas or storm water canals.<br>g. Topsoil and subsoil must be protected from contamination by means of proper site management, for example collect and recycle lubricants and avoid accidental spills of pollutants,<br>h. Vehicles and machinery may not be serviced on site.<br>i. Ensure adequate maintenance of machinery to prevent pollution/spills. | | Obtain proof of removal of waste products from accredited contractor<br><br>**Responsible Person/Party:**<br>Technical consultant<br>Contractor manager<br><br>**Monitoring Frequency:**<br>Continually during construction phase<br>Bi-monthly | |
| 8.13 | **Aspects:** Avifaunal interaction<br>**Impact:** Disturbance of avifaunal activities<br>**Objective:** Manage and minimise avifaunal disturbance during the construction phase<br>**Target:** Minimal disruption of avifaunal activities. | Technical consultant<br>Contractor manager<br>ECO | **Monitoring Action:**<br>Incident Register; Photographs; ECO Audit Checklist<br><br>**Responsible Person/Party:** | |
| | **Mitigation/Management Measures:**<br>a. Implement and adhere to avifaunal mitigation measures as per heading 7.1 as far as practicably possible. | | | |

| CONSTRUCTION PHASE:PROPOSED DEVELOPMENT OF A 132 KV TRANSMISSION LINE AND ASSOCIATED SIX SUB-STATIONS | | RESPONSIBLE PARTY/PERSON (implementation of mitigation measures) | MONITORING: ACTION, RESPONSIBLE PERSON/PARTY AND FREQUENCY | COMPLIANT ? (for use by ECO) |
|---|---|---|---|---|
| | | | Technical consultant<br>Contractor manager<br>ECO<br><br>**Monitoring Frequency:**<br>Initial prior to commencement of construction phase<br>Bi- monthly | |
| 8.14 | **Aspects:**Heritage resources conservation<br>**Impact:** Damage/destruction to any significant heritage (archaeologically and/or paleontologically) items or areas found on site.<br>**Objective:** No significant damage to any significant heritage items found on site<br>**Target:** No significant damage.<br><br>**Mitigation/Management Measures:**<br>a. Restrict all construction work to the proposed project footprint as this was the only area assessed during the site inspection.<br>b. If any evidence of archaeological sites or remains (e.g. remnants of stone-made structures, indigenous ceramics, bones, stone artefacts, ostrich eggshell fragments, charcoal and ash concentrations), fossils or other categories of heritage resources are found during the proposed development, the ECO and SAHRA APM Unit (Natasha Higgitt/John Gribble 021 462 5402) must be alerted. If unmarked human burials are uncovered, the SAHRA Burial Grounds and Graves (BGG) Unit (Itumeleng Masiteng/Mimi Seetelo 012 320 8490), must be alerted immediately. A professional archaeologist or palaeontologist, depending on the nature of the finds, must be contracted as soon as possible to inspect the findings. If the newly discovered heritage resources prove to be of archaeological or | Applicant<br>Technical consultant<br>Contractor manager<br>ECO | **Monitoring Action:**<br><br>ECO and applicant project manager to ensure that construction contractor manager is aware of and enforces the mitigation conditions.<br><br>**Responsible Party:**<br>Technical consultant<br>Contractor manager<br>ECO | |

| CONSTRUCTION PHASE:PROPOSED DEVELOPMENT OF A 132 KV TRANSMISSION LINE AND ASSOCIATED SIX SUB-STATIONS | | RESPONSIBLE PARTY/PERSON (implementation of mitigation measures) | MONITORING: ACTION, RESPONSIBLE PERSON/PARTY AND FREQUENCY | COMPLIANT ? (for use by ECO) |
|---|---|---|---|---|
| | palaeontological significance, a Phase 2 rescue operation may be required. | | **Monitoring Frequency:** Monthly. Continually during the construction phase. | |

## Conclusion

- All relevant environmental mitigation measures and recommendations as per heading 7.1 of the EMPr must be implemented and adhered to as far as practicably possible.

## 7.5 Operational Phase Environmental Management Programme

The intention of providing an EMPr for the operational phase is to provide guidelines for management of facilities and infrastructure to safeguard the environment against negative environmental impacts.

| **CONSTRUCTION PHASE:PROPOSED DEVELOPMENT OF A 132 KV TRANSMISSION LINE AND ASSOCIATED SIX SUB-STATIONS** | **RESPONSIBLE PARTY/PERSON (implementation of mitigation measures)** | **MONITORING: ACTION, RESPONSIBLE PERSON/PARTY AND FREQUENCY** | **COMPLIANT? (for use by ECO)** |
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| 1. **Activity:** Permits and authorisations | | | |
| **Aspects:** Legislative compliance<br>**Impact:** Non-compliance with South African environmental legislation.<br>**Objective:** Ensure compliance with all triggered environmental legislation.<br>**Target:** Commence operational processes with all authorisations, permits and approvals received and available on site. | Applicant | **Monitoring Action:** Obtain copies of all required documents and ensure they are filed and readily available on site; Adequate record keeping<br><br>**Responsible party:**<br><br>Applicant<br><br>**Monitoring Frequency:**<br>Once off<br>Keep readily available | |
| **Mitigation/Management Measures:**<br>b. The Developer is to have the following permits readily available at all times<br>• Environmental Authorisation<br>• Environmental Management Program (EMPr) | | | |

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| | • National and provincial permits for protected species | | | |
| 2. **Activity:** Operational site management and maintenance | | | | |
| 2.1 | **Aspects:** Erosion Control<br>**Impact:** Loss of topsoil and formation of gullies through wash away<br>**Objective:** Manage and prevent any significant soil erosion<br>**Target:** No signs of significant soil erosion and loss of topsoil should be evident on site.<br>**Mitigation/Management Measures:**<br>b. Ensure adequate erosion control measures are implemented and maintained to reduce the risk of soil erosion.<br>c. Apply erosion control measures before the rainy season begins preferably immediately following construction. Ensure maintenance of implemented erosion management structures and measures.<br>**d.** Adequately and concurrently rehabilitate surrounding areas after construction completion of specific areas. | Applicant | **Monitoring**<br>Applicant project manager manage potential erosion.<br>**Responsible Party:**<br>Applicant<br>**Monitoring Frequency:**<br>Continually. | |
| 2.2 | **Aspects:** Noise Generation<br>**Impact:** Noise nuisance from management and maintenance operations<br>**Objective:** To avoid excessive noise generation from site operations.<br>**Target:** Minimise the incidence of noise generation and no public complaints of noise generation.<br>**Mitigation/Management Measures:**<br>g. Management and maintenance schedules and activities to be discussed and approved by landowners in order for them to be aware of activities.<br>h. Should multiple activities result in the excessive generation of noise, it should be strived to coordinate the incidence of these at the same time.<br>i. Fit machinery with silencers in necessary to prevent excessive noise generation.<br>j. All stationary noisy equipment such as compressors and pumps should be contained behind acoustic covers, screens or sheds where necessary.<br>k. The regular inspection and maintenance of equipment must be undertaken to ensure that all components function | Applicant<br>Maintenance contractor | **Monitoring Action:**<br>A public complaints register to be present during management and maintenance activities.<br>**Responsible Party:**<br>Applicant<br>Maintenance contractor<br>**Monitoring Frequency:**<br>During management and maintenance activities | |

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| | optimally;<br>l. Vehicles are to abide by speed restrictions on access roads and limit trip generation so as to minimise disturbance to surrounding land users.<br>m. Implement a public complaints register in order to be made aware of any potential noise impacts on surrounding areas. | | | |
| 2.3 | **Aspects:** Fire Prevention<br>**Impact:** Uncontrollable fire damage to areas<br>**Objective:** Prevent the outbreak of fires emanating during management and maintenance activities.<br>**Target:** No incidences of uncontrollable fires must take place on site. | Applicant<br>Maintenance contractor | **Monitoring Action:**<br>Ensure compliance with fire management recommendations<br><br>**Responsible Person/Party:**<br>Applicant<br>Maintenance contractor<br><br>**Monitoring Frequency:**<br>During management and maintenance activities | |
| | **Mitigation/Management Measures:**<br>l. No open fires allowed on the project footprint.<br>m. The potential risk of veld fires is heightened by windy conditions in the area, specifically during the dry, windy winter months.<br>n. Assume acceptable precautions to guarantee that fires are not started as a result of works on site. The maintenance contractor will be held responsible for any damage to structures or property on or neighbouring the site as a result of any fire caused by employees.<br>o. Maintenance contractor manager should ensure that construction related activities that pose a potential fire risk are properly managed and confined to areas where the risk of fires has been reduced. In this regard special care should be taken during the high risk dry, windy winter months.<br>p. The maintenance contractor should have a trained fire-fighting construction staff member and take cognisance of the Veld and Forest Fire Act, Act No. 101, 1998;<br>q. As per the conditions of the Code of Conduct, in the advent of a fire being caused by construction workers and or construction activities, the appointed contractors must compensate farmers for any damage caused to their farms. The contractor should also compensate the fire-fighting costs borne by farmers and local authorities.<br>r. Equip vehicles and site structures with fire extinguishers. Rubber beaters should also be stored on site;<br>s. Storage of fuel or chemicals under trees is not permitted. Fuel storage areas must be clear of any significant burning fuel.<br>t. Gas and liquid fuel is not to be stored in the same place.<br>u. Cigarettes and matches to be adequately disposed of. | | | |

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| | v. Material Safety Data Sheets (MSDS) of all flammable products to be readily available. | | | |
| 2.4 | **Aspects:** Local communities<br>**Impact:** Local job creation<br>**Objective:** Create new jobs and provide a manner of income to local communities during the management and maintenance activities.<br>**Target:** Implement the principle of local employment as far as possible. | Applicant<br>Maintenance contractor | **Monitoring Action:**<br>Implementation of local employment principle.<br>**Responsible Party:**<br>Applicant<br>Maintenance contractor<br>**Monitoring Frequency:**<br>During management and maintenance activities | |
| | **Mitigation/Management Measures:**<br>c. Implement the principle of local employment as far as practicably possible in order to provide job opportunities and a manner of income to the local communities.<br>d. If this is not possible, sufficient motivation must be provided. | | | |
| 2.5 | **Aspects:** Soil and water contamination<br>**Impact:**Pollution of soil and watercourses by hazardous or other waste products<br>**Objective:** Provide facilities for appropriate management, collection and disposal of hazardous waste to prevent contamination during management and maintenance activities. No significant hazardous to be generated on site.<br>**Target:** No record of pollution or site contamination by hazardous waste. | Applicant<br>Maintenance contractor | **Monitoring Action:**<br>Implement adequate stormwater management actions.<br>Obtain proof of removal of waste products from accredited contractor | |
| | **Mitigation/Management Measures:**<br>j. Implement adequate stormwater and erosion management actions.<br>k. Protect surface and ground water bodies from direct or indirect spills of pollutants such as garbage, sewage, cement, concrete wash out water, oils, fuels, or organic material or any hazardous substances resulting from the Maintenance contractor's activities. This must be done by adequate management and isolation of hazardous and other waste | | | |

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| | products through 110 % bunding as well as storage and removal of other waste products.<br>l. Soil contaminated with oil, diesel, petrol or other foreign matter must be excavated as far as contaminated and disposed of at a licensed hazardous waste disposal site. Proof of such disposal must be kept on site. A suitably qualified and registered water removal contactor must be appointed.<br>m. All equipment on site must be inspected for diesel leaks prior to operation,<br>n. Leakages must be repaired as soon as possible and drip trays must be placed underneath machinery until such leakages have been repaired,<br>o. Polluted runoff water must be isolated and not be allowed to enter drainage lines, wetland areas or storm water canals.<br>p. Topsoil and subsoil must be protected from contamination by means of proper site management, for example collect and recycle lubricants and avoid accidental spills of pollutants,<br>q. Vehicles and machinery may not be serviced on site.<br><br>Ensure adequate maintenance of machinery to prevent pollution/spills. | | **Responsible Person/Party:**<br>Applicant<br>Maintenance contractor<br><br>**Monitoring Frequency:**<br>During management and maintenance activities. | |
| 2.6 | **Aspects:** Avifaunal interaction<br>**Impact:** Avifaunal collision and electrocution with infrastructure<br>**Objective:** Manage and minimise avifaunal interaction with infrastructure<br>**Target:** Minimal mortalities of avifaunal individuals | Applicant<br>Technical consultant<br>Contractor manager<br>ECO | **Monitoring Action:** Incident Register; Photographs; ECO Audit Checklist<br><br>**Responsible Person/Party:**<br>Technical consultant<br>Contractor manager<br>ECO<br><br>**Monitoring Frequency:**<br>Initial prior to commencement of construction phase | |

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| | | | Bi- monthly | |
| | **Mitigation/Management Measures:**<br>b. Implement and adhere to avifaunal mitigation measures as per heading 7.2 as far as practicably possible. | | | |

## Conclusion

- All relevant environmental mitigation measures and recommendations as per heading 7.2 of the EMPr must be implemented and adhered to as far as practicably possible.

# 8 Emergency Response Plan

The following table is provided to assist the ECO and contractor manager with remedial work options and problem solving in the event of potential environmental emergencies occurring on site.

The two main environmental emergencies identified are spillage of hazardous substances and fire outbreaks.

| Observation or Event | Action by Inspector or Observer | Action by Contractor manger |
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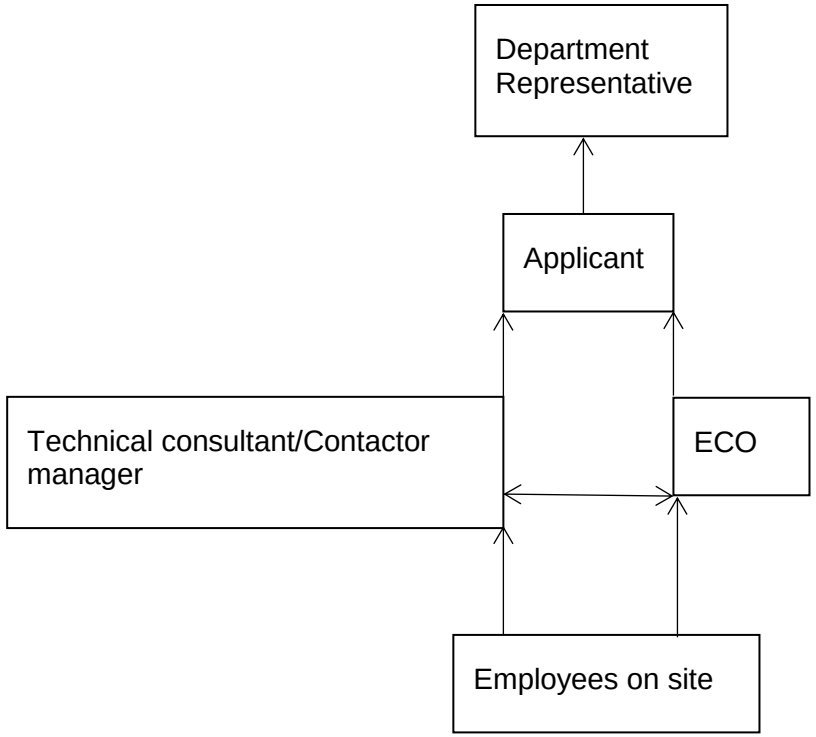
| **Spillage of hazardous substances** | Immediately report to Applicant, Technical consultant, Contractor manager and ECO.<br><br>Immediately put emergency response plan into action | Immediate action will be required by implementing the following steps:<br>See responsibility organogram below.<br>• Immediately stop work and isolate the contaminated area as soon and well as possible.<br>• Isolate source of contamination in order to prevent increase in pollution footprint or severity.<br>• Inform the relevant construction contractor manager, applicant project manager and ECO.<br>• Construction contractor manager, applicant project manager and ECO to implement clean-up procedure<br>• Dig down into the soil to determine the pollution penetration depth.<br>• If less than 300 mm penetrated:<br>  o Turn the soil over to expose it to the air.<br>  o Apply Mono Ammonium Phosphate (MAP) at a rate of 58 gr/m² to the overturned soil.<br>  o Water enough to keep the soil moist.<br>• If penetration is greater than 300 mm:<br>  o Remove the affected soil and spread in a layer not more than 300 mm thick.<br>  o Apply MAP at a rate of 50gr/m².<br>  o Water enough to keep the soil moist.<br>• Repeat the above steps every 6 weeks or until the soil is clean.<br>• Inform the relevant governmental department of the incident. |
| **Fire outbreak** | Immediately report to Applicant, Technical consultant, Contractor manager and ECO who in turn must inform all relevant local | Action will be required ASAP by following the next steps:<br>Remove all potential burning fuel as far as possible and start extinguishing fire from the base of the sources.<br>Inform all relevant local emergency authorities in order to provide assistance if necessary.<br>Trained firefighters as per headings 7.4 & 7.5 must immediately implement relevant firefighting activities. |

| Observation or Event | Action by Inspector or Observer | Action by Contractor manger |
|---|---|---|
| | emergency authorities.<br><br>Immediately put emergency response plan into action. | |

**Responsibility and Reporting Organogram in the event of an emergency**



# 9 Complaints/Incident Register

| INCIDENT REGISTER: PROPOSED DEVELOPMENT OF A 132 KV TRANSMISSION LINE AND ASSOCIATED SIX SUB-STATIONS | | | | | |
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| **NAME OF PERSON REPORTING THE INCIDENT** | **INCIDENT** | **DATE OF INCIDENT IDENTIFIED** | **HOW WAS INCIDENT ADDRESSED?** | **DATE OF RECTIFICATION** | **SIGNATURE** |
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# 10 Construction Rehabilitation Measures

Areas affected by the construction phase need to be suitably and concurrently rehabilitated. It will entail site clean-up and environmental rehabilitation of the area to a suitably functional ecological state. The underlying aim of this phase is therefore to return the landscape to a suitable self-sustainable landscape.

Key aspects within this process include the:

- Removal of structures and infrastructure;
- Handling of inert waste and rubble;
- Handling of hazardous waste and pollution control;
- Final shaping of the terrain profile in line with the natural topography and water catchment and drainage
- Topsoil replacement and soil amelioration;
- Soil cultivation (ripping and scarifying of surfaces)
- Amelioration and grassing of adequate indigenous vegetation
- Adequate follow up amelioration and maintenance for a period as indicated by a specialist.

The final shaping designs as well as amelioration and grassing recommendation should be determined and provided by suitably qualified specialists only once the rehabilitation stage is reached.

# 11 Decommissioning Phase

If the operational phase is ever concluded in the future, the area will be suitable rehabilitated in order to return the project area to a self-sustainable ecological state.

In the event of decommission, the footprint area needs to be suitably rehabilitated. It will entail infrastructure removal; site clean-up and environmental rehabilitation of the area to a suitably functional ecological state. The underlying aim of this phase is therefore to return the landscape to a suitable self-sustainable landscape.

Key aspects within this process include the:

- Removal of structures and infrastructure;
- Handling of inert waste and rubble;
- Final shaping of the terrain profile in line with the natural topography and water catchment and drainage
- Soil cultivation (ripping and scarifying of surfaces)
- Amelioration and grassing of adequate indigenous vegetation
- Adequate follow up amelioration and maintenance for a period as indicated by a specialist.

# 12 Conclusion

The management and subsequent monitoring measures and recommendations as indicated in this EMPr document need to be adequately implemented and continually enforced by the assigned responsible role-players. This will ensure the successful management and minimisation of environmental risks and potential impacts associated with the project. The development needs to be completed and operated in an environmentally sustainable and responsible manner in strict accordance with the Environmental Authorisation (EA), permit and EMPr conditions, recommendations and requirements.