PROPOSED CONSTRUCTION OF TWO 132KV CHICKADEE LINES TO THE NEW ZONNEBLOEM SWITCHING STATION, MPUMALANGA PROVINCE

ENVIRONMENTAL MANAGEMENT PROGRAMME

April 2018

Prepared for:

Eskom Holdings SOC Limited
Corner of Watermeyer and Jellicoe Street,
Witbank
1034

Prepared by:

Savannah Environmental (Pty) Ltd
First Floor, Block 2, 5 Woodlands Drive Office Park
Woodmead
Johannesburg, 2191
Tel: +27 (0)11 656 3237
Fax: +27 (0)86 684 0547
E-mail: info@savannahsa.com
www.savannahsa.com

PROJECT DETAILS

Title	:	Environmental Assessment Process Environmental Management Programme for the proposed construction of two 132kV Chickadee Lines to the new Zonnebloem Switching Station, Mpumalanga Province
Authors	:	Savannah Environmental Thalita Botha Sharon Meyer
Specialists	:	Gerhard Botha Jaco van der Walt Elize Butler
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DEFINITIONS AND TERMINOLOGY

Alien species: A species that is not indigenous to the area or out of its natural distribution range.

Alternatives: Alternatives are different means of meeting the general purpose and need of a proposed activity. Alternatives may include location or site alternatives, activity alternatives, process or technology alternatives, temporal alternatives or the 'do nothing' alternative.

Ambient sound level: The reading on an integrating impulse sound level meter taken at a measuring point in the absence of any alleged disturbing noise at the end of a total period of at least 10 minutes after such meter was put into operation.

Assessment: The process of collecting, organising, analysing, interpreting and communicating information which is relevant.

Biological diversity: The variables among living organisms from all sources including, terrestrial, marine and other aquatic ecosystems and the ecological complexes they belong to.

Commence: The start of any physical activity, including site preparation and any other activity on site furtherance of a listed activity or specified activity, but does not include any activity required for the purposes of an investigation or feasibility study as long as such investigation or feasibility study does not constitute a listed activity or specified activity.

Cumulative impacts: Impacts that result from the incremental impact of the proposed activity on a common resource when added to the impacts of other past, present or reasonably foreseeable future activities (e.g. discharges of nutrients and heated water to a river that combine to cause algal bloom and subsequent loss of dissolved oxygen that is greater than the additive impacts of each pollutant). Cumulative impacts can occur from the collective impacts of individual minor actions over a period of time and can include both direct and indirect impacts.

Direct impacts: Impacts that are caused directly by the activity and generally occur at the same time and at the place of the activity (e.g. noise generated by blasting operations on the site of the activity). These impacts are usually associated with the construction, operation or maintenance of an activity and are generally obvious and quantifiable.

Disturbing noise: A noise level that exceeds the ambient sound level measured continuously at the same measuring point by 7 dB or more.

Ecosystem: A dynamic system of plant, animal and micro-organism communities and their non-living environment interacting as a functional unit.

Endangered species: Taxa in danger of extinction and whose survival is unlikely if the causal factors continue operating. Included here are taxa whose numbers of individuals have been reduced to a critical level or whose habitats have been so drastically reduced that they are deemed to be in immediate danger of extinction.

Endemic: An "endemic" is a species that grows in a particular area (is endemic to that region) and has a restricted distribution. It is only found in a particular place. Whether something is endemic or not depends on the geographical boundaries of the area in question and the area can be defined at different scales.

Environment: the surroundings within which humans exist and that are made up of:

i. the land, water and atmosphere of the earth;
ii. micro-organisms, plant and animal life;
iii. any part or combination of (i) and (ii) and the interrelationships among and between them; and
iv. the physical, chemical, aesthetic and cultural properties and conditions of the foregoing that influence human health and well-being.

Environmental Impact: An action or series of actions that have an effect on the environment.

Environmental impact assessment: Environmental Impact Assessment (EIA), as defined in the NEMA EIA Regulations and 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 that application.

Environmental management: Ensuring that environmental concerns are included in all stages of development, so that development is sustainable and does not exceed the carrying capacity of the environment.

Environmental Management Programme: A plan that organises and co-ordinates mitigation, rehabilitation and monitoring measures in order to guide the implementation of a proposal and its on-going maintenance after implementation.

Environmental assessment practitioner: An individual responsible for the planning, management and coordinating of environmental management plan or any other appropriate environmental instruments introduced by legislation.

Habitat: The place in which a species or ecological community occurs naturally.

Hazardous waste: means any waste that contains organic or inorganic elements or compounds that may, owing to the inherent physical, chemical or toxicological characteristics of that waste, have a detrimental impact on health and the environment and includes hazardous substances, materials or objects within business waste, residue deposits and residue stockpiles

Indigenous Biological Resource:

(a) when used in relation to bioprospecting, means any indigenous biological resource as defined in section 80(2); or

(b) when used in relation to any other matter, means any resource consisting of-

(i) any living or dead animal, plant or other organism of an indigenous
(ii) any derivative of such animal, plant or other organism; or
(iii) any genetic material of such animal, plant or other organism

Indigenous Species: means a species that occurs, or has historically occurred, naturally in a free state in nature within the borders of the Republic, but excludes a species that has been introduced in the Republic as a result of human activity

Indirect impacts: Indirect or induced changes that may occur as a result of the activity (e.g. the reduction of water in a stream that supply water to a reservoir that supply water to the activity). These types of impacts include all the potential impacts that do not manifest immediately when the activity is undertaken or which occur at a different place as a result of the activity.

Interested and Affected Party: Individuals or groups concerned with or affected by an activity and its consequences. These include the authorities, local communities, investors, work force, consumers, environmental interest groups and the general public.

Pollution: means any change in the environment caused by-

(i) substances;
(ii) radioactive or other waves; or
(iii) noise, odours, dust or heat,

emitted from any activity, including the storage or treatment of waste or substances, construction and the provision of services, whether engaged in by any person or an organ of state, where that change has an adverse effect on human health or well-being or on the composition, resilience and productivity of natural or managed ecosystems, or on materials useful to people, or will have such an effect in the future;

Rare species: Taxa with small world populations that are not at present Endangered or Vulnerable, but are at risk as some unexpected threat could easily cause a critical decline. These taxa are usually localised within restricted geographical areas or habitats or are thinly scattered over a more extensive range. This category was termed Critically Rare by Hall and Veldhuis (1985) to distinguish it from the more generally used word "rare".

Red data species: Species listed in terms of the International Union for Conservation of Nature and Natural Resources (IUCN) Red List of Threatened Species, and/or in terms of the South African Red Data list. In terms of the South African Red Data list, species are classified as being extinct, endangered, vulnerable, rare, indeterminate, insufficiently known or not threatened (see other definitions within this glossary).

Riparian: the area of land adjacent to a stream or river that is influenced by stream-induced or related processes. Riparian areas which are saturated or flooded for prolonged periods would be considered wetlands and could be described as riparian wetlands. However, some riparian areas are not wetlands (e.g. an area where alluvium is periodically deposited by a stream during floods but which is well drained).

Significant impact: An impact that by its magnitude, duration, intensity or probability of occurrence may have a notable effect on one or more aspects of the environment.

Vulnerable species: A taxon is Vulnerable when it is not Critically Endangered or Endangered but is facing a high risk of extinction in the wild in the medium-term future.

Waste: is defined as (a) any substance, material or object, that is unwanted, rejected, abandoned, discarded or disposed of, or that is intended or required to be discarded or disposed of, by the holder of that substance, material or object, whether or not such substance, material or object can be re-used,

recycled or recovered and includes all wastes as defined in Schedule 3 to this Act; or (b) any other substance, material or object that is not included in Schedule 3 that may be defined as a waste by the Minister by notice in the Gazette, but any waste or portion of waste, referred to in paragraphs (a) and (b), ceases to be a waste— (i) once an application for its re-use, recycling or recovery has been approved or, after such approval, once it is, or has been re-used, recycled or recovered; (ii) where approval is not required, once a waste is, or has been re-used, recycled or recovered; (iii) where the Minister has, in terms of section 74, exempted any waste or a portion of waste generated by a particular process from the definition of waste; or (iv) where the Minister has, in the prescribed manner, excluded any waste stream or a portion of a waste stream from the definition of waste.

Wetland: land which is transitional between terrestrial and aquatic systems where the water table is usually at or near the surface, or the land is periodically covered with shallow water, and which under normal circumstances supports or would support vegetation typically adapted to life in saturated soil (Water Act 36 of 1998); land where an excess of water is the dominant factor determining the nature of the soil development and the types of plants and animals living at the soil surface (Cowardin et al., 1979).

Watercourse: as per the National Water Act means -

(a) a river or spring;
(b) a natural channel in which water flows regularly or intermittently;
(c) a wetland, lake or dam into which, or from which, water flows; and
(d) any collection of water which the Minister may, by notice in the Gazette, declare to be a watercourse, and a reference to a watercourse includes, where relevant, its bed and banks

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CHAPTER 1: PROJECT DETAILS

The Mpumalanga region as a whole has been earmarked for the development and expansion of various mining developments and operations. Mining in the Steve Tshwete Local Municipality (LM) is the highest contributor to the Municipality's Gross Domestic Product (GDP) and contributes up to 45,8% according to the Steve Tshwete LM Local Economic Development Strategy 2015-2020. Glencore Operations South Africa (Pty) Ltd plans to expand mining operations east of the study area and would require connection to the existing electrification networks and services. Eskom Holdings SOC Limited (Eskom) is therefore proposing to establish a new 40MVA 132/22kV switching station, to be known as the 132/22kV Zonnebloem Switching Station, and two loop-in-loop-out (LILO) Chickadee power lines to connect to the existing 132kV Mafube/Pan Traction power line to accommodate the expansion of the Zonnebloem Coal Mine situated approximately 6km east of the study area. The proposed power lines and Zonnebloem Switching Station will be constructed, owned and operated by Eskom. Glencore Operations South Africa (Pty) Ltd will be responsible for the construction and operation of a 132kV overhead power line to connect the new coal mining point to the Zonnebloem Switching Station. It should be noted that this power line does not form part of this application and will be assessed in a separate application.

The project is located approximately 24km east of Middelburg on the Remaining Extent of the Farm Patattafontein 412, the Remaining Extent of the Farm Zevenfontein 415 and Portion 4 of the Farm Gemsbokfontein 411 located within the Steve Tshwete Local Municipality and within the greater Nkangala District Municipality, Mpumalanga Province (refer to **Figure 1.1**). A study area of 84ha situated within the project site[1] of 2456ha in extent was investigated to allow for optimisation of the infrastructure layout in order to accommodate specialist findings where necessary. All infrastructure associated with the proposed project will fall within this assessed area (refer to **Figure 1.2** for the layout map).

The proposed project will consist of the following activities:

- Construction and operation of the new 40MVA Zonnebloem 132/22kV switching station and ancillaries (including a communication tower, metering station, laydown area, access roads, control building and associated infrastructure).
- Two 500m 132kV LILO Chickadee power lines from the existing 132kV Mafube/Pan traction power line to the newly proposed Zonnebloem switching station. Each power line will have a 32m wide servitude and a separation distance of 15m will be applied between the power lines.

Two alternative alignments for the access road are being considered:

- Alternative A: Access road will be up to 8m wide and approximately 990m in length.
- Alternative B: Access road will be up to 8m wide and approximately 805m in length.

[1] The project site includes the three affected properties which consist of the Remaining Extent of the Farm Patattafontein 412, the Remaining Extent of the Farm Zevenfontein 415 and Portion 4 of the Farm Gemsbokfontein 411 within which the project is being proposed.

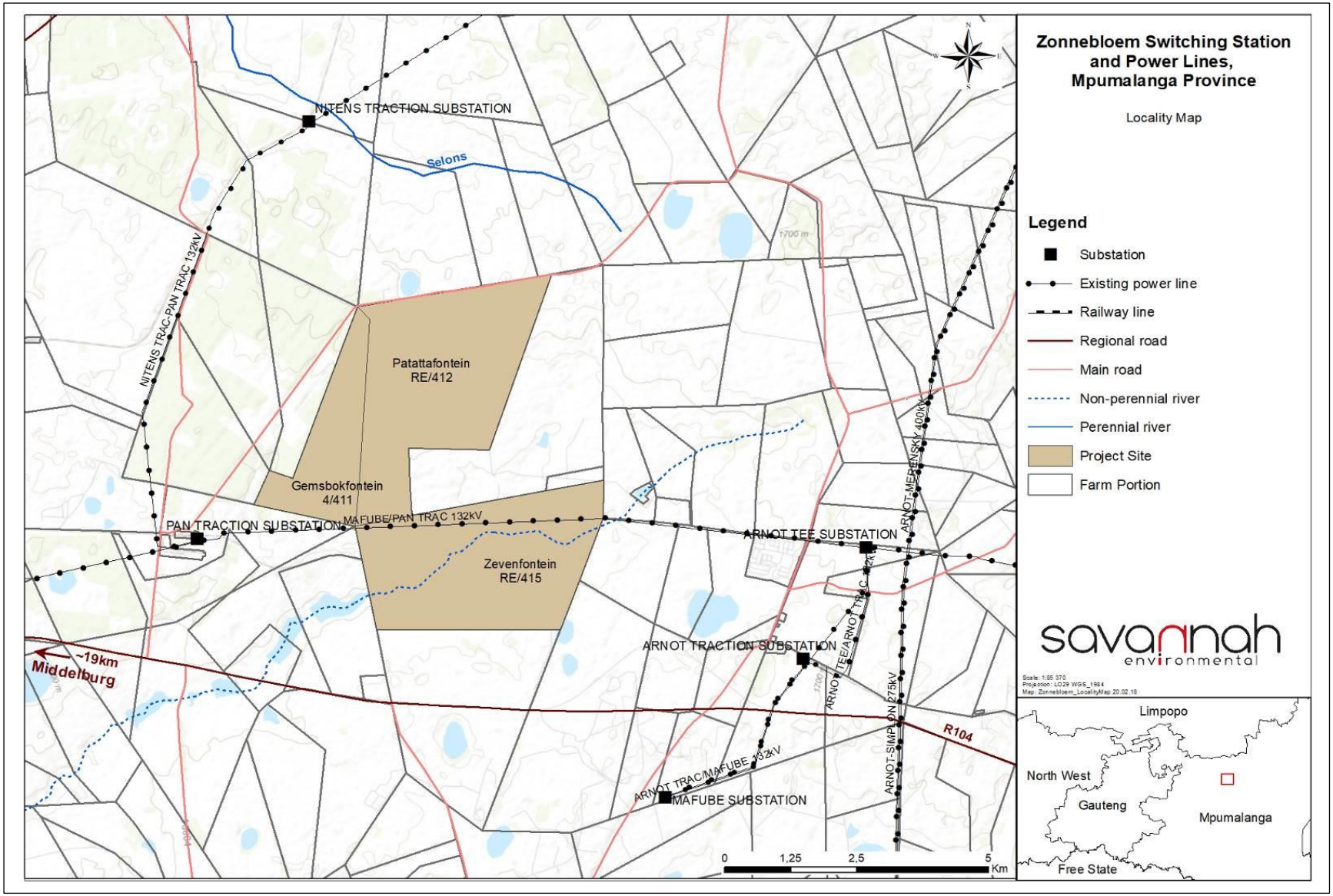


Figure 1.1: Locality map showing the location of the project site location in relation to the surrounding area (**Appendix G1**)

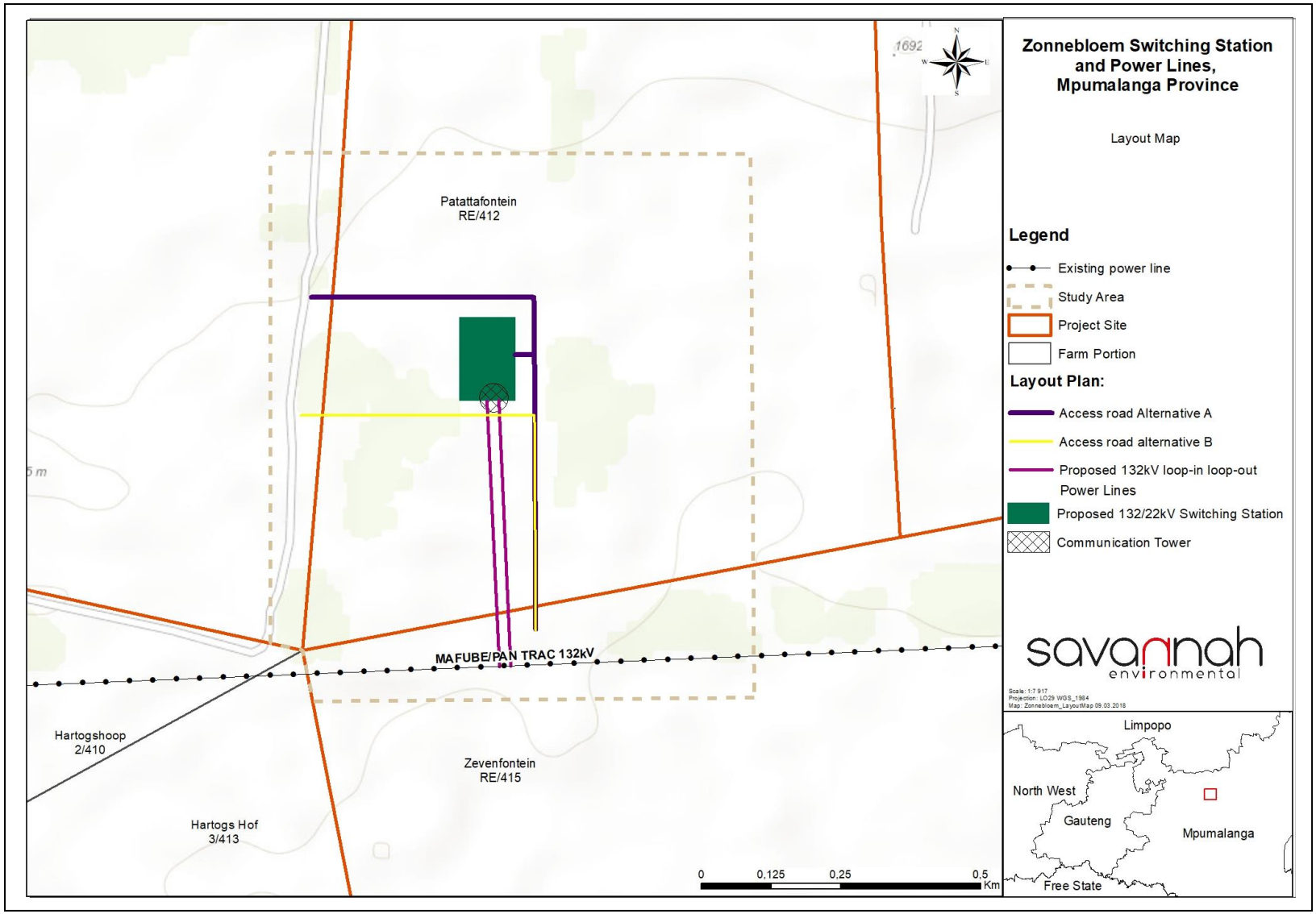


Figure 1.2: Layout map showing the development footprint of the project and access road alternatives (**Appendix G2**).

Table 1.1: Location of the study area

Province	Mpumalanga Province	
District Municipality	Nkangala	
Local Municipality	Steve Tshwete	
Ward number(s)	Ward 9	
Nearest town(s)	~23km east of Middelburg and ~35km south west of Belfast	
Farm Name/Portion and 21 Digit SG Code Preferred Substation site	**FARM NAME**	**PORTION NUMBER**
	Remaining Extent of the Farm Patattafontein 412,	T0JS00000000041200000
	Remaining Extent of the Farm Zevenfontein 415	T0JS00000000041500000
	Portion 4 of the Farm Gemsbokfontein 411	T0JS00000000041100004
Current Land Use	Agricultural	
Site Coordinates	Northern-most extent: 25°42'46.236" S	29°44'7.620" E
	Eastern-most extent: 25°44'57.214" S	29° 44' 44.087" E
	Southern-most extent: 25° 46' 32.323" S	29° 44' 15.260" E
	Western-most extent: 25° 45' 13.656" S	29° 40' 46.444" E
Project Site	2456ha	
Study Area	84ha	
Site Access	Main access to the project site will be via the Regional Road R104 which connects Middelburg and Belfast or the R555 which connects Middelburg and Stoffberg. Direct Access to study area is possible via the use of existing main roads (gravel). Apart from these, farm entrances and gravel farm roads, including the existing power line service roads, can be used where permissible farm roads (gravel) as well as the new access road to be constructed.	

The EMPr has been developed on the basis of the findings of the Basic Assessment Report, and must be implemented to protect sensitive on-site and off-site features through controlling pre-construction, construction, operation and decommissioning activities that could have a detrimental effect on the environment, and through avoiding or minimising potential impacts. This EMPr is applicable to all Eskom Holdings SOC Ltd employees and contractors working on the pre-construction, construction, and operation and maintenance phases of the proposed substation as well as decommissioning of the existing substation. The document will be adhered to and updated as relevant throughout the project life cycle.

1.1. Potential impacts

Based on the findings of the Basic Assessment, the following conclusions were made:

1.1.1 Ecology

Ecological impacts identified to be associated with the development of the project has a low impact rating, subject to the implementation of the recommended mitigation measures. The impacts relate mainly to the clearance of vegetation as well as disturbance to the area.

The majority of the study area is considered to be of low ecological sensitivity with the exception of the wetland habitat types which is regarded as medium to high sensitive. Most of these Medium-High wetland habitats falls outside of the development footprint and will not be impacted by the development apart from a small depression wetland located in the central portion of the western boundary of the study area.

It should be noted that the ecological condition of these azonal habitats varies from severely degraded and transformed (depression wetland, wetland flat and some of the seepages) to mostly disturbed and transformed (valley-bottom wetland and remaining seepages). As a result, there are no ecological fatal flaws or impacts that cannot be mitigated that should prevent the development from being approved.

Five species of conservation concern were recorded within the study area. However, none of these species occurred within the development footprint and will not be impacted through the proposed development. The identified species are as follows:

» Red Data Species: *Hypoxis hemerocallidea* (Declining);
» Protected according to Schedule 11 of the Mpumalanga Nature Conservation Act (Act No. 10 of 1998) (MNCA): *Aloe ecklonis, Eucomis autumnalis, Habenaria galpinii, Gladiolus spp*.

All of these species do not have deep rooting systems and can be successfully removed and relocated to a similar habitat if some species were to be encountered with the development area during the walkthrough. These species may not be disturbed/destroyed or relocated without the necessary permits obtained from the relevant authority (Mpumalanga Tourism and Parks Agency).

From an ecological perspective it was concluded that access road Alternative A is the preferred alternative unless the applicant re-aligns Alternative B, which in-turn will result in Alternative B being acceptable as well.

1.1.2 Avifauna

Avifauna impacts associated with the development of the project relate mainly to disturbance, habitat destruction, electrocution as a result of the switching station and power line infrastructure and the risk of collision. However, the impacts associated with the development have been assessed as being of a low significance, subject to the implementation of the recommended mitigation measures.

This is mainly due to the highly degraded and transformed nature of the study area with a mostly uniform vegetation composition as well as avifaunal composition (low diversity comprising of mostly adaptable species with no recorded Red Data species).

When considering the impacts associated with the two access road alternatives, both alternatives are preferred. The proposed impacts to avifauna is expected to be similar for both access road alternatives as both are located within similar habitat types providing habitat for a very limited amount of avifaunal species. There are no fatal flaws associate with the study area and the significance of the impact has been identified as being low.

1.1.3 Archaeology

No Stone Age sites, ceramics or stone walls attributed to the Iron Age were recorded. The lack of Stone Age sites can be attributed to the lack of raw material suitable for stone tool manufacture in the study area. No burial sites were recorded within the study area. Four features (built environment) have been recorded within the study area of only one feature (Feature 1) will be impacted on by the current development footprint.

Based on the findings of the Heritage Impact Assessment the study area is considered to be of low archaeological significance. The impact of the development of the project in the study area, with the implementation of the appropriate and recommended and appropriate mitigation measures is considered to be of a low significance. There are no fatal flaws associate with the study area.

When considering the impacts associated with the access road alternatives, both alternatives are considered as the preferred for implementation.

1.1.4 Palaeontology

No fossiliferous outcrops were identified within the study area. The impacts associated with the development of the project relate mainly to the potential impact to palaeontological resources The impact associated with the development has been assessed as being of a low significance, subject to the implementation of the recommended mitigation measures.

From a palaeontological perspective the impacts associated with both access road alternatives are considered to be the same. Both alternatives are deemed appropriate and feasible and will not lead to detrimental impacts on the palaeontological resources of the area.

1.1.5 Overall Impact

Overall, the impacts associated with the development of the Zonnebloem Switching Station, two LILO power lines and associated infrastructure are considered to be of an acceptable significance and can be mitigated successfully in order to ensure that the development will not create any detrimental environmental impacts that will be long-term and unacceptable.

From the assessment, and through a comparative assessment of the access road alternatives, it is concluded that access road Alternative A is the preferred alternative by all specialist studies undertaken unless the applicant re-aligns Alternative B, which in-turn will result in Alternative B being acceptable as well.

Refer to **Figure 1.3** for a sensitivity map of the substation alternatives.

Through the undertaking of the Basic Assessment and in consultation with the independent specialists, sensitivities were identified to be associated with the development of the new Zonnebloem Switching Station, two LILO power lines and associated infrastructure situated within the study area of 84ha in extent.

The following sensitive areas/environmental features have been identified to be associated with the study area and immediate surroundings:

Ecology:

Four vegetation habitats have been identified that would be affected by the development:

» Vegetation Unit 1 and 2 are considered to be of a low ecological sensitivity as these units are highly degraded and transformed grassland re-established on historically ploughed land and old woodlot areas. The majority of the development footprint falls within these units.

- Vegetation Unit 3 is considered to be of a medium to high ecological sensitivity and should be regarded as no-go areas. This vegetation unit is mostly associated with the wetland flat and valley-bottom wetland. Disturbances within the wetlands themselves as well as within the catchment has resulted in the significant alteration of the hydrological and morphological character of these wetland areas, subsequently resulting in an alteration/transformation of the species composition of these areas leaving some locations exposed to invasion with alien plants. This vegetation unit is excluded from the development footprint and will not be impacted.
- Vegetation Unit 4 is considered to be of a medium to high ecological sensitivity and should be regarded as no-go areas. This unit comprise two hydrological zones (temporary and seasonal saturated zones) and can be described as a mixture of moisture loving graminoids. One Red Data Species (*Hypoxis hemerocallidea* – Declining) and four MPNCA Protected species (*Eucomis autumnalis, Habenaria galpinii, Gladiolus* spp. and *Aloe ecklonis*) have been recorded within this unit. None of these species occurred within the development footprint and will subsequently not be impacted by the proposed development. Access road Alternative B traverses a depression wetland within this unit.

Avifauna:

The majority of the study area and surrounding surveyed area has been assessed as being of low sensitivity from an avifaunal perspective. The entire footprint area is located within a low sensitive area as a result of historical disturbances (cultivation) which has led to a severely altered and degraded area resulting in some loss of appropriate habitat and foraging area.

- A temporary wetland has been identified on the northern boundary of the study area and is considered to be a medium to low avifaunal sensitivity as these habitats may temporary provide potential preferable habitat for waterfowl and waders (during periods of inundation). No project infrastructure is situated within this sensitivity.
- A valley-bottom wetland and associated seepages have been identified along the eastern section of the study area and are considered to be of a medium to high sensitivity due to its connectivity to downstream wetland and aquatic habitats as well as the fact that this area may provide a corridor of movement / migration for several bird species. No project infrastructure is situated within this sensitivity.
- A 100m avifaunal buffer has been awarded to the valley-bottom wetland and associated seepages and is applicable for power line infrastructure and communication tower only and is considered to be of a medium to high sensitivity.

Archaeology:

- Four features were recorded during the site survey of which two are of no heritage significance. Feature 3, a dug out hole/reservoir with stone-built walling against the sides, are assumed to be associated with Feature 4 and is therefore considered to be of low sensitivity. Feature 4, which is partially demolished sand stone structures, are not older than 60 years but does form part of the cultural landscape relating to farming practises in the area and are therefore of low heritage sensitivity. Feature 1, remnants of a stone and cement wall, is the only feature to be traversed by the development footprint.

Palaeontology:

» During the field survey of the development footprint (including the two access road alternatives), no fossiliferous outcrops were found. For this reason, a low palaeontological sensitivity is allocated to the development footprint.

Apart from the medium and high sensitivities identified above, the remaining habitat within the study area is considered to be of low sensitivity. Therefore, from an overall environmental sensitivity analysis the location of the development footprint (excluding access road Alternative B) is considered as the most appropriate location for the construction and operation of the project and will not result in detrimental environmental or social impacts.

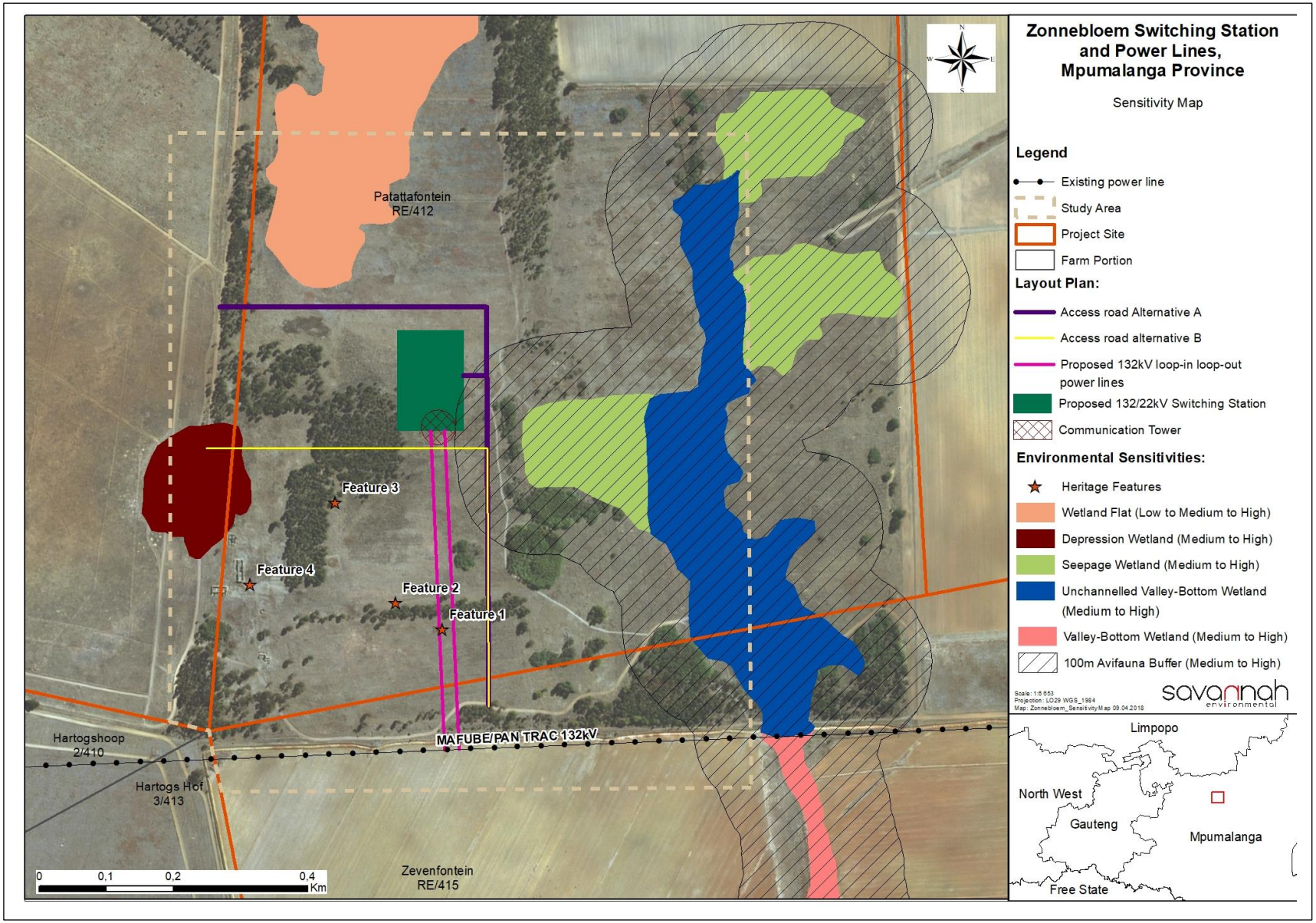


Figure 1.3: Environmental and sensitivity map of the study area and immediate surrounding area proposed for the development of the project (**Appendix G3**).

1.2. Project Activities

The following activities will be undertaken as part of the construction, operation and decommissioning phases of the project.

1.2.1. Construction Phase

The duration of the construction phase for the Zonnebloem Switching Station and all associated infrastructure is expected take approximately 10 months to complete.

Switching station

The proposed Zonnebloem Switching Station is proposed to be construction on the Remaining Extent of the Farm Patattafontein 412. The following sequence will be followed with the construction of the Zonnebloem Switching Station:

Step 1: Conduct geotechnical investigations to determine founding conditions;
Step 2: Conduct site survey;
Step 3: Vegetation clearance and construction of access road;
Step 4: Site grading and levelling;
Step 5: Construction of foundations;
Step 6: Import of switching station components;
Step 7: Construction of switching station;
Step 8: Rehabilitation of disturbed area and protection of erosion sensitive areas; and
Step 9: Testing and commissioning.

Power lines

The two 132kV LILO chickadee power lines considered within this Basic Assessment Report (BAR) will be approximately 500m in length and would be located within the assessed study area. Overhead power lines are constructed in the following simplified sequence:

Step 1: Survey of the routes;
Step 2: Determination of the conductor type;
Step 3: Selection of best-suited conductor, towers, insulators, foundations;
Step 4: Final design of line and placement of towers;
Step 5: Issuing of tenders, and award of contract to construction companies;
Step 6: Vegetation clearance and construction of access roads (where required);
Step 7: Stay pegging;
Step 8: Assembly and erection of towers;
Step 9: Stringing of conductors;
Step 10: Rehabilitation of disturbed area and protection of erosion sensitive areas; and
Step 11: Testing and commissioning.

i. Technical Details

The footprint of the switching station may include a metering station, control building, communication tower and associated infrastructure. The construction of ancillary infrastructure will follow a similar sequence as that of the substation described above. The table below provides an overview of the technical details of the switching station components to be constructed.

Table 5: Technical details of the project components to be constructed and operated

SWITCHING STATION	
Project Component	**Specification**
Mega Volt Ampere	40MVA
Size of the substation	4240m^2
Distance between equipment	9m
Footprint of the development	100m x 100m
Number of transformers	One 40 MVA transformer
Number of feeder bays	Two 132kV feeder bays
Communication tower	Up to 30m in height
Temporary Laydown Area	70,3m x 60,3m
LILO POWER LINES	
Project Component	**Specification**
Pylon Type	Steel monopoles and/or self-supporting towers
Line Capacity	132kV
Pylon Height	20m – 26m on average
Separation distance between the parallel lines	15m
Pylon Separation Distance	Average distance of 200m apart
Pylon foundation footprint	10mx10m (100m^2)
Servitude	32m

High voltage power lines require a large clearance area for safety precautions. The Occupational Health and Safety Act, 1993 (Act No. 85 of 1993) provides for statutory clearances. Minimal distances include:

- Vertical Distance of structures not forming part of the power line should be >3.8m;
- Vertical distance of conductors to the ground should be >6.3m;
- Distance between trees and shrubs and the bare phase conductor should be >3.8m;
- Minimal clearance to other overhead line conductors should be >2m;
- Above roads and in towns, proclaimed roads should be >7.5m.

ii. Access

Ready access is not currently available at the switching station site and as such an access road of up to 8m in width will need to be constructed as part of the construction phase. Two access road alternatives are proposed within the study area and include:

- Alternative A: Access road will be up to 8m wide and approximately 990m in length and will join two existing farm roads (gravel) close to the western and southern boundaries of the study area.
- Alternative B: Access road will be up to 8m wide and approximately 805m in length and will join two existing farm roads (gravel) close to the western and southern boundaries of the study area.

Main access to the study area will be via the Regional Road R104 which connects Middelburg and Belfast or the R555 which connects Middelburg and Stoffberg. Direct Access to study area is possible via the use of existing main roads (gravel). Apart from these, farm entrances and gravel farm roads, including the existing power line service roads can be used where permissible. The proposed access road will be gravel in nature for low-bed trucks and maintenance trucks. Impacts on the surrounding environment associated with the access road alternatives have been assessed within this report.

iii. Waste Management

It is anticipated that construction waste will be generated and will be mainly comprised of soil material from excavation activities as well as metal and cabling offcuts. Non-recyclable waste will be removed from site by a suitable contractor and will be transported to the nearest registered waste disposal facility for appropriate disposal. In order to comply with legal requirements, should there be excess solid construction waste after recycling options have been exhausted, the waste will be transported to the nearest registered waste disposal facility for appropriate disposal.

iv. Dust and Noise

During the construction phase, it is expected that there will be short term, localised dust generation and emissions from vehicles and machinery. However the dust and emissions will be of short term duration and have limited impact in terms of extent and severity. Appropriate dust suppression measures must be implemented to reduce the impacts. It is recommended that construction vehicles be serviced and kept in good mechanical condition in order to minimise possible exhaust emission.

Short term noise impacts are anticipated during the construction phase of the project. It is anticipated that the noise will be localised and contained within the construction area and its immediate surroundings. During operation, maintenance of the substation could potentially generate noise, however this is likely to be minimal. Moreover, the Preferred Substation location is isolated in the environmental and unlikely to pose any noise impacts on sensitive receptors.

v. Water Use

The project will require 5000l of potable water during the construction phase and will be provided by the contractor. No abstraction, storage or discharge of water is expected on site during the construction, operation or decommissioning of the infrastructure.

Several hydrological features have been identified within and surrounding the study area and includes depression wetlands, seepage wetlands and unchannelled valley-bottom wetlands. The ecological condition of these azonal habitats varies from severely degraded and transformed (Depression, Wetland Flat and some of the Seepages) to mostly disturbed and transformed (Valley-bottom Wetland and remaining seepages). A depression wetland located on the southern boundary of the study area is traversed by access road Alternative B. According to the Ecological Impact assessment (refer to

Appendix D1) the significance of the impact of the access road on the depression wetland with the implementation of mitigation measures will be low. The remaining infrastructure falls within the regulated area of the wetlands. No direct impact is expected to occur on wetlands due to the remaining infrastructure. A risk assessment and General Authorisation may be required to be undertaken for the project. No application has been lodged with the Department of Water and Sanitation (DWS) as yet.

1.2.2. Operation and Maintenance

The Zonnebloem Switching Station and the LILO power lines will be operational for more than 20 years and will require routine maintenance work throughout this period. The switching station and power lines will be accessed via existing roads where possible and where required access roads will be established during the construction phase. During the operation and maintenance phase, vegetation around the switching station and within the power line servitudes will require management only if it impacts on the safety and operational objectives of the project. Operation and maintenance of the switching station and power lines will be undertaken by the Eskom.

1.2.3 Decommissioning phase

When the project has reached the end of its economic life, it will be decommissioned. The following decommissioning activities are expected to be undertaken:

a) Site Preparation

Site preparation activities will include confirming the integrity of the access to the site to accommodate the required equipment and the mobilisation of decommissioning equipment.

b) Disassemble Components

The components would be disassembled, reused and recycled (where possible), or disposed of in accordance with regulatory requirements.

c) Rehabilitation

Following decommissioning and removal of all project material from the site, the disturbed areas will be rehabilitated to the pre-project land capability. Where possible, rehabilitation will be conducted concurrently with decommissioning. The following rehabilitation activities are relevant:

- The existing profiles of the land affected will be improved and stabilised thereby leaving profiles compatible with the topography of the area, which is essentially flat.
- Ripping of compacted soils will be done prior to adding topsoil, which will be done by mechanical means. It is expected that there will be a sufficient amount of topsoil and/or subsoil moved and stockpiled during the construction phase to facilitate rehabilitation. If required, areas or land for extracting topsoil or subsoil will be identified. The land capability characteristics of such areas should be similar to the affected soils (same texture, colour, permeability, etc.).
- Vegetation will be re-established. The plant species to be used will match those naturally occurring in the area. This will be conducted in consultation with a biodiversity specialist.

CHAPTER 2: PURPOSE AND OBJECTIVES OF THE EMPR

An EMPr is a set of guidelines and actions aimed at ensuring that construction and/or installation activities, and subsequent management of facilities, are undertaken in a manner that minimises environmental risks and impacts. An effective EMPr is concerned with both the immediate outcome as well as the long-term impacts of the project. The objective of this EMPr is to provide consistent information and guidance for implementing the management and monitoring measures established in the permitting process and help achieve environmental policy goals. The purpose of an EMPr is to ensure continuous improvement of environmental performance, reducing negative impacts and enhancing positive effects during the construction and operational phases of a project.

The EMPr provides specific environmental guidance for the construction, operation and decommissioning phases of a project, and is intended to manage and mitigate construction and operational activities so that unnecessary or preventable environmental impacts do not result. These impacts range from those incurred during start up (i.e. site clearing and site establishment), during the construction activities themselves (i.e. erosion, noise, dust, and visual impacts), during site rehabilitation (i.e. soil stabilisation, re-vegetation), during operation and during decommissioning (i.e. similar to construction phase activities).

This EMPr has been compiled in accordance with Appendix 4, Section 1 of the 2014 EIA Regulations, as amended in April 2017 and will be further developed in terms of specific requirements listed in any authorisations or permit issued for the proposed project. The EMPr has been developed as a set of environmental specifications which are appropriately contextualised to provide clear guidance in terms of the on-site implementation of these specifications (i.e. on-site contextualisation is provided through the inclusion of expected impacts of activities and various monitoring and implementation tools for the management measures).

This EMPr has the following objectives:

- Outline impact management objectives and environmental specifications which are required to be implemented for the planning, construction and rehabilitation, operation, and decommissioning phases of the project in order to manage and minimise the extent of potential environmental impacts associated with the project.
- Ensure that all the phases of the project do not result in undue or reasonably avoidable adverse environmental impacts, and ensure that any potential positive environmental benefits are enhanced.
- Identify entities responsible for the implementation of the measures and outline functions and responsibilities.
- Propose mechanisms and frequency for monitoring compliance, and preventing long-term or permanent environmental degradation.
- Facilitate appropriate and proactive responses to unforeseen events or changes in project implementation that was not considered in the BA process.

The management and mitigation measures identified within the BA process are systematically addressed in this EMPr, and ensure the minimisation of identified adverse environmental impacts to an acceptable level. This EMPr has been prepared as part of the environmental authorisation process for the proposed grid connection infrastructure.

This EMPr shall be binding on all the relevant parties and as contained in this EMPr, involved in the construction, operational and decommissioning phases of the project, and shall be enforceable at all levels of contract and operational management within the project.

The EMPr is a dynamic document, which must be updated to include any additional specifications as and when required. It is considered critical that this EMPr be updated to include site-specific information and specifications following the final walk-through survey by specialists of the proposed project as a whole. This will ensure that the construction and operation activities are planned and implemented considering sensitive environmental features. Any amendments must be approved by the Competent Authority (i.e. DEA) prior to implementation, unless these are required to address an emergency situation.

Eskom must ensure that the implementation of the project complies with the requirements of all environmental authorisations, permits, and obligations emanating from relevant environmental legislation. This obligation is partly met through the development and the implementation of this EMPr and through its integration into the contract documentation. Since this EMPr is part of the BA process, it is important that this document be read in conjunction with the Basic Assessment Report compiled for this project. This will contextualise the EMPr and enable a thorough understanding of its role and purpose in the integrated environmental management process. Should there be a conflict of interpretation between this EMPr and the environmental authorisation, the stipulations in the environmental authorisation shall prevail over that of the EMPr, unless otherwise agreed by the authorities in writing. Similarly, any provisions in legislation overrule any provisions or interpretations within this EMPr.

CHAPTER 3: STRUCTURE OF THIS EMPR

The first two chapters provide background to the EMPr and the proposed project, while the chapters which follow consider the following:

- Pre-construction, planning and design activities;
- Construction activities;
- Rehabilitation activities;
- Operation activities; and
- Decommissioning activities.

These chapters set out the procedures necessary for Eskom SOC Ltd as the project owner, to minimise environmental impacts and achieve environmental compliance. For each of the phases of implementation, an overarching environmental **goal** is stated. In order to meet this goal, a number of **objectives** are listed. The EMPr has been structured in a table format in order to show the links between the goals for each phase and their associated impact management objectives, activities/risk sources, mitigation actions and management statements, monitoring requirements and performance indicators. A specific EMPr table has been established for each environmental impact management objective. The information provided within the EMPr table for each objective is outlined below.

OBJECTIVE: Description of the objective, which is necessary to meet the overall goals; which take into account the findings of the BA specialist studies

Project Component/s	» List of project components affecting the objective.
Potential Impact	» Description of the potential environmental impact if objective is not met.
Activity/Risk Source	» Description of activities which could affect achieving the objective.
Mitigation: Target/Objective	» Description of the target and/or desired outcomes of mitigation.

Mitigation: Action/Control	**Responsibility**	**Timeframe**
Lists specific action(s) required to meet the mitigation target/objective described above.	Who is responsible for the measures?	Periods for implementation.

Performance Indicator	Description of key indicator(s) that track progress/indicate the effectiveness of the EMPr.
Monitoring	Mechanisms for monitoring compliance; the key monitoring actions required to check whether the objectives are being achieved, taking into consideration responsibility, frequency, methods, and reporting.

The objectives and EMPr tables are required to be reviewed and possibly modified whenever changes, such as the following, occur:

- Planned activities change;

» Modification to or addition to environmental objectives and targets;
» Relevant legal or other requirements are changed or introduced; or
» Significant progress has been made in achieving an objective or target such that it should be re-examined to determine if it is still relevant, should be modified, etc.

3.1. Project Team

This EMPr was compiled by and had input from:

Inputs	Name	Company
EMPr Compilers:	Thalita Botha Sharon Meyer	Savannah Environmental
Ecological impact assessment	Gerhard Botha	Eco-Care Consultancy
Avifaunal impact assessment	Gerhard Botha	Eco-Care Consultancy
Heritage impact assessment	Jaco van der Walt	Heritage Contracts and Archaeological Consulting (HCAC));
Palaeontological impact assessment	Elize Butler	Banzai Environmental

The Savannah Environmental team has extensive knowledge and experience in EIAs and environmental management, having been involved in BA processes & EIAs over the past 10 years. The team has managed and drafted EMPrs for other large infrastructure and power distribution projects throughout South Africa.

3.2. Details of the EAP

The consulting team from Savannah Environmental who are responsible for this project are:

» *Thalita Botha* -Responsible for the compilation of this EMPr. She holds a Bachelor degree with Honours in Environmental Management and has 02 years of experience in the environmental field. Her key focus is on environmental impact assessments, public participation, environmental management plans and programmes, as well as mapping using ArcGIS for a variety of environmental projects
» *Sharon Meyer* - Is the principal EAP for the project. Has 17 years of work experience in the environmental consulting space. She has an MSc in Environmental Management and Zoology. She is a *Pr. Sci. Nat.* with SACNASP (400293/05), and her particular focus is on integrated Environmental Authorisation Processes, managing multi-disciplinary teams on complex energy projects. She works closely with the client, authorities and stakeholders to identify practical solutions to project challenges.
» *Gabriele Stein* - Holds an Honours Degree in Anthropology, with 6 years consulting experience in public participation and social research. Her experience includes the design and implementation of public participation programmes and stakeholder management strategies for numerous integrated development planning and infrastructure projects. Her work focuses on managing the public participation component of Environmental Impact Assessments and Basic Assessments undertaken by Savannah Environmental.

Curricula vitae for the Savannah Environmental project team **and specialist consultants** are included in **Appendix G of the Basic Assessment Report**.

CHAPTER 4: MANAGEMENT PROGRAMME: PRE- CONSTRUCTION

Overall Goal: Undertake the pre-construction (planning and design) activities in a way that:

- Ensures that the design responds to the identified environmental constraints and opportunities.
- Ensures that pre-construction activities are undertaken in accordance with all relevant legislative requirements
- Ensures that adequate regard has been taken of any landowner and community concerns and that these are appropriately addressed through design and planning (where appropriate).
- Ensures that the best environmental options are selected for the linear components, including the access roads.
- Enables the construction activities to be undertaken without significant disruption to other land uses and activities in the area.

In order to meet this goal, the following objectives have been identified, together with necessary actions and monitoring requirements.

4.1. Objectives

OBJECTIVE 1: Ensure the design responds to identified environmental constraints and opportunities

The main impact associated with the construction of the switching station, LILO power lines and associated infrastructure is likely to result from vegetation clearing. This includes habitat loss and disturbance for endemic fauna and flora. Vegetation clearing is necessary and required.

Project Component/s	» Switching Station and Ancillaries » Loop-in-loop-out power lines » Access roads
Potential Impact	» Soil erosion » Impacts on flora and fauna » Loss of protected plant species » Impacts on sensitive habitats
Activities/Risk Sources	» Positioning of the substation and new access roads » Construction not being confined as far as possible to area of impact
Mitigation: Target/Objective	» The design responds to the identified environmental constraints and opportunities

Mitigation: Action/Control	Responsibility	Timeframe
Plan and conduct pre-construction activities in an environmentally acceptable manner.	Eskom	Pre-construction
Pre-construction walk-through of the final development footprint for species of conservation concern that would be affected and that can be translocated.	Eskom	Pre-construction
Implement the preferred access road alternative as recommended in	Eskom	Design

Mitigation: Action/Control	Responsibility	Timeframe
the Basic Assessment Report.		
Plan to use motion sensor triggered lighting at the switching station.	Eskom	Planning
Obtain any additional environmental permits required (such as a water use license, biodiversity permits, etc.).	Eskom	Project planning
A rehabilitation plan that specifies the rehabilitation process should be compiled.	Eskom	Pre-construction
Undertake negotiations with affected landowners and agree on landowner-specific conditions for construction and maintenance	Eskom	Project planning
Plan to use existing roads as far as possible. Any new access roads must be carefully planned to minimise the impacted area and prevent unnecessary excavation, placement, and compaction of soil.	Eskom	Planning/ Design Phase
All relevant perching surfaces should be fitted with bird guards and perch guards as deterrents to avoid perching on live electrical structures at the substation. The installation of artificial bird space perches and nesting platforms, at a safe distance from energised components.	Eskom	Design phase
Bird-friendly power line tower and conductor designs must be used. The tower designs used should be those which are poorly suited to serve as nesting substrates by most bird species and with perching areas situated in areas either off-set or well away from the conductors.	Eskom	Design phase
Compile an appropriate storm water management plan.	Contractor	Pre-construction
Plan to install anti-collision devices such as bird flappers onto the power lines	Eskom	Design phase
Ensure that Heritage resources (if any identified during pre-construction / construction) are preserved in situ as far as possible.	Eskom in consultation with Specialist	Pre-construction
The terms of this EMPr and the Environmental Authorisation (once issued) must be included in all tender documentation and Contractors contracts.	Eskom	Tender process

Performance Indicator	» The design meets the objectives and does not significantly degrade the environment. » Design and layouts respond to the mitigation measures and recommendations in the BA Report.
Monitoring	» Review of the design by Eskom and the project manager prior to the commencement of construction. » Review of the alignment of the servitude by the Environmental Control Officer (ECO) prior to the commencement of construction.

OBJECTIVE 2: To ensure effective communication mechanisms

On-going communication with affected and surrounding landowners is important to maintain during the construction and operation phases of the switching station, LILO power lines and associated infrastructure. Any issues and concerns raised should be addressed as far as possible in as short a timeframe as possible.

Project component/s	» Switching Station and Ancillaries » Loop-in-loop-out power lines

	» Access roads
Potential Impact	» Impacts on affected and surrounding landowners and land uses
Activity/risk source	» Activities associated with the construction and operation of the switching station and associated infrastructure
Mitigation: Target/Objective	» Effective communication with affected and surrounding landowners » Addressing of any issues and concerns raised as far as possible in as short a timeframe as possible

Mitigation: Action/control	**Responsibility**	**Timeframe**
The Eskom approved grievance mechanism procedure for the public must be followed and implemented during both the construction and operational phases of the project.	Eskom	Project life cycle
Develop and implement a grievance mechanism for the construction, operation and decommissioning phases of the project for all employees, contractors, subcontractors and site personnel. This procedure should be in line with the South African Labour Law.	Eskom	Project life cycle)
Liaison with landowners is to be undertaken prior to the commencement of construction in order to provide sufficient time for them to plan agricultural activities.	Eskom	Pre-construction

Performance Indicator	» Effective communication procedures in place.
Monitoring	» An incident reporting system should be used to record non-conformances to the EMPr.

CHAPTER 5: MANAGEMENT PROGRAMME: CONSTRUCTION

Overall Goal: Undertake the construction phase in a way that:

- Ensures that construction activities are appropriately managed in respect of environmental aspects and impacts.
- Enables construction activities to be undertaken without significant disruption to other land uses and activities in the area, in particular concerning noise impacts, farming practices, traffic and road use, and effects on local residents.
- Minimises the impact on the indigenous natural vegetation, and habitats of ecological value.
- Minimises impacts on fauna (including birds) in the study area.
- Minimises the impact on heritage sites should they be uncovered.
- Establishes an environmental baseline during construction activities on the site, where possible.

5.1. Institutional Arrangements: Roles and Responsibilities for the Construction Phase

As the proponent, Eskom must ensure that the project complies with the requirements of all environmental authorisations and permits, and obligations emanating from other relevant environmental legislation. This obligation is partly met through the development of the EMPr, and the implementation of the EMPr through its integration into the contract documentation. Eskom will retain various key roles and responsibilities during the construction phase.

OBJECTIVE 1: Establish clear reporting, communication, and responsibilities in relation to overall implementation of the EMPr

Formal responsibilities are necessary to ensure that key procedures are executed. Specific responsibilities of the Project Manager; Site Manager; the Environmental Officer (EO), Environmental Control Officer (ECO) and Contractor for the construction phase of this project are as detailed below. Roles and responsibilities should be confirmed and updated throughout the construction phase in order to ensure effective environmental management and communication between parties.

Technical Director is responsible for overall management of project and EMPr implementation. The following tasks will fall within his/her responsibilities:

- Ensure all specifications and legal constraints specifically with regards to the environment are highlighted to the Contractor(s) so that they are aware of these.
- Ensure that Eskom and its Contractor(s) are made aware of all stipulations within the EMPr.
- Commission internal audits of the construction phase against the EMPr.
- Ensure that the EMPr is correctly implemented throughout the project by means of site inspections and meetings. This will be documented as part of the site meeting minutes.
- Be fully conversant with the BA for the project, the EMPr, the conditions of the Environmental Authorisation (once issued), and all relevant environmental legislation.
- Ensure that transgressions are rectified through the implementation of corrective action contained in this EMPr.

Site Manager (Eskom's on-site Representative) will:

- Be fully knowledgeable with the contents of the BA and risk management.
- Be fully knowledgeable with the contents and conditions of the Environmental Authorisation (once issued).
- Monitor site activities on a daily basis for compliance.
- Be fully knowledgeable with the contents of the EMPr.
- Be fully knowledgeable with the contents of all relevant environmental legislation, and ensure compliance with these.
- Have overall responsibility of the EMPr and its implementation.
- Conduct audits to ensure compliance to the EMPr.
- Ensure there is communication with the Project Manager, the ECO, and relevant discipline engineers on matters concerning the environment.
- Ensure that no actions are taken which will harm or may indirectly cause harm to the environment, and take steps to prevent pollution on the site.
- Confine activities to the demarcated construction site.

An independent **Environmental Control Officer (ECO)** must be appointed by Eskom prior to the commencement of any authorised activities and will be responsible for monitoring, reviewing and verifying compliance by the Contractor with the environmental specifications of the EMPr and the conditions of the Environmental Authorisation. Accordingly, the ECO will:

- Be fully knowledgeable with the contents of the BA.
- Be fully knowledgeable with the contents of the conditions of the Environmental Authorisation (EA) (once issued).
- Be fully knowledgeable with the contents of the EMPr.
- Be fully knowledgeable of all the licences and permits issued to the site.
- Be fully knowledgeable with the contents of all relevant environmental legislation, and ensure compliance with them.
- Ensure that the contents of this document are communicated to the Contractor site staff and that the Site Manager and Contractor are constantly made aware of the contents through discussion.
- Ensure that the compliance of the EMPr, EA and the legislation is monitored through regular and comprehensive inspection of the site and surrounding areas.
- Ensure that if the EMPr, EA and/or the legislation conditions, regulations or specifications are not followed then appropriate measures are undertaken to address any non-compliances (for example an ECO may cease construction or an activity to prevent a non-compliance from continuing).
- Monitoring and verification must be implemented to ensure that environmental impacts are kept to a minimum, as far as possible.
- Ensure that the Site Manager has input into the review and acceptance of construction methods and method statements.
- Ensure that activities on site comply with all relevant environmental legislation.
- Ensure that a removal is ordered of any person(s) and/or equipment responsible for any contravention of the specifications of the EMPr.
- Keep record of all activities on site, problems identified, transgressions noted and a task schedule of tasks undertaken by the ECO.

- Ensure that the compilation of progress reports for submission to the Project Manager, with input from the Site Manager, takes place on a regular basis, including a final post-construction audit.
- Ensure that there is communication with the Site Manager regarding the monitoring of the site.
- Ensure that any non-compliance or remedial measures that need to be applied are reported.
- Keep record of all activities on site, problems identified, transgressions noted and a task schedule of tasks undertaken by the ECO.
- Submit independent reports to the DEA and other regulating authorities regarding compliance with the requirements of the EMPr, EA and other environmental permits. This can be done upon request from the Competent Authority.

Contractors and Service Providers are responsible for the overall execution of the activities envisioned in the construction phase including the implementation and compliance with recommendations and conditions of the EMPr as well as the EA (once issued). It is important that contractors are aware of the responsibilities in terms of the relevant environmental legislation and the contents of this EMPr. The contractor is responsible for informing employees and sub-contractors of their environmental obligations in terms of the environmental specifications, and for ensuring that employees are adequately experienced and properly trained in order to execute the works in a manner that will minimise environmental impacts. The contractor's obligations in this regard include the following:

- Ensure implementation and compliance with the EMPr at all times during construction activities and maintain, inter alia, an environmental register which keeps a record of all environmental incidents which occurs on the site during the construction of the Project.
- Ensure that the compliance of the EMPr, EA and the legislation is monitored through regular and comprehensive inspection of the site and surrounding areas.
- Ensure that if the EMPr, EA and/or the legislation conditions, regulations or specifications are not followed then appropriate measures are undertaken to address any non-compliances (for example an ECO may cease construction or an activity to prevent a non-compliance from continuing, if reasonable).
- Implementation of corrective actions recommended by the EO/ Environmental Representative, for non-conformances recorded by the ECO, and Project Coordinator within a reasonable period.

The **Contractor's Safety, Health and Environment Representative** should:

- Be well versed in environmental matters.
- Understand the relevant environmental legislation and processes.
- Understand the hierarchy of Environmental Compliance Reporting, and the implications of Non-Compliance.
- Know the background of the project and understand the implementation programme.
- Be able to resolve conflicts and make recommendations on site in terms of the requirements of this Specification.
- Keep accurate and detailed records of all EMPr-related activities on site.

5.2. Objectives

In order to meet the overall goal for construction, the following objectives, actions, and monitoring requirements have been identified.

OBJECTIVE 2: Minimise impacts related to site establishment

The contractor must take all reasonable measures to ensure the safety of the public in the surrounding area. In order to minimise impacts on the surrounding environment, contractors must be required to adopt a certain Code of Conduct and commit to restricting construction activities to areas within the development footprint. Contractors and their sub-contractors must be familiar with the conditions of the Environmental Authorisation, the BA Report, and this EMPr, as well as the requirements of all relevant environmental legislation.

Project Component/s	» Switching Station and Ancillaries » Loop-in-loop-out power lines » Access roads
Potential Impact	» Hazards to landowners and public. » Damage to indigenous natural vegetation. » Loss of threatened plant species.
Activities/Risk Sources	» Excavations. » Movement of construction vehicles in the area and on-site.
Mitigation: Target/Objective	» To secure the site against unauthorised entry. » To protect members of the public/landowners/residents. » No loss of or damage to sensitive vegetation in areas outside the immediate development footprint.

Mitigation: Action/Control	Responsibility	Timeframe
Secure site, working areas and excavations in an appropriate manner, as agreed with the Site Manager and EO.	Contractor	Site establishment, and duration of construction
Where necessary control access, fence, and secure area.	Contractor	Site establishment, and duration of construction
The siting of the construction equipment camp/s must take cognisance of any sensitive areas identified by the independent specialist studies and reflected on the sensitivity map (**Figure 1.3**).	Contractor	Site establishment
Plan the placement of laydown areas and temporary construction equipment camps in order to minimise vegetation clearing (i.e. in already disturbed areas) wherever possible.	Contractor	Site establishment, and duration of construction
Fence and secure contractor's equipment camp.	Contractor	Site establishment
Site access should be controlled and no unauthorized persons should be allowed onto the site.	Contractor	Site establishment and duration of construction
As far as possible, minimise vegetation clearing and levelling for equipment storage areas.	Contractor	Site establishment, and during construction
Where the public could be exposed to danger by any of the works or site activities, the contractor must, as appropriate, provide suitable flagmen, barriers and/or warning signs in English, Afrikaans	Contractor	Site establishment and duration of construction

Mitigation: Action/Control	Responsibility	Timeframe
and any other relevant local languages.		
All unattended open excavations must be adequately demarcated and/or fenced. Adequate protective measures must be implemented to prevent unauthorised access to the working area and the access routes.	Contractor	Site establishment and duration of construction
Establish appropriately bunded areas for storage of hazardous materials (i.e. fuel/chemicals to be required during construction).	Contractor	Site establishment
The development footprint for the proposed project should be appropriately fenced off and clearly demarcated.	Contractor	Site establishment, and duration of construction
Provide adequate sanitation facilities and ablutions for construction workers (1 toilet per every 15 workers) within appropriate walking distance of the work area/s. Separate toilets should be provided for men and women. Provide sanitary bins for female workers.	Contractor	Site establishment, and duration of construction
Supply adequate (closable, tamper proof) waste collection bins at site where construction is being undertaken.	Contractor	Site establishment, and duration of construction
Separate bins should be provided for recyclable, general and hazardous waste.	Contractor	Site establishment, and duration of construction

Performance Indicator	» Site is secure and there is no unauthorised entry. » The construction equipment camps have avoided sensitive areas. » Appropriate and adequate waste management and sanitation facilities provided at construction site.
Monitoring	» An incident reporting system must be used to record non-conformances to the EMPr. » ECO to monitor all construction areas on a continuous basis until all construction is completed. Non-conformances must be immediately reported to the site manager.

OBJECTIVE 3: Appropriate management of the construction site and construction workers

Project Component/s	» Switching Station and Ancillaries » Loop-in-loop-out power lines » Access roads
Potential Impact	» Damage to indigenous natural vegetation and sensitive areas. » Damage to and/or loss of topsoil (i.e. pollution, compaction etc.). » Impacts on the surrounding environment due to inadequate sanitation and waste removal facilities. » Pollution/contamination of the environment.
Activities/Risk Sources	» Vegetation clearing and levelling of equipment storage area/s. » Access to and from the equipment storage area/s. » Ablution facilities. » Contractors not aware of the requirements of the EMPr, leading to unnecessary impacts on the surrounding environment.
Mitigation: Target/Objective	» Limit equipment storage within demarcated designated areas. » Ensure adequate sanitation facilities and waste management practices.

	» Ensure appropriate management of actions by on-site personnel in order to minimise impacts to the surrounding environment.

Mitigation: Action/Control	Responsibility	Timeframe
Ensure that all personnel have the appropriate level of environmental awareness and competence to ensure continued environmental due diligence and on-going minimisation of environmental harm. This can be achieved through the provision of appropriate environmental awareness training to all personnel. Records of all training undertaken must be kept. Topics must include, but are not limited to: » What is meant by "Environment" » Why the environment needs to be protected and conserved » How construction activities can impact on the environment » Awareness of emergency and spills response provisions » Social responsibility during construction activities, e.g. being considerate to local residents	Contractor	Duration of construction
Contractors must use chemical toilets/ablution facilities provided on site. No ablution activities will be permitted outside the designated areas.	Contractor and sub-contractor/s	Duration of contract
Ensure ablution facilities are appropriately maintained. Ablutions must be cleaned regularly and associated waste disposed of at a permitted wastewater treatment facility. Ablutions must be removed from site when construction is completed.	Contractor	Duration of construction
Cooking and eating of meals must take place in a designated area.	Contractor and sub-contractor/s	Duration of contract
No firewood or kindling may be gathered from the site or surrounds.	Contractor and sub-contractor/s	Duration of contract
No open fires are permitted on site and construction personnel must be made aware of the consequences of starting a fire on site to avoid damage to neighbouring farms.	Contractor and sub-contractor/s	Duration of contract
A firebreak should be maintained around the development boundary to avoid potential fires occurring within the facility from spreading into the surrounding grasslands, subsequently posing a threat to faunal species occurring within the surrounding environment.	Contractor and sub-contractor/s	Duration of contract
All litter must be deposited in a clearly marked, closed, animal-proof disposal bin in the construction area. Particular attention needs to be paid to food waste.	Contractor and sub-contractor/s	Duration of contract
Ensure waste containers are maintained and emptied on a regular basis.	Contractor	Duration of construction
Ensure waste is removed from site on a regular basis and disposed of at an appropriately licensed waste disposal facility.	Contractor	Duration of construction
No plants may be collected from site for medicinal or any other purpose.	Contractor	Duration of contract
No one may disturb flora or fauna outside of the demarcated construction area/s.	Contractor and sub-contractor/s	Duration of contract
Firefighting equipment and training must be provided before the construction	Contractor	Duration of

Mitigation: Action/Control	Responsibility	Timeframe
phase commences and must be maintained in working order throughout construction.	and sub-contractor/s	contract
A Code of Conduct for construction workers should be compiled and implemented.	Contractor and sub-contractor/s	Construction
Contractors must ensure that all workers are informed of the conditions contained in the EMPr before commencing work, specifically consequences of stock theft and trespassing on adjacent farms.	Contractor and sub-contractor/s	Construction
On completion of the construction phase, all construction workers must leave the site.	Contractor and sub-contractor/s	Construction
Rehabilitate all disturbed areas as soon as construction is complete within an area. No exotic plants may be used in rehabilitation. Only indigenous plants of the area may be used.	Contractor	Contraction

Performance Indicator	» Ablution and waste removal facilities are in a good working order and do not pollute the environment due to mismanagement. » Excess vegetation clearing and levelling is not undertaken. » No complaints regarding contractor behaviour or habits. » Appropriate training of all staff is undertaken prior to them commencing work on the construction site. » Code of Conduct drafted before commencement of construction phase. » All areas are rehabilitated promptly after construction in an area is complete.
Monitoring	» Regular audits of the construction camps and areas of construction on site by the ECO. » Proof of disposal of sewage at an appropriate licensed wastewater treatment works. » Proof of disposal of waste at an appropriate licensed waste disposal facility. » Observation and supervision of Contractor practices throughout construction phase by the Contractor's EO. » Complaints must be investigated and, if appropriate, acted upon. » An incident reporting system must be used to record non-conformances to the EMPr.

OBJECTIVE 4: Ensure regulation of construction and maintenance vehicles to-site, on-site and off-site

The construction phase of the project will be the most significant in terms of generating traffic impacts; resulting from the transport of equipment and materials and construction crews to the site and the return of the vehicles after delivery of materials.

Project Component/s	» Switching Station and Ancillaries » Loop-in-loop-out power lines » Access roads
Potential Impact	» Impact of construction vehicles on road surfaces, and possible increased risk in accidents involving people and animals. » Deterioration of road pavement conditions (both surfaced and gravel road) due to increased traffic.
Activities/Risk Sources	» Construction vehicle movement. » Speeding on local roads.

	» Degradation of local road conditions. » Site preparation and earthworks. » Foundations or plant equipment installation. » Transportation of ready-mix cement from off-site batching plant to the site if required. » Mobile construction equipment movement on-site. » Construction activities related to the project
Mitigation: Target/Objective	» Minimise the impact of traffic on local traffic volumes, existing infrastructure, property owners, animals, and road users. » To ensure all vehicles are roadworthy and all materials/ equipment are transported appropriately and within any imposed permit/licence conditions.

Mitigation: Action/Control	Responsibility	Timeframe
Construction vehicles and those transporting materials and goods should in good working order and not overloaded. Proof in this regard should be provided by the transport contractor on request.	Transport Contractor	Construction
All relevant permits for abnormal loads must be applied for from the relevant authority.	Contractor (or appointed transportation contractor)	Pre-construction
A designated access to the proposed site must be created to ensure safe entry and exit.	Contractor	Pre-construction
No unnecessary deviation from approved transportation or construction routes must be allowed, unless roads are closed for whatever reason outside the control of the contractor.	Contractor	Duration of contract
Appropriate dust suppression techniques must be implemented to minimise dust from gravel roads. These could include the use of water or other appropriate dust suppressants, as determined by the local site conditions.	Contractor	Construction
Appropriate road management strategies must be implemented, and all employees and contractors required must be required to abide by standard road and safety procedures.	Contractor (or appointed transportation contractor)	Pre-construction
Any traffic delays resulting from the presence of construction traffic must be co-ordinated with the appropriate authorities.	Contractor	Duration of contract
The movement of all vehicles within the study area must be on designated roadways.	Contractor	Duration of contract
Signage must be established at appropriate points warning of turning traffic and the construction site (all signage to be in accordance with prescribed standards).	Contractor	Duration of contract
Signs must be placed along construction roads to identify speed limits, travel restrictions, and other standard traffic control information. Signage must be appropriately maintained for the duration of the construction period.	Contractor	Duration of contract
A speed limit of 30km/h should be implemented for vehicles travelling on site in order to minimise dust generation and ensure safety of personnel and the environment and lessen environmental degradation	Contractor	Duration of contract
All construction vehicles and/or machineries travelling on public roads must adhere to the specified speed limits and all drivers must be in possession of an appropriate valid driver's license.	Contractor	Duration of contract
Ensure that there is adequate signage along all roads to be used throughout the project and that there are effective control measures to make local	Contractor	Duration of contract

Mitigation: Action/Control	Responsibility	Timeframe
residents and road users are aware of vehicle movements and schedules.		
Ensure that any damage to roads attributed to construction activities is repaired before completion of the construction phase.	Contractor	Construction

Performance Indicator	» Vehicles keeping to the speed limits » Vehicles are in good working order and safety standards are implemented » Local residents and road users are aware of vehicle movements and schedules » No construction traffic related accidents are experienced » Local road conditions and road surfaces are not unnecessarily degraded by development » Complaints of residents are not received (e.g. concerning the speeding of heavy vehicles) » Drivers are aware of the potential safety issues and enforcement of strict speed limits when they are employed
Monitoring	• Proponent, Contractor or appointed ECO (whichever is more applicable) must monitor performance indicators to ensure that they have been effectively implemented.

OBJECTIVE 5: To avoid and or minimise the potential impact of the activities during the construction on the safety of local communities and the potential loss of stock and damage to farm infrastructure

Project Component/s	» Switching Station and Ancillaries » Loop-in-loop-out power lines » Access roads
Potential Impact	» Impact on safety of farmers and communities and potential loss of livestock and damage to farm infrastructure, such as gates and fences. » Impact on agricultural practices
Activities/Risk Sources	» The presence of construction workers on the site and people in the area seeking employment can pose a potential safety risk to local farmers and communities and may result in stock thefts. The activities of construction workers may also result in damage to farm infrastructure.
Mitigation: Target/Objective	» To avoid and or minimise the potential impact on local communities and their livelihoods.

Mitigation: Action/Control	Responsibility	Timeframe
Ensure that all farm gates are locked and secure at all times.	Contractor	Construction and Operation
Inform all landowners of activity on their land at least 2 days in advance of planned activities.	Contractor	All phases of the project
The construction site should be fenced and access to the area controlled.	Contractor	All phases of project
Procedures and measures to prevent, and in worst cases, attend to fires should be developed in consultation with the surrounding property owners.	Eskom Contractor	Pre- construction and when required
Employees, visitors and/or subcontractors should be made well aware of the consequences of any damage to private property and/or loss of	Contractor	Duration of contract

Mitigation: Action/Control	Responsibility	Timeframe
livestock, game and/or other fauna.		
Should there be any damage to private property and/or loss of livestock, game and/or other fauna that can be linked to the Contractor, or any subcontractor, the landowner shall be compensated accordingly upon sufficient proof thereof.	Project Company/Contractor	Duration of contract
Contact details of emergency services should be prominently displayed on site.	Contractor	Construction
Establish and communicate employment procedures to the community and municipal representatives.	Contractor	Construction

Performance Indicator	» No criminal activities and theft of livestock, illegal hunting or trapping of game and/or other fauna attributable to the construction workers are reported. » No complaints received from landowners or the general public. » No fires or on-site accidents occur.
Monitoring	» Eskom and appointed ECO must monitor indicators listed above to ensure that they have been implemented.

OBJECTIVE 6: Management of dust and air emissions

During the construction phase, limited gaseous or particulate emissions are anticipated from exhaust emissions from construction vehicles and equipment on-site, as well as vehicle entrained dust from the movement of vehicles on the main and internal access roads.

Project Component/s	» Switching Station and Ancillaries » Loop-in-loop-out power lines » Access roads
Potential Impact	» Dust and particulates from vehicle movement to and on-site, foundation excavation, road construction activities, road maintenance activities, temporary stockpiles, and vegetation clearing affecting the surrounding residents and visibility. » Release of minor amounts of air pollutants (for example NO_2, CO and SO_2) from vehicles and construction equipment
Activities/Risk Sources	» Clearing of vegetation and topsoil. » Excavation, grading, scraping, levelling, digging, drilling. » Transport of materials, equipment, and components on internal access roads. » Re-entrainment of deposited dust by vehicle movements. » Wind erosion from topsoil and spoil stockpiles and unsealed roads and surfaces. » Fuel burning vehicle and construction engines.
Mitigation: Target/Objective	» To ensure emissions from all vehicles and construction engines are minimised, where possible, for the duration of the construction phase » To minimise nuisance to the community from dust emissions and to comply with workplace health and safety requirements for the duration of the construction phase

Mitigation: Action/Control	Responsibility	Timeframe
Access roads must be maintained in a manner that will ensure that nuisance from dust emissions from road or vehicle sources are not visibly excessive.	Contractor	Construction

Mitigation: Action/Control	Responsibility	Timeframe
Appropriate dust suppressant must be applied on all exposed areas and stockpiles as required to minimise/control airborne dust. These could include the use of water or other appropriate dust suppressants, as determined by the local site conditions.	Contractor	Duration of contract
Haul vehicles moving outside the construction site carrying material that can be wind-blown must be covered with tarpaulins.	Contractor	Duration of contract
A speed limit of 30km/h should be implemented for vehicles travelling on site in order to minimise dust generation and ensure safety of personnel and the environment.	Contractor	Duration of contract
Drivers must be made aware of the potential safety issues and enforcement of strict speed limits when they are employed.	Contractor	Pre-construction
Dust-generating activities or earthworks may need to be rescheduled or the frequency of application of dust control/suppressant increased during periods of high winds if excessive visible dust is blowing toward nearby residences outside the site.	Contractor	Duration of contract
Disturbed areas must be re-vegetated as soon as practicable in line with the progression of construction activities.	Contractor	Completion of construction
Vehicles and equipment must be maintained in a road-worthy condition at all times.	Contractor	Duration of contract

Performance Indicator	» No complaints from affected residents or community regarding dust or vehicle emissions. » Dust suppression measures implemented for all areas that require such measures during the construction phase. » Road-worthy certificates in place for all heavy vehicles at the outset of the construction phase and monitored on a monthly basis.
Monitoring	» Immediate reporting by personnel of any potential or actual issues with nuisance dust or emissions to the Site Manager. » An incident reporting system must be used to record non-conformances to the EMPr. » Public complaints register must be developed and maintained on site.

OBJECTIVE 7: Minimisation of soil degradation and erosion, as well as disturbance to topsoil

Soil degradation including erosion (by wind and water) and subsequent deposition elsewhere is of a concern in areas underlain by fine grained soil which can be mobilised when disturbed, even on relatively low slope gradients (accelerated erosion). Uncontrolled run-off relating to construction activity will also lead to accelerated erosion. Degradation of the natural soil profile due to excavation, stockpiling, compaction, pollution and other construction activities will affect soil forming processes and associated ecosystems. A set of strictly adhered to mitigation measures are required to be implemented in order to effectively limit the impact on the environment as outline below.

Project Component/s	» Switching Station and Ancillaries » Loop-in-loop-out power lines » Access roads.

Potential Impact	» Impacts on soil. » Loss of topsoil. » Soil and rock degradation. » Soil erosion. » Increased deposition of soil into drainage systems in the surrounding area. » Increased run-off over the site.
Activity/Risk Source	» Site preparation and earthworks. » Excavation of foundations. » Construction of access road. » Site preparation (e.g. compaction). » Switching station and power line construction activities. » Stockpiling of topsoil, subsoil and spoil material. » Rainfall - water erosion of disturbed areas. » Wind erosion of disturbed areas. » Concentrated discharge of water from construction activity.
Mitigation: Target/Objective	» To retain natural vegetation, where possible » Minimise extent of disturbance areas. » Minimise activity within disturbance areas. » Minimise soil degradation (mixing, wetting, compaction, etc.). » Minimise soil erosion. » Minimise instability of embankments/excavations. » To ensure appropriate removal, storage and reuse of topsoil in areas. » Minimise spoil material.

Mitigation: Action/Control	Responsibility	Timeframe
Areas to be cleared must be clearly marked on-site to eliminate the potential for unnecessary clearing.	Contractor in consultation with Specialist	Pre-construction
Practical phased development and vegetation clearing should be practiced so that cleared areas are not left un-vegetated and vulnerable to erosion for extended periods of time.	Contractor	Site establishment & duration of contract
Stockpiled topsoil should be covered to prevent erosion if deemed necessary by the EO.	Contractor	Site establishment & duration of contract
Erosion control measures should be implemented in areas where soil has been disturbed due to construction activities.	Contractor	Site establishment & duration of contract
All roads and other hardened surfaces should have runoff control features which redirect water flow and dissipate any energy in the water which may pose an erosion risk.	Contractor	Site establishment & duration of contract
Re-instate as much of the eroded area to its pre-disturbed, "natural" geometry (no change in elevation and any banks not to be steepened).	Contractor	Site establishment & duration of contract
No activities must take place outside of demarcated construction site.	Contractor	Site

Mitigation: Action/Control	Responsibility	Timeframe
		establishment & duration of contract
All bare areas, as a result of the development, should be revegetated as soon as possible with locally occurring species, to bind the soil and limit erosion potential.	Contractor	Site establishment & duration of contract
Topsoil should be removed and stored separately and should be reapplied where appropriate as soon as possible in order to encourage and facilitate rapid regeneration of the natural vegetation on cleared areas.	Contractor	Site establishment & duration of contract
Any fill material required must be sourced from a commercial off-site suitable/permitted source, quarry or borrow pit. Where possible, material from foundation excavations must be used as fill on-site.	Contractor	Duration of contract
Excavated topsoil must be stockpiled in designated areas separate from base material at a maximum height of 2m and covered (during windy conditions) until replaced during rehabilitation.	Contractor	Site establishment & duration of contract
Topsoil must not be stripped or stockpiled when it is raining or when the soil is wet as compaction will occur.	Contractor	Site establishment Maintenance: for duration of contract
Rehabilitate disturbed areas as soon as practicable when construction in an area is complete.	Contractor	During and after construction
Any erosion problems observed should be rectified as soon as possible and monitored thereafter to ensure that they do not re-occur.	Contractor	Duration of the contract
Due to the disturbance at the site as well as the increased runoff generated at the site, alien plant species are likely to be a long-term problem at the site. A long-term control plan will need to be implemented and regular monitoring for alien plants within the development footprint should be undertaken (**Appendix C**)	Contractor	During and after construction
Any new access roads required to be carefully planned and constructed to minimise the impacted area and prevent unnecessary excavation, placement, and compaction of soil.	Engineer Contractor	Design and construction
Minimise removal of vegetation which adds stability to soil.	Contractor	Construction
Soil conservation: Stockpile topsoil for re-use in rehabilitation phase, protect stockpile from erosion.	Contractor	Before and during construction
Control depth of excavations and stability of cut faces/sidewalls.	Contractor	Duration of contract
Compile and implement an appropriate stormwater management plan.	Contractor	Duration of construction

Performance Indicator	» Minimal disturbance outside of designated work areas. » Minimise clearing of existing vegetation. » Topsoil is appropriately stored. » No activity outside demarcated disturbed areas.

	» Minimal level of activity within disturbed areas. » Minimal level of soil erosion around site. » Acceptable state of excavations. » No activity in restricted areas.
Monitoring	» An incident reporting system will be used to record non-conformances to the EMPr. » Monthly inspections of erosion control devices » Immediate reporting of ineffective erosion and sediment control systems » An incident reporting system must be in place to record non-conformances

OBJECTIVE 8: Minimise the impacts of disturbance and loss of indigenous vegetation and faunal habitat

The study area is situated in the Grassland biome and Mesic Highveld Grassland Bioregion and comprises the Rand Highveld Grassland vegetation type (Endangered). Extremely little of the study area contains vegetation that resembled Rand Highveld Grassland with most of the study area in a severe degraded and disturbed condition. This is mainly a result of historical cultivation activities as well as afforestation activities (plantations and woodlots). The previous disturbed areas as well as the surrounding areas contain a vegetation cover comprising of numerous weeds, alien plants as well as pioneer and sub-climatic species associated with such disturbed areas.

Numerous small rodent burrows were noted throughout Vegetation Unit 2 with a preference of the unit's finely textured sandy soil. Mammals most likely include Swamp musk shrew, Forest Shrew, Four-striped grass mouse and Multimammate Mouse. Highly adaptable and mobile species such as Steenbok, Yellow Mongoose, Cape porcupine and Scrub Hare may occasionally utilise the study area. A few tremitarias were noted although not abundant throughout the study area and may provide some food source and habitat for species such as Aardvark and Lesser Dwarf Shrew. Within the Wetland Flat, signs of rodent activity was noted and likely belonged to South African Vlei Rat. The impact associated with the development on mammals can be regarded as low. No reptile or amphibian activity were noted during the survey of the study area.

Project component/s	» Switching Station and Ancillaries » Loop-in-loop-out power lines » Access roads
Potential Impact	» Clearing of natural vegetation » Construction activities » Traffic to and from site
Activity/risk source	» Site preparation and earthworks » Construction-related traffic » Excavations of foundations » Mobile construction equipment » Construction activities related to the project » Dumping or damage by construction equipment outside of demarcated construction areas.
Mitigation: Target/Objective	» To retain natural vegetation as far as possible, especially in the high and moderate sensitive areas on the site » To minimise footprints of disturbance of vegetation/habitats on-site » To protect fauna

Mitigation: Action/control	Responsibility	Timeframe
Areas to be cleared must be clearly marked in the field to eliminate unnecessary clearing.	Contractor in consultation with Specialist	Pre-construction
A pre-construction walk-through of the final development footprint for species of conservation concern that would be affected and that can be translocated should be undertaken. Before construction commences individuals of listed species within the development footprint that would be affected, should be counted and marked and translocated, where deemed necessary by the ecologist conducting the pre-construction walk-through survey, and according to the recommended rations. Permits from the relevant provincial authorities, i.e. the Mpumalanga Tourism and Parks Agency, will be required to relocate and/or disturb listed plant species.	Contractor in consultation with Specialist	Pre-construction
Any individuals of protected species affected by and observed within the development footprint during construction should be translocated under the supervision of the ECO and/or Contractor's Environmental Officer (EO).	Contractor	Construction
Any fauna directly threatened by the construction activities should be removed to a safe location by the ECO or other suitably qualified person.	Contractor ECO	Construction
Protected plants identified within the development footprint must not be disturbed or removed prior to a relevant permit being granted	Contractor	Construction
Staff/ employees must be educated to keep construction activities within the demarcated areas.	Contractor	Construction
A site rehabilitation programme must be developed implemented as soon as possible once construction is completed.	Contractor in consultation with Specialist	Duration of contract
The collection, hunting or harvesting of any plants or animals at the site or surrounding area must be strictly forbidden.	Contractor	Duration of contract
EO must inspect the immediate area surrounding the construction area for evidence of snakes.	Contractor /EO	Construction
Any fauna directly threatened by the construction activities should be removed to a safe location, in line with the required permit, to a similar environment by a suitably qualified person.	Contractor/suitably qualified fauna handler	Pre-construction and construction
Employees must be prohibited from harvesting wild plants for any purpose, except for approved botanical search-and-rescue operations performed under the guidance of an ecologist or other appropriately qualified person (and subject to the necessary permits).	Contractor	Duration of contract
All construction vehicles should adhere to a low speed limit to avoid collisions with susceptible species such as snakes and tortoises.	Contractor	Duration of contract
All hazardous materials should be stored in the appropriate manner to prevent contamination of the site. Any accidental chemical, fuel and oil spills that occur at the site should be cleaned up in the appropriate manner as related to the nature of the spill.	Contractor	Duration of the contract
Construction staff should undergo an environmental induction at the start of the project to ensure that they are aware of the appropriate response to the presence of fauna at the site and do not kill or harm fauna such as snakes or other reptiles which are often feared.	Contractor	Pre-construction and construction

Performance	» No disturbance outside of designated work areas

Indicator	» Minimised clearing of vegetation » Limited impacts on areas of identified and demarcated sensitive habitats/vegetation » Limited displacement and killings of fauna » No trapping or killing fauna illegally
Monitoring	» Supervision of all clearing and earthworks by the Contractor's EO » An incident reporting system will be used to record non-conformances to the EMPr.

OBJECTIVE 9: Limit the damage to wetlands and watercourses

Due to the geomorphological setting of the extended (local drainage network), the area, is characterized by numerous small, short non-perennial streams flowing in a largely south-eastern and south western direction to join the Springbokspruit River (south of the study area). Several hydrological systems have been identified within and surrounding the study area. These include depression wetlands, wetland flat and some of seepages of which the ecological condition of these azonal habitats varies from severely degraded and transformed, and valley-bottom wetland and remaining seepages which are mostly disturbed and transformed.

Project component/s	» Switching Station and Ancillaries » Loop-in-loop-out power lines » Access roads
Potential Impact	» Damage to watercourse (such as erosion, siltation) that will impact on ecosystem functioning.
Activity/risk source	» Construction, environmental management
Mitigation: Target/Objective	» No damage to the drainage line, wetlands and watercourses within the area.

Mitigation: Action/control	Responsibility	Timeframe
No vehicles to refuel within watercourses or wetland areas.	Contractor	Duration of the contract
Strict use and management of all hazardous materials used on site must be implemented.	Contractor	Duration of the contract
Strict management of potential sources of pollutants (e.g. litter hydrocarbons from vehicles and machinery, cement during construction etc.) must be implemented.	Contractor	Duration of the contract
Containment of all contaminated water by means of careful run-off management on the development site must be ensured.	Contractor	Duration of the contract
Any erosion problems observed should be rectified as soon as possible and monitored thereafter to ensure that they do not re-occur.	Contractor	Duration of the contract
All bare areas, as a result of the development, should be revegetated with locally occurring species, to bind the soil and limit erosion potential.	Contractor	Duration of the contract
Any areas disturbed during the construction phase should be encouraged to rehabilitate as quickly and effectively as possible. Natural indigenous species applicable to the specific habitat should be used and the area should be monitored on a monthly basis by the Environmental Officer (EO) to ensure effective rehabilitation and to avoid erosion and the invasion	Contractor	Duration of the contract

Mitigation: Action/control	Responsibility	Timeframe
with weeds and alien invasive species.		
Silt traps should be used where there is a danger of topsoil or material stockpiles eroding and entering streams and other sensitive areas.	Contractor	Duration of the contract
Topsoil should be removed and stored separately and should be reapplied where appropriate as soon as possible in order to encourage and facilitate rapid regeneration of the natural vegetation on cleared areas.	Contractor	Duration of the contract
Where practical, phased development and vegetation clearing should be applied so that cleared areas are not left un-vegetated and vulnerable to erosion for extended periods of time.	Contractor	Duration of the contract
Reduce activity at the site after large rainfall events when the soils are wet. No driving off of hardened roads should occurred.	Contractor	Duration of the contract
The development footprint should be kept to a minimum and natural vegetation should be encouraged to return to disturbed areas.	Contractor	Duration of the contract

Performance Indicator	» No disturbance outside of designated work areas » Minimised clearing of existing/natural vegetation » Limited impacts on areas of identified and demarcated sensitive habitats/vegetation
Monitoring	» An ECO/EO should monitor the habitat loss before and after construction.

OBJECTIVE 10: Minimise the establishment and spread of alien invasive plants

The previous disturbed areas as well as the surrounding areas contain a vegetation cover comprising of numerous weeds, alien plants as well as pioneer and sub-climatic species associated with such disturbed areas. Some invasive alien trees have also settled within these areas (apart from the woodlots).

A total of 147 different plant species were recorded within the study area of which 54 species were alien plant and weeds (12 were listed invasive alien plants), subsequently contributing 36.7% to the total species composition of the study area. Five conservation worthy species were recorded within the study area including one Red Data Species (Hypoxis hemerocallidea – Declining) and four MNCA protected species, namely *Gladiolus spp., Habenaria galpinii, Eucomis autumnalis and Aloe ecklonis*. All of these species were identified outside of the development footprint and subsequently will not be impacted by the proposed development.

Since all of the identified conservation worthy species with the study area are geophytes and succulents with relative shallow rooting systems (e.g *Hypoxis hemerocallidea, Gladiolus spp., Habenaria galpinii, Eucomis autumnalis and Aloe ecklonis*), the potential for successful translocation is high. **Before construction commences** individuals of listed species within the development footprint that would be affected, should be counted and marked and translocated, where deemed necessary by the ecologist conducting the pre-construction walk-through survey, and according to the recommended rations. Permits from the relevant provincial authorities, i.e. the Mpumalanga Tourism and Parks Agency, will be required to relocate and/or disturb listed plant species.

Project Component/s	» Switching Station and Ancillaries. » Loop-in-loop-out power lines. » Access roads.
Potential Impact	» Invasion of natural vegetation surrounding the site by declared weeds or invasive alien species.
Activities/Risk Sources	» Construction phase activities. » Environmental management.
Mitigation: Target/Objective	» There is a target of no alien plants within project control area during the construction and operation phases.

Mitigation: Action/Control	Responsibility	Timeframe
Avoid creating conditions in which alien plants may become established: » Keep disturbance of vegetation to a minimum. » Rehabilitate disturbed areas as quickly as possible. » Do not import soil from areas with alien plants.	Contractor	Construction
Any individuals of protected species affected by and observed within the development footprint during construction should be translocated under the supervision of the ECO and/or Contractor's Environmental Officer (EO).	Contractor	Construction
When alien plants are detected, these should be controlled and cleared using the recommended control measures for each species to ensure that the problem is not exacerbated or does not re-occur.	Contractor	Construction
No planting or importing any listed invasive alien plant species (all Category 1a, 1b and 2 invasive species) to the site for landscaping, rehabilitation or any other purpose.	Contractor	Construction
Disturbed areas containing no infrastructure and hard surfaces should be allowed to rehabilitate with indigenous vegetation as soon as possible to avoid the potential of erosion and invasion with alien plants. The area should be monitored (responsibility of EO) on a weekly basis throughout the construction phase and on a monthly basis thereafter and to the point where the area has rehabilitated to a satisfactory level.	Contractor/EO	Construction
On-going alien plant monitoring and removal should be undertaken in all areas of the development site on an annual basis.	Contractor	Construction
Immediately control any alien plants that become established using registered control methods.	Contractor	Construction

Performance Indicator	» Disturbed areas rehabilitated, if the area does not establish naturally, and at least 40% plant cover achieved on rehabilitated sites over a period of 2 to 5 years. » Site free of erosion and alien invasive plants.
Monitoring	» On-going monitoring of area by the Contractor's EO during construction. » If any alien invasive species are detected then the distribution of these should be mapped (GPS co-ordinates of plants or concentrations of plants), number of individuals (whole site or per unit area), age and/or size classes of plants and aerial cover of plants. » The results should be interpreted in terms of the risk posed to sensitive habitats within and surrounding the project area. » The environmental manager should be responsible for driving this process. » Reporting frequency depends on legal compliance framework.

OBJECTIVE 11: Protection of heritage resources

Archaeology:

No Stone Age sites, ceramics or stone walls attributed to the Iron Age were recorded. The lack of Stone Age sites can be attributed to the lack of raw material suitable for stone tool manufacture in the study area. No burial sites were recorded within the study area. Four features (built environment) have been recorded within the study area, however, only one feature (Feature 1) will be impacted on by the current development footprint. Should any other heritage resources be discovered during the construction phase, work must cease and the SAHRA APM unit should be contacted immediately.

Palaeontology:

No fossiliferous outcrops were identified within the study area. The impacts associated with the development of the project relate mainly to the potential impact to palaeontological resources The impact associated with the development has been assessed as being of a low significance, subject to the implementation of the recommended mitigation measures.

Project Component/s	» Switching Station and Ancillaries. » Loop-in-loop-out power lines. » Access roads.
Potential Impact	» Heritage objects/ artefacts/ Unidentified Sites/ Burial and Grave Sites (found on site are inappropriately managed or destroyed.
Activity/Risk Source	» Site preparation and earthworks. » Foundations or project equipment installation. » Mobile construction equipment movement on site. » Construction activities associated with the switching station, power lines and access road.
Mitigation: Target/Objective	» To ensure that any heritage objects found on site are treated appropriately and in accordance with the relevant legislation.

Mitigation: Action/control	Responsibility	Timeframe
In the event that fossil material does exist within the study area proposed for the development, any negative impact upon it could be mitigated by recording and sampling of well-preserved fossils by a professional palaeontologist. This should precede vegetation clearance but *before* the ground is levelled for construction. A collecting permit from SAHRA is required before any fossil heritage may be excavated and the material must be housed in an accredited institution.	Contractor in consultation with Specialist	Pre-construction
Areas required to be cleared during construction must be clearly marked in the field to avoid unnecessary disturbance of adjacent areas.	Contractor in consultation with Specialist	Pre-construction
Construction managers/foremen should familiarise himself/herself before construction starts on the possible types of heritage sites and cultural material they may encounter and the procedures to follow if they find sites. The contractor's EO may be trained to identify/ follow the relevant procedure and report to the site manager if heritage sites are found.	Contractor	Duration of contract
Familiarise all staff and contractors with procedures for dealing with	Contractor	Duration of

Mitigation: Action/control	Responsibility	Timeframe
heritage objects/sites. Project employees and any contract staff must maintain, at all times, a high level of awareness of the possibility of discovering heritage sites.		contract
Should fossil remains be discovered during any phase of the construction, either on the surface or exposed by fresh excavation, the ECO must be alerted and the discovery must be protected, preferably in situ. The ECO must alert SAHRA so that the appropriate mitigation can be taken by a professional palaeontologist. Significant fossil material should be curated in an approved repository as advised by the palaeontologist and/or SAHRA. Collection permits may be required from SAHRA for the removal of any fossil material.	Eskom, and Contractor in consultation with Specialist	Duration of contract
If any evidence of archaeological sites or remains (e.g. stone tool scatters, artefacts or bone and fossil remains), or other categories of heritage resources are found during the proposed development, the operations must be stopped and a qualified archaeologist must be contacted for an assessment of the find and the SAHRA APM Unit must be alerted. If unmarked human burials are uncovered, the SAHRA Burial Grounds and Graves (BGG) Unit 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 at the expense of the developer. If the newly discovered heritage resources prove to be of archaeological or palaeontological significance, a Phase 2 rescue operation may be required at the expense of the developer.	Eskom, and Contractor in consultation with Specialist	Duration of contract

Performance Indicator	» No disturbance outside of designated work areas. » All heritage items located are dealt with as per the legislative guidelines. » Project employees and any contract staff aware of potential for uncovering heritage materials during construction.
Monitoring	» Due care taken during earthworks and disturbance of land by all staff and any heritage objects found reported. » Appropriate permits obtained from SAHRA prior to the disturbance or destruction of heritage sites. » An incident reporting system will be used to record non-conformances to the EMPr.

OBJECTIVE 12: Minimisation of visual impacts associated with construction

During the construction phase heavy vehicles, components, equipment and construction crews will frequent the area and may cause, at the very least, a cumulative visual nuisance to landowners and residents in the area as well as road users. The placement of laydown areas and temporary construction camps should be carefully considered in order to not negatively influence the future perception of the project. Secondary visual impacts associated with the construction phase, such as the sight of construction vehicles, dust and construction litter must be managed to reduce visual impacts.

Project Component/s	» Laydown areas. » Switching Station and Ancillaries. » Loop-in-loop-out power lines.

	» Access roads.
Potential Impact	» Visual impact of general construction activities » Potential scarring of the landscape due to vegetation clearing.
Activity/Risk Source	» The viewing of the above mentioned by observers on or near the site.
Mitigation: Target/Objective	» Minimal visual intrusion by construction activities and construction accommodation and intact vegetation cover outside of immediate works areas.

Mitigation: Action/Control	Responsibility	Timeframe
Ensure that vegetation is not unnecessarily removed during the construction period.	Contractor	Planning and construction
Retain / re-establish and maintain natural vegetation in all areas outside of the development footprint/servitude.	Contractor	Planning
Reduce and control construction dust using approved dust suppression techniques as and when required (i.e. whenever dust becomes apparent)	Contractor	Construction
Rehabilitate construction disturbance as soon as possible after construction in an area is completed.	Contractor	Construction
Reduce the construction period through careful logistical planning and productive implementation of resources.	Eskom or contractor	Planning and duration of construction
Restrict the activities and movement of construction workers and vehicles to the immediate construction site and existing access roads.	Contractor	Construction
Ensure that rubble, litter, and disused construction materials are appropriately stored (if not removed daily) and then disposed regularly at licensed waste facilities.	Contractor	Construction
Restrict construction activities in close proximity to sensitive receptors to daylight hours whenever possible in order to reduce lighting impacts.	Contractor	Construction
Rehabilitate all disturbed areas immediately after the completion of construction works.	Contractor	Construction

Performance Indicator	» Vegetation clearance is minimised. » Construction site is kept in a neat and tidy state.
Monitoring	» Monitoring of vegetation clearing during the construction phase by the EO. » Monitoring of rehabilitation activities to ensure appropriate rehabilitation of the site. » An incident reporting system will be used to record non-conformances to the EMPr. » Public complaints register must be developed and maintained on site.

OBJECTIVE 13: Protection of avifauna

Four micro-habitats have been identified within the study area and include degraded grassland, wetlands and small watercourses, alien tree woodlots and artificial landscapes. During the site survey a total of 52 bird species were recorded within the surveyed area. Endemic species recorded during the survey included Cape Shoveler, Black-chested Prinia, Sentinel Rock Thrush, Cape Sparrow and Cape Longclaw. No Red listed species were recorded within the focal area with two species recorded within the larger surveyed area; Greater Flamingo (Near Threatened) and Black-winged Pratincole (Near Threatened).

Project Component/s	» Communication tower. » Switching Station and Ancillaries. » Loop-in-loop-out power lines. » Access roads.
Potential Impact	» Electrocution events with live hardware in the switching station yard during operation. » Collision and electrocution events with the overhead power line during operation.
Activities/Risk Sources	» Operation of the power line without appropriate mitigation measures. » Construction activities in close proximity to sensitive bird species or nesting sites
Mitigation: Target/Objective	» Ensure that construction activities do not result in unnecessary disturbances to existing avifaunal species. » Minimised disturbance on ground nesting species » Maintenance, as far as possible, of the ecological connectivity of the landscape for migrating species.

Mitigation: Action/Control	Responsibility	Timeframe
The temporal and spatial footprint of the development should be kept to a minimum.	Contractor	Construction
Provide adequate briefing for site personnel on the possible important (Red Data) species occurring and/or nesting in the area and the procedures to be followed to minimise impacts.	Contractor	Construction
Ensure bird-friendly tower designs are implemented to minimise the risk of electrocutions.	Contractor	Construction
To reduce collision and electrocution of birds on the power line, insulating electrical components and bird flight diverters must be installed.	Contractor	Construction
Strict control must be maintained over all activities during construction.	Contractor	Construction
During construction, if any of the Red Data species identified in the BA report are observed to be roosting and/or breeding in the vicinity, the ECO must be notified and were deemed necessary an appropriate buffer should be placed around the nests and/or roosting areas. If uncertain on the size of such buffer the ECO may contact an avifaunal specialist for advice.	Contractor Specialist	Construction
Contractors and working staff should remain within the development footprint and movement outside these areas especially into avian micro-habitats must be restricted.	Contractor	Construction
The boundaries of the development footprint are to be clearly demarcated and it must be ensured that all activities remain within the demarcated footprint area.	Contractor	Construction

Performance Indicator	» Switching station design implemented in line with required mitigation measures. » Bird diverters implemented in appropriate areas.
Monitoring	» Monitoring of the substation construction activities by the ECO to ensure implemented structures are in line with the required deign to minimise impacts on birds

OBJECTIVE 14: Appropriate handling and management of waste

The main wastes expected will include spoil from excavation activities, general construction waste, hazardous waste (e.g. oils), and liquid waste (including grey water and sewage). In order to manage the

wastes effectively, guidelines for the assessment, classification, and management of wastes, along with industry principles for minimising construction wastes must be implemented.

Project Component/s	» Switching Station and Ancillaries. » Loop-in-loop-out power lines. » Access roads.
Potential Impact	» Inefficient use of resources resulting in excessive waste generation. » Litter or contamination of the site or water through poor waste management practices.
Activity/Risk Source	» Packaging. » Other construction wastes. » Hydrocarbon use and storage. » Spoil material from excavation, earthworks, and site preparation.
Mitigation: Target/Objective	» To comply with waste management legislation. » To minimise production of waste. » To ensure appropriate waste storage and disposal. » To avoid environmental harm from waste disposal. » A waste manifest should be developed for the ablutions showing proof of disposal of sewage at appropriate water treatment works.

Mitigation: Action/control	Responsibility	Timeframe
The storage of flammable and combustible liquids such as oils must be in designated areas which are appropriately bunded, and stored in compliance with Material Safety Data Sheets (MSDS) files.	Contractor	Duration of contract
Any spills must receive the necessary clean-up action. Bioremediation kits are to be kept on-site and used to remediate any spills that may occur. Appropriate arrangements to be made for appropriate collection and disposal of all cleaning materials, absorbents and contaminated soils (in accordance with a waste management plan).	Contractor	Duration of contract
Any storage and disposal permits/approvals which may be required must be obtained, and the conditions attached to such permits and approvals will be complied with.	Contractor	Duration of contract
Routine servicing and maintenance of vehicles is not to take place on-site (except for emergency situations or e.g. large cranes which cannot be moved off-site). If repairs of vehicles must take place on site, an appropriate drip tray must be used to contain any fuel or oils.	Contractor	Duration of contract
An incident/complaints register must be established and maintained on-site.	Contractor	Duration of contract
Transport of all hazardous substances must be in accordance with the relevant legislation and regulations.	Contractor	Duration of contract
Waste disposal records must be available for review at any time.	Contractor	Duration of contract
All solid waste collected must be disposed of at a registered waste disposal site. A certificate of disposal must be obtained and kept on file. The disposal of waste must be in accordance with all relevant legislation. Under no circumstances may solid waste be burnt or buried on site.	Contractor	Erection: during site establishment Maintenance: for duration of Contract within a particular area

Mitigation: Action/control	Responsibility	Timeframe
Construction contractors must provide specific detailed waste management plans to deal with all waste streams.	Contractor	Duration of contract
Specific areas must be designated on-site for the temporary management of various waste streams, i.e. general refuse, construction waste (wood and metal scrap) and contaminated waste. Location of such areas must seek to minimise the potential for impact on the surrounding environment, including the prevention of contaminated runoff, seepage and vermin control.	Contractor	Duration of contract
Where possible, construction and general wastes on-site must be reused or recycled.	Contractor	Duration of contract
Disposal of waste must be in accordance with relevant legislative requirements, including the use of licensed contractors and licensed waste disposal sites.	Contractor	Duration of contract
Hydrocarbon waste must be contained and stored in sealed containers within an appropriately bunded area.	Contractor	Duration of contract
Waste and surplus dangerous goods must be kept to a minimum and must be transported by approved waste contractors to sites designated for their disposal.	Contractor	Duration of contract
Documentation (waste manifest) must be maintained detailing the quantity, nature and fate of any hazardous waste.	Contractor	Duration of contract
Storage of waste must be undertaken in terms of the relevant Norms and Standards.	Contractor	Duration of contract
Hazardous and non-hazardous waste must be separated at the source. Separate waste collection bins must be provided for this purpose. These bins must be clearly marked and appropriately covered.	Contractors	Erection: during site establishment Maintenance: for duration of Contract within a particular area
Under no circumstances may waste be burnt or buried on site.	Contractors	Erection: during site establishment Maintenance: for duration of Contract within a particular area
Sewage waste from chemical toilets and septic tanks (if required) must be removed on a regular basis and disposed of at a registered wastewater treatment facility. A certificate of appropriate disposal must be obtained and kept on file.	Contractor	Duration of contract
Supply waste collection bins at construction equipment and construction crew camps.	Contractors	Erection: during site establishment Maintenance: for duration of Contract within a particular area
Construction equipment must be refuelled within designated refuelling	Contractor	Duration of

Mitigation: Action/control	Responsibility	Timeframe
locations, or where remote refuelling is required, appropriate drip trays must be utilised.		contract
All stored fuels to be maintained within a bund and on a sealed surface.	Contractor	Duration of contract
Fuel storage areas must be inspected regularly to ensure bund stability, integrity and function.	Contractor	Duration of contract
Oily water from bunds at the switching station must be removed from site by licensed contractors.	Contractor	Duration of contract
Spilled cement and concrete must be cleaned up as soon as possible and disposed of at a suitably licensed waste disposal site.	Contractor	Duration of contract
Any contaminated/polluted soil must be removed from the site and must be disposed of at a licensed hazardous waste disposal facility.	Contractor	Duration of contract
Corrective action must be undertaken immediately if a complaint is made, or potential/actual leak or spill of polluting substance identified. This includes stopping the contaminant from further escaping, cleaning up the affected environment as much as practically possible and implementing preventive measures.	Contractor	Duration of contract
Upon the completion of construction, the area must be cleared of potentially polluting materials.	Contractor	Completion of construction

Performance Indicator	» No complaints received regarding waste on site or indiscriminate dumping. » Internal site audits ensuring that waste segregation, recycling and reuse is occurring appropriately. » Provision of all appropriate waste manifests for all waste streams.
Monitoring	» Waste collection must be monitored on a regular basis. » Waste documentation completed. » A complaints register must be maintained, in which any complaints from the community are logged. Complaints must be investigated and, if appropriate, acted upon. » An incident reporting system must be used to record non-conformances to the EMPr.

OBJECTIVE 15: Appropriate handling and storage of chemicals, hazardous substances and equipment

The construction phase will involve the storage and handling of a variety of chemicals including adhesives, abrasives, oils and lubricants, paints and solvents.

Project Component/s	» Switching Station and Ancillaries. » Loop-in-loop-out power lines. » Access roads.
Potential Impact	» Release of contaminated water from contact with spilled chemicals. » Generation of contaminated wastes from used chemical containers. » Spills/ leaks of hydrocarbons, fuels and other hazardous substances may contaminate soil and/or water resources.
Activity/Risk Source	» Vehicles associated with site preparation and earthworks. » Construction activities of area infrastructure.

	» Hydrocarbon use and storage.
Mitigation: Target/Objective	» To ensure that the storage and handling of chemicals and hydrocarbons on-site does not cause pollution to the environment or harm to persons. » To ensure that the storage and maintenance of machinery on-site does not cause pollution of the environment or harm to persons.

Mitigation: Action/Control	**Responsibility**	**Timeframe**
Appropriate spill kits must be made available on-site for the clean-up of spills and leaks of contaminants.	Contractor	Duration of contract
Corrective action must be undertaken immediately if a potential/actual leak or spill of a polluting substance is identified. This includes stopping the contaminant from further escaping, cleaning up the affected environment as much as practically possible and implementing preventive measures.	Contractor	Duration of contract
In the event of a major incident (including a major emission, fire or explosion leading to serious danger to the public or potentially serious pollution of or detriment to the environment, whether immediate or delayed), the responsible person must, as soon as reasonably practicable after knowledge of the incident: (a) take all reasonable measures to contain and minimise the effects of the incident, including its effects on the environment and any risks posed by the incident to the health, safety and property of persons; (b) undertake clean-up procedures; (c) remedy the effects of the incident; (d) assess the immediate and long-term effects of the incident on the environment and public health.	Contractor	Duration of contract
Any storage tanks containing hazardous materials must be placed in bunded containment areas with sealed surfaces. The bund walls must be high enough to contain 110% of the total volume of the stored hazardous material.	Contractor	Duration of contract
Bunded areas must be inspected regularly to ensure bund stability, integrity and function.	Contractor	Duration of contract
Construction machineries (i.e. stumpers, generators etc.) must be stored in an appropriately sealed area.	Contractor	Duration of contract
The storage of flammable and combustible liquids such as oils will be in designated areas which are appropriately bunded, and stored in compliance with Material Safety Data Sheets (MSDS) files.	Contractor	Duration of contract
Drip trays must be placed under stationery machineries in sensitive areas.	Contractor	Duration of contract
Routine servicing and maintenance of vehicles must not take place on-site but on designated bunded areas at the camp (except for emergencies). If repairs of vehicles must take place, an appropriate drip tray must be used to contain any fuel or oils leaks.	Contractor	Duration of contract
Any storage and disposal permits/approvals which may be required must be obtained, and the conditions attached to such permits and approvals must be compiled with.	Contractor	Duration of contract
Transport of all hazardous substances must be in accordance with the relevant legislation and regulations.	Contractor	Duration of contract
All small chemical substances used onsite must be accompanied by a portable drip tray to store them.	Contractor	Duration of contract
Upon the completion of construction, the area must be cleared of potentially	Contractor	Completion of

Mitigation: Action/Control	Responsibility	Timeframe
polluting materials.		construction

Performance Indicator	» No chemical spills outside of designated storage areas. » No unattended water or soil contamination by spills. » No complaints received regarding the storage or handling of hazardous substances.
Monitoring	» A complaints register must be maintained, in which any complaints from the community will be logged. » An incident reporting system must be used to record non-conformances to the EMPr.

OBJECTIVE 16: Noise control

Traffic movement to and from the site, particularly of heavy-duty vehicles during construction, could potentially result in a noise impact.

Project component/s	» Switching Station and Ancillaries. » Loop-in-loop-out power lines. » Access roads.
Potential Impact	» Nuisance noise from construction affecting the surrounding community.
Activity/risk source	» Site preparation and earthworks. » Construction-related transport. » Foundations or plant equipment installation. » Construction activities of infrastructure.
Mitigation: Target/Objective	» To minimise noise to any surrounding residences from the construction activities. » To comply with Noise Control Regulations and SANS Guidelines. » To ensure noise levels are acceptable at residences in close proximity to construction activities.

Mitigation: Action/control	Responsibility	Timeframe
On-site construction activities in close proximity to homesteads should be limited to daylight hours as far as possible. Affected and surrounding landowners should be notified if there is a need to deviate from standard working hours.	Contractor	Duration of contract
Construction noise must be managed according to the Noise Control Regulations and SANS 10103.	Contractor	Duration of contract
All construction equipment, including vehicles, must be properly and appropriately maintained in order to minimise noise generation.	Contractor	Duration of contract

Performance Indicator	» No complaints received concerning noise.
Monitoring	» A complaints register must be maintained, in which any complaints from the community will be logged. Complaints must be investigated and, if appropriate, acted upon. » An incident reporting system must be used to record non-conformances to the EMPr.

5.3. Detailing Method Statements

The environmental specifications are required to be underpinned by a series of Method Statements, within which the Contractors and Service Providers are required to outline how any identified environmental risks will practically be mitigated and managed for the duration of the contract, and how specifications within this EMPr will be met. That is, the Contractor will be required to describe how specified requirements will be achieved through the submission of written Method Statements to the Site Manager and ECO.

A Method Statement is defined as "a written submission by the Contractor in response to the environmental specification or a request by the Site Manager, setting out the plant, materials, labour and method the Contractor proposes using to conduct an activity, in such detail that the Site Manager is able to assess whether the Contractor's proposal is in accordance with the Specifications and/or will produce results in accordance with the Specifications". The Method Statement must cover applicable details with regard to:

- Responsible person/s;
- Construction procedures;
- Materials and equipment to be used;
- Getting the equipment to and from site;
- How the equipment/material will be moved while on-site;
- How and where material will be stored;
- The containment (or action to be taken if containment is not possible) of leaks or spills of any liquid or material that may occur;
- Timing and location of activities;
- Compliance/non-compliance with the Specifications; and
- Any other information deemed necessary by the Site Manager.

Specific method statements required may include:

- Site establishment.
- Preparation of the site.
- Soil management/stockpiling and erosion control.
- Excavations and backfilling procedure.
- Stipulate norms and standards for water supply and usage (i.e.: comply strictly with licence and legislation requirements and restrictions).
- Storm water management procedures.
- Wash bay for the construction vehicles and or machineries.
- Ablution facilities (placement, maintenance, management and servicing).
- Solid Waste Management.
- Liquid waste management.
- Dust and noise pollution.
- Hazardous substance storage (ensure compliance with all national, regional and local legislation with regard to the storage of oils, fuels, lubricants, solvents, wood treatments, bitumen, cement, pesticides and any other harmful and hazardous substances and materials. South African National Standards apply).
- Fire prevention and management measures on site.

- Fauna and flora protection process on and off site (i.e. removal to reintroduction or replanting, if necessary).
- Incident and accident reporting protocol.
- General administration.
- Designate access road and the protocol on while roads are in use.
- Requirements on gate control protocols.

The Contractor may not commence the activity covered by the Method Statement until it has been approved by the Site Manager, except in the case of emergency activities and then only with the consent of the Site Manager. Approval of the Method Statement will not absolve the Contractor from their obligations or responsibilities in terms of their contract.

Failure to submit a method statement may result in suspension of the activity concerned until such time as a method statement has been submitted and approved. The ECO should monitor the construction activities to ensure that these are undertaken in accordance with the approved Method Statement.

5.4. Awareness and Competence: Construction Phase

To achieve effective environmental management, it is important that Contractors are aware of the responsibilities in terms of the relevant environmental legislation and the contents of this EMPr. The Contractor is responsible for informing employees and sub-contractors of their environmental obligations in terms of the environmental specifications, and for ensuring that employees are adequately experienced and properly trained in order to execute the works in a manner that will minimise environmental impacts.

The Contractors obligations in this regard include the following:

- Employees must have a basic understanding of the key environmental features of the construction site and the surrounding environment.
- Ensuring that a copy of the EMPr is readily available on-site, and that all site employees are aware of the location and have access to the document.
- Employees shall be familiar with the requirements of the EMPr and the environmental specifications as they apply to the construction of the project.
- Ensuring that, prior to commencing any site works, all employees and sub-contractors have attended an Environmental Awareness Training course.
- The course should be sufficient to provide the site staff with an appreciation of the project's environmental requirements, and how they are to be implemented.
- Awareness of any other relevant environmental matters, which are deemed necessary by the ECO.
- Ensuring that employee information posters, outlining the environmental "do's" and "don'ts" (as per the environmental awareness training course) are erected at prominent locations throughout the site.
- Ensure that construction workers have received basic training in environmental management, including the storage and handling of hazardous substances, minimisation of disturbance to sensitive areas, management of waste, and prevention of water pollution.
- Records must be kept of those that have completed the relevant training.
- Training should be done either in a written or verbal format but must be appropriate for the receiving audience.
- Refresher sessions must be held annually to ensure the contractor staffs are aware of their environmental obligations as practically possible, detailed below.

5.4.1 Environmental Awareness Training

Environmental Awareness Training must take the form of an on-site talk and demonstration by the ECO and Contractor's EO before the commencement of site establishment and construction on site. The education/awareness programme should be aimed at all levels of management and construction workers within the contractor team. A record of attendance of this training must be maintained by the ECO on site. Proof of awareness training should be kept on record.

5.4.2 Induction Training

Environmental induction training must be presented to all persons who are to work on the site – be it for short or long durations; Contractor's or Engineer's staff; administrative or site staff; sub-contractors or visitors to site.

This induction training should include discussing the developer's environmental policy and values, the function of the EMPr and Contract Specifications and the importance and reasons for compliance to these. The induction training must highlight overall do's and don'ts on site and clarify the repercussions of not complying with these. The non-conformance reporting system must be explained during the induction as well. Opportunity for questions and clarifications must form part of this training. A record of attendance of this training must be maintained by the Environmental Officer on site. Proof of induction training should be kept on record.

5.4.3 Toolbox Talks

Toolbox talks should be held on a scheduled and regular basis (at least twice a month) where foremen, environmental and safety representatives of different components of the Works and sub-consultants hold talks relating to environmental practices and safety awareness on site. These talks should also include discussions on possible common incidents occurring on site and ones recommended by the onsite ECO and the prevention of reoccurrence thereof. Records of attendance and the awareness talk subject must be kept on file.

5.5. Monitoring Programme: Construction Phase

A monitoring programme must be in place not only to ensure conformance with the EMPr, but also to monitor any environmental issues and impacts which have not been accounted for in the EMPr that are, or could result in significant environmental impacts for which corrective action is required. The period and frequency of monitoring will be stipulated by the Environmental Authorisation (once issued). The Project Manager will ensure that the monitoring is conducted and reported.

The aim of the monitoring and auditing process would be to monitor the implementation of the specified environmental specifications, in order to:

- Monitor and audit compliance with the prescriptive and procedural terms of the environmental specifications.
- Ensure adequate and appropriate interventions to address non-compliance.
- Ensure adequate and appropriate interventions to address environmental degradation.
- Provide a mechanism for the lodging and resolution of public complaints.
- Ensure appropriate and adequate record keeping related to environmental compliance.

5.5.1. Non-Conformance Reports

All supervisory staff including Foremen, Engineers, and the ECO must be provided the means to be able to submit non-conformance reports to the Site Manager. Non-conformance reports will describe, in detail, the cause, nature and effects of any environmental non-conformance by the Contractor. Records of penalties imposed may be required by the relevant authority within 48 (forty eight) hours.

The non-conformance report will be updated on completion of the corrective measures indicated on the finding sheet. The report must indicate that the remediation measures have been implemented timeously and that the non-conformance can be closed-out to the satisfaction of the Site Manager and ECO.

5.5.2. Incident Reports

According to Section 30 of National Environmental Management Act (NEMA), an "Incident" is defined as unexpected sudden occurrence, including a major emission, fire or explosion leading to serious danger to the public or potentially serious pollution of or detriment to the environment, whether immediate or delayed.

In terms of the requirements of NEMA, the responsible person must, within 14 days of the incident, report to the Director General, provincial head of department and municipality such information as is available to enable an initial evaluation of the incident, including:

(a) the nature of the incident;
(b) the substances involved and an estimation of the quantity released and their possible acute effect on persons and the environment and data needed to assess these effects;
(c) initial measures taken to minimise impacts;
(d) causes of the incident, whether direct or indirect, including equipment, technology, system, or management failure; and
(e) measures taken and to be taken to avoid a recurrence of such incident.

5.5.3. Monitoring Reports

A monitoring report will be compiled by the ECO on a monthly basis and must be submitted to DEA for their records. This report should include details of the activities undertaken in the reporting period, any non-conformances or incidents recorded if any, corrective action required, and details of those non-conformances or incidents which have been closed out.

5.5.4. Final Audit Reports

Final environmental audit reports must be compiled by an independent auditor and be submitted to DEA upon completion of the construction and rehabilitation activities (within 30 days of completion of the construction phase (i.e.: within 30 days of site handover)) and within 30 days of completion of rehabilitation activities). These reports must indicate the date of the audit, the name of the auditor and the outcome of the audit in terms of compliance with the environmental authorisation conditions and the requirements of the EMPr.

CHAPTER 6: MANAGEMENT PROGRAMME: REHABILITATION

Overall Goal: Undertake the rehabilitation measures in a way that:

» Ensures rehabilitation of disturbed areas following the execution of the works, such that residual environmental impacts are remediated or curtailed.

6.1. Objectives

In order to meet this goal, the following objective, actions and monitoring requirements are relevant:

OBJECTIVE 1: Ensure appropriate rehabilitation of disturbed areas such that residual environmental impacts are remediated or curtailed

Areas requiring rehabilitation will include all areas disturbed during the construction phase and that are not required for regular operation and maintenance operations. Rehabilitation should be undertaken in an area as soon as possible after the completion of construction activities within that area.

Project Component/s	» Switching Station and Ancillaries. » Loop-in-loop-out power lines. » Access roads.
Potential Impact	» Environmental integrity of site undermined resulting in reduced visual aesthetics, erosion and increased runoff, and the requirement for on-going management intervention.
Activity/Risk Source	» Temporary construction areas. » Temporary access roads/tracks. » Power line servitudes. » Other disturbed areas/footprints.
Mitigation: Target/Objective	» Ensure and encourage site rehabilitation of disturbed areas. » Ensure that the site is appropriately rehabilitated following the execution of the works, such that residual environmental impacts (including erosion) are remediated or curtailed.

Mitigation: Action/Control	Responsibility	Timeframe
All temporary facilities, equipment, and waste materials must be removed from site.	Contractor	Following execution of the works
All temporary fencing and danger tape must be removed once the construction phase has been completed.	Contractor	Following completion of construction activities in an area
The area that previously housed the construction equipment camp is to be checked for spills of substances such as oil, paint, etc. and these should be cleaned up.	Contractor	Following completion of construction activities in an area
All hardened surfaces within the construction equipment camp area should be ripped, all imported materials removed, and the area shall be top soiled and re-vegetated.	Contractor	Following completion of construction activities in an area
Temporary roads must be closed and access across these blocked.	Contractor	Following completion of

Mitigation: Action/Control	Responsibility	Timeframe
		construction activities in an area
Necessary drainage works and anti-erosion measures must be installed, where required, to minimise loss of topsoil and control erosion.	Contractor	Following completion of construction activities in an area
Where disturbed areas are not to be used during the construction of the project, these areas must be rehabilitated/re-vegetated with appropriate natural vegetation and/or local seed mix.	Contractor in consultation with rehabilitation specialist	Following completion of construction activities in an area
Topsoil must be replaced on all areas from which it was removed and stabilised where practicable	Contractor	Rehabilitation
General measures relating to site rehabilitation as contained in **Appendix D** of this EMPr should be implemented where appropriate and feasible.	Contractor	Rehabilitation
Re-vegetated areas may have to be protected from wind erosion and maintained until an acceptable plant cover has been achieved.	Eskom in consultation with rehabilitation specialist	Post-rehabilitation
Erosion control measures should be used in sensitive areas such as areas with (i.e. areas sensitive to erosion including slopes and the banks of watercourses).	Eskom in consultation with rehabilitation specialist (if required)	Post-rehabilitation
Alien plant management must be undertaken as per the alien management and monitoring plan to be developed pre-construction.	Contractor	Post-rehabilitation
On-going plant monitoring and removal must be undertaken on all areas of natural vegetation on an annual basis.	Eskom	Post-rehabilitation

Performance Indicator	» All portions of the site, including construction equipment camp and working areas, cleared of equipment and temporary facilities. » Topsoil replaced on all areas and stabilised where practicable or required after construction and temporally utilised areas. » Disturbed areas are rehabilitated and acceptable plant cover achieved on rehabilitated sites. » Complete site is free of erosion alien invasive plants.
Monitoring	» On-going inspection of rehabilitated areas in order to determine effectiveness of rehabilitation measures implemented. » On-going alien plant monitoring and removal should be undertaken on an annual basis.

CHAPTER 7: MANAGEMENT PROGRAMME: OPERATION

Overall Goal: To ensure that the operation of the switching station, power lines and associated infrastructure (i.e. communication tower) do not have unforeseen impacts on the environment and to ensure that all impacts are monitored and the necessary corrective action taken in all cases. In order to address this goal, it is necessary to operate the infrastructure in a way that:

» Ensures that operation activities are properly managed in respect of environmental aspects and impacts.
» Enables the operation activities to be undertaken without significant disruption to other land uses in the area, in particular with regard to farming practices, traffic and road use, and effects on local residents.
» Minimises impacts on fauna and avifauna using the site.

7.1. Roles and Responsibilities for Operation and Maintenance

7.1.1. Eskom Environmental Advisor

Responsibilities include:

» To implement and integrate environmental management systems by ensuring compliance to ISO 14000 and monitoring performance.
» Report environmental incidents.
» Provides environmental training.
» Ensures compliance to legislations and other legally binding documents.

7.2. Objectives

In order to meet this goal, the following objectives have been identified, together with necessary actions and monitoring requirements.

OBJECTIVE 1: Minimisation of disturbance and protection of indigenous natural vegetation, fauna and maintenance of rehabilitation

Indirect impacts on vegetation and fauna during operation could result from maintenance activities and the movement of people and vehicles on site and in the surrounding area. In order to ensure the long-term environmental integrity of the site following construction, maintenance of the areas rehabilitated post-construction must be undertaken until these areas have successfully re-established.

Project component/s	» Service roads utilised during regular maintenance. » Areas disturbed during the construction phase and subsequently rehabilitated. » Switching station site
Potential Impact	» Disturbance to or loss of vegetation and/or habitat. » The displacement and disturbance of fauna.

Activity/Risk Source	» Movement of employee vehicles within and around site. » Vegetation clearance or trimming.
Mitigation: Target/Objective	» Maintain minimised footprints of disturbance of vegetation/habitats on-site. » Ensure and encourage plant regrowth in non-operational areas of post-construction rehabilitation.

Mitigation: Action/Control	Responsibility	Timeframe
Vehicle movements must be restricted to designated roadways.	Eskom	Operation
Due to the disturbance at the site as well as the increased runoff generated at the site, alien plant species are likely to be a long-term problem at the site. A long-term control plan will need to be implemented and regular monitoring for alien plants within the development footprint should be undertaken.	Eskom	Operation
No disturbance of vegetation outside of the study area must occur.	Eskom	Operation
Erosion control measures should be implemented in areas where soil has been disturbed due to construction activities.	Eskom	Operation
Due to the disturbance at the site as well as the increased runoff generated at the site, alien plant species are likely to be a long-term problem at the site. A long-term control plan will need to be implemented and regular monitoring for alien plants within the development footprint should be undertaken.	Eskom	Operation
Regular alien clearing should be conducted using the best-practice methods for the species concerned. The use of herbicides should be avoided as far as possible and should only be used for woody species which re-sprout following continual manual control.	Eskom	Operation
Any potentially dangerous fauna such as snakes or fauna threatened by the maintenance and operational activities should be removed to a safe location.	Eskom	Operation
Existing roads must be maintained to ensure limited erosion and impact on areas adjacent to roadways.	Eskom	Operation

Performance Indicator	» No further disturbance to vegetation or terrestrial faunal habitats. » Continued improvement of rehabilitation efforts. » No disturbance of vegetation outside of project site.
Monitoring	» Regular inspection to monitor plant regrowth/performance of rehabilitation efforts and weed infestation compared to natural/undisturbed areas

OBJECTIVE 2: Protection of avifauna

During operation, electrocutions within the switching station and electrocution by the power line could potentially have a negative impact on a variety of bird species, particularly those species that regularly utilize the electrical infrastructure to perch, or breed and nest as well as those tolerant of disturbances e.g. crows, ravens and other species. The impact of electrocution from the switching station infrastructure are considered to be much lower of significance once mitigation in the form of bird friendly structures and bird deterrent measures have been put in place.

Due to the short distance of the proposed loop-in loop-out power lines, limited space for perching is available. However, numerous small raptor species such as Black-winged Kite, Steppe Buzzard and Amur Falcon were recorded, using the existing Mafube/Pan traction line as perch and thus it is highly likely that

some of these species may also use the new proposed loop-in loop-out lines. The impact of electrocution on avifauna may be of moderate significance before mitigation, and low significance after the mitigation (in the form of bird friendly structures).

Project Component/s	» Power line. » Switching Station. » Communication Tower.
Potential Impact	» Collision and electrocution events with the overhead power line. » Electrocution events with live hardware in the switching station yard.
Activities/Risk Sources	» Operation of the substation without appropriate mitigation measures.
Mitigation: Target/Objective	» Maintain a low number of collision, and electrocution events with the switching station.

Mitigation: Action/Control	Responsibility	Timeframe
Bird Flight Diverters (BFDs) must be installed on sections of the powerline as identified by the avifaunal specialist during the pre-construction walkthrough, or as specified by the specialist in response to avifauna mortality monitoring during the operational phase.	Eskom	Operation/Planning
A "Bird Friendly" structure, with a bird perch (as per standard Eskom guidelines) must be used for the tower structures.	Eskom	Operation/planning
Insulating, covering or isolating hardware (e.g. >180 cm between phase conductors or phase conductors and grounded infrastructure) may reduce electrocutions and outages.	Eskom	Operation/planning
Installation of artificial bird space perches and nesting platforms should be installed, at a safe distance from energised components (Goudie 2006; Prinsen et al. 2012).	Eskom	Operation/planning
Potential Faulting (caused by nesting and perching of birds on structures in the substation) may require detailed, site specific mitigation dependent on the precise design and equipment in the new substation. Upon completion of construction, or during planning, an avifaunal specialist is to be contacted to determine if mitigation is required and if so, what mitigation measures are to be implemented.	Eskom	Operation/planning
Mark sections of line in high to medium-high sensitive areas with anti-collision marking devices (diurnal and nocturnal diverters) to increase the visibility of the power line and reduce likelihood of collisions. Marking devices should be spaced 10 m apart, and must be installed as soon as the conductors are strung. These line marking devices include spiral vibration dampers, strips, Bird Flight Diverters, bird flappers, aerial marker spheres, ribbons, tapes, flags and aviation balls (Prinsen et al. 2012).	Eskom	Operation/planning
All BFDs must be checked regularly, e.g. this can be combined with general maintenance activities, and be replaced if they are damaged or have fallen off the power line.	Eskom	Operation
Perching surfaces fitted with bird guards and perch guards as deterrents must be maintained.	Eskom	Operation
Maintain marked sections of line in high sensitivity areas with anti-collision marking devices (diurnal and nocturnal diverters) to increase the visibility of the power line and reduce likelihood of collisions. Marking devices should	Eskom	Operation

Mitigation: Action/Control	Responsibility	Timeframe
be spaced 10 m apart, and must be installed as soon as the conductors are strung.		
Contractors and working staff should remain within the development footprint and movement outside these areas, especially into avian micro-habitats, must be restricted.	Eskom	Operation
Maintenance staff should remain within the development footprint.	Eskom	Operation
Driving must take place on existing roads and a speed limit of 30km/h must be implemented on all roads running through the study area during the operation phase.	Eskom	Operation
Line inspections should be ongoing for the operational life of the line.	Eskom	Operation
Maintain insulation of live components at support structures.	Eskom	Operation

Performance Indicator	» Minimal collision or electrocution events.
Monitoring	» Observation of electrocution or collision events with the power line. » Monitor switching station for mortalities. » Monitor power line servitude for mortalities.

OBJECTIVE 3: Minimise soil degradation and erosion

The soil on site may be impacted in terms of:

» Soil degradation including erosion (by wind and water) and subsequent deposition elsewhere is of a concern across the entire site which is underlain by fine grained soil which can be mobilised when disturbed, even on relatively low slope gradients (accelerated erosion).
» Degradation of the natural soil profile due to pollution.

Project Component/s	» Power line. » Switching Station and ancillaries. » Access roads.
Potential Impact	» Soil degradation. » Soil erosion. » Increased deposition of soil into drainage systems. » Increased run-off over the site.
Activities/Risk Sources	» Poor rehabilitation of cleared areas. » Rainfall - water erosion of disturbed areas. » Wind erosion of disturbed areas. » Concentrated discharge of water from construction activity.
Mitigation: Target/Objective	» Ensure rehabilitation of disturbed areas is maintained. » Minimise soil degradation (i.e. wetting). » Minimise soil erosion and deposition of soil into drainage lines. » Ensure continued stability of embankments/excavations.

Mitigation: Action/Control	Responsibility	Timeframe
Rehabilitate disturbed areas should the previous attempt be unsuccessful.	Eskom	Operation
All bare areas should be revegetated with locally occurring species, to bind the soil and limit erosion potential.	Eskom	Operation
Maintain erosion control measures implemented during the construction phase (i.e. run-off attenuation on slopes (sand bags, logs), silt fences, stormwater catch-pits, and shade nets) where deemed necessary.	Eskom	Operation

Performance Indicator	» Minimal level of soil erosion around site.
Monitoring	» Inspections of site on a bi-annual basis.

OBJECTIVE 4: Minimise disturbance and degradation of watercourses

Project Component/s	» Power line. » Switching Station and ancillaries. » Access roads.
Potential Impact	» Damage to the watercourse (such as erosion, siltation, dumping of waste within the wetland) that will impact on ecosystem functioning.
Activities/Risk Sources	» Operation and maintenance activities.
Mitigation: Target/Objective	» No damage to the drainage lines, wetlands and watercourses within and surrounding the study area. » Minimise soil erosion and deposition of soil into drainage lines and wetland areas. » Ensure continued stability of embankments/excavations.

Mitigation: Action/Control	Responsibility	Timeframe
Rehabilitate disturbance areas should the previous attempt be unsuccessful.	Eskom	Operation
Roads and other disturbed areas should be regularly monitored for erosion problems and problem areas should receive follow-up monitoring to assess the success of the remediation.	Eskom	Operation
Any erosion problems observed should be rectified as soon as possible and monitored thereafter to ensure that they do not re-occur.	Eskom	Operation
Maintain erosion control measures implemented during the construction phase (i.e. run-off attenuation on slopes (sand bags, logs), silt fences, storm water catch-pits, and shade nets).	Eskom	Operation

Performance Indicator	» Minimal level of soil erosion around site. » Minimal level of increased siltation wetland areas as a result of the project.
Monitoring	» Inspections of site on a bi-annual basis.

OBJECTIVE 5: Appropriate handling and management of hazardous substances and waste at the switching station site

The operation and maintenance of the switching station will involve the generation of limited waste products. The main wastes expected to be generated by the operation and maintenance activities include:

» general solid waste;
» hazardous waste; and
» liquid waste.

Project component/s	» Switching station.
Potential Impact	» Inefficient use of resources resulting in excessive waste generation. » Litter or contamination of the site or water through poor waste management practices.
Activity/risk source	» Control building at the switching station. » Transformers and switchgear. » Fuel and oil storage.
Mitigation: Target/Objective	» To comply with waste management guidelines. » To minimise production of waste. » To ensure appropriate waste disposal. » To avoid environmental harm from waste disposal.

Mitigation: Action/control	Responsibility	Timeframe
Hazardous substances must be stored in sealed containers within a clearly demarcated designated area.	Eskom	Operation
Storage areas for hazardous substances must be appropriately sealed and bunded.	Eskom	Operation
All structures and/or components replaced during maintenance activities shall be appropriately disposed of at an appropriately licensed waste disposal site or sold to a recycling merchant for recycling.	Eskom	Operation
Care shall be taken to ensure that spillage of oils and other hazardous substances are limited during maintenance. Handling of these materials should take place within an appropriately sealed and bunded area. Should any accidental spillage take place, it shall be cleaned up according to specified standards regarding bioremediation.	Eskom	Operation and maintenance
Waste handling, collection and disposal operations shall be managed and controlled by a waste management contractor.	Eskom/waste management contractor	Operation
Water from bunds and oily water from oil/water separator shall be removed by a licensed contractor.	Eskom/waste contractor	Operation
Used oils and chemicals: » Appropriate disposal shall be arranged with a licensed facility in consultation with the administering authority. » Waste shall be stored and handled according to the relevant legislation and	Eskom/waste management contractor	Operation

Mitigation: Action/control	Responsibility	Timeframe
regulations.		
General waste shall be recycled where possible or disposed of at an appropriately licensed landfill.	Eskom/waste management contractor	Operation
Hazardous waste (including hydrocarbons) shall be stored and disposed of separately.	Eskom/waste management contractor	Operation
Disposal of waste shall be in accordance with relevant legislative requirements, including the use of licensed contractors.	Eskom	Operation
In the event of a major incident (including a major emission, fire or explosion leading to serious danger to the public or potentially serious pollution of or detriment to the environment, whether immediate or delayed), the responsible person must, as soon as reasonably practicable after knowledge of the incident: (a) take all reasonable measures to contain and minimise the effects of the incident, including its effects on the environment and any risks posed by the incident to the health, safety and property of persons; (b) undertake clean-up procedures; (c) remedy the effects of the incident; (d) assess the immediate and long-term effects of the incident on the environment and public health. In terms of the requirements of NEMA, the responsible person must, within 14 days of the incident, report to the Director General, provincial head of department and municipality such information as is available to enable an initial evaluation of the incident, including: (a) the nature of the incident; (b) the substances involved and an estimation of the quantity released and their possible acute effect on persons and the environment and data needed to assess these effects; (c) initial measures taken to minimise impacts; (d) causes of the incident, whether direct or indirect, including equipment, technology, system, or management failure; and (e) measures taken and to be taken to avoid a recurrence of such incident.	Eskom	Operation

Performance Indicator	» No complaints received regarding waste on site or indiscriminate dumping. » Internal site audits identifying that waste segregation recycling and reuse is occurring appropriately. » Provision of all appropriate waste manifests. » No contamination of soil or water.
Monitoring	» Waste collection must be monitored on a regular basis· » Waste documentation must be completed and available for inspection on request » An incidents/complaints register must be maintained, in which any complaints from the community must be logged. Complaints must be investigated and, if appropriate, acted upon. » Regular reports on the quantities of all waste streams exiting the site must be compiled by the waste management contractor and monitored by the EO. All appropriate waste

	disposal certificates accompany the monthly reports.

OBJECTIVE 6: To ensure adequate regard is taken of landowner / stakeholder concerns and that these are appropriately addressed

Project component/s	» Power line. » Switching Station and ancillaries. » Access roads.
Potential Impact	» Stakeholder concerns not addressed with regard to maintenance.
Activity/risk source	» Maintenance of infrastructure.
Mitigation: Target/Objective	» To ensure adequate regard is taken of landowner / stakeholder concerns and that these are appropriately addressed.

Mitigation: Action/control	**Responsibility**	**Timeframe**
Eskom maintenance personnel should be in possession of the required identification documents when undertaking maintenance work.	Contractor	Duration of contract
Sound servitude management measures should be implemented. The implementation of the servitude management measures should be monitored on an ongoing basis.	Contractor	Duration of contract
Eskom personnel should not access private properties without prior notification of the property owners.	Contractor	Duration of contract

Performance Indicator	» No complaints received form the landowners or stakeholders.
Monitoring	» Keep a register of all complaints received including the details of when the complaints were addressed and what the outcome was.

CHAPTER 8: MANAGEMENT PROGRAMME: DECOMMISSIONING

It is most likely that decommissioning activities of the infrastructure would comprise the disassembly and removal of the project infrastructure from the site.

The relevant mitigation measures contained under the construction section should be applied during decommissioning and therefore are not repeated in this section. It must be noted that decommissioning activities will need to be undertaken in accordance with the legislation applicable at that time, which may require this section of the EMPr to be revisited and amended.

8.1. Objectives

The overall objective of the decommissioning phase is to leave the project area in a condition that minimises adverse impacts on the socio-economic and biophysical environment, with a legacy that contributes to sustainable development.

The objectives of the decommissioning phase of the proposed project are to:

- Follow a process of decommissioning that is progressive and integrated into the short- and long-term project plans that will assess the closure impacts proactively at regular intervals throughout project life.
- Implement progressive rehabilitation measures, beginning during the construction phase.
- Leave a safe and stable environment for both humans and animals and make their condition sustainable.
- Return rehabilitated land-use to a standard that can be useful to the post-project land user.
- Maintain and monitor all rehabilitated areas following re-vegetation, and if monitoring shows that the objectives have been met, apply for closure.

8.2. Approach to the decommissioning phase

It is recommended that planning of the decommissioning of the project and rehabilitation of the site take place well in advance (at least two years) of the planned decommissioning activities. Important factors that need to be taken into consideration are detailed below.

8.2.1. Identification of structures for post-closure use

Access roads should be assessed in conjunction with the primary land users to determine if these could be used in future. Where not required, these access roads should be decommissioned and rehabilitated. Ensure that the use of the decommissioned substation site is consistent with residential use and Eskom Rehabilitation Guidelines/Standards.

8.2.2. Removal of infrastructure

All infrastructure must be dismantled and removed. Inert material must be removed from site and disposed of at a registered landfill site. All foundations must be removed to a depth of 1m. Hard surfaces must be ripped to a depth of 1m and vegetated.

8.2.3. Soil amelioration

The steps that should be taken during the amelioration of soils are as follows:

- The deposited soils must be ripped to ensure reduced compaction;
- An acceptable seed bed should be produced by surface tillage;
- Restore soil fertility;
- Incorporate the immobile fertilisers in to the plant rooting zone before ripping; and
- Apply maintenance dressing of fertilisers on an annual basis until the soil fertility cycle has been restored.

8.2.4. Establishment of vegetation

The objective is to restore the project site to a self-sustaining cycle, i.e. to realise the re-establishment of the natural nutrient cycle with ecological succession initiated.

The objectives for the re-vegetation of reshaped and top-soiled land are to:

- Prevent erosion;
- Restore the land to the agreed land capability;
- Re-establish eco-system processes to ensure that a sustainable land use can be established without requiring fertilizer additions; and
- Restore the biodiversity of the area as far as possible.

8.2.5. Maintenance

Established vegetation requires regular maintenance. If the growth medium consists of low-fertility soils, then regular maintenance will be required until the natural fertility cycle has been restored.

8.2.6. Monitoring

The purpose of monitoring is to ensure that the objectives of rehabilitation are met and that the rehabilitation process is followed. The physical aspects of rehabilitation should be carefully monitored during the progress of establishment of desired final ecosystems.

The following items should be monitored continuously:

- Erosion status;
- Surface drainage systems and surface water quality;
- Vegetation species diversity;
- Faunal re-colonisation; and
- Regular alien clearing should be conducted every year for 2 years using the best-practice methods for the species concerned. The use of herbicides should be avoided as far as possible.

APPENDIX A:

KEY LEGISLATION APPLICABLE TO THE DEVELOPMENT

APPLICABLE LEGISLATION, POLICIES AND/OR GUIDELINES

The following legislation, policies and guidelines are relevant to the development of the Zonnebloem Switching Station, two LILO power lines and associated infrastructure. Through the consideration of the relevant legislation, policies and guidelines associated with the project the necessary formal requirements are identified which needs to be complied with for the duration of the project. This is considered at a national, provincial and local level.

Table 1: Applicable Legislation, Policies and/or Guidelines associated with the development of the project

Legislation / Policy / Guideline	Applicable Requirements	Relevant Authority	Compliance requirements
	National Legislation		
National Environmental Management Act (Act No. 107 of 1998)	The EIA Regulations have been promulgated in terms of Chapter 5 of the Act. Listed activities which may not commence without an environmental authorisation are identified within these Regulations. In terms of S24(1) of NEMA, the potential impact on the environment associated with these listed activities must be assessed and reported on to the competent authority charged by NEMA with granting of the relevant environmental authorisation. In terms of GNR 983 and 985 of June 2010 a Basic Assessment Process is required to be undertaken for the proposed project.	» National Department of Environmental Affairs (DEA) » Mpumalanga Department of Agriculture, Rural Development, Land and Environmental Affairs – commenting authority	The listed activities triggered by the proposed project have been identified and assessed in the EIA process being undertaken (i.e. Basic Assessment). This Basic Assessment Report will be submitted to the competent and commenting authority in support of the application for authorisation.
National Environmental Management Act (Act No. 107 of 1998)	In terms of the Duty of Care provision in S28(1) the project proponent must ensure that reasonable measures are taken throughout the life cycle of this project to ensure that any pollution or degradation of the environment associated with a project is avoided, stopped or minimised.	» National Department of Environmental Affairs (DEA)	The implementation of mitigation measures are included as part of the EMPr and will continue to apply throughout the life cycle of the project.

Legislation / Policy / Guideline	Applicable Requirements	Relevant Authority	Compliance requirements
National Environmental Management: Biodiversity Act (Act No. 10 of 2004) and Alien Invasive Species Regulations 2014	In terms of S57, the Minister of Environmental Affairs has published a list of critically endangered, endangered, vulnerable, and protected species in GNR 151 in Government Gazette 29657 of 23 February 2007 and the regulations associated therewith in GNR 152 in GG29657 of 23 February 2007, which came into effect on 1 June 2007. In terms of GNR 152 of 23 February 2007: Regulations relating to listed threatened and protected species, the relevant specialists must be employed during the EIA Phase of the project to incorporate the legal provisions as well as the regulations associated with listed threatened and protected species (GNR 152) into specialist reports in order to identify permitting requirements at an early stage of the EIA Phase. The Act provides for listing threatened or protected ecosystems, in one of four categories: critically endangered (CR), endangered (EN), vulnerable (VU) or protected. The first national list of threatened terrestrial ecosystems has been gazetted, together with supporting information on the listing process including the purpose and rationale for listing ecosystems, the criteria used to identify listed ecosystems, the implications of listing ecosystems, and summary statistics and national maps of listed ecosystems (National Environmental Management: Biodiversity Act:	» National Department of Environmental Affairs (DEA) » Mpumalanga Tourism and Parks Agency	A Specialist Ecological Impact Assessment was undertaken as part of the Basic Assessment process (refer to **Appendix D1**). As such the potential occurrence of critically endangered, endangered, vulnerable, and protected species, as well as critically endangered (CR), endangered (EN), vulnerable (VU) or protected ecosystems and species and the potential for them to be affected has been considered. One Red Data Species (*Hypoxis hemerocallidea* – Declining) and four Mpumalanga Nature Conservation Act (Act 10 of 1998) (MPNCA) Protected species (*Eucomis autumnalis, Habenaria galpinii, Gladiolus* spp. and *Aloe ecklonis*) have been recorded within the area. None of these species occur within the development footprint and will subsequently not be impacted by the proposed development. If such species were to be identified within the development area, these species may not be disturbed/destroyed or relocated with the necessary permits obtained from the relevant authority (Mpumalanga Tourism and Parks Agency). This Basic Assessment report includes an Alien Plant and Open Space Management Plan as part of the EMPr (**Appendix C**).

Legislation / Policy / Guideline	Applicable Requirements	Relevant Authority	Compliance requirements
	National list of ecosystems that are threatened and in need of protection, (GG 34809, GN 1002), 9 December 2011). Invasive Species are categorised into four categories: » **Category 1a** Listed Invasive Species are those species listed as such by notice in terms of section 70(1)(a) of the Act as species which must be combatted or eradicated. » **Category 1b** Listed Invasive Species are those species listed as such by notice in terms of section 70(1)(a) of the Act as species which must be controlled. » **Category 2** Listed Invasive Species are those species listed by notice in terms of section 70(1)(a) of the Act as species which require a permit to carry out a restricted activity within an area specified in the Notice or an area specified in the permit, as the case may be » **Category 3** Listed Invasive Species are species that are listed by notice in terms of section 70(1)(a) of the Act, as species which are subject to exemptions in terms of section 71(3) and prohibitions in terms of section 71A of Act, as specified in the Notice. o Any plant species identified as a Category 3 Listed Invasive Species that occurs in riparian areas, must, for the		

Legislation / Policy / Guideline	Applicable Requirements	Relevant Authority	Compliance requirements
	purposes of these regulations, be considered to be a Category 1b Listed Invasive Species and must be managed according to regulation 3. Section 76 of the Act requires that all Protected Area Management Authorities and all other "Organs of State in all spheres of government", including all municipalities, draw up an "Invasive Species Monitoring, Control and Eradication Plan for land under their control." These plans have to cover all Listed Invasive Species in terms of Section 70(1) of this Act.		
National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008)	The Minister may by notice in the *Gazette* publish a list of waste management activities that have, or are likely to have, a detrimental effect on the environment. The Minister may amend the list by – » Adding other waste management activities to the list. » Removing waste management activities from the list. » Making other changes to the particulars on the list. In terms of the Regulations published in terms of this Act (GN 921), A Basic Assessment or Environmental Impact Assessment is required to be undertaken for identified listed activities	» National Department of Environmental Affairs (DEA) » Mpumalanga Department of Agriculture, Rural Development, Land and Environmental Affairs	As no waste disposal site is to be associated with the proposed project, no permit is required in this regard. Waste handling, storage and disposal during construction and operation is required to be undertaken in accordance with the requirements of the Act, as detailed in the EMPr (refer to **Appendix F**).

Legislation / Policy / Guideline	Applicable Requirements	Relevant Authority	Compliance requirements
	(Category A and B) while Category C Activities (such as storage of waste) must be undertaken in accordance with the necessary norms and standards. Any person who stores waste must at least take steps, unless otherwise provided by this Act, to ensure that: » The containers in which any waste is stored, are intact and not corroded or in any other way rendered unlit for the safe storage of waste. » Adequate measures are taken to prevent accidental spillage or leaking. » The waste cannot be blown away. » Nuisances such as odour, visual impacts and breeding of vectors do not arise; and » Pollution of the environment and harm to health are prevented.		
National Environmental Management: Air Quality Act (Act No. 39 of 2004)	S18, S19, and S20 of the Act allow certain areas to be declared and managed as "priority areas." Declaration of controlled emitters (Part 3 of Act) and controlled fuels (Part 4 of Act) with relevant emission standards. GN R 827 – National Dust Control Regulations prescribes general measures for the control of dust in all areas	» National Department of Environmental Affairs (DEA) » Steve Tshwete Local Municipality	Dust Control Regulations describe the measures for control and monitoring of dust, including penalties. These regulations might be applicable during the construction phase of the project. Dust management has also been accounted for in the EMPr (see **Appendix F**)

Legislation / Policy / Guideline	Applicable Requirements	Relevant Authority	Compliance requirements
National Water Act (Act No. 36 of 1998)	Water uses under S21 of the Act must be licensed unless such water use falls into one of the categories listed in S22 of the Act or falls under the general authorisation. In terms of S19, the project proponent must ensure that reasonable measures are taken throughout the life cycle of this project to prevent and remedy the effects of pollution to water resources from occurring, continuing, or recurring.	» Department of Water and Sanitation	A General Authorisation may be required in terms of Section 21 of the Act due to the proximity of the infrastructure to wetlands which could be impacted by the proposed project. A risk assessment and General Authorisation may be required to be undertaken for the project. No application has been lodged with the Department of Water and Sanitation (DWS) as yet.
Environment Conservation Act (Act No. 73 of 1989)	National Noise Control Regulations (GN R154 dated 10 January 1992)	» National Department of Environmental Affairs (DEA) » Mpumalanga Department of Agriculture, Rural Development, Land and Environmental Affairs	Noise impacts are expected to be associated with the construction phase of the project and are not likely to present a significant intrusion to the local community. There is no requirement for a noise permit in terms of the legislation.
Minerals and Petroleum Resources Development Act (Act No. 28 of 2002)	An Environmental Authorisation and mining permit or mining right may be required where a mineral in question is to be mined (e.g. materials from a borrow pit) in accordance with the provisions of the Act.	» Department of Mineral Resources	As no borrow pits are expected to be required for project, no mining permit or Environmental Authorisation is required to be obtained for borrow pits.
National Heritage Resources Act (Act No. 25 of 1999)	» S38 states that Heritage Impact Assessments (HIAs) are required for certain kinds of development including » The construction of a road, power line, pipeline, canal or other similar linear development or barrier exceeding 300 m in length;	» South African Heritage Resources Agency » Mpumalanga Heritage Resources Authority	For features have been identified within the study area. Feature 1 may be impacted by the proposed loop-in-loop-out power lines. This feature is of low significance. A permit may be required should any identified cultural/ heritage sites on site be required to be disturbed or destroyed (i.e. Feature 1) as a result of the proposed development, subject to the approval of SAHRA.

Legislation / Policy / Guideline	Applicable Requirements	Relevant Authority	Compliance requirements
	» Any development or other activity which will change the character of a site exceeding 5 000 m^2 in extent » The relevant Heritage Authority must be notified of developments such as linear developments (i.e. roads and power lines), bridges exceeding 50 m, or any development or other activity which will change the character of a site exceeding 5 000 m^2; or the re-zoning of a site exceeding 10 000 m^2 in extent. This notification must be provided in the early stages of initiating that development, and details regarding the location, nature and extent of the proposed development must be provided. » Standalone HIAs are not required where an EIA is carried out as long as the EIA contains an adequate HIA component that fulfils the provisions of S38. In such cases only those components not addressed by the EIA should be covered by the heritage component.		
National Forests Act (Act No. 84 of 1998)	» In terms of S5(1) no person may cut, disturb, damage or destroy any protected tree or possess, collect, remove, transport, export, purchase, sell donate or in any other manner acquire or dispose of any protected tree or any forest product derived from a protected tree, except under a license granted by the Minister to an (applicant and	» Department of Agriculture, Forestry and Fisheries	No protected trees were identified within the development footprint and therefore no permits would be required in this regard.

Legislation / Policy / Guideline	Applicable Requirements	Relevant Authority	Compliance requirements
	subject to such period and conditions as may be stipulated". » The list of protected tree species was published in GN 877 of 22 November 2013.		
National Veld and Forest Fire Act (Act 101 of 1998)	» In terms of S12 the landowner would be obliged to burn firebreaks to ensure that should a veldfire occur on the property, that it does not spread to adjoining land. » In terms of S12 the firebreak would need to be wide and long enough to have a reasonable chance of preventing the fire from spreading, not causing erosion, and is reasonably free of inflammable material. » In terms of S17, the applicant must have such equipment, protective clothing, and trained personnel for extinguishing fires.	» Department of Agriculture, Forestry and Fisheries	While no permitting or licensing requirements arise from this legislation, this Act will find application during the construction and operation phase of the project.
Conservation of Agricultural Resources Act (CARA) (Act No 43 of 1983)	» Prohibition of the spreading of weeds (S5). » Classification of categories of weeds & invader plants (Regulation 15 of GN R1048) & restrictions in terms of where these species may occur. » Requirement & methods to implement control measures for alien and invasive plant species (Regulation 15E of GN R1048) » **Category 1** - prohibited and must be controlled; » **Category 2** – must be grown within a demarcated area under permit; and » **Category 3** - ornamental plants that may no longer be planted, but existing plants may remain provided that all	» Department of Agriculture, Forestry and Fisheries	Significant numbers of alien and weed plant species are present within the site. Alien plants are also likely to establish when the site is disturbed during construction. Mitigation measures have been recommended to avoid the risk of increased alien invasion during construction, operation and maintenance phases of project (**Appendix F**). All alien plants present at the site should be controlled using the best practice methods for the species present.

Legislation / Policy / Guideline	Applicable Requirements	Relevant Authority	Compliance requirements
	reasonable steps are taken to prevent the spreading thereof, except within the floodlines of watercourses and wetlands		
Hazardous Substances Act (Act No. 15 of 1973)	This Act regulates the control of substances that may cause injury, or ill health, or death due to their toxic, corrosive, irritant, strongly sensitising, or inflammable nature or the generation of pressure thereby in certain instances and for the control of certain electronic products. To provide for the rating of such substances or products in relation to the degree of danger; to provide for the prohibition and control of the importation, manufacture, sale, use, operation, modification, disposal or dumping of such substances and products. » Group I and II: Any substance or mixture of a substance that might by reason of its toxic, corrosive etc., nature or because it generates pressure through decomposition, heat or other means, cause extreme risk of injury etc., can be declared to be Group I or Group II hazardous substance; » Group IV: any electronic product; » Group V: any radioactive material. The use, conveyance, or storage of any hazardous substance (such as distillate fuel) is prohibited without an appropriate license being in force.	» Department of Health	It is necessary to identify and list all the Group I, II, III, and IV hazardous substances that may be on the site and in what operational context they are used, stored or handled. If applicable, a license could be required to be obtained from the Department of Health.

Legislation / Policy / Guideline	Applicable Requirements	Relevant Authority	Compliance requirements
National Road Traffic Act (Act No 93 of 1996)	The technical recommendations for highways (TRH 11): "Draft Guidelines for Granting of Exemption Permits for the Conveyance of Abnormal Loads and for other Events on Public Roads" outline the rules and conditions which apply to the transport of abnormal loads and vehicles on public roads and the detailed procedures to be followed in applying for exemption permits are described and discussed. Legal axle load limits and the restrictions imposed on abnormally heavy loads are discussed in relation to the damaging effect on road pavements, bridges and culverts. » The general conditions, limitations and escort requirements for abnormally dimensioned loads and vehicles are also discussed and reference is made to speed restrictions, power/mass ratio, mass distribution and general operating conditions for abnormal loads and vehicles. Provision is also made for the granting of permits for all other exemptions from the requirements of the National Road Traffic Act and the relevant Regulations.	» Provincial Department of Transport (provincial roads) » South African National Roads Agency Limited (national roads)	An abnormal load/vehicle permit may be required to transport the various components to site for construction. These include route clearances and permits could be required for vehicles carrying abnormally heavy or abnormally dimensioned loads. Depending on the trailer configuration and height when loaded, some of the components may not meet the specified dimensional limitations (height and width) and would need to apply for the relevant permit/ clearance.
Provincial Policies / Legislation			
Mpumalanga Nature Conservation Act (Act 10 of 1998)	» Provides inter alia for the sustainable utilisation of wild animals, aquatic biota and plants as well as permitting and trade regulations regarding wild fauna and flora	» Mpumalanga Department of Agriculture, Rural Development, Land and Environmental Affairs	A permit is required for any activities which involve species listed under schedule 11 or 12.

Legislation / Policy / Guideline	Applicable Requirements	Relevant Authority	Compliance requirements
	within the province. In terms of this act the following section may be relevant with regards to any security fencing the development may require. The Act also lists protected fauna and flora under different schedules ranging from specially protected Game (Schedule 1), protected plants (schedule 11) to specially protected plants (schedule 12). The Act, accompanied by all amendments, are regarded by the Mpumalanga Province as the legal binding, provincial documents, providing regulations, guidelines and procedures with the aim of protecting game and fish, the conservation of flora and fauna, and the destruction of problematic (vermin and invasive) species.		The following provincially protected plant species according to Schedule 11 were found within the study area but not within the development footprint: » *Aloe ecklonis,* » *Eucomis autumnalis,* » *Habenaria galpinii,* » *Gladiolus* spp. Therefore, a permit could be required for removal of such species. A permit could be required from Mpumalanga Department of Agriculture, Rural Development, Land and Environmental Affairs to relocate protected plants and to clear natural vegetation at the substation site.

Various Guidelines have been consulted throughout the Basic Assessment Report. These include:

» Eskom – Vegetation management guideline
» Eskom – Monitoring, Control and Eradication Plan for Invasive Species
» Eskom – Utilisation of flight bird diverters on Eskom overhead lines
» Eskom – Waste Management Standard

APPENDIX B:

GRIEVANCE MECHANISM

GRIEVANCE MECHANISM / PROCESS

PURPOSE

This Grievance Mechanism has been developed to receive and facilitate resolution of concerns and grievances about the Project's environmental and social performance. The aim of the grievance mechanism is to ensure that grievances or concerns raised by local landowners and or communities are addressed in a manner that:

- Provides a predictable, transparent, and credible process to all parties, resulting in outcomes that are seen as fair, effective, and lasting.
- Builds trust as an integral component of broader community relations activities.
- Enables more systematic identification of emerging issues and trends, facilitating corrective action and pre-emptive engagement.

The aim of this Grievance Mechanism is to address grievances in a manner that does not require a potentially costly and time consuming legal process.

PROCEDURE FOR RECEIVING AND RESOLVING GRIEVANCES

- Local landowners, communities and authorities must be informed in writing by the Proponent of the grievance mechanism and the process by which grievances can be brought to the attention of the Proponent through its designated representative.
- A company representative must be appointed as the contact person for grievances to be addressed to. The name and contact details of the contact person must be provided to local landowners, communities and authorities.
- Project related grievances relating to the construction, operational and or decommissioning phase must be addressed in writing to the contact person. The contact person should assist local landowners and or communities who may lack resources to submit/prepare written grievances.
- The grievance must be registered with the contact person who, within 2 working days of receipt of the grievance, must contact the Complainant to discuss the grievance and agree on suitable date and venue for a meeting in order to discuss the grievances raised. Unless otherwise agreed, the meeting should be held within 2 weeks of receipt of the grievance.
- The contact person must draft a letter to be sent to the Complainant acknowledging receipt of the grievance, the name and contact details of Complainant, the nature of the grievance, the date that the grievance was raised, and the date and venue for the meeting (once agreed).
- Prior to the meeting being held the contact person must contact the Complainant to discuss and agree on the parties who should attend the meeting. The people who will be required to attend the meeting will depend on the nature of the grievance. While the Complainant and or proponent are entitled to invite their legal representatives to attend the meeting/s, it should be made clear that to all the parties involved in the process that the grievance mechanism process is not a legal process. It is therefore recommended that the involvement of legal representatives be limited.

- The meeting should be chaired by the Proponent representative appointed to address grievances. The Proponent must provide a person to take minutes of and record the meeting/s. Any costs associated with hiring venues must be covered by the Proponent.
- Draft copies of the minutes must be made available to the Complainant and the Proponent within 4 working days of the meeting being held. Unless otherwise agreed, comments on the Draft Minutes must be forwarded to the company representative appointed to manage the grievance mechanism within 4 working days of receipt of the draft minutes.
- In the event of the grievance being resolved to the satisfaction of all the parties concerned, the outcome must be recorded and signed off by the relevant parties. The record should provide details of the date of the meeting/s, the names of the people that attended the meeting/s, the outcome of the meeting/s, and where relevant, the measures identified to address the grievance, the party responsible for implementing the required measures, and the agreed upon timeframes for the measures to be implemented.
- In the event of a dispute between the Complainant and the proponent regarding the grievance, the option of appointing an independent mediator to assist with resolving the issue should be discussed. The record of the meeting/s must note that a dispute has arisen and that the grievance has not been resolved to the satisfaction of all the parties concerned.
- In the event that the parties agree to appoint a mediator, the Proponent will be required to identify three (3) mediators and forward the names and CVs to the Complainant within 2 weeks of the dispute being declared.
- The Complainant, in consultation with the Project Company, must identify the preferred mediator and agree on a date for the next meeting. The cost of the mediator must be borne by the Project Company. The Project Company must provide a person to take minutes of and record the meeting/s.
- In the event of the grievance, with the assistance of the mediator, being resolved to the satisfaction of all the parties concerned, the outcome must be recorded and signed off by the relevant parties, including the mediator. The record should provide details on the date of the meeting/s, the names of the people that attended the meeting/s, the outcome of the meeting/s, and where relevant, the measures identified to address the grievance, the party responsible for implementing the required measures, and the agreed upon timeframes for the measures to be implemented.
- In the event of the dispute not being resolved, the mediator must prepare a draft report that summaries the nature of the grievance and the dispute. The report should include a recommendation by the mediator on the proposed way forward with regard to the addressing the grievance.
- The draft report must be made available to the Complainant and the Proponent for comment before being finalised and signed by all parties. Unless otherwise agreed, comments on the draft report must be forwarded to the company representative appointed to manage the grievance mechanism within 4 working days.
- The way forward will be informed by the recommendations of the mediator and the nature of the grievance.

A Complaint is closed out when no further action can be or needs to be taken. Closure status will be classified in the Complaints Register as follows:

- Resolved. Complaints where a resolution has been agreed and implemented and the Complainant has signed the Confirmation Form.
- Unresolved. Complaints where it has not been possible to reach an agreed resolution and the case has been authorised for close out by the Appeals Committee.
- Abandoned. Complaints where the Complainant is not contactable after one month following receipt of a Complaint and efforts to trace his or her whereabouts have been unsuccessful.

The grievance mechanism does not replace the right of an individual, community, group or organization to take legal action should they so wish. In the event of the grievance not being resolved to the satisfaction of Complainant and or the Proponent, either party may be of the opinion that legal action may be the most appropriate option.

APPENDIX C:

ALIEN PLANT AND OPEN SPACE MANAGEMENT PLAN

ALIEN PLANT AND OPEN SPACE MANAGEMENT PLAN

1. PURPOSE

Invasive alien plant species pose the second largest threat to biodiversity after direct habitat destruction. The purpose of this Alien Plant and Open Space Management Plan is to provide a framework for the management of alien and invasive plant species during the construction and operation of the Zonnebloem Switching Station, loop-in-loop-out power lines and associated infrastructure. The broad objectives of the plan include the following:

» Ensure alien plants do not become dominant in parts of the site, or the whole site, through the control and management of alien and invasive species presence, dispersal and encroachment.
» Develop and implement a monitoring and eradication programme for alien and invasive plant species.
» Promote the natural re-establishment and planting of indigenous species in order to retard erosion and alien plant invasion.

2. RELEVANT ASPECTS OF THE SITE

The study area is situated in the Grassland biome and Mesic Highveld Grassland Bioregion and comprises the Rand Highveld Grassland vegetation type (Endangered). Extremely little of the study area contains vegetation that resembles Rand Highveld Grassland with most of the study area in a severe degraded and disturbed condition as a result of historical cultivation activities as well as afforestation activities (plantations and woodlots). The previous disturbed areas within the study area, as well as the surrounding areas contain a vegetation cover comprising of numerous weeds, alien plants as well as pioneer and sub-climatic species associated with such disturbed areas. Some invasive alien trees have also settled within these areas (apart from the woodlots).

A total of 147 different plant species were recorded within the study area of which 54 species were alien plant and weeds (12 were listed invasive alien plants), subsequently contributing 36.7% to the total species composition of the study area. Five conservation worthy species were recorded within the study area including one Red Data Species (Hypoxis hemerocallidea – Declining) and four MNCA protected species, namely *Gladiolus spp., Habenaria galpinii, Eucomis autumnalis and Aloe ecklonis*. All of these species were identified outside of the development footprint and subsequently will not be impacted by the proposed development.

3. LEGISLATIVE CONTEXT

Conservation of Agricultural Resources Act (Act No. 43 of 1983)

In terms of the amendments to the regulations under the Conservation of Agricultural Resources Act (Act No. 43 of 1983), all declared alien plant species must be effectively controlled. Landowners are legally responsible for the control of invasive alien plants on their properties. In terms of this Act alien invasive plant species are ascribed to one of the following categories:

- Category 1: Prohibited and must be controlled.
- Category 2 (commercially used plants): May be grown in demarcated areas provided that there is a permit and that steps are taken to prevent their spread.
- Category 3 (ornamentally used plants): May no longer be planted. Existing plants may be retained as long as all reasonable steps are taken to prevent the spreading thereof, except within the flood line of watercourses and wetlands.

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

The National Environmental Management: Biodiversity Act (NEM:BA) regulates all invasive organisms in South Africa, including a wide range of fauna and flora. Regulations have been published in Government Notices R.506, R.507, R.508 and R.509 of 2013 under NEMBA. According to this Act and the regulations, any species designated under Section 70 cannot be propagated, grown, bought or sold without a permit. Below is an explanation of the three categories:

- **Category 1a:** Invasive species requiring compulsory control. Any specimens of Category 1a listed species need, by law, to be eradicated from the environment. No permits will be issued.
- **Category 1b:** Invasive species requiring compulsory control as part of an invasive species control programme. Remove and destroy. These plants are deemed to have such a high invasive potential that infestations can qualify to be placed under a government sponsored invasive species management programme. No permits will be issued.
- **Category 2:** Invasive species regulated by area. A demarcation permit is required to import, possess, grow, breed, move, sell, buy or accept as a gift any plants listed as Category 2 plants. No permits will be issued for Cat 2 plants to exist in riparian zones.
- **Category 3:** Invasive species regulated by activity. An individual plant permit is required to undertake any of the following restricted activities (import, possess, grow, breed, move, sell, buy or accept as a gift) involving a Category 3 species. No permits will be issued for Category 3 plants to exist in riparian zones.

The following guide is a useful starting point for the identification of alien plant species: Bromilow, C. 2010. Problem Plants and Alien Weeds of South Africa. Briza, Pretoria.

It is important to note that alien plant species that are regulated in terms of the Conservation of Agricultural Resources Act (Act 43 of 1983) (CARA) as weeds and invader plants are exempted from NEM:BA. This implies that the provisions of the CARA in respect of listed weed and invader plants supersede those of NEM: BA.

4. ALIEN PLANT MANAGEMENT PRINCIPLES

4.1. Prevention and early eradication

A prevention strategy should be considered and established, including regular surveys and monitoring for invasive alien plants, effective rehabilitation of disturbed areas and prevention of unnecessary disturbance of natural areas.

Monitoring plans should be developed which are designed to identify Invasive Alien Plant Species already on site, as well as those that are introduced to the site by the construction activities. Keeping up to date on which weeds are an immediate threat to the site is important, but efforts should be planned to update this information on a regular basis. When new Invasive Alien Plant Species are recorded on site, an immediate response of locating the site for future monitoring and either hand-pulling the weeds or an application of a suitable herbicide (where permissible only) should be planned. It is, however, better to monitor regularly and act swiftly than to allow invasive alien plants to become established on site.

4.2. Containment and control

If any alien invasive plants are found to become established on site, action plans for their control should be developed, depending on the size of the infestations, budgets, manpower considerations and time. Separate plans of control actions should be developed for each location and/or each species. Appropriate registered chemicals and other possible control agents should be considered in the action plans for each site/species. The uses of chemicals are not recommended for any wetland areas. Herbicides should be applied directly to the plant and not to the soil. The key is to ensure that no invasions get out of control. Effective containment and control will ensure that the least energy and resources are required to maintain this status over the long-term. This will also be an indicator that natural systems are impacted to the smallest degree possible.

4.3. General Clearing and Guiding Principles

Alien species control programmes are long-term management projects and should consist of a clearing plan which includes follow up actions for rehabilitation of the cleared area. The lighter infested areas should be cleared first to prevent the build-up of seed banks. Pre-existing dense mature stands ideally should be left for last, as they probably won't increase in density or pose a greater threat than they are currently. Collective management and planning with neighbours may be required in the case of large woody invaders as seeds of alien species are easily dispersed across boundaries by wind or watercourses. All clearing actions should be monitored and documented to keep records of which areas are due for follow-up clearing.

i. Clearing Methods

Different species require different clearing methods such as manual, chemical or biological methods or a combination of both. Care should however be taken that the clearing methods used do not encourage further invasion. As such, regardless of the methods used, disturbance to the soil should be kept to a minimum.

Fire should not be used for alien species control or vegetation management at the site. The best-practice clearing method for each species identified should be used.

» **Mechanical control**
This entails damaging or removing the plant by physical action. Different techniques could be used, e.g. uprooting, felling, slashing, mowing, ringbarking or bark stripping. This control option is only really feasible in sparse infestations or on a small scale, and for controlling species that do not coppice after cutting. Species that tend to coppice, need to have the cut stumps or coppice growth treated with

herbicides following the mechanical treatment. Mechanical control is labour intensive and therefore expensive, and could cause severe soil disturbance and erosion.

» **Chemical Control**

Although it is usually preferable to use manual clearing methods where possible, such methods may create additional disturbance which stimulates alien plant invasion and may also be ineffective for many woody species which resprout. Where herbicides are to be used, the impact of the operation on the natural environment should be minimised by observing the following:

- Area contamination must be minimised by careful, accurate application with a minimum amount of herbicide to achieve good control.
- All care must be taken to prevent contamination of any water bodies. This includes due care in storage, application, cleaning equipment and disposal of containers, product and spray mixtures.
- Equipment should be washed where there is no danger of contaminating water sources and washings carefully disposed of at a suitable site.
- To avoid damage to indigenous or other desirable vegetation, products should be selected that will have the least effect on non-target vegetation.
- Coarse droplet nozzles should be fitted to avoid drift onto neighbouring vegetation.
- The appropriate health and safety procedures should also be followed regarding the storage, handling and disposal of herbicides.
- The use of chemicals is not recommended for wetland areas.

For all herbicide applications, the following Regulations and guidelines should be followed:

- Working for Water: Policy on the Use of Herbicides for the Control of Alien Vegetation.
- Pesticide Management Policy for South Africa published in terms of the Fertilizers, Farm Feeds, Agricultural Remedies and Stock Remedies Act, 1947 (Act No. 36 of 1947) – GNR 1120 of 2010.
- South African Bureau of Standards, Standard SANS 10206 (2010)

According to Government Notice No. 13424 dated 26 July 1992, it is an offence to "*acquire, dispose, sell or use an agricultural or stock remedy for a purpose or in a manner other than that specified on the label on a container thereof or on such a container*".

Contractors using herbicides need to have a valid Pest Control Operators License (limited weeds controller) according to the Fertilizer, Farm Feeds, Agricultural Remedies and Stock Remedies Act (Act No. 36 of 1947). This is regulated by the Department of Agriculture, Forestry and Fisheries.

» **Biological control**

Biological weed control consists of the use of natural enemies to reduce the vigour or reproductive potential of an invasive alien plant. Biological control agents include insects, mites, and micro-organisms such as fungi or bacteria. They usually attack specific parts of the plant, either the reproductive organs directly (flower buds, flowers or fruit) or the seeds after they have dropped. The stress caused by the biological control agent may kill a plant outright or it might impact on the plant's reproductive capacity. In certain instances, the reproductive capacity is reduced to zero and the population is effectively sterilised. All of these outcomes will help to reduce the spread of the species.

To obtain biocontrol agents, provincial representatives of the Working for Water Programme or the Directorate: Land Use and Soil Management (LUSM), Department of Agriculture, Forestry and Fisheries (DAFF) can be contacted.

4.4. General management practices

The following general management practices should be encouraged or strived for:

- Establish an on-going monitoring programme for construction phase to detect and quantify any alien species that may become established.
- Alien vegetation regrowth on areas disturbed by construction must be immediately controlled.
- Care must be taken to avoid the introduction of alien invasive plant species to the site. Particular attention must be paid to imported material such as building sand or dirty earth-moving equipment. Stockpiles should be checked regularly and any weeds emerging from material stockpiles should be removed.
- Cleared areas that have become invaded by alien species can be sprayed with appropriate herbicides provided that these herbicides break down on contact with the soil. Residual herbicides should not be used.
- The effectiveness of vegetation control varies seasonally and this is also likely to impact alien species. Control early in the wet season will allow species to re-grow, and follow-up control is likely to be required. It is tempting to leave control until late in the wet season to avoid follow-up control. However, this may allow alien species to set seed before control, and hence will not contribute towards reducing alien species abundance. Therefore, vegetation control should be aimed at the middle of the wet season, with a follow-up event towards the end of the wet season. There are no exact dates that can be specified here as each season is unique and management must therefore respond according to the state and progression of the vegetation.
- Alien plant management is an iterative process and it may require repeated control efforts to significantly reduce the abundance of a species. This is often due to the presence of large and persistent seed banks. However, repeated control usually results in rapid decline once seed banks become depleted.
- Some alien species are best individually pulled by hand. Regular vegetation control to reduce plant biomass within the site should be conducted. This should be timed so as to coincide with the critical growth phases of the most important alien species on site. This will significantly reduce the cost of alien plant management as this should contribute towards the control of the dominant alien species and additional targeted control will be required only for a limited number of species.
- No alien species should be cultivated on-site. If vegetation is required for aesthetic purposes, then non-invasive, water-wise locally-occurring species should be used.
- During operation, surveys for alien species should be conducted regularly. It is recommended that this be undertaken every 6 months for the first two years after construction and annually thereafter. All alien plants identified should be cleared using appropriate means.

4.5. Monitoring

In order to assess the impact of clearing activities, follow-ups and rehabilitation efforts, monitoring must be undertaken. This section provides a description of a possible monitoring programme that will provide an

assessment of the magnitude of alien plant invasion on site, as well as an assessment of the efficacy of the management programme.

In general, the following principles apply for monitoring:

» Photographic records must be kept of areas to be cleared prior to work starting and at regular intervals during initial clearing activities. Similarly, photographic records should be kept of the area from immediately before and after follow-up clearing activities. Rehabilitation processes must also be recorded.
» Simple records must be kept of daily operations, e.g. area/location cleared, labour units and, if ever used, the amount of herbicide used.
» It is important that, if monitoring results in detection of invasive alien plants, that this leads to immediate action.

The following monitoring should be implemented to ensure management of alien invasive plant species.

Construction Phase

Monitoring Action	Indicator	Timeframe
Document alien species present at the site	List of alien plant species	Preconstruction Monthly during Summer and Autumn (Middle November to end March) 3 Monthly during Winter and Spring
Document alien plant distribution	Alien plant distribution map within priority areas	3 Monthly
Document & record alien plant control measures implemented	Record of clearing activities	3 Monthly

Operation Phase

Monitoring Action	Indicator	Timeframe
Document alien plant species distribution and abundance over time at the site	Alien plant distribution map	Biannually
Document alien plant control measures implemented & success rate achieved	Records of control measures and their success rate. A decline in alien distribution and cover over time at the site	Biannually
Document rehabilitation measures implemented and success achieved in problem areas	Decline in vulnerable bare areas over time	Biannually

4.6. Power line corridor vegetation clearance width

Historically, Eskom maintained alien invasive plants and invader weeds and invasive plants were controlled as per CARA specifications. Recently, Eskom has adopted a strategy to maintain vegetation on servitudes to follow a biome related specification which includes the controlling of declared weeds and invader plants. For a 132kV power line, as for this project, 8m on either side of the power line will be cleared and

eradicated from declared weeds and invader plants (Monitoring, Control and Eradication Plan for Invasive Species on Eskom Land).

APPENDIX D:

REVEGETATION, REHABILITATION AND PLANT PROTECTION PLAN

REVEGETATION, REHABILITATION AND PLANT PROTECTION PLAN

1. PURPOSE

The purpose of this plan is to ensure that areas cleared or impacted during construction activities of project are rehabilitated with a plant cover that reduces the risk of erosion from these areas, in addition to restoring some ecosystem function. The purpose of the rehabilitation plan for the site can be summarised as follows:

» Achieve long-term stabilisation of all disturbed areas to minimise erosion potential.
» Re-vegetate all disturbed areas with suitable local plant species.
» Minimise visual impact of disturbed areas.

This Revegetation and Rehabilitation Plan should be closely aligned with other site-specific plans, including inter alia an Erosion Management Plan and Alien Plant Management Plan. Prior to commencement of construction, a detailed Rehabilitation Plan and Method Statement for the construction site and road reserve should be compiled with the aid of a Rehabilitation Specialist, as required.

2. RELEVANT ASPECTS OF THE SITE

The study area is situated in the Grassland biome and Mesic Highveld Grassland Bioregion and comprises the Rand Highveld Grassland vegetation type (Endangered). Extremely little of the study area contains vegetation that resembles Rand Highveld Grassland, with most of the study area in a severe degraded and disturbed condition as a result of historical cultivation activities as well as afforestation activities (plantations and woodlots). The previous disturbed areas within the study area as well as the surrounding areas contain a vegetation cover comprising of numerous weeds, alien plants as well as pioneer and sub-climatic species associated with such disturbed areas. Some invasive alien trees have also settled within these areas (apart from the woodlots). Almost 97% (81.52ha) of the study area has been transformed and disturbed. The remaining 2.8% is regarded as slightly disturbed to semi-natural and contains some elements of the natural occurring grassland, occurring as isolated patches associated mostly with the wetland habitats.

A total of 147 different plant species were recorded within the study area, of which 54 species were alien plant and weeds (12 were listed invasive alien plants), subsequently contributing 36.7% to the total species composition of the study area.

As a result of the highly transformed and degraded state of the study area, this portion of land provides very limited ecological functions and services, including some habitat for a very limited amount of biota (flora and fauna). Very little grazing potential is provided by this area due to the dominance of unpalatable weeds and forbs as well as pioneer grasses.

3. REHABILITATION METHODS

Any areas disturbed during the construction phase should be encouraged to rehabilitate as quickly and effectively as possible and, where deemed necessary by the ECO, artificial rehabilitation (e.g. re-seeding with collected or commercial indigenous seed mixes) should be applied in order to speed up the rehabilitation process in critical areas (e.g. wetland areas).

- Immediately after replacing topsoils in disturbed areas, the soil surface must be revegetated with a suitable plant cover.
- It is expected that soil seed banks of indigenous vegetation will be present to initiate initial vegetation cover. However, simply applying this topsoil to a well-prepared rehabilitation site does not result in the same species richness and diversity as the natural vegetation prior to disturbance. Due to the prevalence of alien and weed species in the sudy area, the regeneration of the naturally occuring vegetation may be poor and the application of relevant seed to enhance vegetation recovery may be required.
- Where possible, seed should be collected from plants present at the site during plant rescue oprerations. Indigenous seeds may also be harvested for purposes of re-vegetation in areas that are free of alien or invasive vegetation, either at the site prior to clearance or from suitable neighbouring sites.
- Seed collection should be undertaken by a suitably qualified specialist who is familiar with the various seed types associated with the plant species and rehabilitation in the area.
- Seed collection may be done throughout the year as seed ripens, but can also be restricted to summer, when a large amount of the perennial seed should have ripened. The collection of unripe seeds will reduce the percentage germination thereby reducing the effectiveness of the rehabilitation efforts. Seeds should be stored in paper or canvas bags dusted with insecticide, and sown at the onset of the rainy season.
- Seed can be sown onto the soil, but should preferably be applied in conjunction with measures to improve seedling survival such as scarification of the soil surface or simultaneous application of mulch. Additional organic material may be added to the soil mix, if required, to assist with water retention during the early stages of seedling establishment.
- It should be ensured that the seed mix is as diverse as possible in the first season. After the first season, when pioneer plant communities have successfully established, attempts should be made to re-sow and replant the area with more perennial and woody species. It is a process that will require several follow-ups.
- Planting is dependent on species involved. Planting of species recommended for rehabilitation should be carried out as far as is practicable to coincide with the onset of the first significant rains. In general however, planting should commence as soon as possible after construction is completed in order to minimise the potential for erosion.
- The final vegetation cover should resemble the vegetation composition and structure of the study are before the development occured as far as practicably possible.
- Progressive rehabilitation is an important element of the rehabilitation strategy and should be implemented where feasible. Re-vegetation of disturbed surfaces must occur immediately after construction activities are completed.
- Once revegetated, areas should be protected to prevent trampling and erosion.
- No construction equipment, vehicles or unauthorised personnel should be allowed onto areas that have been vegetated.

» Any erosion channels or wash aways developing after revegetation should be restored to a stable condition.

4. MONITORING AND FOLLOW-UP ACTIONS

The following are the minimum criteria that should be monitored within the development footprint during maintenance activities:

» Composition, density and stability of replanted vegetation.
» Associated nature and stability of surface soils.
» Emergence of alien and invasive plant species. If noted, remedial action must be taken immediately.

The initial revegetation period post-construction is estimated to be over a period of 6 months (minimum) to 12 months. The rehabilitation phase (including post seeding maintenance) should be at least 12 months (depending on time of seeding and rainfall) to ensure establishment of an acceptable plant cover is achieved (excluding invasive plant species or weeds).

Monitoring and follow-up action is important in order to achieve the desired cover and soil protection. The following monitoring protocol is recommended:

» Re-vegetated areas should be monitored every 4 months for the first 12 months following construction.
» Re-vegetated areas showing inadequate surface coverage (less than 20% within 12 months after re-vegetation) should be prepared and re-vegetated.
» Any areas showing erosion should be re-contoured and seeded with indigenous grasses or other locally occurring species which grow quickly.

If the plants have not established and the acceptable plant cover is not achieved within the specified maintenance period, maintenance of these areas shall continue until an acceptable plant cover is achieved (excluding alien plant species or weeds). Additional seeding or planting may be necessary to achieve acceptable plant cover. Hand seeding may have to be considered as an option in this case.

Monitoring of rehabilitation success and follow-up adaptive management, together with clearing of emerging alien plant species should continue for as long as considered necessary, depending on regrowth rates.

5. PLANT PROTECTION

The purpose of the plant protection plan is to implement avoidance and mitigation measures, in addition to the mitigations included in the Environmental Management Programme (EMPr) to reduce the impact of the development of the project on listed and protected plant species and their habitats and to provide guidance on search and rescue of species of conservation concern.

Successful plant rescue can only be achieved if:

» Species can be removed from their original habitat with minimal damage to the plant, especially the roots.

- All plants removed are safely stored and treated according to their specific requirements prior to being transplanted again.
- They are relocated into a suitable habitat and protected from further damage and all disturbances to aid their re-establishment.
- Timing of planting activities is planned with the onset of the growing season.
- Steps are taken where necessary to aid the initial establishment of vegetation, including occasional watering.

The following principles apply in terms of plant rescue and protection:

- A permit is required from the Mpumalanga Department of Agriculture, Rural Development, Land and Environmental Affairs to translocate or destroy any listed and protected species. This permit should be obtained prior to any search and rescue operations being undertaken.
- Where suitable species are identified, a search and rescue operation for these species should be undertaken within the development footprint, where these species would be affected, and prior to the commencement of construction.
- As far as possible, timing of search and rescue activities should be planned with the onset of the growing season.
- Affected individuals should be translocated to a similar habitat outside of the development footprint and marked and recorded for monitoring purposes. For each individual plant that is rescued, the plant must be photographed before removal, tagged with a unique number or code and a latitude longitude position recorded using a hand-held GPS device.
- The rescued plants must be planted into a container to be housed within a temporary nursery on site or immediately planted into the target habitat.
- Rescued plants, if re-planted back in the wild, should be placed as close as possible to where they were originally removed. Re-planting into the wild must cause as little disturbance as possible to existing natural ecosystems. The position of the rescued individual/s must be recorded to aid in future monitoring of that plant as noted earlier.
- During construction, the Environmental Control Officer (ECO)/ Contractor's Environmental Officer (EO)/ Environmental Representative must monitor vegetation clearing at the site. Any deviations from the plans that may be required should first be checked for listed species by the Environmental Control Officer (ECO)/ Contractor's Environmental Officer (EO/ SHE Representative) and any listed species present which are able to survive translocation should be translocated to a safe site.
- Any listed species suitable for translocation observed within the development footprint, and that would be affected, that were not previously observed be translocated to a safe site.
- The collecting of plants of their parts should be strictly forbidden. Staff should be informed of the legal and conservation aspects of harvesting plants from the wild as part of the environmental induction training.
- Sensitive habitats and area outside project development should be clearly demarcated as no go areas during the construction and operational phase to avoid accidental impacts.

6. REFERENCES

Van Wyk, A. & Smith, G., 2001. *Regions of floristic endemism in southern Africa.* Hatfield. Umdaus press.

APPENDIX E:

WASTE MANAGEMENT PLAN

WASTE MANAGEMENT PLAN

1. PURPOSE

A Waste Management Plan (WMP) plays a key role in achieving sustainable waste management throughout all phases of the project. The plan prescribes measures for the collection, temporary storage and safe disposal of the waste streams associated with the project and includes provisions for the recovery, re-use and recycling of waste. The purpose of this plan is therefore to ensure that effective procedures are implemented for the handling, storage, transportation and disposal of waste that is generated from the project activities on site.

This WMP has been compiled as part of the project Environmental Management Programme (EMPr) and includes waste stream information available at the time of compilation. Construction practices and operations must be measured and analysed on an ongoing basis in order to determine the efficacy of the plan and whether further revision of the plan is required. This plan should be updated should further detail regarding waste quantities and categorisation become available, during the construction and/or operational stages.

2. RELEVANT ASPECTS OF THE SITE

It is anticipated that construction waste will be generated and will be mainly comprised of soil material from excavation activities as well as metal and cabling offcuts. Non-recyclable waste will be removed from site by a suitable contractor and will be transported to the nearest registered waste disposal facility for appropriate disposal. In order to comply with legal requirements, should there be excess solid construction waste after recycling options have been exhausted, the waste will be transported to the nearest registered waste disposal facility for appropriate disposal.

3. LEGISLATIVE REQUIREMENTS

Waste in South Africa is currently governed by several pieces of legislation, including:

- National Environmental Management: Waste Act (NEM:WA), 2008 (Act 59 of 2008);
- National Environmental Management: Waste Amendment Act, 2014 (Act 26 of 2014);
- The South African Constitution (Act 108 of 1996);
- Hazardous Substances Act (Act 5 of 1973);
- Health Act (Act 63 of 1977);
- Environment Conservation Act (Act 73 of 1989);
- Occupational Health and Safety Act (Act 85 of 1993);
- National Water Act (Act 36 of 1998);
- The National Environmental Management Act (Act 107 of 1998) (as amended);
- Municipal Structures Act (Act 117 of 1998);
- Municipal Systems Act (Act 32 of 2000);
- Mineral and Petroleum Resources Development Act (Act 28 of 2002); and
- Air Quality Act (Act 39 of 2004).

Storage of waste must be undertaken in accordance with the National Norms and Standards for the Storage of Waste published in GN926.

4. WASTE MANAGEMENT PRINCIPLES

An integrated approach to waste management on site is needed. Such an approach is illustrated in the **Figure 1**.

It is important to ensure that waste is managed with the following objectives in mind during all phases of the project:

- Reducing volumes of waste is a priority;
- If reduction is not feasible, the maximum amount of waste is to be recycled; and
- Waste that cannot be recycled is to be disposed of in the most environmentally responsible manner as possible.

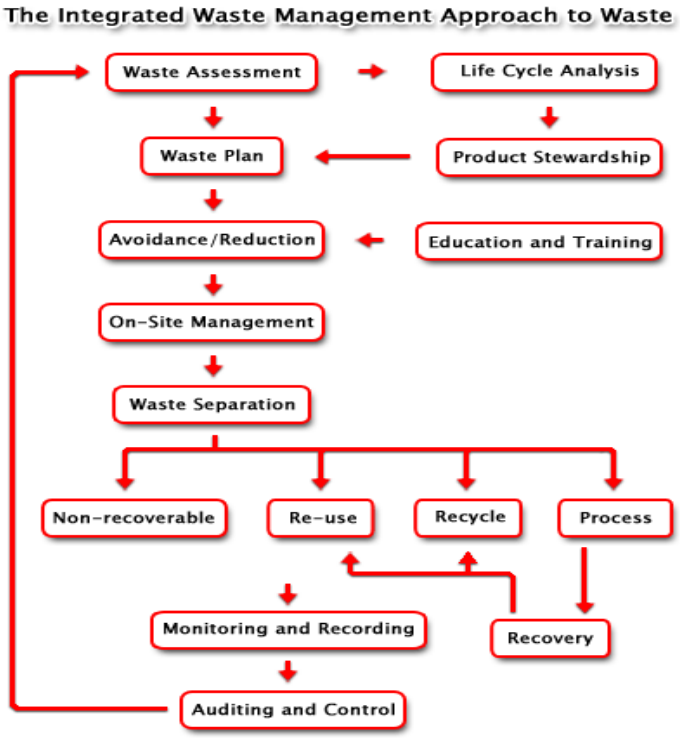


Figure 1: Integrated Waste Management Flow Diagram
(Source: http://www.enviroserv.co.za/pages/content.asp?SectionId=496)

4.1. Construction phase

A plan for the management of waste during construction is detailed below. Construction practices must be measured and analysed in order to determine the efficacy of the plan and whether further revision of the plan is required. A Method Statement detailing specific waste management practices during construction should be prepared by the Contractor prior to the commencement of construction.

4.1.1. Waste Assessment / Inventory

- The Environmental Officer (EO), or designated staff member, must develop, implement and maintain a waste inventory reflecting all waste generated during construction for both general and hazardous waste streams.
- Construction method and materials should be carefully considered in view of waste reduction, re-use, and recycling opportunities.
- Once a waste inventory has been established, targets for recovery of waste (minimisation, re-use, recycling) should be set.
- The EO must conduct waste classification and rating in terms of SANS 10288 and Government Notice 634 published under the NEM: WA.

4.1.2. Waste collection, handling and storage

- It is the responsibility of the EO to ensure that each subcontractor implements their own waste recycling system, i.e. separate bins for food waste, plastics, paper, wood, glass cardboard, metals, etc.
- Waste manifests and waste acceptance approvals from designated waste facilities must be kept on hand in order to prove compliance.
- Septic tanks and portable toilets must be monitored and maintained daily. Below ground storage of septic tanks must withstand the external forces of the surrounding environment. The area above the tank must be demarcated to prevent any vehicles or heavy machinery from driving around the area.
- Waste collection bins and hazardous waste containers must be provided by the principal contractor and subcontractors and placed at various areas around site for the storage of organic, recyclable and hazardous waste.
- A dedicated waste area must be established on site for the storage of all waste streams, before removal from site. The storage period must not trigger listed waste activities as per the NEMWA, GN 921 of November 2013.
- Signage/ colour coding must be used to differentiate disposal areas for the various waste streams (i.e. paper, cardboard, metals, food waste, glass etc.).
- Hazardous waste must be stored within a bunded area constructed according to SABS requirements. The volume of waste stored in the bunds must not exceed 100% of the bund capacity.
- The location of all temporary waste storage areas must aim to minimise the potential for impact on the surrounding environment, including prevention of contaminated runoff, seepage, and vermin control.
- Waste storage shall be in accordance with all Regulations and best-practice guidelines and under no circumstances may waste be burnt on site.
- If possible a dedicated waste management team must be appointed by the principal contractors' SHE Officer, whom will be responsible for ensuring the continuous sorting of waste and maintenance of the area. The waste management team must be trained in all areas of waste management and monitored by the SHE Officer.
- All waste removed from site must be done so by a registered/ licensed subcontractor, whom must supply information regarding how waste recycling/ disposal will be achieved. The registered subcontractor must provide waste manifests for all removals at least once a month or for every disposal made.

4.1.3. Management of waste storage areas

» The position of all waste storage areas must be located at least 32m away from water features (i.e. wetland areas) and ensure minimal degradation to the environment. The main waste storage area must have a suitable stormwater system separating clean and dirty stormwater.
» Collection bins placed around site and at subcontractors' camps (if at a different location than the main site camp) must be maintained and emptied on a regular basis by the principal contractor.
» Inspections and maintenance of the main waste storage area must be undertaken daily. Skips and storage containers must be clearly marked or colour coded and well-maintained, not allowing access to vermin or other rodents. A tarp or shade cloth should ideally be used to ensure avifauna does not have access to waste.
» Waste must be stored in designated containers and not on the ground.
» Inspections and maintenance of bunds must be undertaken daily. Bunds must be inspected for leaks or cracks in the foundation and walls.
» It is assumed that any rainwater collected inside the bund is contaminated and must be removed and stored as hazardous waste, and not released into the environment. If any leaks occur in the bund, these must be removed immediately.

4.1.4. Disposal

» Waste generated on site must be removed on a regular basis. This frequency may change during construction depending on waste volumes generated at different stages of the construction process.
» Waste must be removed by a suitably qualified contractor and disposed of at an appropriately licensed landfill site. Proof of appropriate disposal must be provided by the contractor to the EO and ECO.

4.1.5. Record keeping

The success of the Waste Management Plan is determined by measuring criteria such as waste volumes, cost recovery from recycling, cost of disposal. Recorded data can indicate the effect of training and education, or the need for education. It will provide trends and benchmarks for setting goals and standards. It will provide clear evidence of the success or otherwise of the plan.

» Documentation (waste manifest, certificate of issue or safe disposal) must be kept detailing the quantity, nature, and fate of any regulated waste for audit purposes.
» Waste management must form part of the monthly reporting requirements in terms of volumes generated, types, storage and final disposal.

4.1.6. Training

Training and awareness regarding waste management shall be provided to all employees and contractors as part of the toolbox talks or on-site awareness sessions with the EO and at the frequency as set out by the ECO.

4.2. Operation phase

It is expected that the operation phase will result in the production of limited amounts of general waste consisting mostly of cardboard, paper, plastic, tins, metals and a variety of synthetic compounds. Hazardous wastes (including grease, oils) will also be generated. All waste generated will be required to be temporarily stored at the facility in appropriate sealed containers prior to disposal at a permitted landfill site or other facilities.

The following waste management principles apply during the operational phase:

- The SHE Manager must develop, implement and maintain a waste inventory reflecting all waste generated during operation for both general and hazardous waste streams.
- Adequate waste collection bins at site must be supplied. Separate bins should be provided for general and hazardous waste.
- Recyclable waste must be removed from the waste stream and stored separately.
- All waste must be stored in appropriate temporary storage containers (separated between different construction wastes, and contaminated or wet waste).
- Waste storage shall be in accordance with all best-practice guidelines and under no circumstances may waste be burnt on site.
- Waste generated on site must be removed on a regular basis throughout the operational phase.
- Waste must be removed by a suitably qualified contractor and disposed at an appropriately licensed landfill site. Proof of appropriate disposal must be provided by the contractor and kept on site.

5. Monitoring of Waste Management Activities

Records must be kept of the volumes/ mass of the different waste streams that are collected from the site throughout the life of the project. The appointed waste contractor is to provide monthly reports to the operator containing the following information:

- Monthly volumes/ mass of the different waste streams collected;
- Monthly volumes/ mass of the waste that is disposed of at a landfill site;
- Monthly volumes/ mass of the waste that is recycled;
- Data illustrating progress compared to previous months.

This report will aid in monitoring the progress and relevance of the waste management procedures that are in place. If it is found that the implemented procedures are not as effective as required, this WMP is to be reviewed and amended accordingly. This report must from part of the EO's reports to the ECO on a monthly basis.

APPENDIX F:

EMERGENCY PREPAREDNESS AND RESPONSE PLAN

EMERGENCY PREPAREDNESS, RESPONSE AND FIRE MANAGEMENT PLAN

1. PURPOSE

The purpose of the Emergency Preparedness and Response Plan is:

- To assist contractor personnel to prepare for and respond quickly and safely to emergency incidents, and to establish a state of readiness which will enable prompt and effective response to possible events.
- To control or limit any effect that an emergency or potential emergency may have on site or on neighbouring areas;
- To facilitate emergency response and to provide such assistance on the site as is appropriate to the occasion;
- To ensure communication of all vital information as soon as possible;
- To facilitate the reorganisation and reconstruction activities so that normal operations can be resumed;
- To provide for training so that a high level of preparedness can be continually maintained.

This plan outlines response actions for potential incidents of any size. It details response procedures that will minimise potential health and safety hazards, environmental damage, and clean-up efforts. The plan has been prepared to ensure quick access to all the information required in responding to an emergency event. The plan will enable an effective, comprehensive response to prevent injury or damage to the construction personnel, public, and environment during the project. Contractors are expected to comply with all procedures described in this document. A Method Statement should be prepared at the commencement of construction detailing how this plan is to be implemented as well as details of relevant responsible parties for the implementation. The method statement must also reflect conditions of the IFC Performance Standard 1 and include the following:

- » Identification of areas where accidents and emergency situations may occur;
- » Communities and individuals that may be impacted;
- » Response procedure;
- » Provisions of equipment and resources;
- » Designation of responsibilities;
- » Communication; and
- » Periodic training to ensure effective response to potentially affected communities.

2. PROJECT-SPECIFIC DETAILS

Eskom Holdings SOC Limited (Eskom) is proposing to establish a new 40MVA 132/22kV switching station, to be known as the 132/22kV Zonnebloem Switching Station, and two loop-in-loop-out (LILO) Chickadee power lines to connect to the existing 132kV Mafube/Pan Traction power line to accommodate the expansion of the Glencore coal mine situated approximately 6km east of the study area.

It is anticipated that the following risks could potentially arise during the construction and operational phases of the project:

- Fires;
- Leakage of hazardous substances;
- Storage of flammable materials and substances;
- Accidents; and
- Natural disasters.

3. EMERGENCY RESPONSE PLAN

There are three levels of emergency as follows:

- Local Emergency: An alert confined to a specific locality within the site.
- Site Emergency: An alert that cannot be localised and which presents danger to other areas within the site boundary and/or outside the site boundary.
- Evacuation: An alert when all personnel are required to leave the affected area and assemble in a safe location.

If there is any doubt as to the whether any hazardous situation constitutes an emergency, then it must be treated as an Evacuation.

Every effort must be made to control, reduce or stop the cause of any emergency, provided it is safe to do so. For example, in the event of a fire, isolate the fuel supply and limit the propagation of the fire by cooling the adjacent areas. Then confine and extinguish the fire (where appropriate) making sure that re-ignition cannot occur; for a gas fire it is usually appropriate to isolate the fuel and let it burn itself out but keeping everything around the fire cold and/or damp.

3.1. Emergency Scenario Contingency Planning

3.1.1. Scenario: Spill which would result in the contamination of land, surface or groundwater

i. Spill Prevention Measures

Preventing spills must be the top priority at all operations which have the potential of endangering the environment. The responsibility to effectively prevent and mitigate any scenario lies with the Contractor and the ECO. In order to reduce the risk of spills and associated contamination, the following principles should be considered during construction and operation activities:

» All equipment refuelling, servicing and maintenance activities should only be undertaken within appropriately sealed designated areas.

- All maintenance materials, oils, grease, lubricants, etc. should be stored in a designated area in an appropriate storage container.
- No refuelling, storage, servicing, or maintenance of equipment should take place within 50m of drainage lines or sensitive environmental resources in order to reduce the risk of contamination by spills.
- No refuelling or servicing should be undertaken without absorbent material or drip pans properly placed to contain spilled fuel.
- Any fluids drained from the machinery during servicing should be collected in leak-proof containers and taken to an appropriate disposal or recycling facility.
- If these activities result in damage or accumulation of product on the soil, the contaminated soil must be disposed of as hazardous waste. Under no circumstances shall contaminated soil be added to a spoils pile and transported to a regular disposal site.
- Chemical toilets used during construction must be regularly cleaned. Chemicals used in toilets are also hazardous to the environment and must be controlled. Portable chemical toilets could overflow if not pumped regularly or they could spill if dropped or overturned during moving. Care and due diligence should be taken at all times.
- Contact details of emergency services and HazMat Response Contractors are to be clearly displayed on the site. All staff are to be made aware of these details and must be familiar with the procedures for notification in the event of an emergency.

ii. Procedures

The following action plan is proposed in the event of a spill:

1. Spill or release identified.
2. Assess personal safety, safety of others and environment.
3. Stop the spill if safely possible.
4. Contain spill to limit entering water bodies and surrounding areas.
5. Identify substance spilled.
6. Quantify spill (under or over guideline/threshold levels).
7. Notify Site Manager and emergency response crew and authorities (in event of major spill).
8. Inform users (and downstream users) of potential risk.
9. Clean up of spill using spill kit or by HazMat team.
10. Record of spill incident on company database.

a) Procedures for containing and controlling the spill (i.e. on land or in water)

Measures can be taken to prepare for quick and effective containment of any potential spills. Each contractor must keep sufficient supplies of spill containment equipment at the construction sites, at all times during and after the construction phase. These should include specialised spill kits or spill containment equipment. Other spill containment measures include using drip pans underneath vehicles and equipment every time refuelling, servicing, or maintenance activities are undertaken.

Specific spill containment methods for land and water contamination are outlined below.

Containment of Spills on Land

Spills on land include spills on rock, gravel, soil and/or vegetation. It is important to note that soil is a natural sorbent, and therefore spills on soil are generally less serious than spills on water as contaminated soil can be more easily recovered. It is important that all measures be undertaken to avoid spills reaching open water bodies. The following methods could be used:

» *Dykes*
Dykes can be created using soil surrounding a spill on land. These dykes are constructed around the perimeter or down slope of the spilled substance. A dyke needs to be built up to a size that will ensure containment of the maximum quantity of contaminant that may reach it. A plastic tarp can be placed on and at the base of the dyke such that the contaminant can pool up and subsequently be removed with sorbent materials or by pump into barrels or bags. If the spill is migrating very slowly, a dyke may not be necessary and sorbents can be used to soak up contaminants before they migrate away from the source of the spill.

» *Trenches*
Trenches can be dug out to contain spills. Spades, pick axes or a front-end loader can be used depending on the size of trench required. Spilled substances can then be recovered using a pump or sorbent materials.

Containment of Spills on Water

Spills in water can negatively impact water quality and aquatic life. All measures need to be undertaken to contain spills on open water. The following methods could be used:

» *Weirs*
Weirs can be used to contain spills in streams and to prevent further migration downstream. Plywood or other materials found on site can be placed into and across the width of the stream, such that water can still flow under the weir. Weirs are however only effective for spilled substances which float on the water surface.

» *Barriers*
In some situations barriers made of netting or fence material can be installed across a stream, and sorbent materials placed at the base to absorb spilled substance. Sorbents will need to be replaced as soon as they are saturated. Water will be allowed to flow through.

b) Procedures for transferring, storing, and managing spill related wastes

Used sorbent materials are to be placed in plastic bags for future disposal. All materials mentioned in this section are to be available in the spill kits. Following clean up, any tools or equipment used must be properly washed and decontaminated, or replaced if this is not possible.

Spilled substances and materials used for containment must be placed into empty waste oil containers and sealed for proper disposal at an approved disposal facility.

c) Procedures for restoring affected areas

Criteria that may be considered include natural biodegradation of oil, replacement of soil and revegetation. Once a spill of reportable size has been contained, the ECO and the relevant Authority must be consulted to confirm that the appropriate clean up levels are met.

3.1.2. Scenario: Fire (and fire water handling)

i. Action Plan

The following action plan is proposed in the event of a fire:

1. Quantify risk.
2. Assess personal safety, safety of others and environment.
3. If safe – attempt to extinguish fire using appropriate equipment.
4. If not safe to extinguish, contain fire.
5. Notify Site Manager and emergency response crew and authorities.
6. Inform users (and downstream users) of potential risk of fire.
7. Record of incident on company database.

ii. Procedures

Because large scale fires may spread very fast in the environment it is most advisable that the employee/contractor not put his/her life in danger in the case of an uncontrolled fire.

Portable firefighting equipment must be provided in line with the Building Code of South Africa and the relevant provincial building code. All emergency equipment including portable fire extinguisher, hose reels, hydrants must be maintained and inspected by a qualified contractor in accordance with the relevant legislation and National standards.

Current evacuation signs and diagrams for the building or site that are compliant to relevant state legislation must be provided in a conspicuous position, on each evacuation route. Contact details for the relevant emergency services should be clearly displayed on site and all employees should be aware of procedures to follow in the case of an emergency.

a) Procedures for initial actions

Persons should not fight the fire if any of the following conditions exist:

» They have not been trained or instructed in use of a fire extinguisher.
» They do not know what is burning.
» The fire is spreading rapidly.
» They do not have the proper equipment.
» They cannot do so without a means of escape.
» They may inhale toxic smoke.

b) Reporting procedures

» Report fire immediately to the site manager, who will determine if it is to be reported to the relevant emergency services and authorities.
» The site manager must have copies of the Report form to be completed.

SUMMARY: RESPONSE PROCEDURE

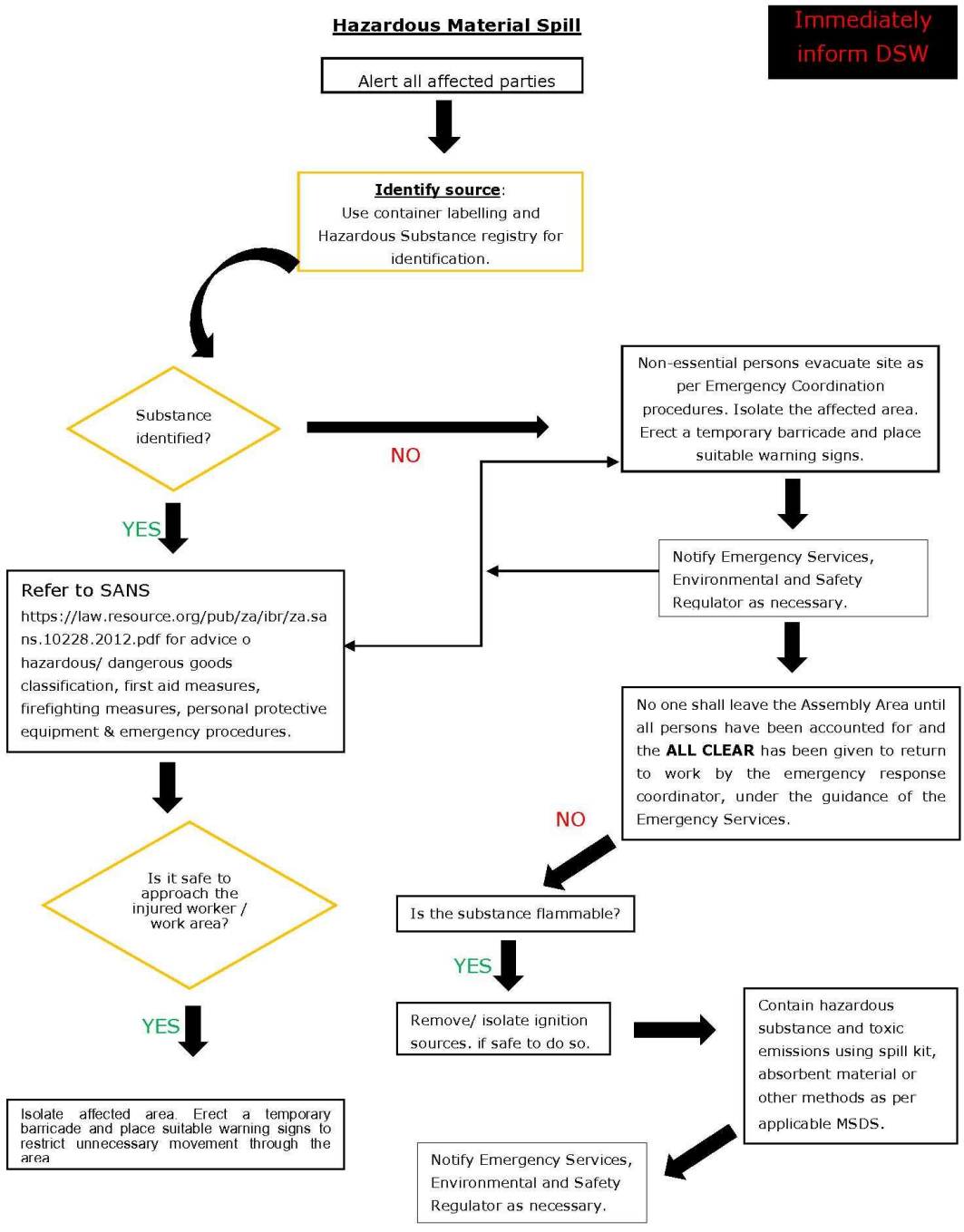


Figure 1: Hazardous Material Spill

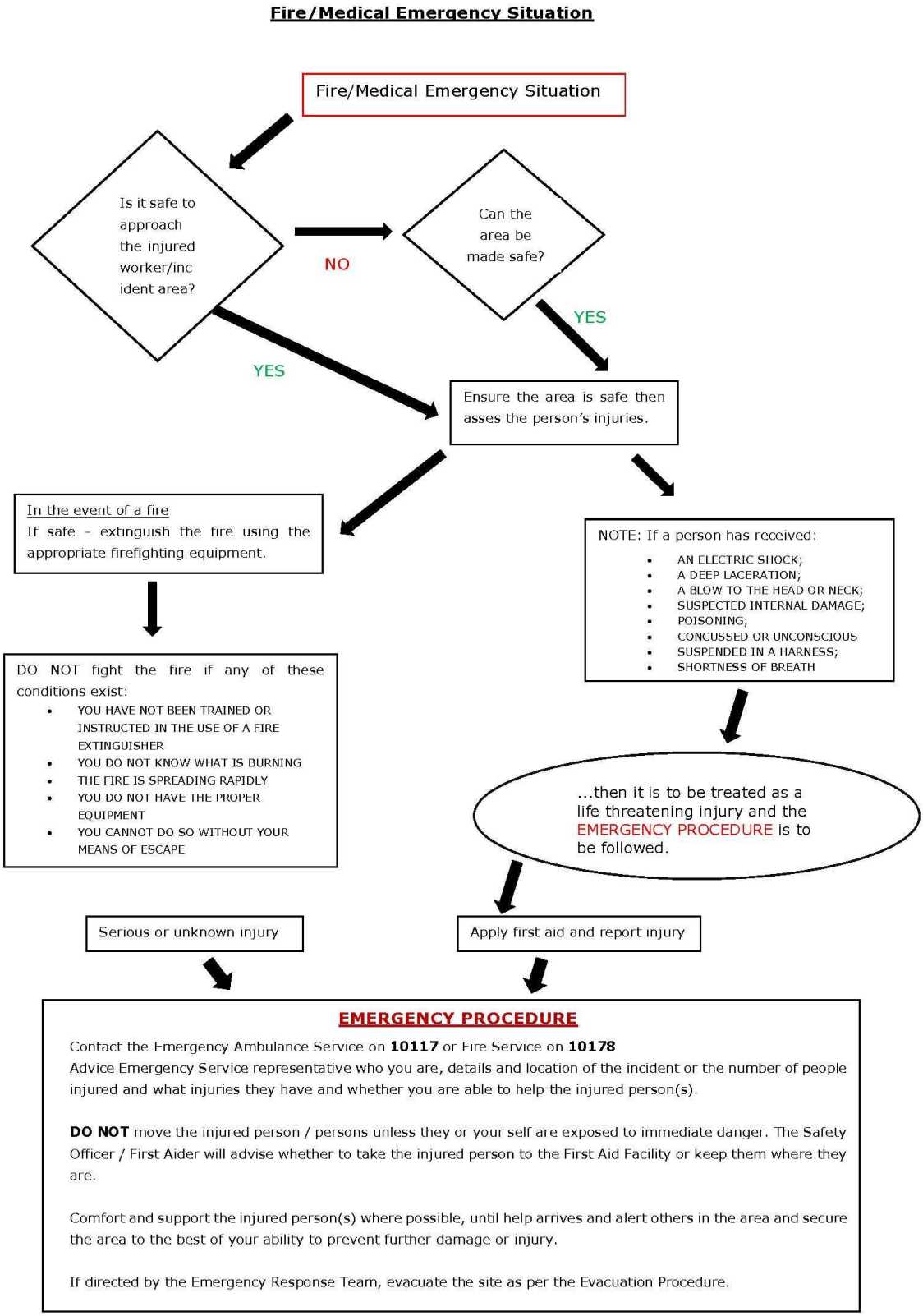
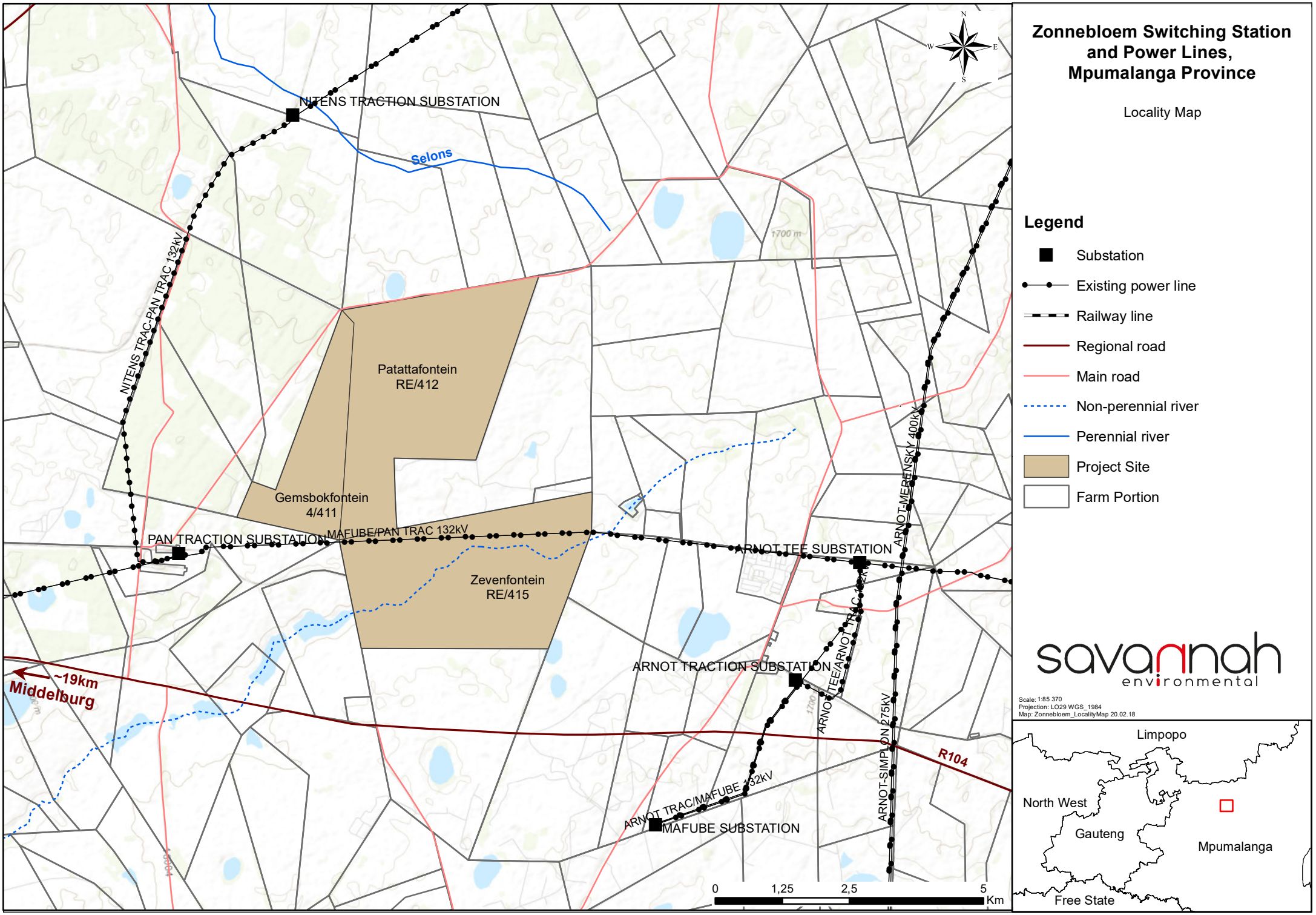


Figure 2: Emergency Fire/Medical

APPENDIX G:

A3 MAPS



Zonnebloem Switching Station and Power Lines, Mpumalanga Province

Locality Map

Legend

- Substation
- Existing power line
- Railway line
- Regional road
- Main road
- Non-perennial river
- Perennial river
- Project Site
- Farm Portion

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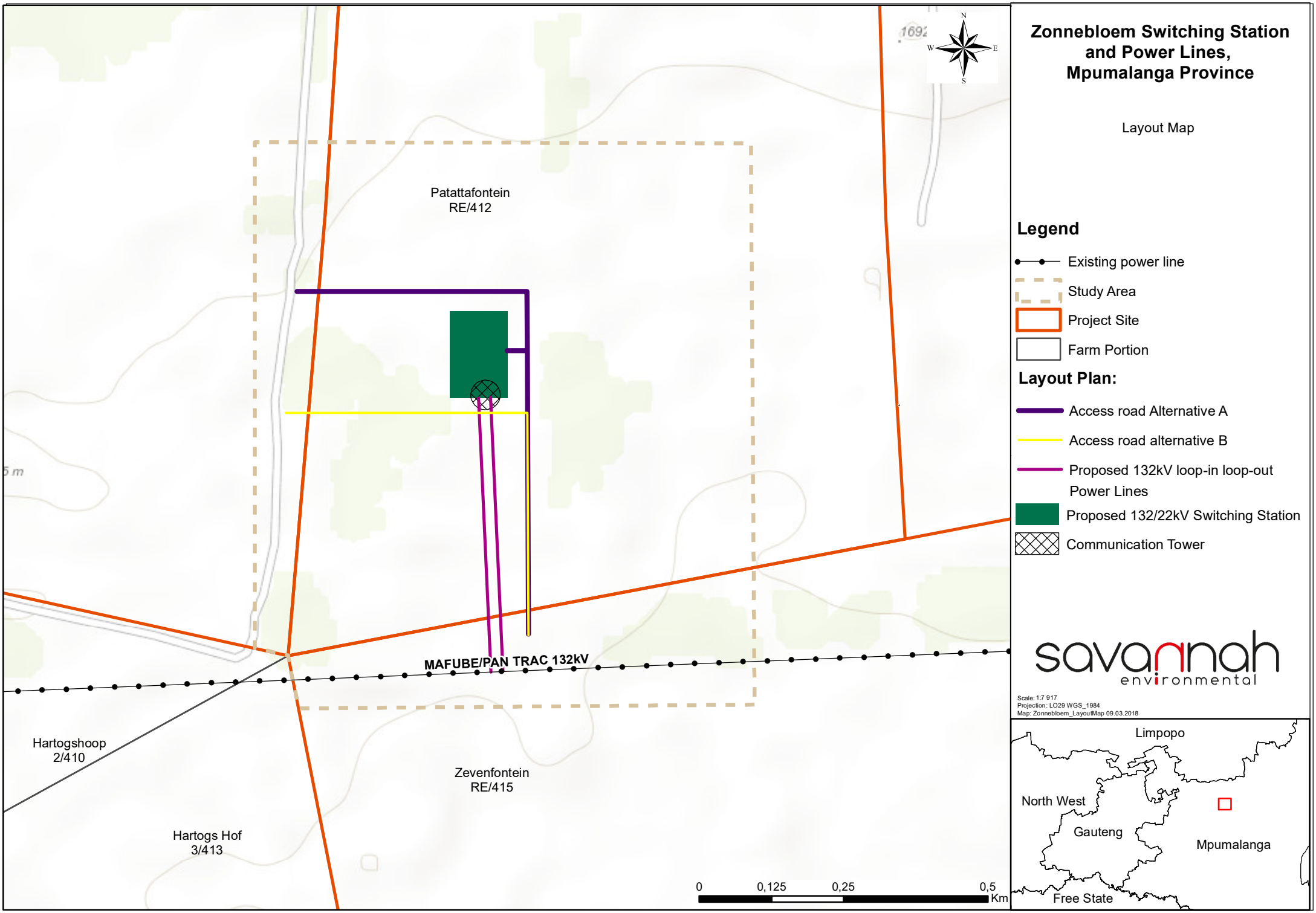
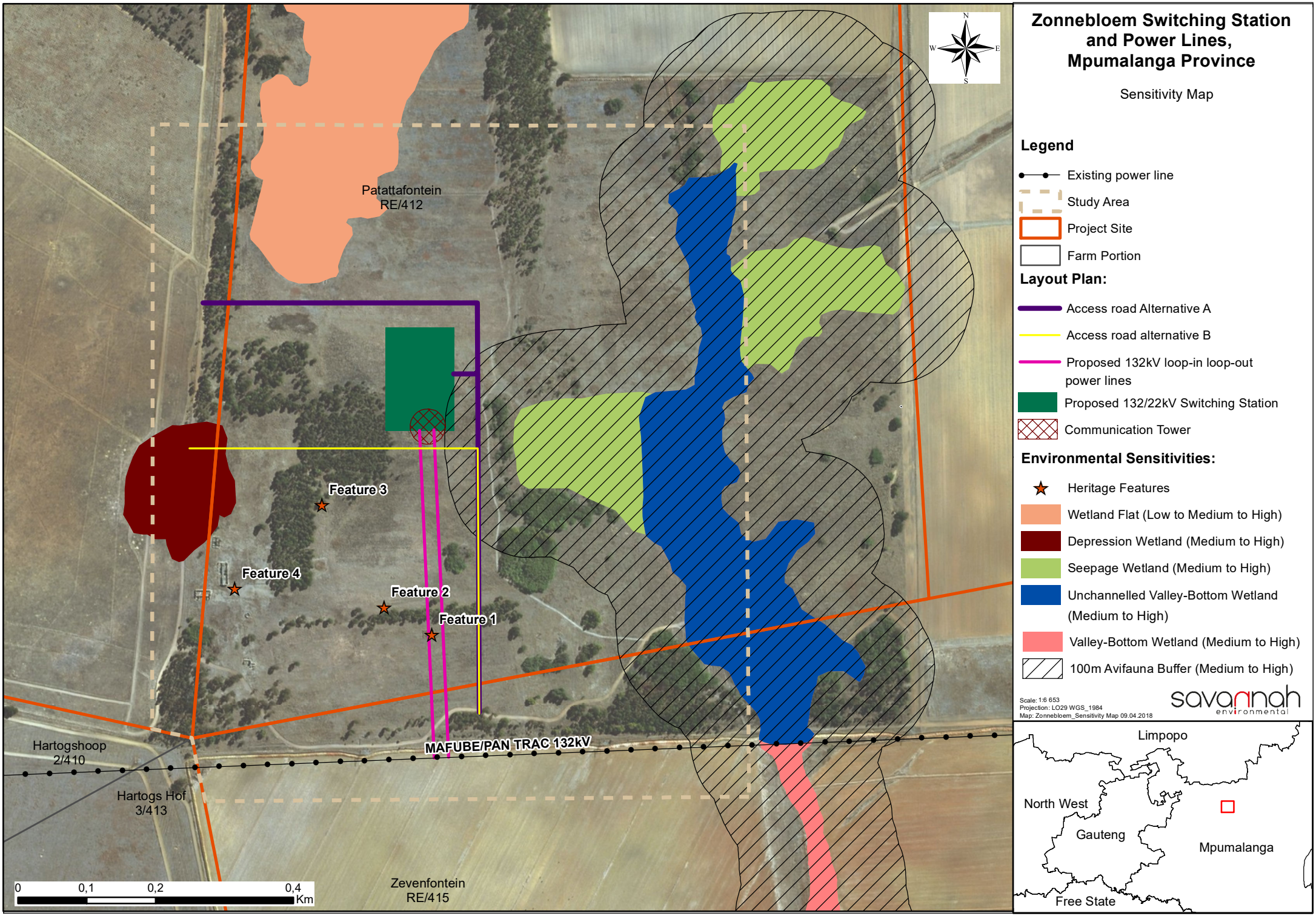
Scale: 1:85 370
Projection: LO29 WGS_1984
Map: Zonnebloem_LocalityMap 20.02.18


Zonnebloem Switching Station and Power Lines, Mpumalanga Province
Layout Map
Patattafontein RE/412
Hartogshoop 2/410
Hartogs Hof 3/413
Zevenfontein RE/415
MAFUBE/PAN TRAC 132kV
Legend
Existing power line
Study Area
Project Site
Farm Portion
Layout Plan:
Access road Alternative A
Access road alternative B
Proposed 132kV loop-in loop-out Power Lines
Proposed 132/22kV Switching Station
Communication Tower
savannah environmental
Scale: 1:7 917
Projection: LO29 WGS_1984
Map: Zonnebloem_LayoutMap 09.03.2018
Limpopo
North West
Gauteng
Mpumalanga
Free State
0 0,125 0,25 0,5 Km



Zonnebloem Switching Station and Power Lines, Mpumalanga Province

Sensitivity Map

Legend

- Existing power line
- Study Area
- Project Site
- Farm Portion

Layout Plan:

- Access road Alternative A
- Access road alternative B
- Proposed 132kV loop-in loop-out power lines
- Proposed 132/22kV Switching Station
- Communication Tower

Environmental Sensitivities:

- Heritage Features
- Wetland Flat (Low to Medium to High)
- Depression Wetland (Medium to High)
- Seepage Wetland (Medium to High)
- Unchannelled Valley-Bottom Wetland (Medium to High)
- Valley-Bottom Wetland (Medium to High)
- 100m Avifauna Buffer (Medium to High)

Scale: 1:6 653
Projection: LO29 WGS_1984
Map: Zonnebloem_Sensitivity Map 09.04.2018

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