

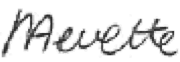


POFADDER WIND FACILITY 3 (PTY) LTD

**Proposed Development of the Pofadder
Wind Energy Facility (WEF) 3 and
Associated Infrastructure near
Pofadder in the Northern Cape Province**

**Draft Environmental Management
Programme (EMPr)**

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POFADDER WIND FACILITY 3 (PTY) LTD

POFADDER WIND ENERGY FACILITY 3

DRAFT ENVIRONMENTAL MANAGEMENT PROGRAMME (EMPR)

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POFADDER WIND FACILITY 3 (PTY) LTD

POFADDER WIND ENERGY FACILITY 3

DRAFT ENVIRONMENTAL MANAGEMENT PROGRAMME (EMPR)

1. INTRODUCTION

Pofadder Wind Facility 3 (Pty) Ltd (The Applicant) is proposing to develop, construct and operate the Pofadder Wind Energy Facility (WEF) 3 and associated infrastructure approximately 35 km south east of Pofadder in the Kai !Garib Local and Z F Mgcawu District Municipalities, in the Northern Cape (**Figure 1**). (**DFFE Reference Number:** 14/12/16/3/3/2/2153). The overall objective of the proposed development is to generate electricity by means of renewable energy technologies capturing wind energy to feed into the national grid. The proposed development will have a maximum output generation capacity of up to 248 megawatt (MW).

SiVEST Environmental Division has subsequently been appointed as the independent Environmental Assessment Practitioner (EAP) to undertake the required Draft Environmental Management Programme (EMPr) (in line with the National Environmental Management Act, 1998 (Act 107 of 1998)) for the proposed construction of the Pofadder WEF 3 and associated grid infrastructure.

This EMPr provides a set of guidelines for the environmental management of all works executed by the Developer, Engineer, Contractor and Sub-contractor/s to have a minimum impact on the environment in accordance with all relevant legislation, policies and standards. In this context, it should be viewed as a dynamic or “living” document which may require updating or revision during the life-cycle of the development to address new circumstances as the need arises. It is essentially, a written plan of how the environment is to be managed in practical and achievable terms. The EMPr shall be deemed to have contractual standing on the developer and contractors onsite.

The effectiveness of the EMPr is limited by the level of adherence to the conditions set forth in this report by the Developer and the Contractor and Sub-contractors. It is further assumed that compliance with the EMPr will be monitored and audited on a regular basis as set out in the EMPr and contractual clauses.

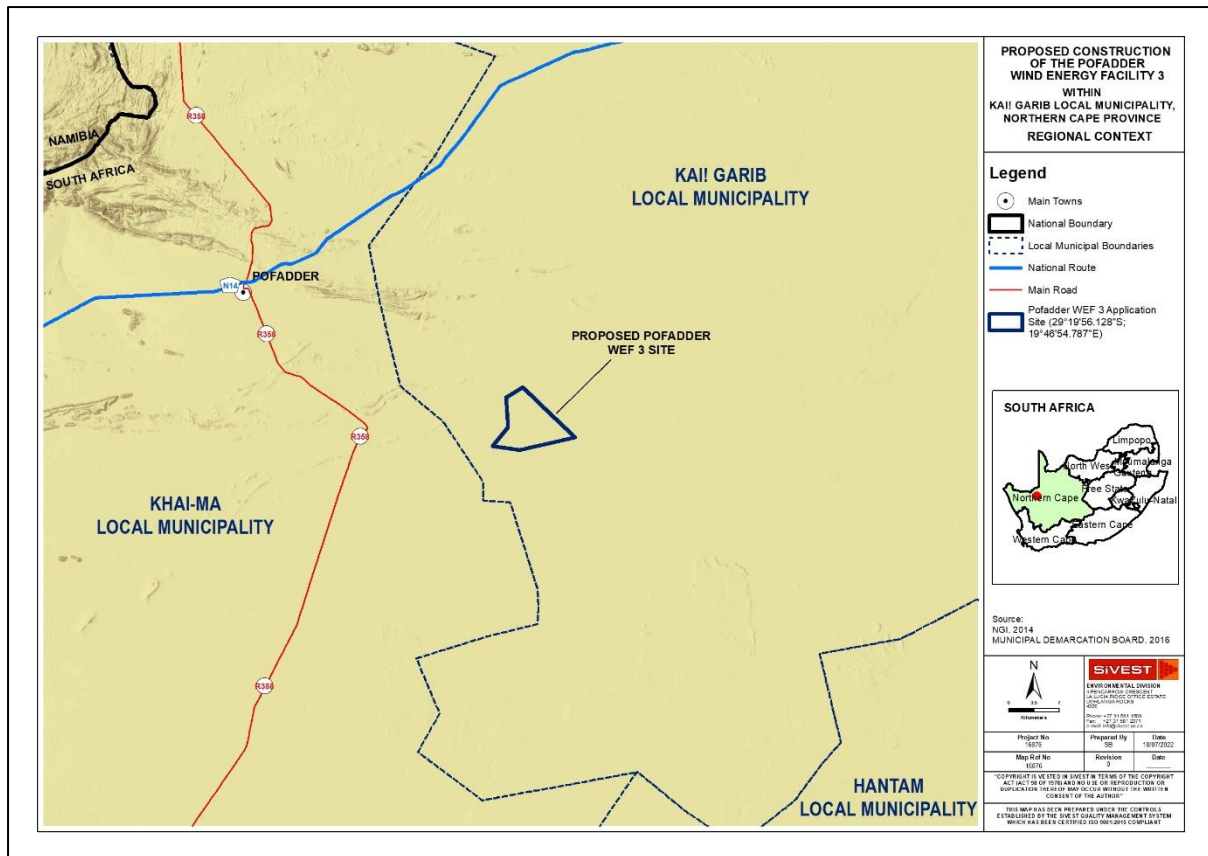


Figure 1: Site Locality

1.1. Content Requirements for an Environmental Management Programme (EMPr)

The content requirements for an EMPr (as provided in Appendix 4 of the EIA Regulations 2014, as amended), as well as details of which section of the report fulfils these requirements, are shown in Table 1 below.

Table 1: Content requirements for a EMPr

2014 EIA Regulations, as amended.	Requirements for an EMPr	Location in this EMPr
Appendix 4, Section 1. (1)	An EMPr must comply with section 24N of the Act and include -	Refer to relevant reference sections below:
Appendix 4, Section 1 (a)	Details of –	-
	(i) The EAP who prepared the EMPr; and	Section 3.1 Section 3.2
	(ii) The expertise of that EAP to prepare an EMPr, including a curriculum vitae.	Section 3.2
Appendix 1, Section 3 (b)	a detailed description of the aspects of the activity that are covered by the EMPr as identified by the project description;	Section 4.1
Appendix 4, Section 1 (c)	a map at an appropriate scale which superimposes the proposed activity, its associated structures, and infrastructure on the environmental	Figure 1 and Figure 5

2014 EIA Regulations, as amended.	Requirements for an EMPr	Location in this EMPr
	sensitivities of the preferred site, indicating any areas that should be avoided, including buffers;	
Appendix 4, Section 1 (d)	a description of the impact management outcomes, including management statements, identifying the impacts and risks that need to be avoided, managed and mitigated as identified through the environmental impact assessment process for all phases of the development including— (i) planning and design; (ii) pre-construction activities; (iii) construction activities; (iv) rehabilitation of the environment after construction and where applicable post closure; and (v) where relevant, operation activities;	Section 9
Appendix 4, Section 3 (f)	a description of proposed impact management actions, identifying the manner in which the impact management outcomes contemplated in paragraph (d) will be achieved, and must, where applicable, include actions to — (i) avoid, modify, remedy, control or stop any action, activity or process which causes pollution or environmental degradation; (ii) comply with any prescribed environmental management standards or practices; (iii) comply with any applicable provisions of the Act regarding closure, where applicable; and (iv) comply with any provisions of the Act regarding financial provision for rehabilitation, where applicable;	Section 9
Appendix 4, Section 3 (g)	the method of monitoring the implementation of the impact management actions contemplated in paragraph (f);	Section 9
Appendix 4, Section 3 (h)	the frequency of monitoring the implementation of the impact management actions contemplated in paragraph (f);	Section 9
Appendix 4, Section 3 (i)	an indication of the persons who will be responsible for the implementation of the impact management actions;	Section 8 Section 9
Appendix 4, Section 3 (j)	the time periods within which the impact management actions contemplated in paragraph (f) must be implemented;	Section 9
Appendix 4, Section 3 (k)	the mechanism for monitoring compliance with the impact management actions contemplated in paragraph (f);	Section 9
Appendix 4, Section 3 (l)	a program for reporting on compliance, taking into account the requirements as prescribed by the Regulations;	Section 9
Appendix 4, Section 3 (m)	an environmental awareness plan describing the manner in which— (i) the applicant intends to inform his or her employees of any environmental risk which may result from their work; and (ii) risks must be dealt with in order to avoid pollution or the degradation of the environment; and	Section 11
Appendix 4, Section 3 (n)	any specific information that may be required by the competent authority.	Section 7.3 Section 10
Appendix 4 Section 2	Where a government notice gazetted by the Minister provides for a generic EMPr, such generic EMPr as indicated in such notice will apply.	Generic EMPr has been compiled and included.

2. DETAILS OF APPLICANT

2.1 Name and contact details of the Applicant

Name and contact details of Applicant:

Table 2: Name and contact details of the applicant

Business Name of Applicant	Pofadder Wind Facility 3 (Pty) Ltd
Physical Address	1501, 15th Floor, Portside Building, 4 Bree Street Cape Town 8001
Postal Address	PO Box 1730 Welgemoed Cape Town Western Cape
Postal Code	7538
Telephone	082 300 6497
Fax	+ 27 (0) 86 514 8184
Email	unai.bravo.urtasun@acciona.com

3. DETAILS AND EXPERTISE OF THE EAP

3.1 Name and contact details of the Environmental Assessment Practitioner (EAP)

The table below provides the name and contact details of the Lead EAP for the project:

Table 3: Name and contact details of the Environmental Consultant who prepared the report

Business Name of EAP	SIVEST SA (PTY) Ltd
Name of Lead EAP	Michelle Guy
Physical Address	4 Pencarrow Crescent, La Lucia Ridge Office Estate
Postal Address	PO Box 1899, Umhlanga Rocks
Postal Code	4320
Telephone	031 581 1500
Fax	031 566 2371
Email	michelleg@sivest.co.za

3.2 Names and expertise of the EAPs

The table below provides the names of the people who prepared this report and their expertise:

Table 4: Names and details of the expertise of the EAP's involved in the preparation of this report

Name of representative of the EAP	Educational Qualifications	Professional Affiliations	Experience (years)
Michelle Nevette (<i>Cert.Sci.Nat.</i>)	MEnvMgt. (Environmental Management)	SACNASP Registration No. 120356 EAPASA Registration No. 2019/1560 IAIAsa	19
Michelle Guy (<i>Pr.Sci.Nat.</i>)	MSc Environmental Science	SACNASP Registration No. 126338 EAPASA Registration No. 2019/868 IAIAsa	10

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CV's of SiVEST personnel and EAP declaration are attached in **Appendix A**.

3.3 Names and expertise of the specialists

Specialist studies have been conducted in terms of the Procedures for the Assessment and Minimum Criteria for Reporting on Identified Environmental Themes in terms of Sections 24(5)(A) and (H) And 44 of the NEMA when applying for EA, as well as the EIA Regulations, 2014 (as amended). The table below provides the names of the specialists involved in the project:

Table 5: Names of specialists involved in the project

Company	Name of representative of the specialist	Specialist	Educational Qualifications	Experience (years)
Visual Resource Management Africa (VRM)	Stephen Stead	Visual Impact Assessment	B.A (Hons) Human Geography, 1991 (UKZN, Pietermaritzburg) Registered with the Association of Professional Heritage Practitioners since 2014.	16
ASHA Consulting (Pty) Ltd	Jayson Orton	Heritage Impact Assessment	D.Phil. (Archaeology) Accredited Professional Heritage Practitioner	26
	Marion Bamford	Palaeontology Impact Assessment	PhD (Palaeontology)	25
Johann Lanz Consulting	Johann Lanz	Agriculture and Soils Impact Assessment (desktop)	M.Sc. (Environmental Geochemistry)	24
Safetech	Brett Williams	Noise Impact Assessment	PhD is in Environmental Management	26
Savannah Environmental	Nondumiso Bulunga	Socio-economic Impact Assessment (desktop)	M.Sc. Geographical Information Systems	8
	Neville Bews		D. Litt. et Phil	37
Nkurenkuru Ecological and Biodiversity	Gerhard Botha	Biodiversity and Freshwater Impact Assessment	B.Sc. Hons in Botany (Vegetation Ecology) Pr.Sci.Nat 400502/14	8

Company	Name of representative of the specialist	Specialist	Educational Qualifications	Experience (years)
	Jan-Hendrik Keet		Doctor of Philosophy (Botany)	7
Chris Van Rooyen Consulting	Chris van Rooyen	Avifaunal Impact Assessment	BA LLB	22
	Albert Froneman	Avifaunal Impact Assessment	MSc (Conservation)	22
Camissa Sustainability Consulting	Jonathan Aronson	Bat Impact Assessment	MSc (Zoology), MSc (Environment and Resource Management)	13
Traffic	Merchandts Le Maitre	Transportation Impact Assessment	N Dip: Civil Engineering B Tech: Civil Engineering Pr.Tech.Eng. (Reg. No. 2018300094)	16
ITC Services (Pty) Ltd	H. Goosen	Electromagnetic Interference (EMI) Path Loss and Risk Assessment		

4. ACTIVITY INFORMATION

4.1 Project Description

The preferred project site is approximately 5100 hectares (ha) in extent. It is anticipated that the proposed Pofadder 3 WEF will comprise of up to thirty one (31) wind turbines with a maximum total energy generation capacity of up to approximately 248 MW. In summary, the proposed Pofadder WEF 3 development will include the following components:

- Up to 31 wind turbines, each with a maximum of 8 MW output per turbine, with a maximum export capacity of approximately 248 MW. This will be subject to allowable limits in terms of the Renewable Energy Independent Power Producer Procurement Programme (REIPPPP). The final number of turbines and layout of the WEF will, however, be dependent on the outcome of the Specialist Studies conducted during the EIA process.
- Each wind turbine will have a maximum hub height and rotor diameter of up to approximately 200m;
- Concrete turbine foundations and turbine hardstands;
- Each turbine will have a circular foundation with a diameter of up to 32 m and this will be placed alongside the 45 m wide hardstand resulting in an area of about 45 m x 32 m that will be permanently disturbed for the turbine foundation. The combined permanent footprint for the turbines will be approximately 4.4 ha.
- Each turbine will have a crane hardstand of approximately 70 m x 45 m. The permanent footprint for turbine crane hardstands will be approximately 9.5 ha.

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- Each turbine will have a blade hardstand of approximately 80 m x 45 m (3 600 m²). The combined permanent footprint for blade hardstands will be approximately 10.8 ha.
- One (1) new 33/132 kV on-site substation occupying an area of approximately 1.6 ha.
- The wind turbines will be connected to the proposed on-site substation via medium voltage (33 kV) underground cables, which will mainly run alongside the access roads. Where burying of cables is not possible due to technical, geological, environmental or topographical constraints, cables will be overhead via 33 kV monopoles.
- The main access road will be between 8 – 12 m wide (to allow vehicles to pass).
- Internal roads with a width of between 6 – 8 m will provide access to each wind turbine. Existing farm roads will be upgraded and used wherever possible, although new site roads will be constructed where necessary.
- A 12 m wide corridor may be temporarily impacted during construction and rehabilitated to 6 m wide corridor after construction. The internal gravel roads will have an approximate 6 – 8 m wide surface and there will be up to 12m wide impacted during the construction phase, with additional space required for cut and fill, side drains and other stormwater control measures, turning areas and vertical and horizontal turning radii to ensure safe delivery of the turbine components.
- Pofadder WEF 3 will have a total road network of approximately 50 km.
- One (1) construction laydown / staging area of up to approximately 7 ha (to be rehabilitated following construction). It should be noted that no on-site labour camps will be required in order to house workers overnight as all workers will be accommodated in the nearby towns, and transported daily to site (by bus);
- The gate house and security house will occupy an area of up to 0.5 ha.
- Battery Energy Storage System (BESS) of approx. 3.6ha;
- One (1) permanent Operation and Maintenance (O&M) building (including offices, warehouses, workshops, canteen, visitors centre and staff lockers) occupying an area of up to 1 ha;
- A temporary site camp establishment and concrete batching plant occupying an area of up to 1.6 ha.
- Galvanized palisade fencing to be used at the substations with the maximum height of the fencing to be up to 3.5 m;

The Proposed Layout is reflected below in **Figure 2**.

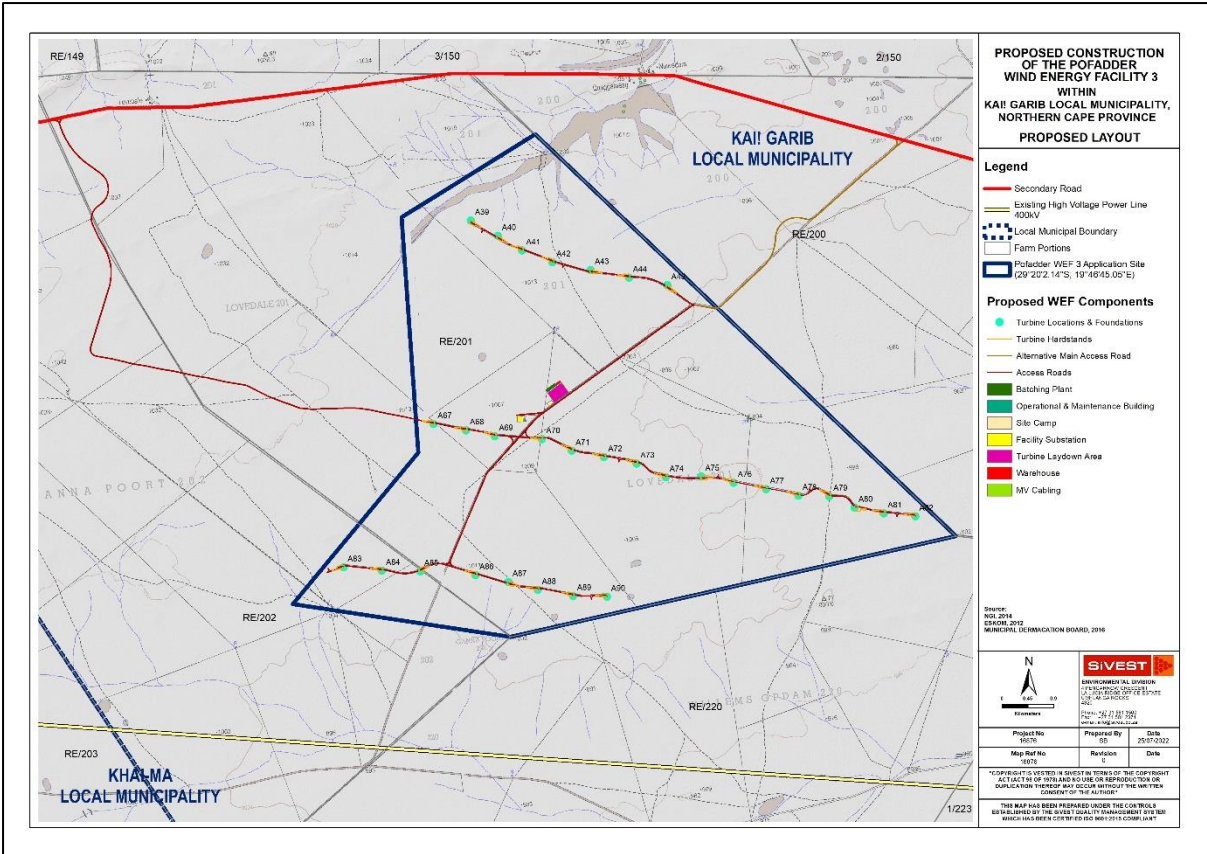


Figure 2: Preliminary layout showing proposed location of wind turbines

The wind turbines and all other project infrastructure will be placed strategically within the development area based on environmental constraints. The exact location of the turbines and associated infrastructure will be determined during the final design stages of the WEF design process.

Please refer to **Figure 3** below for the typical components of a wind turbine.

A summary of the project technical details is provided in **Table 6** below.

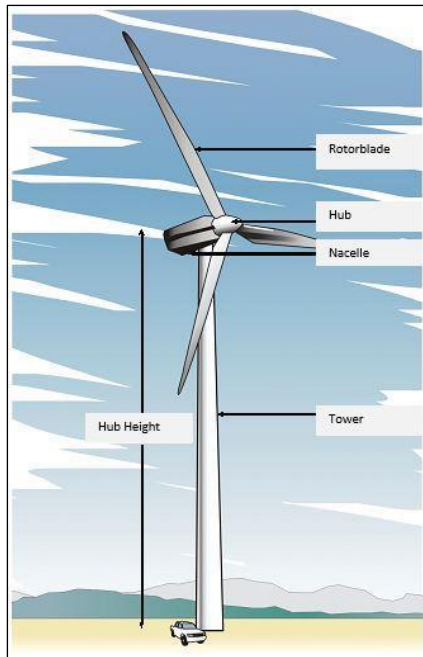


Figure 3: Typical components of a wind farm

Table 6: Technical Detail Summary

Component	Description / Dimensions
Location of site (centre point)	29°20'2.14"S 19°46'45.05"E
Application site area	5100 ha
Turbine development area	Turbine Foundation Area = 45m*32m*30 turbines = 4.4 Ha
SG codes	C03600000000020200000 C03600000000015000003 C03600000000020100000 C03600000000020000000
Export capacity	Up to 248 MW
Proposed technology	Wind turbines and associated infrastructure
Hub height from ground	Up to 200 m
Rotor diameter	Up to 200 m
Substation Area	Approximately 1.56 ha
O&M building area	Approximately 1 ha
Temporary construction laydown / staging area	Up to 7 ha
Temporary site camp & concrete batching plant	1.6 ha
Battery Energy Storage System (BESS)	3.6 ha
Gatehouse and Security	Approximately 0.5 ha
Hard stand areas	Approximately 10.8 ha for blade hardstands and 9.5 ha for crane hardstands
Width of internal access roads	Approximately 6 – 8 m

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Component	Description / Dimensions
Length of internal access roads	Approximately 50 km
Site Access	The main road located within the region is the N14 National Highway which runs from Uppington to Springbok and is located 20 km to the north of the site. A minor district road is located 7.2 km to the west (R358), as well as a minor farm access road routing through the proposed development area (east to west). These roads are for farming access and are gravel, usually unsuited for tourist related traffic.
Proximity to grid connection	Approximately 60 km from application site
Height of fencing (for substation)	Approximately 3.5 m high
Type of fencing (for substation)	Galvanized palisade fencing

4.2 NEMA Listed Activities

The amended EIA Regulations promulgated under Section 24(5) of the National Environmental Management Act, Act 107 of 1998 and published in Government Notice No. R. 326 list activities which may not commence without environmental authorization from the Competent Authority. The proposed activity is identified in terms of Government Notice No. R. 327, 325 and 324 for activities which must follow a full Environmental Impact Assessment Process. The project will trigger the following listed activities:

Table 7: Listed activities in terms of NEMA: EIA Regulations 2014 (as amended in 2017), applicable to the proposed project

Activity No(s):	Relevant activities as set out in Listing Notices 1, 2 and 3 of the EIA Regulations, 2014 as amended	Describe the portion of the proposed project to which the applicable listed activity relates.
Relevant Basic Assessment Activities as set out in Listing Notice 1		
11 (i)	GN R. 327 (as amended) Item 11: The development of facilities or infrastructure for the transmission and distribution of electricity— (i) outside urban areas or industrial complexes with a capacity of more than 33 but less than 275 kilovolts.	New on-site substations/collector switching stations will be constructed as part of the proposed developments. The proposed substations/ collector switching stations will be located outside urban areas and will have capacities of 33/132kV respectively. In addition, each facility substation or collector switching station will occupy a footprint of, ± 125 m x 125 m (1.5625 ha). The height of the sub-station will be a maximum of 10 m, however lightning masts may extend up to 25 m in height.
12 (ii) (a) (c)	GN R. 327 (as amended) Item 12: The development of: ii) infrastructure or structures with a physical footprint of 100 square metres or more; where such development occurs-	Drainage lines and watercourses are scattered across the proposed site. One or more roads and/or powerlines will cross these watercourses or drainage lines or be within 32m thereof.

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Activity No(s):	Relevant activities as set out in Listing Notices 1, 2 and 3 of the EIA Regulations, 2014 as amended	Describe the portion of the proposed project to which the applicable listed activity relates.
	(a) within a watercourse; (c) if no development setback exists, within 32 metres of a watercourse, measured from the edge of a watercourse.	The proposed developments will therefore entail the construction of infrastructure with physical footprints of approximately 100 m ² or more within a surface water feature / watercourse or within 32 m of a surface water feature / watercourse.
19	GN R. 327 (as amended) Item 19: The infilling or depositing of any material of more than 10 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 10 cubic metres from a watercourse;	The proposed development will involve the excavation, removal, infilling or depositing of any material of more than 10 m ³ into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 10 m ³ from some of the identified surface water features / watercourses. Although the layout of the proposed developments has been designed to avoid the identified surface water features / watercourses as far as possible, some of the internal access roads and/or medium voltage cabling will need to traverse the identified surface water features / watercourses. In addition, during construction of these roads, soil will need to be removed from some of the identified surface water features / watercourses.
24 (ii)	GN R. 327 (as amended) Item 24: The development of a road - ii) with a reserve wider than 13,5 meters, or where no reserve exists where the road is wider than 8 metres.	The main access road will be approximately 8 - 12 m wide. Internal roads of approximately 6 – 8 m wide will be needed for the WEF with side drains on one or both sides where necessary. During construction the footprint of road construction works will be up to 12 m, with additional space required for cut and fill, side drains and other stormwater control measures, turning areas and vertical and horizontal turning radii to ensure safe delivery of the turbine components.
28 (ii)	GN R. 327 (as amended) Item 28: Residential, mixed, retail, commercial, industrial or institutional developments where such land was used for agriculture, game farming, equestrian purposes or afforestation on or after 01 April 1998 and where such development:	The total area to be developed for the proposed renewable energy facilities is greater than 1ha and occurs outside an urban area in an area currently zoned as agriculture land.

Activity No(s):	Relevant activities as set out in Listing Notices 1, 2 and 3 of the EIA Regulations, 2014 as amended	Describe the portion of the proposed project to which the applicable listed activity relates.
	(ii) will occur outside an urban area, where the total land to be developed is bigger than 1 hectare;	
48 (i) (a) (c)	<p>GN R. 327 (as amended) Item 48: The expansion of-</p> <p>(i) infrastructure or structures where the physical footprint is expanded by 100 square metres or more;</p> <p>where such expansion occurs—</p> <p>(a) within a watercourse; or (c) if no development setback exists, within 32 metres of a watercourse, measured from the edge of a watercourse;</p>	<p>The proposed developments will entail the expansion (upgrading) of roads and other infrastructure by 100 m² or more within a surface water feature / watercourse or within 32 m from the edge of a surface water feature / watercourse.</p> <p>Although the layout of the proposed development has been designed to avoid the surface water features / watercourses identified within the application site as far as possible, some of the internal roads to be upgraded and expanded will need to traverse some of the surface water features / watercourses identified within the application site and construction will occur within some of the surface water features / watercourses identified within the application site and/or be within 32m of some of the surface water features / watercourses identified within the application site.</p>
56 (ii)	<p>GN R. 327 Item 56: The widening of a road by more than 6 metres, or the lengthening of a road by more than 1 kilometre -</p> <p>(i) where the existing reserve is wider than 13,5 metres; or (ii) where no reserve exists, where the existing road is wider than 8 metres –</p>	Existing roads will require widening of up to 12m and/or lengthening by more than 1km, to accommodate the movement of heavy vehicles and cable trenching activities associated with the WEF.
Relevant Scoping and EIA Activities as set out in Listing Notice 2 of the EIA Regulations, 2014 as amended		
1	GN R. 325 (as amended) Item 1: The development of facilities or infrastructure for the generation of electricity from a renewable resource where the electricity output is 20 megawatts or more.	The proposed development will entail the construction of a WEF where the respective electricity output will be approximately 248MW. In addition, the proposed WEF developments will be located outside urban areas.
15	GN R. 325 (as amended) Item 15: The clearance of an area of 20 hectares or more of indigenous vegetation.	The proposed WEF development will involve the clearance of more than 20ha of indigenous vegetation. Clearance will also be required for the proposed substations, internal access roads and other associated infrastructure.

Activity No(s):	Relevant activities as set out in Listing Notices 1, 2 and 3 of the EIA Regulations, 2014 as amended	Describe the portion of the proposed project to which the applicable listed activity relates.
Relevant Basic Assessment Activities as set out in Listing Notice 3 of the EIA Regulations, 2014 as amended		
14 ii. (a) (c) g (ii) (ff)	<p>GN R. 324 (as amended) Item 14: The development of—</p> <p>(ii) infrastructure or structures with a physical footprint of 10 square metres or more;</p> <p>where such development occurs—</p> <p>(a) within a watercourse; or (c) if no development setback has been adopted, within 32 metres of a watercourse, measured from the edge of a watercourse;</p> <p>excluding the development of infrastructure or structures within existing ports or harbours that will not increase the development footprint of the port or harbour.</p> <p>g. Northern Cape ii. Outside urban areas: (ff) Critical biodiversity areas or ecosystem service areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans;</p>	<p>The proposed development will entail the development of infrastructure with physical footprints of 10m² or more within a watercourse / surface water feature or within 32m from the edge of a watercourse / surface water feature.</p> <p>Although the layouts of the respective proposed developments will be designed to avoid the identified surface water features / watercourse as far as possible, some of the infrastructure / structures will need to traverse the identified surface water features / watercourses.</p> <p>The construction of the infrastructure (MV caballing and roads) for the development will occur within Ecosystem Support Areas located outside of urban areas.</p>
18 g (ii) (ii)	<p>GN R. 324 (as amended) Item 18: The widening of a road by more than 4 meters, or the lengthening of a road by more than 1 kilometer-</p> <p>g. Northern Cape ii. Outside urban areas: (ii) Areas within a watercourse or wetland; or within 100 m from the edge of a watercourse or wetland.</p>	<p>Secondary/internal access roads will be required to access the wind turbines as well as the respective substations. Existing roads will be used wherever possible. In addition, turns will have a radius of up to 50m for abnormal loads (especially turbine blades) to access the various wind turbine positions. Secondary/internal access roads will be widened by more than 4m or lengthened by more than 1km. These roads will occur within the Northern Cape Province, outside urban areas. The respective proposed development sites contain indigenous vegetation. The widening of the roads will occur within a watercourse or wetland or within 100m from the edge of a watercourse or wetland.</p>

5. LOCATION OF THE ACTIVITY

5.1 Regional Locality

The proposed development is located approximately 35 km south east of Pofadder in the Kai !Garib Local and Z F Mgcawu District Municipalities, in the Northern Cape (Figure 4)

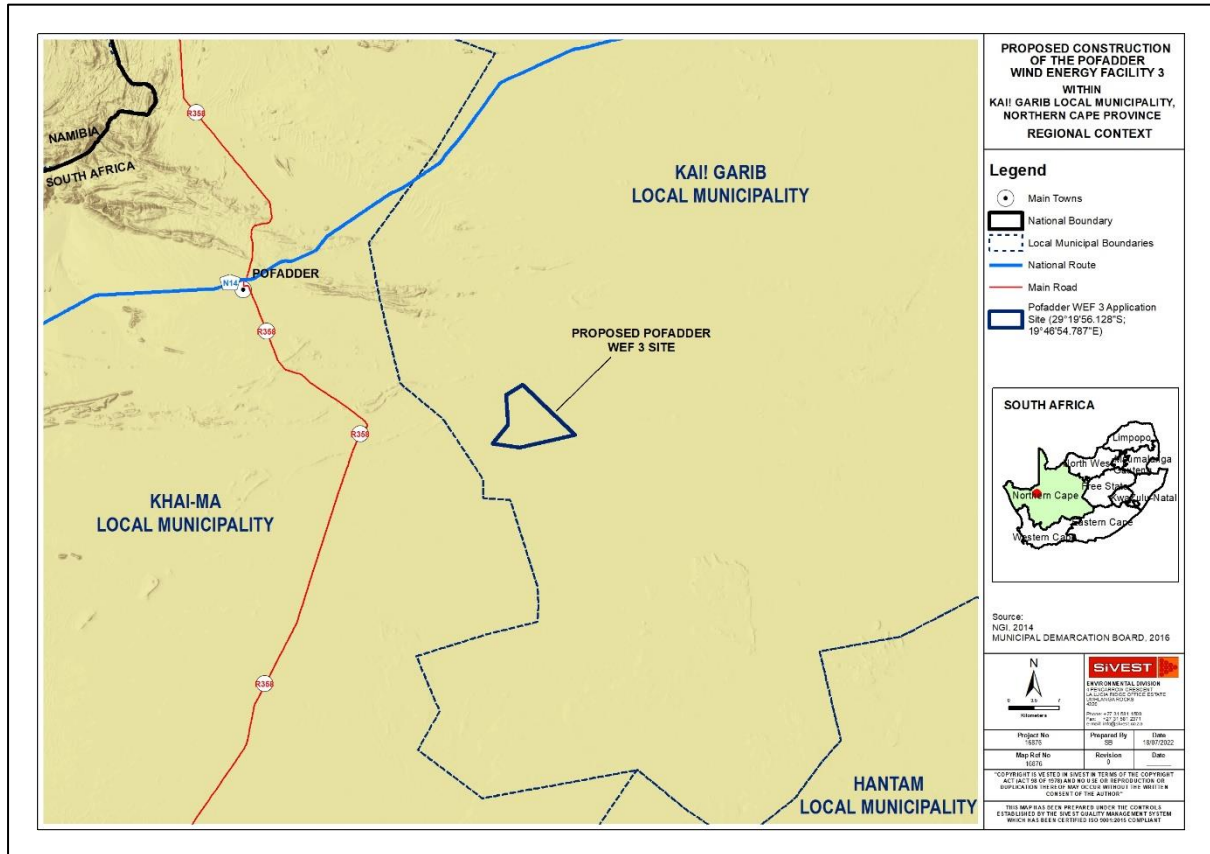


Figure 4: Site Locality

5.2 Summary of affected properties (including SG codes and Farm Names)

Table 8: Summary of affected properties (including SG Codes and Farm Names)

SG CODE	DESCRIPTION
C03600000000020200000	THE FARM GANNA POORT NO. 202
C03600000000015000003	PORTION 3 OF THE FARM SAND GAT NO. 150
C03600000000020100000	THE FARM LOVEDALE NO. 201
C03600000000020000000	THE FARM QUAGGA-MAAG NO. 200 (ONLY APPLICABLE TO THE EXISTING ALTERNATIVE SITE ACCESS ROAD)

5.3 Coordinates of the site

The center point coordinates for the sites are as follows:

- Latitude: 29°20'2.14"S
- Longitude: 19°46'45.05"E

The center point coordinates for the site boundary have been included below:

Table 9: Center point coordinates for the Pofadder WEF 3 site boundary

POFFADER 3 WEF: APPLICATION SITE		
COORDINATES AT CORNER POINTS (DD MM SS.sss)		
POINT	SOUTH	EAST
Centre	29°20'2.14"S	19°46'45.05"E

Table 10: Center point coordinates for the substation on Pofadder WEF 3

POFFADER 3 WEF: SUBSTATION		
COORDINATES AT CENTRE POINT (DD MM SS.sss)		
INFRASTRUCTURE	SOUTH	EAST
Substation	29°19'54.70"S	19°45'57.76"E

5.4 Study Area Description

Much of the assessment area is classified as “Bare / Barren Land”, interspersed with areas of “Low shrubland (nama Karoo)”. In most cases these patches of land are undisturbed areas with very sparse vegetation cover. The study area is an extensive flat plain with minimal relief, the main exception being a low ridge of white quartzite that runs across the northern part of the layout area. Occasional shallow water courses occur within the landscape. The open plains tend to be sandy with some gravel patches in places.

The current land use of the proposed properties is an arid agricultural area with sheep and goat farming carried out in a very dry environment – this is the only agricultural land use on the site and surrounds which is restricted by the arid nature of the local climate. Due to the limited stock carrying capacity, the farms are large in size. The area has a very low density of rural settlement, with relatively few isolated farmsteads. Man-made modifications associated with farming are related to those typical of the low intensity sheep farming. This includes wind pumps with stock watering points. These features are small in scale in the landscape and do not detract from the sense of place.

The area is extremely arid with cold winters and hot summers, with temperatures ranging between 33°C in January (summer) and 2°C in July (winter). Average rainfall happens mostly between December and April and averages about 120mm per year, which makes for a fairly arid climate.

Refer to **Appendix E** for the summary of the specialist findings and recommendations.

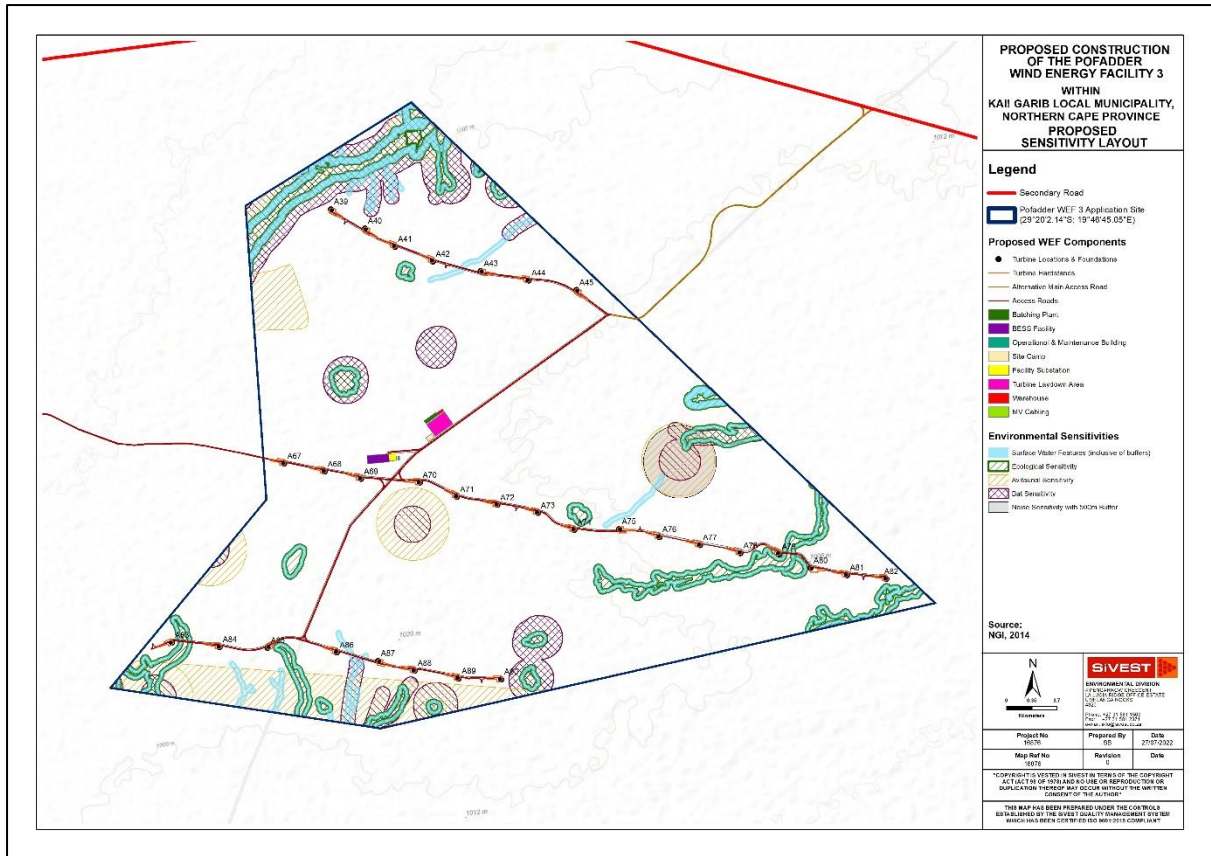


Figure 5: Proposed Layout with Sensitivity Overlay

6. ENVIRONMENTAL MANAGEMENT PROGRAMME

6.1 Introduction

The Environmental Management Programme (EMPr) has been prepared in order to comply with the requirements as stipulated in the National Environmental Management Act (No. 107 of 1998).

This EMPr includes:

- Details and expertise of the EAP who prepared the EMPr including curriculum vitae;
- Project Description;
- Facility Illustration Plans;
- Mitigation measures as contained in the Impact Assessment Report;
- Recommendations and conclusions emanating from the specialist studies;
- Impact Management Objectives and Actions; and
- A copy of the EA (if granted).

6.2 Aim and Objectives of the EMPr

The aim of the EMPr is to:

- Identify those construction activities identified for the proposed development that may have a negative impact on the environment;
- Outline the mitigation measures that will need to be taken and the steps necessary for their implementation;
- Describe the reporting system to be undertaken during construction.

The objectives of the EMP are to:

- Identify a range of mitigation measures which could reduce and mitigate the potential adverse impacts to minimal or insignificant levels.
- Provide a pro-active, feasible and practical working tool to enable the measurement and monitoring of environmental performance on site.
- Provide management structures that address the comments raised by I&APs pertaining to the development.
- Ensure that the environmental specifications are identified, effective and contractually binding so as to enable compliance on site.

6.3 Layout of the EMPr

The EMPr identifies the four phases of development as:

- Preconstruction Planning Phase Activities (Section 9.1)
- Construction Phase Activities (Section 9.2)
- Operation Phase Activities (Section 9.3)
- Decommissioning Phase Activities (Section 9.4)

The generic and specific provisions are included together under each phase for each environmental consideration. The generic provisions are the general environmental issues, procedures and controls that can be applied to the project and site as a whole. The specific provisions are those environmental issues, procedures and controls that are relevant to a particular section of the site. It should be understood that the EMP is considered an evolving document and may be amended at any time by the relevant authorities (DFFE, DWS etc.).

7. LEGAL AND OTHER REQUIREMENTS

7.1 Compliance with Applicable Laws

The supreme law of the land is “The Constitution of the Republic of South Africa”, which states: “*Every person shall have the right to an environment which is not detrimental to his or her health or wellbeing*”. Laws applicable to the protection of the environment in terms of Environmental Management (and relating to construction activities) include but are not restricted to:

- Animals Protection Act, Act No. 71 of 1962
- Astronomy Geographic Advantage (Act No. 21 of 2007)
- Civil Aviation Act (Act No.13 of 2009)
- Conservation of Agricultural Resources Act, Act No. 43 of 1983
- Development Facilitation Act No. 67 of 1995
- Environment Conservation Act, Act No. 73 of 1989
- Environmental Planning Act, Act No. 88 of 1967
- Hazardous Substances Act, Act No. 15 of 1973
- Land Survey Act, Act No. 9 of 1921
- Minerals Act, Act No. 50 of 1991
- National Environmental Management: Air Quality Act, Act No. 39 of 2004);
- National Environmental Management: Biodiversity Act, Act No. 10 of 2004, as amended)
- National Environmental Management Act, Act No.107 of 1998
- NEMA EIA Regulations, 2014 (as amended)
- National Environmental Management: Protected Areas Act (NEM: PAA) (Act No. 57 of 2003, as amended)
- National Environmental Management: Waste Act, Act No. 59 of 2008
- National Forests Act (NFA) (Act No. 84 of 1998)
- The National Heritage Resources Act, Act No. 25 of 1999
- National Water Act, Act No. 36 of 1998
- National Dust Control Regulations (GN No. R. 827 of 1 November 2013)
- National Road Traffic (Act No. 93 of 1996, as amended)
- Occupational Health and Safety Act, Act No. 85 of 1993
- Provincial and Local Government Ordinances and Bylaws
- Soil Conservation Act, Act No. 76 of 1969
- Subdivision of Agricultural Land (Act No. 70 of 1970, as amended)
- Water Services Act, Act No. 108 of 1997

Several regulations will be applicable to the construction phase of the project. These guidelines are mentioned in the EMPr tables. The EMPr forms part of the Contract Documentation and is thus a legally binding document.

7.2 Compliance with the Environmental Management Programme

A copy of the EMPr must be kept on site during the construction period at all times. The EMPr will be made binding on all contractors operating on the site and will be included within the Contractual Clauses. Non-compliance with, or any deviation from, the conditions set out in this document constitutes a failure in compliance with the Environmental Authorisation (EA) issued by DFFE.

It should be noted that in terms of Section 28 of the National Environmental Management Act (NEMA) Act No. 107 of 1998, those responsible for Environmental Damage must pay the repair costs both to the environment and human health and the preventative measures to reduce or prevent further pollution and/or environmental damage. (The polluter pays principle).

In terms of the EA, non-compliance of the EA may result in invalidation of the EA, criminal prosecution or other actions provided for in the NEMA (as amended) and associated regulations. Any non-compliance must result in an immediate stop to works being issued. The contractor and developer will be held liable for any damage and consequent rehabilitation to environmentally sensitive areas outside the site boundary. In the event of any dispute concerning the significance of a particular impact, the opinion of DFFE in respect of its significance will prevail.

National government, provincial government, local authorities or committees appointed in terms of the conditions of the EA or any other public authority shall not be held responsible for any damages or losses suffered by the authorisation holder or successor in title in any instance where construction or operation subsequent to construction is temporarily or permanently stopped for reasons of non-compliance by the authorisation holder with the conditions of authorisation as set out in this document or any subsequent document emanating from these conditions of authorisation.

7.3 Specific Conditions Pertaining to Authorisations

Should the Department of Forestry, Fisheries and the Environment (DFFE) issue an Environmental Authorisation (EA), this EMPr will be updated to include any additional pre-construction, construction, operation and decommissioning conditions stipulated in the EA not already included below.

A water use license will be applied for and may become applicable to the proposed project at a later stage.

Specific conditions pertaining to regulatory processes, or Licensee / Holder of the Authorisation requirements, have not been included within the EMPr and will only be included on finalization of the EMPr (pending decision). These conditions are to be undertaken by the Licensee / Holder of the Authorisation prior to the commencement of construction.

8. PROJECT RESPONSIBILITIES

8.1 Responsible Parties and associated roles

As described above, **Table 11** below provides a summary of the responsible parties and the auditing process to be carried out.

Table 11: Responsible Parties and Auditing Process

TITLE	PARTY	ROLE DURING CONSTRUCTION	ROLE DURING OPERATION
Project Developer (Proponent)	Pofadder Wind Facility 3 (Pty) Ltd	Assume ultimate responsibility	Assume ultimate responsibility
Project Manager	To be appointed by proponent	Project management	N/A
Contractor's Project Manager	Balance of Plant Contractor	Construction management	N/A
Main Contractor/s	There will be multiple contracts placed for the construction phase. These will cover civil earthworks and concrete, structural mechanical and electrical / instrumentation. There could also be the construction camp management contract. These may be managed by the Contractor's Project Manager (or other).	Main Contractor will undertake day to day construction activities covering aspects such as civil earthworks and concrete, structural mechanical and electrical / instrumentation.	N/A
Environmental Officer	To be appointed by Main Contractors	Day to day environmental responsibility, point of contact for ECO	N/A
Environmental Control Officer	To be appointed by Project developer	Monthly audits	Annual audits
Competent Authority	National Department of Forestry, Fisheries and the Environment (DFFE)	Conduct site visits when necessary.	Conduct site visits when necessary

The above may be updated based on the outcome of the Environmental process should additional responsibilities be identified.

9. IMPACT MANAGEMENT ACTIONS AND OUTCOMES

9.1 Pre-construction Phase

9.1.1 Site preparation

This section deals with the issues relative to site preparation during the pre-construction phase.

Table 12: Site preparation

ASPECT/ IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
Appointment of ECO	<ul style="list-style-type: none"> Appoint an Environmental Control Officer. The Environmental Control Officer (ECO) or a responsible appointed person or site manager should contact a bat specialist before construction commences so that they know what to look out for during construction. 	Holder of the EA	Undertake regular audits	<p>Avoid construction delays.</p> <p>Ensure the EMPr is adhered to.</p>	Continuous
Site demarcation	<ul style="list-style-type: none"> Before construction begins, all areas to be developed must be clearly demarcated with fencing or orange construction barrier where applicable. All Construction Camps are to be fenced off in such a manner that unlawful entry is prevented and access is controlled. All access points to the Construction Camp should be controlled by a guard or otherwise monitored, to prevent unlawful access. Records of all environmental incidents (in line with Section 30 of NEMA, 1998) must be maintained and a copy of these records be made available to provincial department on request throughout the project execution. 	Contractor	Undertake regular audits	<p>Prevent unauthorized impact on the environment.</p> <p>Ensure safety of the workers, public and prevent loss/ damage to equipment</p> <p>Ensure the conditions of the EA are adhered to</p>	Continuous

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ASPECT/ IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
				Compliance to all legislative requirements	
Site clearing	<ul style="list-style-type: none"> Site clearing must take place in a phased manner, as and when required. Areas which are not to be constructed on within two months must not be cleared to reduce erosion risks. The area to be cleared must be clearly demarcated and this footprint strictly maintained. Spoil that is removed from the site must be removed to an approved spoil site or a licensed landfill site. The necessary silt fences and erosion control measures must be implemented in areas where these risks are more prevalent. 	Holder of the EA/Contractor	Undertake regular audits	Site establishment undertaken responsibly Sensitive areas identified and avoided Erosion management plan implemented and hydrological measures in place. Appropriate stormwater structures as informed by the Storm Water Management Plan	Once off
Construction Camp	<ul style="list-style-type: none"> Site establishment shall take place in an orderly manner and all required amenities shall be installed at camp sites before the main workforce move onto site. All construction equipment must be stored within the construction camp. All associated oil changes etc. (no servicing) must take place within the camp over a sealed surface such as a concrete slab. An area for the storage of hazardous materials must be established that conforms to the relevant safety requirements and that provides for spillage prevention and containment 	Contractor	Undertake regular audits	Prevent unauthorized impact on the environment. Ensure safety of the public and prevent loss/ damage equipment Ensure EMP is adhered to	Continuous

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ASPECT/ IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
	<ul style="list-style-type: none"> All Construction Camps shall be provided with portable fire extinguishing equipment, in accordance with all relevant legislation and must be readily accessible. The Contractor must provide sufficient ablution facilities, in the form of portable / VIP toilets, at the Construction Camps, and shall conform to all relevant health and safety standards and codes. No pit latrines, French drain systems or soak away systems shall be allowed and toilets may not be situated within 100 meters of any surface water body or 1:100-year flood line. A sufficient number of toilets shall be provided to accommodate the number of personnel working in the area. The Contractor shall inform all site staff to make use of supplied ablution facilities and under no circumstances shall indiscriminate sanitary activities be allowed. No fires will be allowed and the Contractor must make alternative arrangements for heating. LP Gas may be used, provided that all required safety measures are in place. The Contractor shall take specific measures to prevent the spread of fires, caused by activities at the campsites. These measures may include appropriate instruction of employees about fire risks and the construction of firebreaks around the site perimeter. 			Compliance to all legislative requirements	
Training of site staff	<ul style="list-style-type: none"> Environmental awareness training for construction staff, concerning at a minimum the general environmental awareness, conservation of fauna and flora, the prevention of accidental spillage of hazardous chemicals and oil; pollution of water resources (both surface and groundwater), air pollution and litter control and identification of archaeological artefacts. 	Contractor	Undertake regular audits	<p>All staff members are aware of the EMPr requirements relevant to them</p> <p>All waste managed according to approved the Method Statement</p>	Continuous

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ASPECT/ IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
	<ul style="list-style-type: none"> Staff operating equipment (such as loaders, etc.) shall be adequately trained and sensitised to any potential hazards associated with their tasks. No operator shall be permitted to operate critical items of mechanical equipment without having been trained by the Contractor and certified competent by the Project Manager. Staff should be educated as to the need to refrain from indiscriminate waste disposal and/or pollution of local soil and water resources and receive the necessary safety training. Staff must be trained in the hazards and required precautionary measures for dealing with these substances Spillage packs must be available at construction areas. 			compiled by the contractor and approved by the engineer and reviewed by ECO	

9.1.2 Consultation

This section deals with the issues relative to consultation during the pre-construction phase.

Table 13: Consultation

IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
Consultation	<ul style="list-style-type: none"> Provide a mechanism through which information could be exchanged between the project proponent and stakeholders. Identify relevant stakeholders and engage them at applicable stages of the process. Inform the public about the proposed construction process. Surrounding communities must be kept informed, through the identified and agreed consultation channels, of the commencement of construction. Work on site to be restricted to work hours. 	Holder of the EA/ Contractor	Clear communication channels established	Continuous

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	<ul style="list-style-type: none"> Financial provision must be included for rehabilitation in terms of the Renewable Independent Power Producer Programme (REIPPP) financial model requirements. An agreement/contract should be formalised between the landowner and the applicant, that will ensure that the rehabilitation does not leave any liability to future landowners. 			
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9.1.3 Heritage

This section deals with the issues relative to heritage during the pre-construction phase.

Table 14: Heritage

ASPECT/ IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES /FREQUENCY
Impacts to archaeology and graves: Damage or destruction of archaeological sites or graves	Pre-construction survey of unsurveyed areas, micro-siting of infrastructure.	Holder of the EA	Appoint archaeologist to conduct survey well before construction.	Avoid impacts (preferred) or locate and sample or rescue sites/burials before disturbance	Once -off during pre-construction
Impacts to archaeology and graves: Damage or destruction of archaeological sites or graves	Reporting chance finds as early as possible, protect in situ and stop work in immediate area.	Construction Manager or Contractor / ECO	Inform staff and carry out inspections of new excavations.	Rescue information, artefacts or burials before extensive damage occurs	Ongoing basis / whenever on site (at least weekly)

9.1.4 Agriculture and Soils

This section deals with the issues relative to agriculture and soils during the pre-construction phase.

Table 15: Agriculture

ASPECT/ IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES /FREQUENCY
Protection of soil resources: Erosion	Design an effective system of stormwater run-off control, where it is required - that is at any points where run-off water might accumulate. The system must effectively collect and safely disseminate any run-off water from all accumulation points and it must prevent any potential down slope erosion. This is included in the stormwater management plan (Appendix D).	Holder of the EA	Ensure that the stormwater run-off control is included in the engineering design.	That disturbance and existence of hard surfaces causes no erosion on or downstream of the site.	Once-off during the design phase.

9.1.5 Avifauna

This section deals with the issues relative to avifauna during the pre-construction phase.

Table 16: Avifauna

ASPECT/ IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES /FREQUENCY
Avifauna: Displacement due to disturbance and habitat transformation: Displacement of priority avifauna due to disturbance and habitat transformation	<ul style="list-style-type: none"> All surface water (water troughs) should be buffered by 500m (all infrastructure) to prevent displacement of Sclater's Lark breeding population due to disturbance. Alternatively, water troughs could be relocated to maintain a minimum distance of 500m from the closest turbine. Additional Sclater's Lark breeding areas as identified during the pre-construction monitoring must be designated an all-infrastructure No-Go zone. Placement of turbines in highly suitable Red Lark habitat to be avoided where possible. 	Project Developer	<ul style="list-style-type: none"> Design lay-out around the proposed buffer zones 	Prevent mortality of priority avifauna	Once-off during the planning phase.
Avifauna: Mortality due to collisions with the turbines: Mortality of priority avifauna due to collisions with the wind turbines	<ul style="list-style-type: none"> Based on the results of the pre-construction monitoring, a 2.8km turbine exclusion zone must be implemented around the vulture roost on the Aries – Aggeneys 1 400kV high voltage line. 	Project Developer	<ul style="list-style-type: none"> Design lay-out around the proposed buffer zones 	Prevent mortality of priority avifauna	Once-off during the planning phase.
Avifauna: Mortality due to electrocution: Electrocution of	<ul style="list-style-type: none"> A raptor-friendly pole design must be used, and the pole design must be approved by the avifaunal specialist. 	Project Developer	Design engineers to consult with avifaunal specialist on the final design of the poles.	Prevent mortality of priority avifauna	Once-off during the planning phase.

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ASPECT/ IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES /FREQUENCY
raptors on the internal 33kV poles					

9.1.6 Bat

This section deals with the issues relative to bats during the pre-construction phase.

Table 17: Bat

ASPECT/ IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
Modification of Bat Habitat and Roost Disturbance/Destruction	<ul style="list-style-type: none"> Minimise clearing of vegetation - Rehabilitate all areas disturbed during construction (including aquatic habitat) Avoid construction activities at night. Minimise disturbance and destruction of farm buildings on site Minimise removal of trees Minimise blasting and removal of rocky habitat on site Limit potential for bats to roost in project infrastructure (e.g., buildings, turbines, road culverts). 	Pofadder Wind Facility 3 (Pty) Ltd	<ul style="list-style-type: none"> Apply good construction abatement control practices to reduce emissions and pollutants (e.g., noise, erosion, waste) Apply appropriate vegetation rehabilitation practices. Ensure buildings, turbines and road culverts are correctly insulated and sealed to prevent bats from roosting. Where trees and rocky crevices will be impacted, these features should be 	<ul style="list-style-type: none"> No bat roosts are destroyed No bats colonise new project infrastructure for roosting No infrastructure in No-Go areas (except roads) All areas disturbed during construction are rehabilitated 	During design and planning phase and throughout construction phase and until rehabilitation is complete.

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			examined for roosting bats.		
Light Pollution	<ul style="list-style-type: none"> Use as little lighting as possible to avoid sky-glo 	Pofadder Wind Facility 3 (Pty) Ltd	<ul style="list-style-type: none"> Using hoods, low pressure sodium and warm white lights Maximise use of motion-sensor lighting. 	<ul style="list-style-type: none"> No infrastructure in No-Go areas (except roads) Use of appropriate lighting technology Minimised light pollution 	Completed during design and construction phase.
Bat Mortality	<ul style="list-style-type: none"> No placement of turbines within No-Go areas Minimum blade sweep of 35 m Blade feathering must be used to prevent free-wheeling of turbine blades below the turbine cut-in speed Implement post-construction fatality monitoring Apply curtailment or deterrents if fatality thresholds are exceeded. 	Pofadder Wind Facility 3 (Pty) Ltd	<ul style="list-style-type: none"> Adhere to the bat constraints map for No-Go areas (Figure 5). Select turbine with 35 m minimum blades sweep Implement blade feathering below turbine cut-in speed Implement best practise bat fatality monitoring according to Aronson et al. (2020). Estimate bat fatality using GenEst (Simonis et al. 2018). Develop bat adaptive management plan if fatality thresholds are 	<ul style="list-style-type: none"> Bat fatalities do not exceed fatality thresholds for any species. 	Turbine layout and turbine model finalised during design phase. Operational Phase fatality monitoring according to Aronson et al. (2020).

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ASPECT/ IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
			exceeded which will include a curtailment plan and/or plan for use of acoustic deterrents.		

9.1.7 Aquatic

This section deals with the issues relative to aquatic during the pre-construction phase.

Table 18: Aquatic

ASPECT/ IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
Loss of riparian systems and disturbance of the alluvial water courses: Construction of road and MV cable watercourse crossings	<ul style="list-style-type: none"> Existing crossings should be utilized/upgraded. Where it is possible the underground MV cables should be laid within the roads in order to avoid any unnecessary disturbance to the vegetation of the watercourses. All crossings over watercourses should be such that the flow within the channels is not impeded and should be constructed perpendicular to the river channel. Furthermore, for all watercourse crossings, the engineering team must provide an effective means to minimise the loss of riparian vegetation (small as possible footprint). Where possible, culvert bases must be placed as close as possible with natural levels in mind so that these don't form additional steps / barriers. 	Project Company	<ul style="list-style-type: none"> Design-Layout taking into account the location, nature, morphology and ecological drivers of the watercourses to be crossed. 	<ul style="list-style-type: none"> To ensure selection of best environmental option for positioning of proposed infrastructure To minimise direct impacts/damage to vegetation associated with freshwater resource features 	Once-off during the Design Phase

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Loss of riparian systems and disturbance of the alluvial water courses: Construction of road and MV cable watercourse crossings	<ul style="list-style-type: none"> Vegetation rehabilitation management plan. Minimum requirements are listed under the Construction and Operational Phase EMPr 	Project Company and relevant specialist	Compilation of a Vegetation Rehabilitation plan taking into account the various vegetation units, patterns and key plant species, as identified within the terrestrial and aquatic ecological reports.	<ul style="list-style-type: none"> To ensure optimal rehabilitation of temporary disturbed areas (post-construction), with a stable, natural occurring vegetation cover, resembling as far as possible the vegetation composition, patterns and structure of the surrounding vegetation cover. To ensure optimal rehabilitation of development footprint (post-decommissioning), with a stable, natural occurring vegetation cover, resembling as far as possible the vegetation composition, patterns and 	Once-off during the Design Phase

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				structure of the surrounding vegetation cover.	
Loss of riparian systems and disturbance of the alluvial water courses: Construction of Wind Turbines and supporting infrastructure (excluding roads and mv cable watercourse crossings)	<ul style="list-style-type: none"> The recommended buffer areas between the delineated freshwater resource features and proposed project activities should be implemented. Sites for storing, mixing, and handling topsoil piles (if necessary) or any introduced materials, including all machinery or processing implements, should be placed in an ecologically least sensitive area and at least 100 m from any drainage area. Other components of the proposed development that may under no circumstance be located in or within 100 m of any drainage systems would include: <ul style="list-style-type: none"> Man-camps and/or ablution facilities Any form of waste/soil/overburden disposal Any form of storage of materials or machinery Offices, and Substations and switching stations Battery Energy Storage Facilities 	Project Company and relevant specialist	Design-Layout taking into account delineated sensitive habitat features and their ecological importance and sensitivity	<ul style="list-style-type: none"> To avoid indirect damage/impacts to downslope freshwater resource features and associated vegetation. 	Once-off during the Design Phase
Increase in sedimentation and erosion: Construction of road and MV cable watercourse crossings	<ul style="list-style-type: none"> Compile a comprehensive erosion control and stormwater management plan for the footprint area as part of the final design of the project 	Project Company and relevant specialist	Design-Layout taking into account the location and nature of the specific infrastructure as well as the location, nature and morphology of the area	<ul style="list-style-type: none"> To minimise erosion of soil from site during construction. 	Once-off during the Design Phase

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ASPECT/ IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
			wherein the infrastructure will be placed	<ul style="list-style-type: none"> To maintain watercourses' RECs To avoid downstream impacts including: <ul style="list-style-type: none"> erosion; sedimentation; destabilisation of banks and channels. 	
Increase in sedimentation and erosion: Construction of road and MV cable watercourse crossings	<ul style="list-style-type: none"> Vegetation rehabilitation management plan. <ul style="list-style-type: none"> Minimum requirements are listed under the Construction and Operational Phase EMPr 	Project Company and relevant specialist	Compilation of a Vegetation Rehabilitation plan taking into account the various vegetation units, patterns and key plant species, as identified within the terrestrial ecological report.	<ul style="list-style-type: none"> To maintain watercourses' RECs To stabilise previously disturbed areas. To ensure the continuation of the watercourses' functions and services. To ensure optimal rehabilitation of development footprint. 	Once-off during the Design Phase
Increase in sedimentation and erosion: Construction	<ul style="list-style-type: none"> Where new watercourse crossings are required and/or where existing routes will have to be upgraded and widened, the engineering team must provide an effective means to minimise the 	Project Company	Design-Layout taking into account the location, nature, morphology and ecological	To simulate, as close as possible natural flow patterns in order to avoid erosion due to	Once-off during the Design Phase

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of road and MV cable watercourse crossings	<p>potential effects of sedimentation and erosion (erosion protection).</p> <ul style="list-style-type: none"> Design and construct any necessary erosion protection works where the infrastructure intersects the channel banks in order to prevent scouring or outer-bank erosion. Protection works to be considered include gabions, reno mattresses or other stabilising structures to armour them. Structures that cater for through flows (e.g. culverts) should not only allow for the maximum volume of flows but should distribute flows naturally so not to concentrate flows downstream, which could induce erosion/scouring. No stormwater runoff must be allowed to discharge directly into any water course along roads, and flows should thus be allowed to dissipate over a broad area covered by natural vegetation. 		drivers of the watercourses to be crossed.	channelling, bank scouring, destabilisation of channel banks etc.	
Increase in sedimentation and erosion: Construction of Wind Turbines and supporting infrastructure (excluding roads and mv cable watercourse crossings)	Compile a comprehensive erosion control and stormwater management plan for the footprint area as part of the final design of the project	Project and specialist Company relevant	Design-Layout taking into account the location and nature of the specific infrastructure as well as the location, nature and morphology of the area wherein the infrastructure will be placed	<ul style="list-style-type: none"> Prevent upstream erosional features from spreading into the aquatic buffer areas and the resource features themselves. To allow for natural runoff patterns into the downslope 	Once-off during the Design Phase

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				<p>freshwater resource features.</p> <ul style="list-style-type: none"> To avoid unnatural amounts of sediments carried into the downstream freshwater resource features form their catchments. 	
<p>Increase in sedimentation and erosion: Construction of Wind Turbines and supporting infrastructure (excluding roads and mv cable watercourse crossings)</p>	<ul style="list-style-type: none"> Vegetation rehabilitation management plan and Alien Invasive Plant (AIP) Management Plan. Minimum requirements are listed under the Construction and Operational Phase EMPr Stormwater from hard stand areas, buildings and substation must be managed using appropriate channels and swales when located within steep areas. No stormwater runoff must be allowed to discharge directly into the watercourses. The runoff should rather be dissipated over a broad area covered by natural vegetation. 	<p>Project Company and relevant specialist</p>	<ul style="list-style-type: none"> Compilation of a Vegetation Rehabilitation plan taking into account the various vegetation units, patterns and key plant species, as identified within the terrestrial ecological report. Design-Layout taking into account the location and nature of the specific infrastructure as well as the location, nature and morphology of the area wherein the infrastructure will be placed 	<ul style="list-style-type: none"> Prevent upstream erosional features from spreading into the aquatic buffer areas and the resource features themselves. To allow for natural runoff patterns into the downslope freshwater resource features. To avoid unnatural amounts of sediments carried into the downstream freshwater resource features 	<p>Once-off during the Design Phase</p>

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				form their catchments.	
Potential impact on localised surface water quality: All associated infrastructure	Working protocols incorporating pollution control measures (including approved method statements by the contractor) should be clearly set out in the Construction Environmental Management Plan (CEMP) for the project and strictly enforced.	Project Company	Construction Environmental Management Plan	<ul style="list-style-type: none"> 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 comply with waste management legislation To avoid environmental harm from waste disposal 	Once-off during the Design Phase
Impact on riparian systems through the possible increase in surface runoff on riparian form and function during the operation: Road and MV cable watercourse crossings	<ul style="list-style-type: none"> No stormwater runoff must be allowed to discharge directly into any water course along roads, and flows should thus be allowed to dissipate over a broad area covered by natural vegetation. For the crossing of small seasonal to ephemeral watercourses with sandy substrates and gentle gradients: <ul style="list-style-type: none"> Road structures should be stabilized up to the level of the watercourse bed to allow for natural flow across the road. 	Project Company	Design-Layout taking into account the location, nature, morphology and ecological drivers of the watercourses to be crossed.	To simulate, as close as possible natural flow patterns in order to avoid erosion due to channelling, bank scouring, destabilisation of channel banks etc.	Once-off during the Design Phase

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	<ul style="list-style-type: none"> ○ It is crucial that the road surface is level within the watercourse without any flow concentration. • Where the road structure will be built up to the level of the terrestrial land adjacent to the river bed (larger seasonal watercourses with stronger flows, deeper channels and steeper embankments): <ul style="list-style-type: none"> ○ Engineering team must provide an effective means to allow/simulate natural flow patterns without the consecration/modification of flow through the culverts which must be incorporated into the detailed stormwater management plans based on the final design of the Pofadder WEF 3. ○ Culverts should be sized to transport not only water, but other materials that might be mobilized (i.e. debris) and cause blockages to flow. ○ Appropriate erosion protection measures must be installed to reduce bed erosion / scour. • The base (invert) of culverts must be aligned with the natural ground level of the bed of the channel to limit risks of erosion. Where necessary, additional measures such as drop-inlets or stepped inlet weirs must be constructed to address such risks. • The underground grid line, where crossing watercourses, can be laid within the access 				

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ASPECT/ IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
	roads (existing), or if not possible, within the shoulder or at least within 3m of the road shoulder.				

9.1.8 Terrestrial Ecology

This section deals with the issues relative to terrestrial ecology during the pre-construction phase.

Table 19: Terrestrial Ecology

ASPECT/ IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
Disturbance and loss of vegetation	<ul style="list-style-type: none"> Ensure that laydown areas, construction camps and other temporary use areas are located in areas of low and medium sensitivity and are properly fenced or demarcated as appropriate and practically possible. The location of the construction equipment camp and other temporary use areas shall be approved by the project EO/ECO or the specialist doing the pre-commencement footprint investigation 	Project Company and EO/ECO	<ul style="list-style-type: none"> Design-Layout taking into account delineated habitat features and their ecological importance and sensitivity 	<ul style="list-style-type: none"> To ensure selection of best environmental option for positioning of proposed infrastructure Environmental sensitivities are taken into consideration and avoided as far as possible, thereby mitigating potential impacts 	Once-off during the Design Phase

ASPECT/ IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
Disturbance and loss of vegetation within sensitive habitats	<ul style="list-style-type: none"> For watercourse crossings, where it is possible the underground cables should be laid within the roads in order to avoid any unnecessary disturbance to the vegetation of the watercourses. Furthermore, for all watercourse crossings, the engineering team must provide an effective means to minimise the loss of riparian vegetation (small as possible footprint). 	Project Company	<ul style="list-style-type: none"> Design-Layout taking into account the location, nature, morphology and ecological drivers of the watercourses to be crossed. 	<ul style="list-style-type: none"> To ensure selection of best environmental option for positioning of proposed infrastructure Environmental sensitivities are taken into consideration and avoided as far as possible, thereby mitigating potential impacts 	Once-off during the Design Phase
Disturbance and loss of vegetation within sensitive habitats	<ul style="list-style-type: none"> Sites for storing, mixing, and handling topsoil piles (if necessary) or any introduced materials, including all machinery or processing implements, should be placed in an ecologically least sensitive area and at least 100 m from any drainage area. Other components of the proposed development that may under no circumstance be located in or within 100 m of any drainage would include: <ul style="list-style-type: none"> Man-camps and/or ablution facilities Any form of waste/soil/overburden disposal Any form of storage of materials or machinery Offices, and Substations and switching stations 	Project Company	<ul style="list-style-type: none"> Design-Layout taking into account delineated sensitive habitat features and their ecological importance and sensitivity 	<ul style="list-style-type: none"> To ensure selection of best environmental option for positioning of proposed infrastructure Environmental sensitivities are taken into consideration and avoided as far as possible, thereby 	Once-off during the Design Phase

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ASPECT/ IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
	<ul style="list-style-type: none"> ○ Battery Energy Storage Facilities 			mitigating potential impacts	
Soil erosion and associated degradation of ecosystems	<ul style="list-style-type: none"> • Compile a comprehensive erosion control and stormwater management plan for the footprint area as part of the final design of the project 	Project and specialist Company relevant	<ul style="list-style-type: none"> • Design-Layout taking into account the location and nature of the specific infrastructure as well as the location, nature and morphology of the area wherein the infrastructure will be placed 	<ul style="list-style-type: none"> • To minimise impacts on the biophysical environment • To restrict any residual or cumulative impacts to the development footprint where these impacts are maintained to an absolute minimal/acceptable level. 	Once-off during the Design Phase
Soil erosion and associated degradation of ecosystems	<ul style="list-style-type: none"> • Vegetation rehabilitation management plan. <ul style="list-style-type: none"> ○ Minimum requirements are listed under the Construction and Operational Phase EMPr 	Project and specialist Company relevant	Compilation of a Vegetation Rehabilitation plan taking into account the various vegetation units, patterns and key plant species, as identified within the terrestrial ecological report.	<ul style="list-style-type: none"> • To ensure optimal rehabilitation of temporary disturbed areas (post-construction), with a stable, natural occurring vegetation cover, resembling as far as possible the vegetation composition, patterns and structure of the 	Once-off during the Design Phase

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ASPECT/ IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
				<p>surrounding vegetation cover.</p> <ul style="list-style-type: none"> To ensure optimal rehabilitation of development footprint (post-decommissioning), with a stable, natural occurring vegetation cover, resembling as far as possible the vegetation composition, patterns and structure of the surrounding vegetation cover. 	
Soil erosion and associated degradation of ecosystems	<ul style="list-style-type: none"> Where new watercourse crossings are required and/or where existing routes will have to be upgraded and widened, the engineering team must provide an effective means to minimise the potential effects of sedimentation and erosion (erosion protection). Design and construct any necessary erosion protection works where the infrastructure intersects the channel banks in order to prevent scouring or outer-bank erosion. Protection works to be considered include gabions, reno 	Project Company	Design-Layout taking into account the location, nature, morphology and ecological drivers of the watercourses to be crossed.	<ul style="list-style-type: none"> To ensure selection of best environmental option for positioning of proposed infrastructure Environmental sensitivities are taken into consideration and 	Once-off during the Design Phase

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	<p>mattresses or other stabilising structures to armour them.</p> <ul style="list-style-type: none"> Structures that cater for through flows (e.g. culverts) should not only allow for the maximum volume of flows but should distribute flows naturally so not to concentrate flows downstream, which could induce erosion/scouring. 			<p>avoided as far as possible, thereby mitigating potential impacts</p>	
Soil erosion and associated degradation of ecosystems	<ul style="list-style-type: none"> Stormwater from hard stand areas, buildings and substation must be managed using appropriate channels and swales when located within steep areas. No stormwater runoff must be allowed to discharge directly into the watercourses. The runoff should rather be dissipated over a broad area covered by natural vegetation. 	Project Company	Design-Layout taking into account the location and nature of the specific infrastructure as well as the location, nature and morphology of the area wherein the infrastructure will be placed	<ul style="list-style-type: none"> To ensure selection of best environmental option for positioning of proposed infrastructure Environmental sensitivities are taken into consideration and avoided as far as possible, thereby mitigating potential impacts 	Once-off during the Design Phase

9.1.9 Noise

This section deals with the issues relative to noise during the pre-construction phase.

Table 20: Noise

ASPECT/ IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
Reduce construction noise	Conduct noise sensitivity training for all construction staff. No construction piling should occur at night. Piling should only occur during the hottest part of the day to take advantage of unstable atmospheric conditions	Holder of the EA	Training	Reduction in Noise and thus reduction in chance of complaints arising	Before construction commences

9.1.10 Visual

This section deals with the issues relative to visual during the pre-construction phase.

Table 21: Visual

ASPECT/ IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
Aircraft Warning Lights (AWL) at night have the potential to significantly extend the project Zone of Visual Influence and can be decreased by reduced number of night-time AWLs, as well as placing the AWL in shallow cups that	Application should be made to CAA for ground shielded, strategic lighting for the total wind farm using the outer corners points for night-time AWL.	Project management and EPC	On commencement of Pre-construction planning, CAA need to be contacted by the Project Management Team to verify suitability of the AWL mitigation.	High intensity, combined AWL lighting does not create a glow in the regional landscape.	NA

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ASPECT/ IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
restrict line of sight to ground areas.					
Large signage on roads, or on turbines, has the potential to create a visual nuisance.	Signage on the road should be moderated in size and use natural colours, while still providing effective directions. No large signage on the turbines (hubs or towers).	Project management and EPC	n/a	Signage is efficient but not dominating for the causal observers.	n/a
Demolition of the concrete towers has the potential to significantly extend the tower impact area and degrade local landscape resources if demolition planning is not properly implemented.	A detailed Environmental Management Plan needs to be generated to define the demolition impact area, specifying how the rubble will be managed and processed, as the expected demolition (fall area) identified, assessed for vegetation impact and suitability of extraction of the rubble to the bury pits. The plan needs to specify the rehabilitation methodology for the impacted area.	Project management and EPC with inputs from demolition and rehabilitation specialist.	To be defined	The landscape remains rural and while some small undulations take place, the effect does not detract from the local landscape character. The bury pits should not be on the rocky outcrops.	Two years prior to closure.
Un-necessary roads have the potential to create a visual disturbance long after the usage as past.	Limit road access to an efficient minimum by coordinated planning between the project management and the environmental control officer.	Project management and EPC	Clear pre-planning is carried out with clear routing identification, and consequences for off-road driving.	The surrounding landscape remains rural and agricultural in landscape and land use.	As required.
Long fencing lines has the potential to be visually dominating.	Fencing should be simple and appear transparent from a distance and located around the construction camp and not encircle the total project area	Project management and EPC	Clear planning of the laydown and construction yards is carried out with security fencing demarcated around the core construction areas.	Security fencing is kept to an effective minimum without jeopardizing	At onset of project planning.

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ASPECT/ IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
				security of the project.	

9.2 Construction Phase

9.2.1 Construction Camp

This section deals with the issues relative to the construction camp during the construction phase.

Table 22: Construction Camp

ASPECT/ IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	IMPACT MANAGEMENT OUTCOMES	TIMEFRAME
Construction Camp: Site of construction camp	<ul style="list-style-type: none"> The size of the construction camp must be aligned to the approved laydown area. Adequate parking must be provided for site staff and visitors. The Contractor must attend to drainage of the camp site to avoid standing water and / or sheet erosion. Suitable control measures over the Contractor's yard, plant and material storage to mitigate any visual impact of the construction activity must be implemented. No construction should occur in an area of high or unique agricultural value, or in an area under cultivation. 	Holder of the EA/Contractor	<p>Ensure the conditions of the EA are adhered to.</p> <p>Compliance to all legislative requirements.</p> <p>Impacts avoided or managed as per specialist recommendations.</p>	Once-off
Construction Camp: Storage of materials (including hazardous materials)	<ul style="list-style-type: none"> Choice of location for storage areas must take into account prevailing winds, distances to water bodies, general onsite topography and water erosion potential of the soil. Impervious surfaces must be provided where necessary. Storage areas must be designated, demarcated and fenced if necessary. Storage areas should be secure so as to minimize the risk of crime. They should also be safe from access by unauthorised persons i.e. children / animals etc. 	Holder of the EA/Contractor	<p>Choice of storage areas carefully considered to avoid impact to environment</p> <p>Correct handling, storage and/or disposal and/or</p>	Continuous

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ASPECT/ IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	IMPACT MANAGEMENT OUTCOMES	TIMEFRAME
	<ul style="list-style-type: none"> • Fire prevention facilities must be present at all storage facilities. • Storage areas containing chemical substances / materials must be clearly sign posted. • Proper storage facilities for the storage of oils, paints, grease, fuels, chemicals and any hazardous materials to be used must be provided to prevent the migration of spillage into the ground and groundwater regime around the temporary storage area(s). These pollution prevention measures for storage must include a bund wall high enough to contain at least 110% of any stored volume, and this must be sited away from drainage lines in a site with the approval of the Project Manager. The bund wall must be high enough to contain 110% of the total volume of the stored hazardous material with an additional allocation for potential stormwater events. • These storage facilities (including any tanks) must be on an impermeable surface that is protected from the ingress of storm water from surrounding areas and that will not infiltrate into the ground in order to ensure that accidental spillage does not pollute local soil or water resources. • All fuel storage areas must be roofed to avoid creation of dirty stormwater • Material Safety Data Sheets (MSDSs) shall be readily available on site for all chemicals to be used on site. Where possible the available, MSDS's must additionally include information on ecological impacts and measures to minimise negative environmental impacts during accidental releases or escapes. • Staff dealing with these materials / substances must be aware of their potential impacts and follow the appropriate safety measures. • An approved waste disposal contractor must be employed to remove and recycle waste oil, if practical. The contractor must ensure that its staff is made aware of the health risks associated with any hazardous substances used and has been provided with the appropriate protective clothing/equipment in case of spillages or accidents and have received the necessary training. • All excess cement and concrete mixes are to be contained on the construction site prior to disposal off site. 		<p>cleanup of all materials to prevent impact to environment</p> <p>All hazardous substances managed according to approved Method Statement.</p>	

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ASPECT/ IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	IMPACT MANAGEMENT OUTCOMES	TIMEFRAME
	<ul style="list-style-type: none"> All major spills as specified in the contractor emergency response procedure of any materials, chemicals, fuels or other potentially hazardous or pollutant substances must be cleaned immediately and the cause of the spill investigated. Preventative measures must be identified and submitted to the MC and ECO for information. Emergency response procedures to be followed and implemented. 			
Construction Camp: Drainage of construction camp	<ul style="list-style-type: none"> Surface drainage measures must be established in the Construction Camps so as to prevent <ul style="list-style-type: none"> Ponding of water; Erosion as a result of accelerated runoff; and, Uncontrolled discharge of polluted runoff. 	Holder of the EA/Contractor	<p>Storm Water Management Plan provided and accepted prior to construction commencing</p> <p>Storm Water Management Plan implemented</p> <p>Erosion plan implemented and hydrological measures in place.</p>	Continuous

9.2.2 Environmental Education and Training

This section deals with the issues relative to environmental education and training during the construction phase.

Table 23: Environmental Education and Training

ASPECT/ IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
Environmental Education and Training:	<ul style="list-style-type: none"> Ensure that all site personnel have a basic level of environmental awareness training. The Contractor must submit a proposal for this training to the ECO for approval. Translators are to be used where necessary. Topics covered should include: 	Contractor	Thorough induction to site.	Continuous

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ASPECT/ IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
Environmental Training	<ul style="list-style-type: none"> ○ What is meant by “Environment” ○ Why the environment needs to be protected and conserved ○ How construction activities can impact on the environment ○ What can be done to mitigate against such impacts ○ Awareness of emergency and spills response provisions ○ Social responsibility during construction e.g. being considerate to local residents ● It is the Contractor’s responsibility to provide the site foreman with no less than 1 hour’s environmental training and to ensure that the foreman has sufficient understanding to pass this information onto the construction staff. ● Training should be provided to the staff members in the use of the appropriate fire-fighting equipment. ● Use should be made of environmental awareness posters on site. ● The need for a “clean site” policy also needs to be explained to the workers. ● Staff operating equipment (such as loaders, etc.) shall be adequately trained and sensitized to any potential hazards associated with their tasks. 			
Environmental Education and Training: Monitoring of environmental training	<ul style="list-style-type: none"> ● The Contractor must monitor the performance of construction workers to ensure that the points relayed during their introduction have been properly understood and are being followed. If necessary, the ECO and / or a translator should be called to the site to further explain aspects of environmental or social behaviour that are unclear. Toolbox talks are recommended. 	Contractor	Thorough induction to site.	Continuous

9.2.3 Waste Management

This section deals with the issues relative to waste management during the construction phase.

Table 24: Waste Management

ASPECT/ IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
Waste Management: Litter management/general waste	<ul style="list-style-type: none"> Refuse bins must be placed at strategic positions to ensure that litter does not accumulate within the construction site. The Contractor shall supply waste collection bins where such is not available and all solid waste collected shall be disposed of at registered/licensed landfill. A housekeeping team should be appointed to regularly maintain the litter and rubble situation on the construction site. If possible and feasible, all waste generated on site must be separated into glass, plastic, paper, metal and wood and recycled. An independent contractor can be appointed to conduct this recycling. Where vegetation is cleared and is suitable, chipping and/or mulching can be considered. Littering by the employees of the Contractor shall not be allowed under any circumstances. Skip waste containers should be maintained on site. These should be kept covered and arrangements made for them to be collected regularly. Any putrescible waste must be stored in containers that can keep out scavengers such as baboons and birds to prevent the spread of litter. All waste must be removed from the site and transported to a landfill site promptly to ensure that it does not attract vermin or produce odours. The Contractor shall provide a method statement with regard to waste management. A certificate of disposal shall be obtained by the Contractor and kept on file, if relevant. 	<p>Contractor</p> <p>The ECO shall monitor the neatness of the work sites as well as the Contractor campsite.</p>	All waste managed according to approved Method Statement	Continuous

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ASPECT/ IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
	<ul style="list-style-type: none"> Under no circumstances may solid waste be burnt on site. All waste must be removed promptly to ensure that it does not attract vermin or produce odours. 			
Waste Management: Hazardous waste	<ul style="list-style-type: none"> All waste hazardous materials, if present, must be carefully and appropriately stored, and then disposed of off-site at a licensed landfill site, where practical. Contaminants to be stored safely to avoid spillage. Machinery must be properly maintained to keep oil leaks in check All necessary precaution measures shall be taken to prevent soil or surface water pollution from hazardous materials used during construction and any spills shall immediately be cleaned up and all affected areas rehabilitated. 	Contractor	All waste managed according to approved Method Statement	Continuous
Waste Management: Sanitation	<ul style="list-style-type: none"> The Contractor shall install mobile chemical toilets on the site. The construction of "Long Drop" toilets are forbidden. Rather, portable toilets are to be used. Staff shall be sensitised to the fact that they should use these facilities at all times. No indiscriminate sanitary activities on site shall be allowed. Under no circumstances may open areas, neighbours fences or the surrounding bush be used as a toilet facility. Ablution facilities shall be within proximity from workplaces and not closer than 100m from any natural water bodies or boreholes. There should be enough toilets available to accommodate the workforce (minimum requirement 1: 15 workers). Male and females must be accommodated separately where possible. Toilets shall be serviced regularly and the ECO shall inspect toilets regularly. Potable water must be provided for all construction staff. 	Contractor	Staff members aware of EMPr requirements and ablutions used and maintained accordingly	Continuous
Waste Management: Remedial Actions	<ul style="list-style-type: none"> In the event of an accidental spill or leakage of hazardous substances, such incident(s) must be reported to all relevant authorities, including the 	Contractor	All waste managed according to approved Method Statement	Continuous

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ASPECT/ IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
	<p>Directorate: Pollution and Chemicals Management, in accordance with section 30(5) of the NEMA, 1998 pertaining to the control of incidents.</p> <ul style="list-style-type: none"> Depending on the nature and extent of the spill, contaminated soil must be either excavated or treated on-site. Excavation of contaminated soil must involve careful removal of soil using appropriate tools/machinery to storage containers until treated or disposed of at a licensed hazardous landfill site. The precise method of treatment for polluted soil must be identified by a suitable specialist. This could involve the application of soil absorbent materials as well as oil-digestive powders to the contaminated soil. If a spill occurs on an impermeable surface such as cement or concrete, the surface spill must be contained using oil absorbent material. If necessary, oil absorbent sheets or pads must be attached to leaky machinery or infrastructure. Materials used for the remediation of petrochemical spills must be used according to product specifications and guidance for use. Contaminated remediation materials must be carefully removed from the area of the spill so as to prevent further release of petrochemicals to the environment and stored in adequate containers until appropriate disposal. 			

9.2.4 Heritage

This section deals with the issues relative to heritage during the construction phase.

Table 25: Heritage

ASPECT/ IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES /FREQUENCY

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Impacts to archaeology and graves: Damage or destruction of archaeological sites or graves	Reporting chance finds as early as possible, protect in situ and stop work in immediate area.	Construction Manager or Contractor / ECO	Inform staff and carry out inspections of new excavations.	Rescue information, artefacts or burials before extensive damage occurs	Ongoing basis / whenever on site (at least weekly)
Impacts to cultural landscape: Visible landscape scarring	Ensure disturbance is kept to a minimum and does not exceed project requirements. Rehabilitate areas not needed during operation.	Construction Manager or Contractor / ECO	Monitoring of surface clearance relative to approved layout	Minimise landscape scarring	Ongoing basis / as required

9.2.5 Agriculture and Soils

This section deals with the issues relative to agriculture and soils during the construction phase.

Table 26: Agriculture and Soils

ASPECT/ IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES /FREQUENCY
Aspect: Protection of soil resources Erosion	<ul style="list-style-type: none"> Implement an effective system of storm water run-off control, where it is required - that is at any points where run-off water might accumulate. The system must effectively collect and safely disseminate any run-off water from all accumulation points and it must prevent any potential down slope erosion. 	Engineer/Contractor	Undertake a periodic site inspection to verify and inspect the effectiveness and integrity of the storm water run-off control system and to specifically record the occurrence of any erosion on site or downstream. Corrective	That disturbance and existence of hard surfaces causes no erosion on or downstream of the site.	Every 2 months during the construction phase

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ASPECT/ IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES /FREQUENCY
			action must be implemented to the run-off control system in the event of any erosion occurring.		
Aspect: Protection of soil resources Erosion	<ul style="list-style-type: none"> Maintain where possible all vegetation cover and facilitate re-vegetation of denuded areas throughout the site, to stabilize disturbed soil against erosion. 	Engineer/Contractor	Undertake a periodic site inspection to record the occurrence of and re-vegetation progress of all areas that require re-vegetation.	That vegetation clearing does not pose a high erosion risk.	Every 4 months during the construction phase
Aspect: Protection of soil resources Topsoil loss	<ul style="list-style-type: none"> If an activity will mechanically disturb the soil below surface in any way, then any available topsoil should first be stripped from the entire surface to be disturbed and stockpiled for re-spreading during rehabilitation. During rehabilitation, the stockpiled topsoil must be evenly spread over the entire disturbed surface. 	Engineer/Contractor	Record GPS positions of all occurrences of below-surface soil disturbance (e.g. excavations). Record the date of topsoil stripping and replacement. Check that topsoil covers the entire disturbed area.	That topsoil loss is minimised	As required, whenever areas are disturbed.

9.2.6 Avifauna

This section deals with the issues relative to avifauna during the construction phase.

Table 27: Avifauna

ASPECT/ IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES / FREQUENCY
Avifauna: Displacement due to disturbance:	<ul style="list-style-type: none"> A site-specific CEMPr must be implemented, which gives appropriate and detailed description of how construction activities must be conducted. All contractors are to adhere to the CEMPr and should 	Contractor The ECO shall monitor	1. Implementation of the CEMPr. Oversee activities to ensure that the CEMPr is	Prevent unnecessary displacement of avifauna by	1. On a daily basis 2. Weekly 3. Weekly

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ASPECT/ IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES / FREQUENCY
<p>The noise and movement associated with the construction activities at the development footprint will be a source of disturbance which would lead to the displacement of avifauna from the area</p>	<p>apply good environmental practice during construction. The CEMPr must specifically include the following:</p> <ul style="list-style-type: none"> ○ No off-road driving; ○ Maximum use of existing roads, where possible; ○ Measures to control noise and dust according to latest best practice; ○ Restricted access to the rest of the property; ○ Strict application of all recommendations in the botanical specialist report pertaining to the limitation of the footprint. <ul style="list-style-type: none"> • Construction activity should be restricted to the immediate footprint of the infrastructure as far as possible. Access to the remainder of the area should be strictly controlled to prevent unnecessary disturbance of priority species. • Measures to control noise and dust should be applied according to current best practice in the industry. 		<p>implemented and enforced via site audits and inspections. Report and record any non-compliance.</p> <ol style="list-style-type: none"> 2. Ensure that construction personnel are made aware of the impacts relating to off-road driving. 3. Construction access roads must be demarcated clearly. Undertake site inspections to verify. 4. Monitor the implementation of noise control mechanisms via site inspections and record and report non-compliance. 5. Ensure that the construction area is demarcated clearly and that construction personnel are made aware of these demarcations. Monitor 	<p>ensuring that contractors are aware of the requirements of the Construction Environmental Management Programme (CEMPr.)</p>	<ol style="list-style-type: none"> 4. Weekly 5. Weekly

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			via site inspections and report non-compliance.		
Avifauna: Displacement due to habitat transformation Total or partial displacement of avifauna due to habitat transformation associated with the vegetation clearance and the presence of the wind turbines and associated infrastructure.	<ul style="list-style-type: none"> Ensure that all the recommendations for mitigation from the biodiversity/vegetation specialist, including rehabilitation of disturbed areas, are strictly implemented 	Wind farm operator	Appointment of specialist to coordinate and monitor the rehabilitation of the vegetation.	Prevent unnecessary displacement of avifauna by ensuring that the rehabilitation of transformed areas is implemented according to the recommendations of the biodiversity/vegetation specialist..	Once-off

9.2.7 Bat

This section deals with the issues relative to bats during the construction phase.

Table 28: Bat

ASPECT/ IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
Modification of Bat Habitat and Roost Disturbance/Destruction	<ul style="list-style-type: none"> Minimise clearing of vegetation - Rehabilitate all areas disturbed during construction (including aquatic habitat) Avoid construction activities at night. 	Pofadder Wind Facility 3 (Pty) Ltd	<ul style="list-style-type: none"> Apply good construction abatement control practices to reduce emissions and pollutants 	<ul style="list-style-type: none"> No bat roosts are destroyed No bats colonise new project 	During design and planning phase and throughout construction

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ASPECT/ IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
	<ul style="list-style-type: none"> Minimise disturbance and destruction of farm buildings on site Minimise removal of trees Minimise blasting and removal of rocky habitat on site Limit potential for bats to roost in project infrastructure (e.g., buildings, turbines, road culverts). 		<p>(e.g., noise, erosion, waste)</p> <ul style="list-style-type: none"> Apply appropriate vegetation rehabilitation practices. Ensure buildings, turbines and road culverts are correctly insulated and sealed to prevent bats from roosting. Where trees and rocky crevices will be impacted, these features should be examined for roosting bats. 	<p>infrastructure for roosting</p> <ul style="list-style-type: none"> No infrastructure in No-Go areas (except roads) All areas disturbed during construction are rehabilitated 	<p>phase and until rehabilitation is complete.</p>
Light Pollution	<ul style="list-style-type: none"> Use as little lighting as possible to avoid sky-glo 	Pofadder Wind Facility 3 (Pty) Ltd	<ul style="list-style-type: none"> Using hoods, low pressure sodium and warm white lights Maximise use of motion-sensor lighting. 	<ul style="list-style-type: none"> No infrastructure in No-Go areas (except roads) Use of appropriate lighting technology Minimised light pollution 	Completed during design and construction phase.
Bat Mortality	<ul style="list-style-type: none"> No placement of turbines within No-Go areas Minimum blade sweep of 35 m 	Pofadder Wind Facility 3 (Pty) Ltd	<ul style="list-style-type: none"> Adhere to the bat constraints map for No-Go areas (Figure 5). 	<ul style="list-style-type: none"> Bat fatalities do not exceed fatality 	Turbine layout and turbine model finalised during design

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ASPECT/ IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
	<ul style="list-style-type: none"> • Blade feathering must be used to prevent free-wheeling of turbine blades below the turbine cut-in speed • Implement post-construction fatality monitoring • Apply curtailment or deterrents if fatality thresholds are exceeded. 		<ul style="list-style-type: none"> • Select turbine with 35 m minimum blades sweep • Implement blade feathering below turbine cut-in speed • Implement best practise bat fatality monitoring according to Aronson et al. (2020). • Estimate bat fatality using GenEst (Simonis et al. 2018). • Develop bat adaptive management plan if fatality thresholds are exceeded which will include a curtailment plan and/or plan for use of acoustic deterrents. 	<p>thresholds for any species.</p>	<p>phase. Operational Phase fatality monitoring according to Aronson et al. (2020).</p>

9.2.8 Aquatic

This section deals with the issues relative to aquatic during the construction phase.

Table 29: Aquatic

ASPECT/ IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
Loss of riparian systems and disturbance of the alluvial water courses: Construction of road and MV cable watercourse crossings	<ul style="list-style-type: none"> The working servitude within the watercourses must be demarcated on both sides using orange hazard netting prior to construction commencing. 	Project Company, monitored by ECO/EO	<ul style="list-style-type: none"> Taking into account the final design-layout, and any sensitive areas, demarcate the absolute minimal development footprint, and ensure that the appointed contractor is made aware of where what activities and impacts are allowed and disallowed. 	<ul style="list-style-type: none"> Minimise and maintain damage of watercourse vegetation the development footprint. Prevent any residual or cumulative impacts arising. To ensure the persistence/maintenance of the REC 	Prior to commencement of construction activities
Loss of riparian systems and disturbance of the alluvial water courses: Construction of road and MV cable watercourse crossings	<ul style="list-style-type: none"> All sensitive aquatic habitats outside of the demarcated construction area must be considered 'No-Go' areas for the duration of the construction phase. No physical damage should be done to any aspects of the channel and banks of watercourses other than those necessary to complete the works as specified. Vegetation clearing should occur in a phased manner to minimise erosion and/or run-off. There should be reduced activity at the site after large rainfall events when the soils are wet. 	Contractor/ECO/EO	<ul style="list-style-type: none"> At all times be acutely aware of the specified development footprint, and remain within this area avoiding any disturbance of vegetation outside of these areas. The ECO will also need to prepare an induction and training programme to educate the contracting team on the EMPr commitments. 	<ul style="list-style-type: none"> Minimise and maintain damage of watercourse vegetation the development footprint. Prevent any residual or cumulative impacts arising. To ensure the persistence/maintenance of the REC 	Throughout construction and decommissioning Phases

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			<ul style="list-style-type: none"> • Contractor to develop an internal reporting structure to monitor compliance with the commitments given in the EMPr as construction progresses. • The EMPr should be enforced and monitored for compliance by a suitably qualified/trained ECO (Environmental Control Officer) with any additional supporting EO's (Environmental Officers) having the required competency skills and experience to ensure that environmental mitigation measures are being implemented and appropriate action is taken where potentially adverse environmental impacts are highlighted through monitoring and surveillance. • The ECO will need to be responsible for conducting regular site- 		

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			inspections of the construction, processes, reporting back to the relevant environmental authorities with findings of these investigations.		
Loss of riparian systems and disturbance of the alluvial water courses: Excavation and trenching within watercourses	<ul style="list-style-type: none"> • Avoid stockpiling materials in vegetated areas that will not be cleared. • All material stockpiles should be located outside freshwater resource features. • Excavated soils should be stockpiled on the upslope side of the excavated trench so that eroded sediments off the stockpile are washed back into the trench; • Excavated soils will need to be replaced in the same order as excavated from the trench, i.e. sub-soil must be replaced first and topsoil must be replaced last (this will maximise opportunity for re-vegetation of disturbed areas). • Closure and rehabilitation of the disturbed areas should commence as soon as the laying of underground cable has been completed. 	Contractor/ECO/EO	<ul style="list-style-type: none"> • At all times be acutely aware of the specified development footprint, and remain within this area avoiding any disturbance of vegetation outside of these areas. • The ECO will also need to prepare an induction and training programme to educate the contracting team on the EMPr commitments. • Contractor to develop an internal reporting structure to monitor compliance with the commitments given in the EMPr as construction progresses. • The EMPr should be enforced and monitored for compliance by a suitably qualified/trained 	<ul style="list-style-type: none"> • Minimise and maintain damage of watercourse vegetation the development footprint. • Prevent any residual or cumulative impacts arising. • To ensure the persistence/maintenance of the REC 	Throughout construction and decommissioning Phases

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			<p>ECO (Environmental Control Officer) with any additional supporting EO's (Environmental Officers) having the required competency skills and experience to ensure that environmental mitigation measures are being implemented and appropriate action is taken where potentially adverse environmental impacts are highlighted through monitoring and surveillance.</p> <ul style="list-style-type: none"> The ECO will need to be responsible for conducting regular site-inspections of the construction, processes, reporting back to the relevant environmental authorities with findings of these investigations. 		
Loss of riparian systems and disturbance of the alluvial water	<ul style="list-style-type: none"> All alien plant re-growth must be monitored, and should it occur, these plants should be eradicated. Any disturbed areas should be rehabilitated and monitored to ensure that these areas do 	Contractor/ECO/EO	<ul style="list-style-type: none"> The ECO will need to prepare an induction and training programme to educate the contracting team on the EMPr 	<ul style="list-style-type: none"> The successful reduction in the treat (significance) posed by Alien Invasive Plants. 	Throughout construction and operational phase as well as after the

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courses: Alien Invasive Plants	<p>not become subject to erosion or invasive alien plant growth.</p> <ul style="list-style-type: none"> Mitigation and follow up monitoring of residual impacts (alien vegetation growth and erosion) may be required. 		<p>commitments relating to the management/eradication of AIPs.</p> <ul style="list-style-type: none"> The EMPr and IAP Management Plan should be enforced and monitored for compliance by a suitably qualified/trained ECO (Environmental Control Officer) with any additional supporting EO's (Environmental Officers) having the required competency skills and experience to ensure that environmental mitigation measures are being implemented and appropriate action is taken where potentially adverse environmental impacts are highlighted through monitoring and surveillance. The ECO will need to be responsible for conducting regular site-inspections of the 	<ul style="list-style-type: none"> Recreate a non-invasive, acceptable vegetation cover that will facilitate the establishment of desirable and/or indigenous species 	decommissioning phase

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			construction, and operational processes, reporting back to the relevant environmental authorities with findings of these investigations.		
Loss of riparian systems and disturbance of the alluvial water courses: Construction of Wind Turbines and supporting infrastructure (excluding roads and mv cable watercourse crossings)	<ul style="list-style-type: none"> The recommended buffer areas between the delineated freshwater resource features and proposed project activities should be maintained. 	Project Company, monitored by ECO/EO	<ul style="list-style-type: none"> Taking into account the final design-layout, and any sensitive areas, demarcate the absolute minimal development footprint, and ensure that the appointed contractor is made aware of where what activities and impacts are allowed and disallowed. 	<ul style="list-style-type: none"> No indirect damage to downslope freshwater resource features and their associated vegetation. 	Prior to commencement of construction activities
Loss of riparian systems and disturbance of the alluvial water courses: Construction of Wind Turbines and supporting infrastructure (excluding roads and mv cable	<ul style="list-style-type: none"> Vegetation clearing should occur in a phased manner to minimise erosion and/or run-off. Any erosion problems observed to be associated with the project infrastructure should be rectified as soon as possible and monitored thereafter to ensure that they do not re-occur. There should be reduced activity at the site after large rainfall events when the soils are wet. No driving off of hardened roads should occur immediately following large rainfall 	Contractor/ECO/EO	<ul style="list-style-type: none"> The ECO will also need to prepare an induction and training programme to educate the contracting team on the EMPr commitments. Contractor to develop an internal reporting structure to monitor compliance with the commitments given in 	No indirect damage to downslope freshwater resource features and their associated vegetation.	Throughout construction and decommissioning phase

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watercourse crossings)	<p>events until soils have dried out and the risk of bogging down has decreased.</p> <ul style="list-style-type: none"> Any stormwater within the site must be handled in a suitable manner, i.e. trap sediments, and reduce flow velocities Stormwater from hardstand areas, buildings and the substation must be managed using appropriate channels and swales when located within steep areas. 		<p>the EMPr as construction progresses.</p> <ul style="list-style-type: none"> The EMPr should be enforced and monitored for compliance by a suitably qualified/trained ECO (Environmental Control Officer) with any additional supporting EO's (Environmental Officers) having the required competency skills and experience to ensure that environmental mitigation measures are being implemented and appropriate action is taken where potentially adverse environmental impacts are highlighted through monitoring and surveillance. The ECO will need to be responsible for conducting regular site-inspections of the construction, processes, reporting back to the relevant environmental 		

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			authorities with findings of these investigations.		
Increase in sedimentation and erosion: Construction of road and MV cable watercourse crossings	<ul style="list-style-type: none"> All construction activities occurring directly within the watercourses to take place within the dry season. The erosion and stormwater management measures included in the stormwater management plan for the Pofadder WEF 3 must be implemented. The duration of construction work within the watercourses must be minimised as far as practically possible through proper planning and phasing. During the construction phases, monitor culverts to see if erosion issues arise and if any erosion control is required. Any erosion problems observed during the construction phase should be rectified as soon as possible and monitored thereafter to ensure that they do not re-occur. Vegetation clearing should occur in a phased manner to minimise erosion and/or run-off. Any disturbed areas should be rehabilitated and monitored to ensure that these areas do not become subject to erosion Silt traps should be used where there is a danger of topsoil eroding and entering streams and other sensitive areas. These silt traps must be regularly monitored and maintained and replaced / repaired immediately as and when required. These 	Contractor/ECO/EO	<ul style="list-style-type: none"> The ECO will also need to prepare an induction and training programme to educate the contracting team on the EMPr commitments. Contractor to develop an internal reporting structure to monitor compliance with the commitments given in the EMPr as construction progresses. The EMPr should be enforced and monitored for compliance by a suitably qualified/trained ECO (Environmental Control Officer) with any additional supporting EO's (Environmental Officers) having the required competency skills and experience to ensure that environmental mitigation measures are being implemented and appropriate action is 	<ul style="list-style-type: none"> To minimise erosion of soil from site during construction. To maintain watercourses' RECs To avoid downstream impacts including: <ul style="list-style-type: none"> erosion; sedimentation; destabilisation of banks and channels. 	Throughout construction and decommissioning phase

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	<p>measures should be regularly checked, maintained and repaired when required to ensure that they are effective</p> <ul style="list-style-type: none"> • Construction of gabions and other stabilisation features to prevent erosion must be undertaken, if deemed necessary. • Under no circumstances must new channels be created for flow diversion and conveyance purposes unless approved as part of an EA or WUL • There should be reduced activity during the construction phase at the site after large rainfall events when the soils are wet. No driving off of hardened roads should occur immediately following large rainfall events until soils have dried out and the risk of bogging down has decreased. • Closure and rehabilitation of the disturbed areas should commence as soon as the laying of underground cable has been completed. • Soils should be landscaped to the natural landscape profile with care taken to ensure that no preferential flow paths or berms remain 		<p>taken where potentially adverse environmental impacts are highlighted through monitoring and surveillance.</p> <ul style="list-style-type: none"> • The ECO will need to be responsible for conducting regular site-inspections of the construction, processes, reporting back to the relevant environmental authorities with findings of these investigations. 		
Increase in sedimentation and erosion: Construction of road and MV cable	<ul style="list-style-type: none"> • Any areas disturbed during the construction phase should be encouraged to rehabilitate as fast and effective as possible and were deemed necessary by the ECO or Contractor's EO, artificial rehabilitation (e.g. re-seeding with collected or commercial 	Contractor/ECO/EO	<ul style="list-style-type: none"> • The ECO will need to prepare an induction and training programme to educate the contracting team on the EMPr 	<ul style="list-style-type: none"> • Recreate a non-invasive, acceptable vegetation cover that will facilitate the establishment of desirable and/or indigenous species 	After construction and throughout operational phase as well as after the

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watercourse crossings	<p>indigenous seed mixes) should be applied in order to speed up the rehabilitation process in critical areas (e.g. steep slopes and unstable soils).</p> <ul style="list-style-type: none"> All rehabilitated areas must be monitored to ensure that these areas do not become subject to erosion or invasive alien plant growth. 		<p>commitments relating to site rehabilitation.</p> <ul style="list-style-type: none"> Contractor to develop an internal reporting structure to monitor compliance with the commitments given in the EMPr as construction progresses. The EMPr and Rehabilitation Management Plan should be enforced and monitored for compliance by a suitably qualified/trained ECO (Environmental Control Officer) with any additional supporting EO's (Environmental Officers) having the required competency skills and experience to ensure that environmental mitigation measures are being implemented and appropriate action is taken where potentially adverse environmental impacts are highlighted 	<ul style="list-style-type: none"> Prevent accelerated erosion of ecosystem degradation 	decommissioning phase

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			<p>through monitoring and surveillance.</p> <ul style="list-style-type: none"> The ECO will need to be responsible for conducting regular site-inspections of the construction, and operational processes, reporting back to the relevant environmental authorities with findings of these investigations. 		
<p>Increase in sedimentation and erosion: Construction of Wind Turbines and supporting infrastructure (excluding roads and mv cable watercourse crossings)</p>	<ul style="list-style-type: none"> No unnecessary vegetation clearance may be allowed. Vegetation clearing should occur in a phased manner to minimise erosion and/or run-off. Any erosion problems observed to be associated with the project infrastructure should be rectified as soon as possible and monitored thereafter to ensure that they do not re-occur. There should be reduced activity at the site after large rainfall events when the soils are wet. No driving off of hardened roads should occur immediately following large rainfall events until soils have dried out and the risk of bogging down has decreased. Any stormwater within the site must be handled in a suitable manner, i.e. trap sediments, and reduce flow velocities 	Contractor/ECO/EO	<ul style="list-style-type: none"> The ECO will need to prepare an induction and training programme to educate the contracting team on the EMPr commitments. Contractor to develop an internal reporting structure to monitor compliance with the commitments given in the EMPr as construction progresses. The EMPr should be enforced and monitored for compliance by a suitably qualified/trained ECO (Environmental Control Officer) with any 	<ul style="list-style-type: none"> Prevent upstream erosional features from spreading into the aquatic buffer areas and the resource features themselves. To allow for natural runoff patterns into the downslope freshwater resource features. To avoid unnatural amounts of sediments carried into the downstream freshwater resource features from their catchments. 	Throughout construction and decommissioning phase

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			<p>additional supporting EO's (Environmental Officers) having the required competency skills and experience to ensure that environmental mitigation measures are being implemented and appropriate action is taken where potentially adverse environmental impacts are highlighted through monitoring and surveillance.</p> <ul style="list-style-type: none"> The ECO will need to be responsible for conducting regular site-inspections of the construction, processes, reporting back to the relevant environmental authorities with findings of these investigations. 		
Potential impact on localised surface water quality – All associated infrastructure	<ul style="list-style-type: none"> Implement appropriate measures to ensure strict use and management of all hazardous materials used on site Waste should be stored on site in clearly marked containers in a demarcated area. All waste material should be removed at the end of every working day to designated waste 	Contractor/ECO/EO	<ul style="list-style-type: none"> Observation and supervision of chemical storage and handling practices and vehicle maintenance throughout construction phase 	<ul style="list-style-type: none"> To ensure that the storage and handling of chemicals and hydrocarbons on-site does not cause pollution to the environment or harm to persons 	Throughout construction, maintenance and decommissioning phase

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	<p>facilities at the main construction camp/suitable waste disposal facility.</p> <ul style="list-style-type: none"> All waste must be disposed of offsite. Implement appropriate measures to ensure strict management of potential sources of pollutants (e.g. litter, hydrocarbons from vehicles and machinery, cement during construction etc.) Implement appropriate measures to ensure containment of all contaminated water by means of careful run-off management on the development site. Implement appropriate measures to ensure strict control over the behavior of construction workers. Appropriate ablution facilities should be provided for construction workers during construction and on-site staff during the operation of the substation and WEF. Vehicles to refuel within a designated area, at least 100m from any freshwater resource feature. Place spill kits on site which are operated by trained staff members for the adhoc remediation of minor chemical and hydrocarbon spillages. 		<ul style="list-style-type: none"> 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 Observation and supervision of waste management practices throughout construction phase Waste collection to be monitored on a regular basis Waste documentation completed An incident reporting system must be used to record non-conformances to the EMP/IWWMP An appointed ECO must monitor indicators listed above to ensure that they have been met for the construction phase. » Public complaints register must be 	<ul style="list-style-type: none"> To ensure that the storage and maintenance of machinery on-site does not cause pollution of the environment or harm to persons 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 	

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			developed and maintained on site.		

9.2.9 Terrestrial Ecology

This section deals with the issues relative to terrestrial ecology during the construction phase.

Table 30: Terrestrial Ecology

ASPECT/ IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
Disturbance/loss of natural vegetation	<ul style="list-style-type: none"> Demarcate all areas to be cleared with construction tape or similar material where practical. However, caution should be exercised to avoid using material that might entangle fauna. <ul style="list-style-type: none"> Prevent unnecessary destructive activity within construction areas (prevent over-excavations and double handling) Create specific turning points and parking areas for vehicles and heavy machinery as needed Strictly prohibit any driving outside designated areas and roads. 	Project Company, monitored by ECO/EO	<ul style="list-style-type: none"> Taking into account the final design-layout, and any sensitive areas, demarcate the absolute minimal development footprint, and ensure that the appointed contractor is made aware of where what activities and impacts are allowed and disallowed. 	<ul style="list-style-type: none"> To minimise impacts on the biophysical environment To prevent any residual or cumulative impacts arising. 	Prior to commencement of construction activities
Disturbance/loss of natural vegetation	<ul style="list-style-type: none"> No unnecessary vegetation clearance may be allowed. ECO and/or Contractor's EO to provide supervision and oversight of vegetation clearing activities and other activities which may cause damage to the environment, especially at the initiation of the project, when 	Contractor/ECO/EO	<ul style="list-style-type: none"> At all times be acutely aware of the specified development footprint, and remain within this area avoiding any disturbance of 	<ul style="list-style-type: none"> To minimise impacts on the biophysical environment To prevent any residual or cumulative impacts arising. 	EMPr induction and training: Prior to commencement of construction activities

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	<p>the majority of vegetation clearing is taking place.</p> <ul style="list-style-type: none"> • All vehicles to remain on demarcated roads and no unnecessary driving in the veld outside these areas should be allowed. • Regular dust suppression during construction, if deemed necessary, especially along access roads. • No fires should be allowed on-site • No plants may be translocated or otherwise uprooted or disturbed for rehabilitation or other purpose without express permission from the ECO and or Contractor's EO. 		<p>vegetation outside of these areas.</p> <ul style="list-style-type: none"> • Even within the development footprint, where vegetation can be allowed to persist undisturbed, this must be imposed. • The ECO will also need to prepare an induction and training programme to educate the contracting team on the EMPr commitments. • Contractor to develop an internal reporting structure to monitor compliance with the commitments given in the EMPr as construction progresses. • The EMPr should be enforced and monitored for compliance by a suitably qualified/trained ECO (Environmental Control Officer) with 		<p>Rest of the mitigation measures: Throughout construction and decommissioning phases</p>

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			<p>any additional supporting EO's (Environmental Officers) having the required competency skills and experience to ensure that environmental mitigation measures are being implemented and appropriate action is taken where potentially adverse environmental impacts are highlighted through monitoring and surveillance.</p> <ul style="list-style-type: none"> The ECO will need to be responsible for conducting regular site-inspections of the construction, processes, reporting back to the relevant environmental authorities with findings of these investigations. 		
Disturbance of fauna	<ul style="list-style-type: none"> Site access should be controlled and no unauthorised persons should be allowed onto the site. 	Contractor/ECO/EO	<ul style="list-style-type: none"> At all times be acutely aware of the specified development footprint, 	<ul style="list-style-type: none"> To minimise impacts on the biophysical environment 	EMPr induction and training:

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	<ul style="list-style-type: none"> Any fauna directly threatened by the associated activities should be removed to a safe location by a suitably qualified person. The collection, hunting or harvesting of any plants or animals at the site should be strictly forbidden. Personnel should not be allowed to wander off the demarcated site. Fires should not be allowed on site. 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. All construction vehicles should adhere to a low speed limit (30km/h) to avoid collisions with susceptible species such as snakes and tortoises. Construction vehicles limited to a minimal footprint on site (no movement outside of the earmarked footprint). All mammal, large reptiles and avifauna species found injured during construction will be taken to a suitably qualified veterinarian or rehabilitation centre to either be put down in a humane manner or cared for until it can be released again 		<p>and remain within this area avoiding any disturbance of vegetation outside of these areas.</p> <ul style="list-style-type: none"> The ECO will also need to prepare an induction and training programme to educate the contracting team on the EMPr commitments and how address/handle specific fauna when encountered. Contractor to develop an internal reporting structure to monitor compliance with the commitments given in the EMPr as construction progresses. The EMPr should be enforced and monitored for compliance by a suitably qualified/trained ECO (Environmental Control Officer) with 	<ul style="list-style-type: none"> To prevent any residual or cumulative impacts arising. Prevent mortality and injury of faunal species. 	<p>Prior to commencement of construction activities</p> <p>Rest of the mitigation measures: Throughout construction and decommissioning phases Daily inspections throughout construction and decommissioning phases</p>

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			<p>any additional supporting EO's (Environmental Officers) having the required competency skills and experience to ensure that environmental mitigation measures are being implemented and appropriate action is taken where potentially adverse environmental impacts are highlighted through monitoring and surveillance.</p> <ul style="list-style-type: none"> The ECO will need to be responsible for conducting regular site-inspections of the construction, reporting back to the relevant environmental authorities with findings of these investigations. The ECO will also need to prepare an induction and training programme to educate 		

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			<p>the contracting team on the EMPr commitments and how address/handle specific fauna when encountered.</p> <ul style="list-style-type: none"> The EMPr should be enforced and monitored for compliance by a suitably qualified/trained ECO (Environmental Control Officer) with any additional supporting EO's (Environmental Officers) having the required competency skills and experience to ensure that environmental mitigation measures are being implemented and appropriate action is taken where potentially adverse environmental impacts are highlighted through monitoring and surveillance. 		

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			<ul style="list-style-type: none"> The ECO will need to be responsible for conducting regular site-inspections of the construction, processes, reporting back to the relevant environmental authorities with findings of these investigations. 		
Disturbance of fauna	<ul style="list-style-type: none"> All cable trenches, excavations should be checked on a daily basis for the presence of trapped animals. Any animals found should be removed in a safe manner, unharmed, and placed in an area where the animal will be comfortable. If the ECO or contractor is unable to assist in the movement of a fauna species, ensure a member of the conservation authorities assists with the translocation. Note: the McGregor Museum in Kimberley could be approached for advice on relocating animals if required 	Contractor/ECO/EO	<ul style="list-style-type: none"> The ECO will also need to prepare an induction and training programme to educate the contracting team on the EMPr commitments and how address/handle specific fauna when encountered. The EMPr should be enforced and monitored for compliance by a suitably qualified/trained ECO (Environmental Control Officer) with any additional supporting EO's 	<ul style="list-style-type: none"> To minimise impacts on the biophysical environment To prevent any residual or cumulative impacts arising. Prevent mortality and injury of faunal species. 	<p>EMPr induction and training: Prior to commencement of construction activities</p> <p>Rest of the mitigation measures: Throughout construction and decommissioning phases</p> <p>Daily inspections throughout construction and decommissioning phases</p>

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			<p>(Environmental Officers) having the required competency skills and experience to ensure that environmental mitigation measures are being implemented and appropriate action is taken where potentially adverse environmental impacts are highlighted through monitoring and surveillance.</p> <ul style="list-style-type: none"> The ECO will need to be responsible for conducting regular site-inspections of the construction, processes, reporting back to the relevant environmental authorities with findings of these investigations. 		
Disturbance and loss of vegetation within sensitive habitats	<ul style="list-style-type: none"> The working servitude within the watercourses must be demarcated on both sides using orange hazard netting prior to construction commencing. 	Project Company, monitored by ECO/EO	<ul style="list-style-type: none"> Taking into account the final design-layout, and any sensitive areas, demarcate the absolute minimal 	<ul style="list-style-type: none"> To minimise impacts on sensitive habitats. To prevent any residual or cumulative impacts arising. 	Prior to commencement of construction activities

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			development footprint, and ensure that the appointed contractor is made aware of where what activities and impacts are allowed and disallowed.	<ul style="list-style-type: none"> To ensure the persistence/maintenance of the REC 	
Disturbance and loss of vegetation within sensitive habitats	<ul style="list-style-type: none"> All sensitive habitats outside of the demarcated construction area must be considered 'No-Go' areas for the duration of the construction phase. For watercourse road and cable crossings, no physical damage should be done to any aspects of the channel and banks of watercourses other than those necessary to complete the works as specified. Avoid stockpiling materials in vegetated areas that will not be cleared. 	Contractor/ECO/EO	<ul style="list-style-type: none"> At all times be acutely aware of the specified development footprint, and remain within this area avoiding any disturbance of vegetation outside of these areas. The ECO will also need to prepare an induction and training programme to educate the contracting team on the EMPr commitments. Contractor to develop an internal reporting structure to monitor compliance with the commitments given in the EMPr as construction progresses. 	<ul style="list-style-type: none"> To minimise impacts on sensitive habitats To prevent any residual or cumulative impacts arising. To ensure the persistence/maintenance of the REC 	Throughout construction and decommissioning Phases

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			<ul style="list-style-type: none"> The EMPr should be enforced and monitored for compliance by a suitably qualified/trained ECO (Environmental Control Officer) with any additional supporting EO's (Environmental Officers) having the required competency skills and experience to ensure that environmental mitigation measures are being implemented and appropriate action is taken where potentially adverse environmental impacts are highlighted through monitoring and surveillance. The ECO will need to be responsible for conducting regular site-inspections of the construction, processes, reporting 		

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			back to the relevant environmental authorities with findings of these investigations.		
Disturbance and loss of Faunal and Floral Species of Conservation Concern (SCC) as well as protected species.	<ul style="list-style-type: none"> Preconstruction walk-through of the final development footprint for protected species that would be affected and that can be translocated. 	Project Company, carried out by a registered Ecologist	<ul style="list-style-type: none"> Within the development footprint, Identify, mark (GPS), count, describe and map all populations/individuals of protected and fauna-, flora SCC. All results to be incorporated in an Ecological Pre-construction Walk-through Report 	<ul style="list-style-type: none"> To ensure the persistence of healthy, viable populations of protected and SCC within the project site. To ensure the acceptable rehabilitation of the development footprint. 	Prior to commencement of construction activities
Disturbance and loss of Faunal and Floral Species of Conservation Concern (SCC) as well as protected species.	<ul style="list-style-type: none"> The above pre-construction footprint investigations will be used together with results from the ecological specialist report to draft the following: <ul style="list-style-type: none"> A comprehensive search and rescue program for plants and possible burrowing animals A comprehensive alien invasive species eradication and management plan 	Project Company, carried out by a registered Ecologist	Compile detailed reports, with achievable goals.	<ul style="list-style-type: none"> To ensure the persistence of healthy, viable populations of protected and SCC within the project site. To ensure the acceptable rehabilitation of the development footprint. 	Prior to commencement of construction activities
Disturbance and loss of Faunal and Floral Species of Conservation	<ul style="list-style-type: none"> Obtain permits for protected plant removal and relocation prior to commencement of any activity related to this development 	Project Company, or contractor responsible for vegetation clearing,	Provide the relevant authorities with the necessary information and reports.	<ul style="list-style-type: none"> To ensure the persistence of healthy, viable populations of 	Prior to commencement of construction activities

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Concern (SCC) as well as protected species.		assisted by an EAP/Specialist		protected and SCC within the project site	
Disturbance and loss of Faunal and Floral Species of Conservation Concern (SCC) as well as protected species.	<ul style="list-style-type: none"> Search and Rescue (S&R) of all SCC and protected plants that will be affected by the development, especially species occurring in long term and permanent, hard surface development footprints (i.e. all buildings, new roads and tracks, lay down areas, and turbine positions) should take place. <ul style="list-style-type: none"> Plants that can be considered for rescue, and included in subsequent rehabilitation programs are all desirable geophytes and indigenous succulents All rescued species should be transplanted immediately or bagged (or succulents left to first air-dry before planting) and kept in the horticulturist's or a designated on-site nursery, and should be returned to site or land portion once all construction is completed and rehabilitation of disturbed areas is required. Replanting should occur in summer to early autumn once sufficient rains have fallen, in order to facilitate establishment. 	Contractor monitored and approved by ECO/EO	<ul style="list-style-type: none"> The ECO will also need to prepare an induction and training programme to educate the contracting team responsible for S&R on the species to be S&R, the commitments, and appropriate methodology. S&R team to develop an internal reporting structure to record and monitor S&R. S&R should be enforced and monitored by a suitably qualified/trained ECO (Environmental Control Officer) with any additional supporting EO's (Environmental Officers) having the required competency skills and experience 	<ul style="list-style-type: none"> To ensure the persistence of healthy, viable populations of protected and SCC within the project site 	<p>Initial S&R: Prior to commencement of construction activities</p> <p>Any additional species only observed after the initial S&R: Throughout the construction phase</p>

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			<p>to ensure that S&R activities are being implemented appropriately.</p> <ul style="list-style-type: none"> The ECO will need to be responsible for conducting regular site-inspections of the construction, processes, reporting back to the relevant environmental authorities with findings of these investigations. 		
Disturbance and loss of Faunal and Floral Species of Conservation Concern (SCC) as well as protected species.	<ul style="list-style-type: none"> Any additional individuals of protected species affected by and observed within the development footprint during construction (after the initial Search and Rescue) should be translocated under the supervision of the ECO and/or Contractor's Environmental Officer (EO). 	Contractor monitored and approved by ECO/EO	<ul style="list-style-type: none"> The ECO will also need to prepare an induction and training programme to educate the contracting team responsible for S&R on the species to be S&R, the commitments, and appropriate methodology. S&R team to develop an internal reporting structure to record and monitor S&R. 	<ul style="list-style-type: none"> To ensure the persistence of healthy, viable populations of protected and SCC within the project site 	<p>Initial S&R: Prior to commencement of construction activities</p> <p>Any additional species only observed after the initial S&R: Throughout the construction phase</p>

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			<ul style="list-style-type: none"> S&R should be enforced and monitored by a suitably qualified/trained ECO (Environmental Control Officer) with any additional supporting EO's (Environmental Officers) having the required competency skills and experience to ensure that S&R activities are being implemented appropriately. <p>The ECO will need to be responsible for conducting regular site-inspections of the construction, processes, reporting back to the relevant environmental authorities with findings of these investigations.</p>		
Soil erosion and associated degradation of ecosystems	<ul style="list-style-type: none"> Vegetation clearing should occur in a phased manner to minimise erosion and/or run-off. No unnecessary vegetation clearance may be allowed. 	Contractor, ECO to control	<ul style="list-style-type: none"> At all times be acutely aware of the specified development footprint, and remain within this area avoiding any 	<ul style="list-style-type: none"> To minimise erosion of soil from site during construction To minimise deposition of soil into downstream 	Throughout construction and decommissioning Phases

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Construction: Soil erosion and associated degradation of ecosystems	<ul style="list-style-type: none"> Limit the physical footprint of the road and verges that would require clearing to a minimum. 		<p>disturbance of vegetation outside of these areas.</p> <ul style="list-style-type: none"> The ECO will also need to prepare an induction and training programme to educate the contracting team on the EMPr commitments. Contractor to develop an internal reporting structure to monitor compliance with the commitments given in the EMPr as construction progresses. The EMPr should be enforced and monitored for compliance by a suitably qualified/trained ECO (Environmental Control Officer) with any additional supporting EO's (Environmental Officers) having the required competency 	<p>freshwater resource features.</p> <ul style="list-style-type: none"> To minimise damage to vegetation by erosion or deposition No accelerated overland flow related surface erosion as a result of a loss of vegetation cover 	

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			<p>skills and experience to ensure that environmental mitigation measures are being implemented and appropriate action is taken where potentially adverse environmental impacts are highlighted through monitoring and surveillance.</p> <ul style="list-style-type: none"> The ECO will need to be responsible for conducting regular site-inspections of the construction, processes, reporting back to the relevant environmental authorities with findings of these investigations. 		
<p>Soil erosion and associated degradation of ecosystems</p> <p>Construction: Soil erosion and associated</p>	<ul style="list-style-type: none"> No activities or disturbance/transformation permitted outside of the development area. Any erosion problems observed along access roads or any hardened/ engineered surface should be rectified immediately and monitored thereafter to ensure that they do not re-occur. Re-instate as much of the eroded area to its pre-disturbed, "natural" geometry (no change 	Contractor, ECO to control	<ul style="list-style-type: none"> At all times be acutely aware of the specified development footprint, and remain within this area avoiding any disturbance of vegetation outside of these areas. 	<ul style="list-style-type: none"> To minimise erosion of soil from site during construction To minimise deposition of soil into downstream freshwater resource features. 	Throughout construction and decommissioning Phases

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degradation of ecosystems	<p>in elevation and any banks not to be steepened) where possible.</p> <ul style="list-style-type: none"> Implement best practice erosion protection and stormwater management during construction and operation; 		<ul style="list-style-type: none"> The ECO will also need to prepare an induction and training programme to educate the contracting team on the EMPr commitments. Contractor to develop an internal reporting structure to monitor compliance with the commitments given in the EMPr as construction progresses. The EMPr should be enforced and monitored for compliance by a suitably qualified/trained ECO (Environmental Control Officer) with any additional supporting EO's (Environmental Officers) having the required competency skills and experience to ensure that environmental 	<ul style="list-style-type: none"> To minimise damage to vegetation by erosion or deposition No accelerated overland flow related surface erosion as a result of a loss of vegetation cover 	

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			<p>mitigation measures are being implemented and appropriate action is taken where potentially adverse environmental impacts are highlighted through monitoring and surveillance.</p> <ul style="list-style-type: none"> The ECO will need to be responsible for conducting regular site-inspections of the construction, processes, reporting back to the relevant environmental authorities with findings of these investigations. 		
<p>Soil erosion and associated degradation of ecosystems</p> <p>Construction: Soil erosion and associated degradation of ecosystems</p>	<ul style="list-style-type: none"> Roads and other disturbed areas should be regularly monitored for erosion problems and problem areas should receive follow-up monitoring by the EO to assess the success of the remediation. 	Contractor, ECO to control	<ul style="list-style-type: none"> At all times be acutely aware of the specified development footprint, and remain within this area avoiding any disturbance of vegetation outside of these areas. The ECO will also need to prepare an induction and training 	<ul style="list-style-type: none"> To minimise erosion of soil from site during construction To minimise deposition of soil into downstream freshwater resource features. To minimise damage to vegetation by erosion or deposition 	Throughout construction and decommissioning Phases

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			<p>programme to educate the contracting team on the EMPr commitments.</p> <ul style="list-style-type: none"> Contractor to develop an internal reporting structure to monitor compliance with the commitments given in the EMPr as construction progresses. The EMPr should be enforced and monitored for compliance by a suitably qualified/trained ECO (Environmental Control Officer) with any additional supporting EO's (Environmental Officers) having the required competency skills and experience to ensure that environmental mitigation measures are being implemented and appropriate action 	<ul style="list-style-type: none"> No accelerated overland flow related surface erosion as a result of a loss of vegetation cover 	

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			<p>is taken where potentially adverse environmental impacts are highlighted through monitoring and surveillance.</p> <ul style="list-style-type: none"> The ECO will need to be responsible for conducting regular site-inspections of the construction, processes, reporting back to the relevant environmental authorities with findings of these investigations. 		
<p>Soil erosion and associated degradation of ecosystems</p> <p>Construction: Soil erosion and associated degradation of ecosystems</p>	<ul style="list-style-type: none"> Any stormwater within the site must be handled in a suitable manner, i.e. trap sediments, and reduce flow velocities Run-off generated from cleared and disturbed areas such as access roads and slopes that drain into rivers, streams or wetlands must be controlled using erosion control and sediment trapping measures. These control measures must be established at regular intervals perpendicular to the slope to break surface flow energy and reduce erosion as well as trap sediment. Sediment barriers (e.g. silt fences, sandbags, hay bales, earthen filter berms or retaining 	Contractor, ECO to control	<ul style="list-style-type: none"> Design-Layout taking into account the location and nature of the specific infrastructure as well as the location, nature and morphology of the area wherein the infrastructure will be placed. Additionally, the ECO will need to be responsible for conducting regular 	<ul style="list-style-type: none"> To minimise erosion of soil from site during construction To minimise deposition of soil into downslope freshwater resource features. To minimise damage to vegetation by erosion or deposition No accelerated overland flow related surface erosion as a result of a loss of vegetation cover 	<p>Prior to commencement of construction activities and throughout the construction and decommissioning phases.</p>

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	walls) must be established to protect downstream watercourses from erosion and sedimentation impacts from upslope. Sediment barriers should be regularly maintained and cleared so as to ensure effective drainage.		<p>site-inspections of the construction, and operation footprint areas, identifying any additional areas that will have to be addressed.</p> <ul style="list-style-type: none"> Prompt and appropriate response, from the contractor, following any additional recommendations from the ECO. 	<ul style="list-style-type: none"> No reduction in the surface area or natural functionality of natural freshwater resource features as a result of the establishment of infrastructure No increase in runoff into downslope freshwater resource features as a result of construction of project related infrastructure No increase in runoff into downslope freshwater resource features as a result of road construction 	
Soil erosion and associated degradation of ecosystems Construction: Soil erosion and associated degradation of ecosystems	<ul style="list-style-type: none"> Topsoil must be removed and stored separately from subsoil. Topsoils should be removed (and stored) under dry conditions to avoid excessive compaction whenever topsoil will have to be stored for longer than one year. Topsoil to be stored in berms with a width of 150 – 200 cm, and a maximum height of 100 cm, preferably lower <ul style="list-style-type: none"> Place berms along contours or perpendicular to the prevailing wind direction 	Contractor, ECO to control	<ul style="list-style-type: none"> Prior to construction, site and soil conditions to be investigated and appropriate area for topsoil storage to be identified. Ensure the appropriate removal and storage of topsoil as specified within the EMPr. The EMPr should be enforced and monitored for 	<ul style="list-style-type: none"> To retain full biological activity and functionality of topsoil Remove and store all topsoil on areas that are to be excavated; and use this topsoil in subsequent rehabilitation of disturbed areas 	Before and during construction phase

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	<ul style="list-style-type: none"> ○ Adhere to the following general rule: the larger the pile of topsoil storage needs to be, the shorter should be the time it is stored • Topsoil handling should be reduced to stripping, piling (once), and re-application. Between the piling and reapplication, stored topsoils should not undergo any further handling except control of erosion and (alien) invasive vegetation 		<p>compliance by a suitably qualified/trained ECO (Environmental Control Officer) with any additional supporting EO's (Environmental Officers) having the required competency skills and experience to ensure that environmental mitigation measures are being implemented and appropriate action is taken where potentially adverse environmental impacts are highlighted through monitoring and surveillance.</p>		
Soil erosion and associated degradation of ecosystems Construction: Soil erosion and associated degradation of ecosystems	<ul style="list-style-type: none"> • Topsoil must be reapplied where appropriate as soon as possible in order to encourage and facilitate rapid regeneration of the natural vegetation on cleared areas. • Topsoils should be spread evenly over the ripped or trimmed surface, if possible, not deeper than the topsoil originally removed 	Contractor, ECO to control	<ul style="list-style-type: none"> • Topsoil re-application and rehabilitation done in accordance with the EMPr and Site Rehabilitation Management Plan 	<ul style="list-style-type: none"> • To retain full biological activity and functionality of topsoil • Remove and store all topsoil on areas that are to be excavated; and use this topsoil in subsequent rehabilitation of disturbed areas 	During and prior to construction phase

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	<ul style="list-style-type: none"> The final prepared surface should not be smooth but furrowed to follow the natural contours of the land The final prepared surface shall be free of any pollution or any kind of contamination Care should be taken to prevent the compaction of topsoil 				

9.2.10 Transportation

This section deals with the issues relative to transportation during the construction phase.

Table 31: Transportation

IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
Additional Traffic Generation: Increase in Traffic	<ul style="list-style-type: none"> Ensure staff transport is done in the 'off peak' periods and by bus. Stagger material, component and abnormal loads Construction of an on-site concrete batching plant to reduce trips. 	Holder of the EA/Contractor	All staff members are aware of the EMPr requirements relevant to them Ensure the EMPr is adhered to.	Continuous
Additional Traffic Generation: Increase of Incidents with pedestrians and livestock	<ul style="list-style-type: none"> Upgrade of existing / new access points. Reduction in speed of vehicles Adequate enforcement of the law Implementation of pedestrian safety initiatives Regular maintenance of farm fences & access cattle grids Construction of an on-site concrete batching plant to reduce trips. 	Holder of the EA/Contractor	All staff members are aware of the EMPr requirements relevant to them Ensure the EMPr is adhered to.	Continuous

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IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
Additional Traffic Generation: Increase in Dust from gravel roads	<ul style="list-style-type: none"> • Upgrade of existing / new access point. • Reduction in the speed of the vehicles. • Construction of gravel roads in terms of TRH20. • Implement a road maintenance program under the auspices of the respective transport department. • Possible use of approved dust suppressant techniques. • Construction of an on-site batching plant and tower construction to reduce trips. 	Holder of the EA/Contractor	<p>All staff members are aware of the EMPr requirements relevant to them</p> <p>Ensure the EMPr is adhered to.</p>	Continuous
Additional Traffic Generation: Increase in Road Maintenance	<ul style="list-style-type: none"> • Implement a road maintenance program under the auspices of the respective transport department. • Construction of an on-site batching plant to reduce trips. 	Holder of the EA/Contractor	<p>All staff members are aware of the EMPr requirements relevant to them</p> <p>Ensure the EMPr is adhered to.</p>	Continuous
Additional Abnormal Loads	<ul style="list-style-type: none"> • Ensure abnormal vehicles travel to and from the proposed development in the 'off peak' periods or stagger delivery. • Adequate enforcement of the law 	Holder of the EA/Contractor	<p>All staff members are aware of the EMPr requirements relevant to them</p> <p>Ensure the EMPr is adhered to.</p>	Continuous
Internal Access Roads: Increase in Dust from gravel roads	<ul style="list-style-type: none"> • Enforce a maximum speed limit on the development. • Appropriate, timely and high-quality maintenance required in terms of TRH20. • Possible use of approved dust suppressant techniques. 	Holder of the EA/Contractor	<p>All staff members are aware of the EMPr requirements relevant to them</p> <p>Ensure the EMPr is adhered to.</p>	Continuous

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IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
Internal Access Roads: New / Larger Access points	<ul style="list-style-type: none"> Adequate road signage according to the SARTSM Approval from the respective roads department 	Holder of the EA/Contractor	<p>All staff members are aware of the EMPr requirements relevant to them</p> <p>Ensure the EMPr is adhered to.</p>	Continuous

9.2.11 Noise

This section deals with the issues relative to noise during the construction phase.

Table 32: Noise

ASPECT/ IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
Monitor construction noise	Ambient noise monitoring to be conducted.	Specialist noise consultant	As per the requirements of SANS 10103:2008	Validation of Noise Impact Assessment Findings to determine if further noise mitigation is required.	Three times during the construction phase

9.2.12 Visual

This section deals with the issues relative to visual during the construction phase.

Table 33: Visual

ASPECT/ IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
Topsoil loss can reduce the viability of rehabilitation measures and needs to be carefully managed if available.	<ul style="list-style-type: none"> Topsoil excavated from the site should be stockpiled and utilised for rehabilitation of the site after construction. 	Project management and EPC	As defined by the rehabilitation specialist.	Topsoil is utilized and no sterilization of topsoil takes place.	As required.
Un-necessary roads have the potential to create a visual disturbance long after the usage as past.	<ul style="list-style-type: none"> Limit road access to an efficient minimum by coordinated planning between the project management and the environmental control officer. 	Project management and EPC	<p>Temporary roads should be well marked and should only cross drainage lines on areas identified as permanent road features where erosion and soil loss management can be contained.</p> <p>Noncompliance with road signage and utilisation of no authorised roads should become a finable offence.</p>	The surrounding landscape remains rural and agricultural in landscape and land use.	As required.
Windblown dust and dust from moving vehicles have the potential to become a significant nuisance factor to local farms	<ul style="list-style-type: none"> Set up a clear management plan with clear accountability structures with set thresholds for triggering of mitigations. Set up a liaison committee to engage with local farmsteads located within 500m of an access road, with monthly communication with the farm 	Project management and EPC (as the issue arises).	Should excessive dust be generated from the movement of vehicles on the roads such that the dust becomes visible to the immediate surrounds, dust-retardant measures	Dust generated on site as well as on the access road to the site, is well managed and does not become a nuisance factor for	On-going

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ASPECT/ IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
around the site and along the access road.	owners on the effectiveness of the dust management procedures.		should be implemented under authorisation of the EPC.	the workers or the surrounding farmsteads.	
Buildings painted bright colours can increase the visual presence of the structures in a rural landscape, creating higher levels of visual contrast and attracting the attention of the casual observer.	<ul style="list-style-type: none"> The buildings should be painted a grey-brown colour (or other colour in keeping with the surrounding landscape) to assist in reducing colour contrast. Sheet metal structures should make use of mid-grey colour, and preferable have a rough texture material. 	Project management and EPC	At the commencement of construction, purchase order criteria for ordering paints and sheet metals need to be clearly defined.	Colour contrast generated from the buildings as seen from the roads is low and does not attract the attention of the casual observer.	Commencement of construction.
Light spillage from security lighting of structures can significantly increase the visual impact of a project in a rural landscape in a dark-sky context.	<ul style="list-style-type: none"> Light spillage mitigation from security lighting should be implemented and monitored by the ECO during construction to ensure that light spillage does not create a glowing effect. No overhead/ flood lighting of structures or areas. No up lighting to be used. 	Project management and EPC	At the commencement of construction, purchase order criteria for ordering of security lighting need to be clearly defined.	Lights contrast generated from the buildings as seen from the roads is low and does not attract the attention of the casual observer.	Commencement of construction.
Litter has the potential to degrade landscape character and can be contained by fencing around the construction camp/ laydown.	<ul style="list-style-type: none"> Littering should be a finable offence. Fencing around the laydown should be diamond shaped to catch wind blown litter. The fences should be routinely checked for the collection of litter caught on the fence. 	Project management and EPC	Littering rules need to be clearly defined and workers effectively informed of the consequences of littering.	Solid waste litter is effectively controlled and does not become a landscape degradation risk.	Checked bi-monthly
Soil erosion can result in visual scarring on prominent areas.	<ul style="list-style-type: none"> In areas where construction has taken place on steeper slopes, soil erosion measures need to be implemented. 	Project management and EPC (checked monthly)	Clear methodology for rehabilitation and restoration is provided by the	Soil erosion is limited and effectively	Commencement of construction. On-going

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			rehabilitation specialist. As soon as construction has concluded on the area at hand, rehabilitation processes need to commence.	managed such that visual scarring does not take place.	
Cut and Fill areas can generate visual scarring in the landscape beyond the locality.	<ul style="list-style-type: none"> Cut & Fill areas should be limited as much as possible, with specific detail placed on prevention of soil erosion. Slopes should not exceed 1 in 6m gradients and need to be rehabilitated to natural vegetation directly post construction. 	Project management and EPC with inputs from rehabilitation specialist.	Clear methodology for rehabilitation and restoration is provided by the rehabilitation specialist. As soon as construction has concluded on the area at hand, rehabilitation processes need to commence.	Cut/ fill scarring is limited and effectively managed and does not dominate the attention of the casual observer.	Commencement of construction. On-going
Topsoil loss can reduce the viability of rehabilitation measures and needs to be carefully managed if available.	<ul style="list-style-type: none"> Topsoil excavated from the site should be stockpiled and utilised for rehabilitation of the site after construction. 	Project management and EPC	As defined by the rehabilitation specialist.	Topsoil is utilized and no sterilization of topsoil takes place.	As required.

9.2.13 Socio-Economic

This section deals with the issues relative to socio-economic during the construction phase.

Table 34: Socio-Economic

ASPECT/ IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
Noise	The mitigation measures suggested by the noise specialist	The proponent in association with contractors	As stated by the noise specialist	Frequency of complaints laid and the time lag between notification of the complaint and resolutions.	Over construction & operation phases of the project
Increase in crime	Ensure that constructions workers are identifiable. All workers should carry identification cards and wear identifiable clothing. Encourage local people to report any suspicious activity associated with the construction sites through the establishment of community liaison forum. Prevent loitering within the vicinity of the construction camp and construction sites	The proponent in association with contractors	Safety of workforce including security on project site. Fence and secure project site	To minimise the risk potential for local communities	Over the construction phase of the project.
Increase in HIV Infections	Ensure that an onsite HIV Infections Policy is in place and that construction have easy access to condoms Expose workers to a health and HIV/Aids awareness educational program.	Human resource department and project manager	Implement an HIV/AIDs Awareness and Training Programme for contractors workforce within two weeks of commencement of construction	To minimise the risk of the spread of STD's and HIV in the area.	Over construction & operation phases of the project
An influx of construction workers	Communicate the limitation of opportunities created by the project through Community Leaders and Ward Councillors.	The proponent in association with contractors	As far possible source low-skilled workers from local	To minimise the disruptive effect that the workforce	Over construction

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	Draw up a recruitment policy in consultation with the community leaders and Ward Councillors of the area and ensure compliance with this policy		communities and surrounding areas If feasible employ local contractors	may pose for local communities	phase of the project
Hazard exposure	Ensure all construction equipment and vehicles are properly maintained at all times Ensure that operations and drivers are properly trained and make them aware, through regular toolbox talks, of any risk they may pose to the community. Place specific emphasis on the vulnerable sector of the population, such as children and the elderly. Ensure that fires lit by construction staff are only ignited in designated areas and that the appropriate safety precautions, such as not lighting fires in strong winds and completely extinguishing fires before leaving them unattended, are strictly adhered to. Make staff aware of the danger of fire during toolbox talks	The proponent in association with contractors	Provide relevant protection equipment and training to all staff personnel	To avoid and or minimise the potential risk of hazardous exposure on local communities and their livelihoods	Over construction phase of the project
Disruption of daily living patterns	Ensure that, at all times, people have access to their properties as well as to social facilities.	Project proponent in association with contractors	A public grievance and incident register should be established and should be monitored internally by the developer and made available for public scrutiny if requested	Register to be audited to understand any issues regarding property issues.	During operational phase on a monthly basis
Disruptions to social and community infrastructure	Regularly monitor the effect that construction is having on infrastructure and immediately report any damage to infrastructure to the appropriate authority.	Project proponent in association with contractors	A public grievance and incident register should be established and should be monitored internally by the	Register to be audited to understand any	During operational phase on a monthly basis

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			developer and made available for public scrutiny if requested	issues regarding property issues.	

9.3 Operation Phase

9.3.1 Construction Site Decommissioning

This section deals with the issues relative to construction site decommissioning during the operation phase.

Table 35: Construction Site Decommissioning

ASPECT/ IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
Construction Site Decommissioning: Removal of equipment	<ul style="list-style-type: none"> All structures comprising the construction camp are to be removed from site. The area that previously housed the construction camp is to be checked for spills of substances such as oil, paint, etc., and these shall be cleaned up. All hardened surfaces within the construction camp area should be ripped, all imported materials removed, and the area shall be top soiled and regressed using the guidelines set out in the re-vegetation that forms part of this document. 	Holder of EA/Contractor	<p>Compliance to all legislative requirements.</p> <p>Ensure the EMPr is adhered to.</p>	Following construction
Construction Site Decommissioning: Temporary services	<ul style="list-style-type: none"> The Contractor must arrange the cancellation of all temporary services. Temporary roads must be closed and access across these, blocked. 	Holder of EA/Contractor	Compliance to all legislative requirements.	Following construction

ASPECT/ IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
	<ul style="list-style-type: none"> All areas where temporary services were installed are to be rehabilitated to the satisfaction of the ECO. 		Ensure the EMPr is adhered to.	
Construction Site Decommissioning: Associated infrastructure	<ul style="list-style-type: none"> Surfaces are to be checked for waste products from activities such as concreting or asphaltting and cleared in a manner approved by the Engineer. All surfaces hardened due to construction activities are to be ripped and imported material thereon removed. All rubble is to be removed from the site to an approved disposal site as approved by the Engineer. Burying of rubble on site is prohibited. The site is to be cleared of all litter. The Contractor is to check that all watercourses are free from building rubble, spoil materials and waste materials. Fences, barriers and demarcations associated with the construction phase are to be removed from the site unless stipulated otherwise by the Engineer. All residual stockpiles must be removed to spoil or spread on site as directed by the Engineer. All leftover building materials must be returned to the depot or removed from the site. The Contractor must repair any damage that the construction works has caused to neighbouring properties, specifically, but not limited to, damage caused by poor storm water management. 	Holder of EA/Contractor	All waste managed according to approved Method Statement	Following construction
Construction Site Decommissioning: Rehabilitation plan	<ul style="list-style-type: none"> Rehabilitate and re-vegetate cleared areas with indigenous plant species. 	Holder of EA/Contractor	Alien Plant Management Plan Plant Rehabilitation implemented	Following construction

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9.3.2 Operation and Maintenance

This section deals with the issues relative to operation and maintenance during the operation phase.

Table 36: Operation and Maintenance

ASPECT/ IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
Operation and Maintenance: Maintenance	<ul style="list-style-type: none"> • All applicable standards, legislation, policies and procedures must be adhered to during operation. • Regular ground inspection of the plants must take place to monitor their status. • Compile and adhere to a procedure for the safe handling of battery cells. • Lithium-ion batteries must have battery management systems (containment, automatic alarms, and shut-off systems) to monitor and protect cells from overcharging or damaging conditions, such as temperature extremes. • Compile an Emergency Response Plan for implementation in the event of a spill or leakage. • Record and report all significant fuel, oil, hydraulic fluid, or electrolyte spills or leaks so that appropriate clean-up measures can be implemented. A copy of these records must be made available to authorities on request throughout the project lifecycle. • Frequent and appropriate disposal of both general and hazardous waste must be undertaken to prevent pollution of soil and groundwater. • Install leak detection monitoring systems where possible. • On-site battery maintenance should only be undertaken on impermeable surfaces with secondary containment measures. Any resulting hazardous substances must be disposed of appropriately. 	Holder of the EA	Ensure the conditions of the EA are adhered to. Compliance to all legislative requirements	During operation

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ASPECT/ IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
	<ul style="list-style-type: none"> Provide for suitable emergency and safety signage on site, and demarcation of any areas which may pose a safety risk (including hazardous substances). Emergency numbers for the local police, fire department and Eskom must be placed in a prominent clearly visible area on-site 			
Operation and Maintenance: Public awareness	<ul style="list-style-type: none"> The emergency preparedness plan must be ready for implementation at all times should an emergency situation arise. 	Holder of the EA	Adhere to Emergency Evacuation Plan	During operation

9.3.3 Waste Management

This section deals with the issues relative to waste management during the operation phase.

Table 37: Waste Management

ASPECT/ IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	IMPACT MANAGEMENT OUTCOMES	TIME FRAME
Waste Management: Recycling and litter management	<ul style="list-style-type: none"> The site should be kept clear of litter at all times. Solid waste separation and recycling should take place for the duration of the operational phase for the development at the administration block. Where vegetation is cleared and is suitable, chipping and/or mulching can be considered. Any putrescible waste must be stored in containers that can keep out scavengers such as baboons and birds to prevent the spread of litter. All waste must be removed promptly to ensure that it does not attract vermin or produce odours. 	Holder of EA	All waste managed according to approved Method Statement Compliance to all legislative requirements.	Continuous

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ASPECT/ IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	IMPACT MANAGEMENT OUTCOMES	TIME FRAME
	<ul style="list-style-type: none"> Solid waste should be collected on a regular basis 			

9.3.4 Heritage

This section deals with the issues relative to heritage during the operation phase.

Table 38: Heritage

ASPECT/ IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES /FREQUENCY
Impacts to cultural landscape: Visible landscape scarring	Ensure disturbance is kept to a minimum and does not exceed project requirements. Rehabilitate areas not needed during operation.	Construction Manager or Contractor / ECO	Monitoring of surface clearance relative to approved layout	Minimise landscape scarring	Ongoing basis / as required

9.3.5 Agriculture and Soils

This section deals with the issues relative to agriculture and soils during the operation phase.

Table 39: Agriculture and Soils

ASPECT/ IMPACT	IMPACT ACTIONS	MANAGEMENT	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES/ FREQUENCY
Aspect: Protection of soil resources Erosion	<ul style="list-style-type: none"> Maintain the storm water run-off control system. Monitor erosion and remedy the storm water control system in the event of any erosion occurring. 		Facility Environmental Manager	Undertake a periodic site inspection to verify and inspect the effectiveness and integrity of the storm water run-off control system and to specifically record the occurrence of any erosion on site or downstream. Corrective action must be implemented to the run-off control system in the event of any erosion occurring.	That existence of hard surfaces causes no erosion on or downstream of the site.	Bi-annually
Aspect: Protection of soil resources Erosion	<ul style="list-style-type: none"> Facilitate re-vegetation of denuded areas throughout the site. 		Facility Environmental Manager	Undertake a periodic site inspection to record the progress of all areas that require re-vegetation.	That denuded areas are re-vegetated to stabilise soil against erosion	Bi-annually

9.3.6 Avifauna

This section deals with the issues relative to avifauna during the operation phase.

Table 40: Avifauna

ASPECT/ IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES /FREQUENCY
Avifauna: Mortality due to collisions with the wind turbines: Bird collisions with the wind turbines	<ul style="list-style-type: none"> Formal live-bird monitoring and carcass searches should be implemented at the start of the operational phase, as per the most recent edition of the Best Practice Guidelines at the time (Jenkins et al. 2015) to assess collision rates. The exact time when operational monitoring should commence, will depend on the construction schedule, and should commence when the first turbines start operating. The Best Practice Guidelines require that, as an absolute minimum, operational monitoring should be undertaken for the first two (preferably three) years of operation, and then repeated again in year 5, and again every five years thereafter for the operational lifetime of the facility. A procedure for the immediate removal of carcasses within the development area must be implemented to prevent vultures from being attracted to the area where they could be at risk of collision with the turbines. If an Endangered or Critically Endangered species mortality is recorded during the first year of operational monitoring, additional mitigation measures must be implemented which could include shut down on demand, or other proven 	Operations Manager Avifaunal Specialist	<ol style="list-style-type: none"> Appoint Avifaunal Specialist to compile operational monitoring plan, including live bird monitoring and carcass searches. Implement operational monitoring plan. Engage with the landowner to design and implement an effective system to locate a carcass promptly and ensure the immediate removal of the carcass before it can attract vultures. Design and implement mitigation measures if mortality thresholds are exceeded in collaboration with the avifaunal specialist, including if need be 	Prevention of collision mortality on the wind turbines.	<ol style="list-style-type: none"> Once-off Years 1,2, 5 and every five years after that for the duration of the operational lifetime of the facility. Before the first turbines start turning. As and when required, within six months of threshold having been exceeded.

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	mitigation measures as recommended by the avifaunal specialist.		Shutdown on Demand (SDoD). 5. Compile quarterly and annual progress reports detailing the results of the operational monitoring and progress with any recommended mitigation measures.		5. Quarterly and annually.
Avifauna: Mortality due to collisions and electrocutions on the 33kV network: Bird electrocutions on the overhead sections of the internal 33kV cables	<ul style="list-style-type: none"> Conduct regular inspections of the overhead sections of the internal reticulation network to look for carcasses. 	Operations Manager Avifaunal specialist	<ol style="list-style-type: none"> Carcass searchers under the supervision of the Avifaunal Specialist. Design and implement mitigation measures if mortality thresholds are exceeded. Compile quarterly and annual progress reports detailing the results of the operational monitoring and progress with any recommended mitigation measures. 	Prevention of electrocution mortality on the overhead sections of the 33kV internal cable network.	<ol style="list-style-type: none"> At least once every two months. As and when required, within six months of threshold having been exceeded. Quarterly and annually

9.3.7 Bat

This section deals with the issues relative to avifauna during the operation phase.

Table 41: Bat

ASPECT/ IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
Modification of Bat Habitat and Roost Disturbance/Destruction	<ul style="list-style-type: none"> Minimise clearing of vegetation - Rehabilitate all areas disturbed during construction (including aquatic habitat) Avoid construction activities at night. Minimise disturbance and destruction of farm buildings on site Minimise removal of trees Minimise blasting and removal of rocky habitat on site Limit potential for bats to roost in project infrastructure (e.g., buildings, turbines, road culverts). 	Pofadder Wind Energy Facility 3 (Pty) Ltd	<ul style="list-style-type: none"> Apply good construction abatement control practices to reduce emissions and pollutants (e.g., noise, erosion, waste) Apply appropriate vegetation rehabilitation practices. Ensure buildings, turbines and road culverts are correctly insulated and sealed to prevent bats from roosting. Where trees and rocky crevices will be impacted, these features should be examined for roosting bats. 	<ul style="list-style-type: none"> No bat roosts are destroyed No bats colonise new project infrastructure for roosting No infrastructure in No-Go areas (except roads) All areas disturbed during construction are rehabilitated 	During design and planning phase and throughout construction phase and until rehabilitation is complete.
Bat Mortality	<ul style="list-style-type: none"> No placement of turbines within No-Go areas Minimum blade sweep of 35 m 	Pofadder Wind Energy Facility 3 (Pty) Ltd	<ul style="list-style-type: none"> Adhere to the bat constraints map for No-Go areas (Figure 5). 	<ul style="list-style-type: none"> Bat fatalities do not exceed fatality 	Turbine layout and turbine model finalised during design

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	<ul style="list-style-type: none"> • Blade feathering must be used to prevent free-wheeling of turbine blades below the turbine cut-in speed • Implement post-construction fatality monitoring • Apply curtailment or deterrents if fatality thresholds are exceeded. 		<ul style="list-style-type: none"> • Select turbine with 35 m minimum blades sweep • Implement blade feathering below turbine cut-in speed • Implement best practise bat fatality monitoring according to Aronson et al. (2020). • Estimate bat fatality using GenEst (Simonis et al. 2018). • Develop bat adaptive management plan if fatality thresholds are exceeded which will include a curtailment plan and/or plan for use of acoustic deterrents. 	<p>thresholds for any species.</p>	<p>phase. Operational Phase fatality monitoring according to Aronson et al. (2020).</p>

9.3.8 Aquatic

This section deals with the issues relative to aquatic during the operation phase.

Table 42: Aquatic

ASPECT/ IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
Increase in sedimentation and erosion - Entire development footprint	<ul style="list-style-type: none"> All culverts, stormwater run-off infrastructure erosion prevention features/infrastructure must be monitored and maintained. Any erosion problems observed to be associated with the project infrastructure should be rectified as soon as possible and monitored thereafter to ensure that they do not re-occur. 	Contractor, ECO to control	<ul style="list-style-type: none"> Project site and infrastructure annually monitored by EO The EO should be responsible for driving this process. 	<ul style="list-style-type: none"> Ensure that all culverts, stormwater run-off infrastructure and erosion prevention features are functioning optimally, No disturbance or degradation of freshwater resource features occur throughout the operational phase. 	Throughout the operational phase

9.3.9 Terrestrial Ecology

This section deals with the issues relative to terrestrial ecology during the operation phase.

Table 43: Terrestrial Ecology

ASPECT/ IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
Soil erosion and associated degradation of ecosystems	<ul style="list-style-type: none"> Site access should be controlled and no unauthorised persons should be allowed onto the site. 	Contractor, ECO to control	<ul style="list-style-type: none"> Strict access control and the implementation of standard operating procedures 	Prevent any additional disturbance of soil and vegetation outside of the development footprint	Throughout the operational phase

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ASPECT/ IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
Construction: Soil erosion and associated degradation of ecosystems	<ul style="list-style-type: none"> Strictly prohibit any driving outside designated areas and roads 				
Soil erosion and associated degradation of ecosystems Construction: Soil erosion and associated degradation of ecosystems	<ul style="list-style-type: none"> Access roads or any hardened/ engineered surface should be regularly monitored for erosion problems. Any erosion problems observed should be rectified immediately and monitored thereafter to ensure that they do not re-occur. Implement best practice erosion protection and stormwater management during operation; 	Contractor, ECO to control	<ul style="list-style-type: none"> Frequent monitoring of the development site and infrastructure by the ECO/EO, identifying any additional areas that will have to be addressed. Prompt and appropriate response, from the contractor, following any additional recommendations from the ECO. 	<ul style="list-style-type: none"> Recreate a non-invasive, acceptable vegetation cover that will facilitate the establishment of desirable and/or indigenous species Prevent accelerated erosion of ecosystem degradation 	After construction and throughout operational phase
Soil erosion and associated degradation of ecosystems Construction: Soil erosion and associated degradation of ecosystems	<ul style="list-style-type: none"> 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) where possible. All bare/disturbed areas, affected by the development, should be rehabilitated and re-vegetated with locally occurring species, to bind the soil and limit erosion potential where applicable. revegetation will be done according to an approved planting/landscaping plan, also indicating the desirable end states of permissible vegetation 	Contractor, ECO to control	<ul style="list-style-type: none"> The ECO will need to prepare an induction and training programme to educate the contracting team on the EMPr commitments relating to site rehabilitation. Contractor to develop an internal reporting structure to monitor compliance with the commitments given in the EMPr as construction progresses. 	<ul style="list-style-type: none"> Recreate a non-invasive, acceptable vegetation cover that will facilitate the establishment of desirable and/or indigenous species Prevent accelerated erosion of ecosystem degradation 	After construction and throughout operational phase as well as after the decommissioning phase

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ASPECT/ IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
	<ul style="list-style-type: none"> The establishment and new growth of revegetated and replanted species shall be closely monitored Where necessary, reseeding or replanting will have to be done if no acceptable plant cover has been created Monitor success of rehabilitation and revegetation and take remedial actions as needed according to the respective plan Erosion shall be monitored at all times and measures taken as soon as detected Where necessary, reseeding or replanting will have to be done if no acceptable plant cover has been created 		<ul style="list-style-type: none"> The EMPr and Rehabilitation Management Plan should be enforced and monitored for compliance by a suitably qualified/trained ECO (Environmental Control Officer) with any additional supporting EO's (Environmental Officers) having the required competency skills and experience to ensure that environmental mitigation measures are being implemented and appropriate action is taken where potentially adverse environmental impacts are highlighted through monitoring and surveillance. The ECO will need to be responsible for conducting regular site-inspections of the construction, and operational processes, reporting back to the 		

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			relevant environmental authorities with findings of these investigations.		
Soil erosion and associated degradation of ecosystems Construction: Soil erosion and associated degradation of ecosystems	<ul style="list-style-type: none"> Keep disturbance of indigenous vegetation to a minimum Rehabilitate disturbed areas as quickly as possible The meticulous implementation of the IAP and Rehabilitation Management Plans. Regular monitoring by the operation and maintenance team for alien plants must occur and could be conducted simultaneously with erosion monitoring. When alien plants are detected, these must 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 and increase to problematic levels. Clearing methods must aim to keep disturbance to a minimum. 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 must be undertaken. 	Contractor, monitored by ECO	<ul style="list-style-type: none"> The ECO will need to prepare an induction and training programme to educate the contracting team on the EMPr commitments relating to the management/eradication of AIPs. Contractor to develop an internal reporting structure to monitor compliance with the commitments given in the EMPr as construction progresses. The EMPr and IAP Management Plan should be enforced and monitored for compliance by a suitably qualified/trained ECO (Environmental Control Officer) with any additional supporting EO's (Environmental Officers) having the required competency 	<ul style="list-style-type: none"> The successful reduction in the treat (significance) posed by Alien Invasive Plants. Recreate a non-invasive, acceptable vegetation cover that will facilitate the establishment of desirable and/or indigenous species 	Throughout construction and operational phase as well as after the decommissioning phase

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			<p>skills and experience to ensure that environmental mitigation measures are being implemented and appropriate action is taken where potentially adverse environmental impacts are highlighted through monitoring and surveillance.</p> <ul style="list-style-type: none"> The ECO will need to be responsible for conducting regular site-inspections of the construction, and operational processes, reporting back to the relevant environmental authorities with findings of these investigations. 		

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9.3.10 Transportation

This section deals with the issues relative to transportation during the operation phase.

Table 44: Transportation

ASPECT/ IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
Additional Traffic Generation: Increase in Traffic	<ul style="list-style-type: none"> The increase in traffic for this phase of the development is negligible and will not have a significant impact 	Holder of the EA/Contractor	<p>All staff members are aware of the EMPr requirements relevant to them</p> <p>Ensure the EMPr is adhered to.</p>	Continuous
Additional Traffic Generation: Increase of Incidents with pedestrians and livestock	<ul style="list-style-type: none"> The increase in traffic for this phase of the development is negligible and will not have a significant impact 	Holder of the EA/Contractor	<p>All staff members are aware of the EMPr requirements relevant to them</p> <p>Ensure the EMPr is adhered to.</p>	Continuous
Additional Traffic Generation: Increase in Dust from gravel roads	<ul style="list-style-type: none"> The increase in traffic for this phase of the development is negligible and will not have a significant impact 	Holder of the EA/Contractor	<p>All staff members are aware of the EMPr requirements relevant to them</p> <p>Ensure the EMPr is adhered to.</p>	Continuous
Additional Traffic Generation: Increase in Road Maintenance	<ul style="list-style-type: none"> The increase in traffic for this phase of the development is negligible and will not have a significant impact 	Holder of the EA/Contractor	<p>All staff members are aware of the</p>	Continuous

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ASPECT/ IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
			EMPr requirements relevant to them Ensure the EMPr is adhered to.	
Additional Abnormal Loads	<ul style="list-style-type: none"> The increase in traffic for this phase of the development is negligible and will not have a significant impact 	Holder of the EA/Contractor	All staff members are aware of the EMPr requirements relevant to them Ensure the EMPr is adhered to.	Continuous
Internal Access Roads: New / Larger Access points	<ul style="list-style-type: none"> Adequate road signage according to the SARTSM. Approval from the respective roads department. 	Holder of the EA/Contractor	All staff members are aware of the EMPr requirements relevant to them Ensure the EMPr is adhered to.	Continuous

9.3.11 Noise

This section deals with the issues relative to noise during the operation phase.

Table 45: Noise

ASPECT/ IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
Reduce operational noise	Ambient noise monitoring to be conducted at NSA 40 and NSA 41 when operations commence to verify the noise emissions meet the night time noise rating limit. Mitigation measures to be implemented if the noise impact exceeds the 35dB(A) night noise rating limit such as running the turbines in low power mode at certain wind speeds at night.	Specialist noise consultant	As per the requirements of SANS 10103:2008	Reduction in Noise and thus reduction in chance of complaints arising	Once off during project operations

9.3.12 Visual

This section deals with the issues relative to visual during the operation phase.

Table 46: Visual

ASPECT/ IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
Compaction of larger areas can result in soil sterilisation and landscape degradation.	Post construction, the laydown areas and other construction areas no longer needed for operational management, should be ripped (0.5m depth) to restore compacted topsoil, and then rehabilitated to natural vegetation under the supervision of the rehabilitation specialist.	Project management and EPC with inputs from rehabilitation specialist.	As defined by the rehabilitation specialist.	Soil sterilization does not take place and large degraded areas do not occur, with overall landscape integrity maintained.	On completion of construction phase. On-going

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AWL lights at night have the potential to significantly detract from the 'dark-sky' sense of place of the rural landscape.	<ul style="list-style-type: none"> Strategic placement of AWL at total project corner turbines. Placement of the AWL in shallow cups such that ground flash incidence is limited. 	Project management	As specified by the CAA.	AWL do not become dominating such that a clearly defined glow from multiple AWL at night is clearly visible at a regional level.	Project management team.
Soil erosion can result in visual scarring on prominent areas.	In areas where construction has taken place on steeper slopes, soil erosion measures need to be implemented.	Project management and EPC	Clear methodology for rehabilitation and restoration is provided by the rehabilitation specialist. As soon as construction has concluded on the area at hand, rehabilitation processes need to commence.	Soil erosion is limited and effectively managed such that visual scarring does not take place.	Bi-annual
Light spillage from security lighting of structures can significantly increase the visual impact of a project in a rural landscape in a dark-sky context.	Light spillage measures designed during pre-construction phase should be implemented and monitored by the ECO during construction to ensure that light spillage does not create a glowing effect.	Project management and EPC.	A review of the security lights at night is undertaken by the EPC to check that undue light spillage is not taking place without loss of security.	Lights contrast generated from the buildings as seen from the roads is low and does not attract the attention of the casual observer.	At commencement of Operation Phase.
Old turbine blades and equipment have the potential to significantly degrade the local landscape character.	Old turbines and equipment should be removed from site and recycled/ managed according to the National Environmental Management: Waste Act (Act 59 of 2008) (NEMWA) or deposited at a registered landfill if it cannot be recycled or reused.	Project management and EPC (as the need arises).	Old turbine blades are be removed from site and recycled/ managed according to the National Environmental Management: Waste Act (Act 59 of 2008) (NEMWA) or	The project area is not littered with old turbine blades resulting in the management area	On-going

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ASPECT/ IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
			deposited at a registered landfill if it cannot be recycled or reused.	becoming visually degraded.	
Windblown dust and dust from moving vehicles have the potential to become a significant nuisance factor to local farms around the site and along the access road.	Should excessive dust be generated from the movement of vehicles on the roads such that the dust becomes visible to the immediate surrounds, dust-retardant measures should be implemented under authorisation of the ECO.	Project management and EPC (as the need arises).	Set up a clear management plan with clear accountability structures with set thresholds for triggering of mitigations.	Dust generated on site as well as on the access road to the site, is well managed and does not become a nuisance factor for the workers or the surrounding farmsteads.	On-going.

9.3.13 Socio-Economic

This section deals with the issues relative to socio-economic during the operation phase.

Table 47: Socio-Economic

ASPECT/ IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
Noise	The mitigation measures suggested by the noise specialist	The proponent in association with contractors	As stated by the noise specialist	Frequency of complaints laid and the time lag between notification of the complaint and resolutions.	Over construction & operation phases of the project

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ASPECT/ IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
Shadow flicker	<p>Identifying receptor points and applying appropriate technical measures such as computer modelling in siting the wind turbines to limit the effect of shadow flicker.</p> <p>Where necessary and appropriate apply tracking technology that will automatically shutoff and restart the affecting wind turbine to eliminate shadow flicker</p> <p>Consider the application of appropriate screening measures to reduce the effect of shadow flicker</p>	The proponent in association with service providers	Assessment through and health-related issues	Through careful siting of wind turbines to avoid residential areas	During operation phase
Blade glint	<p>Calculate and factor in the risk of blade glint in siting the wind turbines</p> <p>Coat wind turbine blades with non-reflective costing to reduce blade glint.</p> <p>Where appropriate, adjust the angle of turbine blades to reduce blade glint.</p>	The proponent in association with service providers	Assessment through residents or visitors coming into the area	The use of non-reflective coatings	During operation phase
Electromagnetic fields and RF interference	<p>Wind turbine mechanism will be elevated and the risk of EMF's will be minimal.</p> <p>Notwithstanding this, it would be pertinent to regularly monitor the levels of EMFs emitted by the turbines and, if necessary make the appropriate adjustments to ensure that these levels remain within acceptable parameters.</p> <p>Ensure that power lines are not routed in close proximity (with 300 meters) of residential areas to limit the effect of EMFs.</p> <p>Consult with the appropriate telecommunication authorities to ensure that the telecommunication</p>	The proponent in association with service providers	Through consultation with relevant authorities under this area of expertise	Ensure project area is not compromised due to any RF interference	During operation phase

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ASPECT/ IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
	installations identified within the vicinity of the project are not comprised through RFI.				
Hazard exposure	<p>Install early detection techniques to avoid or reduce structural damage</p> <p>Install lighting protection systems</p> <p>Install fire prevention and control measures</p>	The proponent in association with project manager	Safety measures to be adhered too at all times.	Avoid any hazard exposure of the development to reduce any damages	During operation phase
Transformation of the sense of place	<p>Apply the mitigation measures suggested in the Visual Impact Assessment Report.</p> <p>Communicate the benefits associated with renewable energy to the broader community</p> <p>Ensure that all affected landowners and tourist associations are regularly consulted</p> <p>A Grievance Mechanism should be put in place and all grievance should be dealt with transparently</p> <p>The mitigation measures recommended in the Heritage and Palaeontology Impact Assessment should be followed.</p>	The proponent in association with project manager	Through consultation understand concerns regarding to changes in visual perspective and address matters	As part of the consultation should there be grievances then a grievance mechanism needs to be in place and dealt with openly	During construction & construction phase
Socio-economic stimulation	<p>Ensure that the procurement policy supports local enterprises</p> <p>Establish a social responsibility programme either in line with the REIPPP BID guidelines or equivalent;</p> <p>Work closely with the appropriate municipal structures regarding establishing a social responsibility programme;</p>	The proponent	Develop policies in place that aligns with local economic plan of the municipality	Work closely with the municipality and various people with the structures of the organisation	During operation, construction and decommissioning phase

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ASPECT/ IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
	Ensure that any trusts or funds are strictly managed in respect of outcomes and funds				

9.4 Decommissioning Phase

9.4.1 On-going Stakeholder involvement

This is the process that is recommended when the proposed wind farms are decommissioned.

Table 48: On-going Stakeholder involvement

ASPECT/ IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	IMPACT MANAGEMENT ACTIONS	TIME FRAME
Ongoing Stakeholder Involvement	<ul style="list-style-type: none"> • Community to be notified, as culturally appropriate, timeously of the planned decommissioning, e.g.: <ul style="list-style-type: none"> ○ Proposed decommissioning start date; and ○ Process to be followed. • Recommend that a meeting with community leader(s) be held before decommissioning commence to inform them: <ul style="list-style-type: none"> ○ What activities will take place during the decommissioning phase. ○ How these activities will impact upon the communities and/or their properties. ○ Regarding the timeframes of scheduled activities • Regular interaction between the client and community leader(s) during the decommissioning phase. 	Holder of the EA	Clear communication channels maintained	During decommissioning

ASPECT/ IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	IMPACT MANAGEMENT ACTIONS	TIME FRAME
	<ul style="list-style-type: none"> A reporting office/ channel to be established should community members experience problems with contractors/ sub-contractors during the decommissioning phase. A register to be kept of problems reported by community members and the steps taken to address / resolve it. 			

9.4.2 Waste Management

This section deals with the issues relative to waste management during the decommissioning phase.

Table 49: Waste Management

ASPECT/ IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	IMPACT MANAGEMENT ACTIONS	TIME FRAME
Waste Management	<ul style="list-style-type: none"> All decommissioned equipment must be removed from site and disposed of at a registered land fill. Records of disposal must be kept. Any putrescible waste must be stored in containers that can keep out scavengers such as baboons and birds to prevent the spread of litter. Wind turbines must be returned to the manufacturer or relevant recycling agent to be recycled. 	Holder of the EA	All waste managed according to approved Method Statement	During decommissioning

9.4.3 Agriculture and Soils

This section deals with the issues relative to agriculture and soils during the decommissioning phase.

Table 50: Agriculture and Soils

ASPECT/ IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES/ FREQUENCY
Aspect: Protection of soil resources Erosion	<ul style="list-style-type: none"> Implement an effective system of storm water run-off control, where it is required - that is at any points where run-off water might accumulate. The system must effectively collect and safely disseminate any run-off water from all accumulation points and it must prevent any potential down slope erosion. 	Engineer /Contractor	Undertake a periodic site inspection to verify and inspect the effectiveness and integrity of the storm water run-off control system and to specifically record the occurrence of any erosion on site or downstream. Corrective action must be implemented to the run-off control system in the event of any erosion occurring.	That disturbance and existence of hard surfaces causes no erosion on or downstream of the site.	Every 2 months during the decommissioning phase, and then every 6 months after completion of decommissioning, until final sign-off is achieved.
Aspect: Protection of soil resources Erosion	<ul style="list-style-type: none"> Maintain where possible all vegetation cover and facilitate re-vegetation of denuded areas throughout the site, to stabilize disturbed soil against erosion. 	Engineer /Contractor	Undertake a periodic site inspection to record the occurrence of and re-vegetation progress of all areas that require re-vegetation.	That vegetation clearing does not pose a high erosion risk.	Every 4 months during the decommissioning phase, and then every 6 months after completion of decommissioning, until final sign-off is achieved.
Aspect: Protection of soil resources Topsoil loss	<ul style="list-style-type: none"> If an activity will mechanically disturb the soil below surface in any way, then any available topsoil should first be stripped from the entire surface to be disturbed and stockpiled for re- 	Engineer /Contractor	Record GPS positions of all occurrences of below-surface soil disturbance (e.g. excavations). Record the date of topsoil stripping and	That topsoil loss is minimised	As required, whenever areas are disturbed.

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ASPECT/ IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES/ FREQUENCY
	spreading during rehabilitation. During rehabilitation, the stockpiled topsoil must be evenly spread over the entire disturbed surface.		replacement. Check that topsoil covers the entire disturbed area.		

9.4.4 Avifauna

This section deals with the issues relative to avifauna during the decommissioning phase.

Table 51: Avifauna

ASPECT/ IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES/ FREQUENCY
Avifauna: Displacement due to disturbance: The noise and movement associated with the de-commissioning activities at the WEF footprint will be a source of disturbance which would lead to the displacement of avifauna from the area	<ul style="list-style-type: none"> • A site-specific EMPr must be implemented, which gives appropriate and detailed description of how construction activities must be conducted. All contractors are to adhere to the EMPr and should apply good environmental practice during construction. The EMPr must specifically include the following: <ul style="list-style-type: none"> ○ No off-road driving; ○ Maximum use of existing roads, where possible; ○ Measures to control noise and dust according to latest best practice; 	Contractor and ECO	<ol style="list-style-type: none"> 1. Implementation of the EMPr. Oversee activities to ensure that the EMPr is implemented and enforced via site audits and inspections. Report and record any non-compliance. 2. Ensure that construction personnel are made aware of the impacts relating to off-road driving. 3. Access roads must be demarcated clearly. Undertake site inspections to verify. 	Prevent unnecessary displacement of avifauna by ensuring that contractors are aware of the requirements of the Environmental Management Programme (EMPr.)	<ol style="list-style-type: none"> 1. On a daily basis 2. Weekly 3. Weekly 4. Weekly 5. Weekly

ASPECT/ IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES/ FREQUENCY
	<ul style="list-style-type: none"> ○ Restricted access to the rest of the property; ○ Strict application of all recommendations in the botanical specialist report pertaining to the limitation of the footprint. 		<ol style="list-style-type: none"> 4. Monitor the implementation of noise control mechanisms via site inspections and record and report non-compliance. 5. Ensure that the footprint area is demarcated and that construction personnel are made aware of these demarcations. Monitor via site inspections and report non-compliance. 		

9.4.5 Bat

This section deals with the issues relative to bats during the decommissioning phase.

Table 52: Bat

ASPECT/ IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
Modification of Bat Habitat and Roost Disturbance/Destruction	<ul style="list-style-type: none"> • Minimise clearing of vegetation - Rehabilitate all areas disturbed during construction (including aquatic habitat) • Avoid construction activities at night. • Minimise disturbance and destruction of farm buildings on site • Minimise removal of trees 	Pofadder Wind Facility 3 (Pty) Ltd	<ul style="list-style-type: none"> • Apply good construction abatement control practices to reduce emissions and pollutants (e.g., noise, erosion, waste) 	<ul style="list-style-type: none"> • No bat roosts are destroyed • No bats colonise new project infrastructure for roosting 	During design and planning phase and throughout construction phase and until

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ASPECT/ IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
	<ul style="list-style-type: none"> Minimise blasting and removal of rocky habitat on site Limit potential for bats to roost in project infrastructure (e.g., buildings, turbines, road culverts). 		<ul style="list-style-type: none"> Apply appropriate vegetation rehabilitation practices. Ensure buildings, turbines and road culverts are correctly insulated and sealed to prevent bats from roosting. Where trees and rocky crevices will be impacted, these features should be examined for roosting bats. 	<ul style="list-style-type: none"> No infrastructure in No-Go areas (except roads) All areas disturbed during construction are rehabilitated 	rehabilitation is complete.

9.4.6 Aquatic

This section deals with the issues relative to aquatic during the decommissioning phase.

Table 53: Aquatic

ASPECT/ IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
Loss of riparian systems and disturbance of the alluvial water courses: Construction of road and MV cable watercourse crossings	<ul style="list-style-type: none"> All sensitive aquatic habitats outside of the demarcated construction area must be considered 'No-Go' areas for the duration of the construction phase. No physical damage should be done to any aspects of the channel and banks of 	Contractor/ECO/EO	<ul style="list-style-type: none"> At all times be acutely aware of the specified development footprint, and remain within this area avoiding any disturbance of 	<ul style="list-style-type: none"> Minimise and maintain damage of watercourse vegetation the 	Throughout construction and decommissioning Phases

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ASPECT/ IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
	<p>watercourses other than those necessary to complete the works as specified.</p> <ul style="list-style-type: none"> • Vegetation clearing should occur in a phased manner to minimise erosion and/or run-off. • There should be reduced activity at the site after large rainfall events when the soils are wet. 		<p>vegetation outside of these areas.</p> <ul style="list-style-type: none"> • The ECO will also need to prepare an induction and training programme to educate the contracting team on the EMPr commitments. • Contractor to develop an internal reporting structure to monitor compliance with the commitments given in the EMPr as construction progresses. • The EMPr should be enforced and monitored for compliance by a suitably qualified/trained ECO (Environmental Control Officer) with any additional supporting EO's (Environmental Officers) having the required competency skills and experience to ensure that environmental mitigation measures are being implemented and 	<p>development footprint.</p> <ul style="list-style-type: none"> • Prevent any residual or cumulative impacts arising. • To ensure the persistence/maintenance of the REC 	

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			<p>appropriate action is taken where potentially adverse environmental impacts are highlighted through monitoring and surveillance.</p> <ul style="list-style-type: none"> The ECO will need to be responsible for conducting regular site-inspections of the construction, processes, reporting back to the relevant environmental authorities with findings of these investigations. 		
<p>Loss of riparian systems and disturbance of the alluvial water courses: Excavation and trenching within watercourses</p>	<ul style="list-style-type: none"> Avoid stockpiling materials in vegetated areas that will not be cleared. All material stockpiles should be located outside freshwater resource features. Excavated soils should be stockpiled on the upslope side of the excavated trench so that eroded sediments off the stockpile are washed back into the trench; Excavated soils will need to be replaced in the same order as excavated from the trench, i.e. sub-soil must be replaced first and topsoil must be replaced last (this will maximise opportunity for re-vegetation of disturbed areas). 	Contractor/ECO/EO	<ul style="list-style-type: none"> At all times be acutely aware of the specified development footprint, and remain within this area avoiding any disturbance of vegetation outside of these areas. The ECO will also need to prepare an induction and training programme to educate the contracting team on the EMPr commitments. 	<ul style="list-style-type: none"> Minimise and maintain damage of watercourse vegetation the development footprint. Prevent any residual or cumulative impacts arising. To ensure the persistence/maintenance of the REC 	Throughout construction and decommissioning Phases

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	<ul style="list-style-type: none"> Closure and rehabilitation of the disturbed areas should commence as soon as the laying of underground cable has been completed. 		<ul style="list-style-type: none"> Contractor to develop an internal reporting structure to monitor compliance with the commitments given in the EMPr as construction progresses. The EMPr should be enforced and monitored for compliance by a suitably qualified/trained ECO (Environmental Control Officer) with any additional supporting EO's (Environmental Officers) having the required competency skills and experience to ensure that environmental mitigation measures are being implemented and appropriate action is taken where potentially adverse environmental impacts are highlighted through monitoring and surveillance. The ECO will need to be responsible for 		

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			conducting regular site-inspections of the construction, processes, reporting back to the relevant environmental authorities with findings of these investigations.		
Loss of riparian systems and disturbance of the alluvial water courses: Alien Invasive Plants	<ul style="list-style-type: none"> All alien plant re-growth must be monitored, and should it occur, these plants should be eradicated. Any disturbed areas should be rehabilitated and monitored to ensure that these areas do not become subject to erosion or invasive alien plant growth. Mitigation and follow up monitoring of residual impacts (alien vegetation growth and erosion) may be required. 	Contractor/ECO/EO	<ul style="list-style-type: none"> The ECO will need to prepare an induction and training programme to educate the contracting team on the EMPr commitments relating to the management/eradication of AIPs. The EMPr and IAP Management Plan should be enforced and monitored for compliance by a suitably qualified/trained ECO (Environmental Control Officer) with any additional supporting EO's (Environmental Officers) having the required competency skills and experience to ensure that 	<ul style="list-style-type: none"> The successful reduction in the treat (significance) posed by Alien Invasive Plants. Recreate a non-invasive, acceptable vegetation cover that will facilitate the establishment of desirable and/or indigenous species 	Throughout construction and operational phase as well as after the decommissioning phase

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			<p>environmental mitigation measures are being implemented and appropriate action is taken where potentially adverse environmental impacts are highlighted through monitoring and surveillance.</p> <ul style="list-style-type: none"> The ECO will need to be responsible for conducting regular site-inspections of the construction, and operational processes, reporting back to the relevant environmental authorities with findings of these investigations. 		
<p>Loss of riparian systems and disturbance of the alluvial water courses: Construction of Wind Turbines and supporting infrastructure (excluding roads and mv cable watercourse crossings)</p>	<ul style="list-style-type: none"> Vegetation clearing should occur in a phased manner to minimise erosion and/or run-off. Any erosion problems observed to be associated with the project infrastructure should be rectified as soon as possible and monitored thereafter to ensure that they do not re-occur. There should be reduced activity at the site after large rainfall events when the soils are wet. No driving off of hardened roads should occur immediately following large rainfall events until 	Contractor/ECO/EO	<ul style="list-style-type: none"> The ECO will also need to prepare an induction and training programme to educate the contracting team on the EMPr commitments. Contractor to develop an internal reporting structure to monitor compliance with the commitments given in 	No indirect damage to downslope freshwater resource features and their associated vegetation.	Throughout construction and decommissioning phase

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	<p>soils have dried out and the risk of bogging down has decreased.</p> <ul style="list-style-type: none"> Any stormwater within the site must be handled in a suitable manner, i.e. trap sediments, and reduce flow velocities Stormwater from hardstand areas, buildings and the substation must be managed using appropriate channels and swales when located within steep areas. 		<p>the EMPr as construction progresses.</p> <ul style="list-style-type: none"> The EMPr should be enforced and monitored for compliance by a suitably qualified/trained ECO (Environmental Control Officer) with any additional supporting EO's (Environmental Officers) having the required competency skills and experience to ensure that environmental mitigation measures are being implemented and appropriate action is taken where potentially adverse environmental impacts are highlighted through monitoring and surveillance. The ECO will need to be responsible for conducting regular site-inspections of the construction, processes, reporting back to the relevant environmental 		

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			authorities with findings of these investigations.		
Increase in sedimentation and erosion: Construction of road and MV cable watercourse crossings	<ul style="list-style-type: none"> All construction activities occurring directly within the watercourses to take place within the dry season. The erosion and stormwater management measures included in the stormwater management plan for the Pofadder WEF 3 must be implemented. The duration of construction work within the watercourses must be minimised as far as practically possible through proper planning and phasing. During the construction phases, monitor culverts to see if erosion issues arise and if any erosion control is required. Any erosion problems observed during the construction phase should be rectified as soon as possible and monitored thereafter to ensure that they do not re-occur. Vegetation clearing should occur in a phased manner to minimise erosion and/or run-off. Any disturbed areas should be rehabilitated and monitored to ensure that these areas do not become subject to erosion Silt traps should be used where there is a danger of topsoil eroding and entering streams and other sensitive areas. These silt traps must be regularly monitored and maintained and replaced / repaired immediately 	Contractor/ECO/EO	<ul style="list-style-type: none"> The ECO will also need to prepare an induction and training programme to educate the contracting team on the EMPr commitments. Contractor to develop an internal reporting structure to monitor compliance with the commitments given in the EMPr as construction progresses. The EMPr should be enforced and monitored for compliance by a suitably qualified/trained ECO (Environmental Control Officer) with any additional supporting EO's (Environmental Officers) having the required competency skills and experience to ensure that environmental mitigation measures are being implemented and 	<ul style="list-style-type: none"> To minimise erosion of soil from site during construction. To maintain watercourses" RECs To avoid downstream impacts including: <ul style="list-style-type: none"> erosion; sedimentation; destabilisation of banks and channels. 	Throughout construction and decommissioning phase

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	<p>as and when required. These measures should be regularly checked, maintained and repaired when required to ensure that they are effective</p> <ul style="list-style-type: none"> • Construction of gabions and other stabilisation features to prevent erosion must be undertaken, if deemed necessary. • Under no circumstances must new channels be created for flow diversion and conveyance purposes unless approved as part of an EA or WUL • There should be reduced activity during the construction phase at the site after large rainfall events when the soils are wet. No driving off of hardened roads should occur immediately following large rainfall events until soils have dried out and the risk of bogging down has decreased. • Closure and rehabilitation of the disturbed areas should commence as soon as the laying of underground cable has been completed. • Soils should be landscaped to the natural landscape profile with care taken to ensure that no preferential flow paths or berms remain 		<p>appropriate action is taken where potentially adverse environmental impacts are highlighted through monitoring and surveillance.</p> <ul style="list-style-type: none"> • The ECO will need to be responsible for conducting regular site-inspections of the construction, processes, reporting back to the relevant environmental authorities with findings of these investigations. 		
Increase in sedimentation and erosion: Construction of road and MV cable watercourse crossings	<ul style="list-style-type: none"> • Any areas disturbed during the construction phase should be encouraged to rehabilitate as fast and effective as possible and were deemed necessary by the ECO or Contractor's EO, artificial rehabilitation (e.g. re-seeding with collected or commercial indigenous seed mixes) should be applied in order to speed up the 	Contractor/ECO/EO	<ul style="list-style-type: none"> • The ECO will need to prepare an induction and training programme to educate the contracting team on the EMPr commitments relating to site rehabilitation. 	<ul style="list-style-type: none"> • Recreate a non-invasive, acceptable vegetation cover that will facilitate the establishment 	After construction and throughout operational phase as well as after the

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	<p>rehabilitation process in critical areas (e.g. steep slopes and unstable soils).</p> <ul style="list-style-type: none"> All rehabilitated areas must be monitored to ensure that these areas do not become subject to erosion or invasive alien plant growth. 		<ul style="list-style-type: none"> Contractor to develop an internal reporting structure to monitor compliance with the commitments given in the EMPr as construction progresses. The EMPr and Rehabilitation Management Plan should be enforced and monitored for compliance by a suitably qualified/trained ECO (Environmental Control Officer) with any additional supporting EO's (Environmental Officers) having the required competency skills and experience to ensure that environmental mitigation measures are being implemented and appropriate action is taken where potentially adverse environmental impacts are highlighted 	<p>of desirable and/or indigenous species</p> <ul style="list-style-type: none"> Prevent accelerated erosion of ecosystem degradation 	<p>decommissioning phase</p>

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			<p>through monitoring and surveillance.</p> <ul style="list-style-type: none"> The ECO will need to be responsible for conducting regular site-inspections of the construction, and operational processes, reporting back to the relevant environmental authorities with findings of these investigations. 		
<p>Increase in sedimentation and erosion: Construction of Wind Turbines and supporting infrastructure (excluding roads and mv cable watercourse crossings)</p>	<ul style="list-style-type: none"> No unnecessary vegetation clearance may be allowed. Vegetation clearing should occur in a phased manner to minimise erosion and/or run-off. Any erosion problems observed to be associated with the project infrastructure should be rectified as soon as possible and monitored thereafter to ensure that they do not re-occur. There should be reduced activity at the site after large rainfall events when the soils are wet. No driving off of hardened roads should occur immediately following large rainfall events until soils have dried out and the risk of bogging down has decreased. Any stormwater within the site must be handled in a suitable manner, i.e. trap sediments, and reduce flow velocities 	Contractor/ECO/EO	<ul style="list-style-type: none"> The ECO will need to prepare an induction and training programme to educate the contracting team on the EMPr commitments. Contractor to develop an internal reporting structure to monitor compliance with the commitments given in the EMPr as construction progresses. The EMPr should be enforced and monitored for compliance by a suitably qualified/trained ECO (Environmental 	<ul style="list-style-type: none"> Prevent upstream erosional features from spreading into the aquatic buffer areas and the resource features themselves. To allow for natural runoff patterns into the downslope freshwater resource features. 	Throughout construction and decommissioning phase

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			<p>Control Officer) with any additional supporting EO's (Environmental Officers) having the required competency skills and experience to ensure that environmental mitigation measures are being implemented and appropriate action is taken where potentially adverse environmental impacts are highlighted through monitoring and surveillance.</p> <ul style="list-style-type: none"> The ECO will need to be responsible for conducting regular site-inspections of the construction, processes, reporting back to the relevant environmental authorities with findings of these investigations. 	<ul style="list-style-type: none"> To avoid unnatural amounts of sediments carried into the downstream freshwater resource features form their catchments. 	
Potential impact on localised surface water quality – All associated infrastructure	<ul style="list-style-type: none"> Implement appropriate measures to ensure strict use and management of all hazardous materials used on site Waste should be stored on site in clearly marked containers in a demarcated area. 	Contractor/ECO/EO	<ul style="list-style-type: none"> Observation and supervision of chemical storage and handling practices and vehicle 	<ul style="list-style-type: none"> To ensure that the storage and handling of chemicals and hydrocarbons 	Throughout construction, maintenance and

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	<ul style="list-style-type: none"> All waste material should be removed at the end of every working day to designated waste facilities at the main construction camp/suitable waste disposal facility. All waste must be disposed of offsite. Implement appropriate measures to ensure strict management of potential sources of pollutants (e.g. litter, hydrocarbons from vehicles and machinery, cement during construction etc.) Implement appropriate measures to ensure containment of all contaminated water by means of careful run-off management on the development site. Implement appropriate measures to ensure strict control over the behavior of construction workers. Appropriate ablution facilities should be provided for construction workers during construction and on-site staff during the operation of the substation and WEF. Vehicles to refuel within a designated area, at least 100m from any freshwater resource feature. Place spill kits on site which are operated by trained staff members for the adhoc remediation of minor chemical and hydrocarbon spillages. 		<p>maintenance throughout construction phase</p> <ul style="list-style-type: none"> 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 Observation and supervision of waste management practices throughout construction phase Waste collection to be monitored on a regular basis Waste documentation completed An incident reporting system must be used to record non-conformances to the EMP/IWWMP An appointed ECO must monitor indicators listed above to ensure that they have been met for the construction phase.» 	<p>on-site does not cause pollution to the environment or harm to persons</p> <ul style="list-style-type: none"> To ensure that the storage and maintenance of machinery on-site does not cause pollution of the environment or harm to persons To comply with waste management legislation To minimise production of waste To ensure appropriate waste storage and disposal To avoid environmental 	decommissioning phase

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			Public complaints register must be developed and maintained on site.	harm from waste disposal	

9.4.7 Terrestrial Ecology

This section deals with the issues relative to terrestrial ecology during the decommissioning phase.

Table 54: Terrestrial Ecology

ASPECT/ IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
Disturbance/loss of natural vegetation	<ul style="list-style-type: none"> No unnecessary vegetation clearance may be allowed. ECO and/or Contractor's EO to provide supervision and oversight of vegetation clearing activities and other activities which may cause damage to the environment, especially at the initiation of the project, when the majority of vegetation clearing is taking place. All vehicles to remain on demarcated roads and no unnecessary driving in the veld outside these areas should be allowed. Regular dust suppression during construction, if deemed necessary, especially along access roads. No fires should be allowed on-site 	Contractor/ECO/EO	<ul style="list-style-type: none"> At all times be acutely aware of the specified development footprint, and remain within this area avoiding any disturbance of vegetation outside of these areas. Even within the development footprint, where vegetation can be allowed to persist undisturbed, this must be imposed. Contractor to develop an internal reporting 	<ul style="list-style-type: none"> To minimise impacts on the biophysical environment To prevent any residual or cumulative impacts arising. 	Throughout construction and decommissioning phases

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	<ul style="list-style-type: none"> No plants may be translocated or otherwise uprooted or disturbed for rehabilitation or other purpose without express permission from the ECO and or Contractor's EO. 		<p>structure to monitor compliance with the commitments given in the EMPr as construction progresses.</p> <ul style="list-style-type: none"> The EMPr should be enforced and monitored for compliance by a suitably qualified/trained ECO (Environmental Control Officer) with any additional supporting EO's (Environmental Officers) having the required competency skills and experience to ensure that environmental mitigation measures are being implemented and appropriate action is taken where potentially adverse environmental impacts are highlighted through monitoring and surveillance. The ECO will need to be responsible for conducting regular site-inspections of the 		

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ASPECT/ IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
			construction, processes, reporting back to the relevant environmental authorities with findings of these investigations.		
Disturbance of fauna	<ul style="list-style-type: none"> Site access should be controlled and no unauthorised persons should be allowed onto the site. Any fauna directly threatened by the associated activities should be removed to a safe location by a suitably qualified person. The collection, hunting or harvesting of any plants or animals at the site should be strictly forbidden. Personnel should not be allowed to wander off the demarcated site. Fires should not be allowed on site. 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. All construction vehicles should adhere to a low speed limit (30km/h) to avoid collisions with susceptible species such as snakes and tortoises. Construction vehicles limited to a minimal footprint on site (no movement outside of the earmarked footprint). 	Contractor/ECO/EO	<ul style="list-style-type: none"> At all times be acutely aware of the specified development footprint, and remain within this area avoiding any disturbance of vegetation outside of these areas. Contractor to develop an internal reporting structure to monitor compliance with the commitments given in the EMPr as construction progresses. The EMPr should be enforced and monitored for compliance by a suitably qualified/trained ECO (Environmental Control Officer) with any additional supporting EO's (Environmental Officers) having the required competency 	<ul style="list-style-type: none"> To minimise impacts on the biophysical environment To prevent any residual or cumulative impacts arising. Prevent mortality and injury of faunal species. 	<p>Throughout construction and decommissioning phases</p> <p>Daily inspections throughout construction and decommissioning phases</p>

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	<ul style="list-style-type: none"> All mammal, large reptiles and avifauna species found injured during construction will be taken to a suitably qualified veterinarian or rehabilitation centre to either be put down in a humane manner or cared for until it can be released again 		<p>skills and experience to ensure that environmental mitigation measures are being implemented and appropriate action is taken where potentially adverse environmental impacts are highlighted through monitoring and surveillance.</p> <ul style="list-style-type: none"> The ECO will need to be responsible for conducting regular site-inspections of the construction, reporting back to the relevant environmental authorities with findings of these investigations. The ECO will also need to prepare an induction and training programme to educate the contracting team on the EMPr commitments and how address/handle specific fauna when encountered. 		

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			<ul style="list-style-type: none"> The EMPr should be enforced and monitored for compliance by a suitably qualified/trained ECO (Environmental Control Officer) with any additional supporting EO's (Environmental Officers) having the required competency skills and experience to ensure that environmental mitigation measures are being implemented and appropriate action is taken where potentially adverse environmental impacts are highlighted through monitoring and surveillance. The ECO will need to be responsible for conducting regular site-inspections of the construction, processes, reporting back to the relevant environmental authorities with findings of these investigations. 		

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Disturbance of fauna	<ul style="list-style-type: none"> All cable trenches, excavations should be checked on a daily basis for the presence of trapped animals. Any animals found should be removed in a safe manner, unharmed, and placed in an area where the animal will be comfortable. If the ECO or contractor is unable to assist in the movement of a fauna species, ensure a member of the conservation authorities assists with the translocation. Note: the McGregor Museum in Kimberley could be approached for advice on relocating animals if required 	Contractor/ECO/EO	<ul style="list-style-type: none"> The EMPr should be enforced and monitored for compliance by a suitably qualified/trained ECO (Environmental Control Officer) with any additional supporting EO's (Environmental Officers) having the required competency skills and experience to ensure that environmental mitigation measures are being implemented and appropriate action is taken where potentially adverse environmental impacts are highlighted through monitoring and surveillance. The ECO will need to be responsible for conducting regular site-inspections of the construction, processes, reporting back to the relevant environmental authorities with findings of these investigations. 	<ul style="list-style-type: none"> To minimise impacts on the biophysical environment To prevent any residual or cumulative impacts arising. Prevent mortality and injury of faunal species. 	<p>Throughout construction and decommissioning phases</p> <p>Daily inspections throughout construction and decommissioning phases</p>

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Disturbance and loss of vegetation within sensitive habitats	<ul style="list-style-type: none"> All sensitive habitats outside of the demarcated construction area must be considered 'No-Go' areas for the duration of the construction phase. For watercourse road and cable crossings, no physical damage should be done to any aspects of the channel and banks of watercourses other than those necessary to complete the works as specified. Avoid stockpiling materials in vegetated areas that will not be cleared. 	Contractor/ECO/EO	<ul style="list-style-type: none"> At all times be acutely aware of the specified development footprint, and remain within this area avoiding any disturbance of vegetation outside of these areas. The ECO will also need to prepare an induction and training programme to educate the contracting team on the EMPr commitments. Contractor to develop an internal reporting structure to monitor compliance with the commitments given in the EMPr as construction progresses. The EMPr should be enforced and monitored for compliance by a suitably qualified/trained ECO (Environmental Control Officer) with any additional supporting EO's (Environmental Officers) having the 	<ul style="list-style-type: none"> To minimise impacts on sensitive habitats To prevent any residual or cumulative impacts arising. To ensure the persistence/maintenance of the REC 	Throughout construction and decommissioning Phases

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			<p>required competency skills and experience to ensure that environmental mitigation measures are being implemented and appropriate action is taken where potentially adverse environmental impacts are highlighted through monitoring and surveillance.</p> <ul style="list-style-type: none"> The ECO will need to be responsible for conducting regular site-inspections of the construction, processes, reporting back to the relevant environmental authorities with findings of these investigations. 		
<p>Soil erosion and associated degradation of ecosystems</p> <p>Construction: Soil erosion and associated degradation of ecosystems</p>	<ul style="list-style-type: none"> Vegetation clearing should occur in a phased manner to minimise erosion and/or run-off. No unnecessary vegetation clearance may be allowed. Limit the physical footprint of the road and verges that would require clearing to a minimum. 	Contractor, ECO to control	<ul style="list-style-type: none"> At all times be acutely aware of the specified development footprint, and remain within this area avoiding any disturbance of vegetation outside of these areas. 	<ul style="list-style-type: none"> To minimise erosion of soil from site during construction To minimise deposition of soil into downstream freshwater 	Throughout construction and decommissioning Phases

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			<ul style="list-style-type: none"> • The ECO will also need to prepare an induction and training programme to educate the contracting team on the EMPr commitments. • Contractor to develop an internal reporting structure to monitor compliance with the commitments given in the EMPr as construction progresses. • The EMPr should be enforced and monitored for compliance by a suitably qualified/trained ECO (Environmental Control Officer) with any additional supporting EO's (Environmental Officers) having the required competency skills and experience to ensure that environmental mitigation measures are being implemented and appropriate action is taken where potentially 	<p>resource features.</p> <ul style="list-style-type: none"> • To minimise damage to vegetation by erosion or deposition • No accelerated overland flow related surface erosion as a result of a loss of vegetation cover 	

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			<p>adverse environmental impacts are highlighted through monitoring and surveillance.</p> <ul style="list-style-type: none"> The ECO will need to be responsible for conducting regular site-inspections of the construction, processes, reporting back to the relevant environmental authorities with findings of these investigations. 		
<p>Soil erosion and associated degradation of ecosystems</p> <p>Construction: Soil erosion and associated degradation of ecosystems</p>	<ul style="list-style-type: none"> No activities or disturbance/transformation permitted outside of the development area. Any erosion problems observed along access roads or any hardened/ engineered surface should be rectified immediately and monitored thereafter to ensure that they do not re-occur. 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) where possible. Implement best practice erosion protection and stormwater management during construction and operation; 	Contractor, ECO to control	<ul style="list-style-type: none"> At all times be acutely aware of the specified development footprint, and remain within this area avoiding any disturbance of vegetation outside of these areas. The ECO will also need to prepare an induction and training programme to educate the contracting team on the EMPr commitments. Contractor to develop an internal reporting structure to monitor 	<ul style="list-style-type: none"> To minimise erosion of soil from site during construction To minimise deposition of soil into downstream freshwater resource features. To minimise damage to vegetation by erosion or deposition 	Throughout construction and decommissioning Phases

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			<p>compliance with the commitments given in the EMPr as construction progresses.</p> <ul style="list-style-type: none"> The EMPr should be enforced and monitored for compliance by a suitably qualified/trained ECO (Environmental Control Officer) with any additional supporting EO's (Environmental Officers) having the required competency skills and experience to ensure that environmental mitigation measures are being implemented and appropriate action is taken where potentially adverse environmental impacts are highlighted through monitoring and surveillance. The ECO will need to be responsible for conducting regular site-inspections of the construction, processes, 	<ul style="list-style-type: none"> No accelerated overland flow related surface erosion as a result of a loss of vegetation cover 	

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			reporting back to the relevant environmental authorities with findings of these investigations.		
Soil erosion and associated degradation of ecosystems Construction: Soil erosion and associated degradation of ecosystems	<ul style="list-style-type: none"> Roads and other disturbed areas should be regularly monitored for erosion problems and problem areas should receive follow-up monitoring by the EO to assess the success of the remediation. 	Contractor, ECO to control	<ul style="list-style-type: none"> At all times be acutely aware of the specified development footprint, and remain within this area avoiding any disturbance of vegetation outside of these areas. The ECO will also need to prepare an induction and training programme to educate the contracting team on the EMPr commitments. Contractor to develop an internal reporting structure to monitor compliance with the commitments given in the EMPr as construction progresses. The EMPr should be enforced and monitored for compliance by a suitably qualified/trained ECO (Environmental 	<ul style="list-style-type: none"> To minimise erosion of soil from site during construction To minimise deposition of soil into downstream freshwater resource features. To minimise damage to vegetation by erosion or deposition No accelerated overland flow related surface erosion as a result of a loss of vegetation cover 	Throughout construction and decommissioning Phases

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			<p>Control Officer) with any additional supporting EO's (Environmental Officers) having the required competency skills and experience to ensure that environmental mitigation measures are being implemented and appropriate action is taken where potentially adverse environmental impacts are highlighted through monitoring and surveillance.</p> <ul style="list-style-type: none"> The ECO will need to be responsible for conducting regular site-inspections of the construction, processes, reporting back to the relevant environmental authorities with findings of these investigations. 		
<p>Soil erosion and associated degradation of ecosystems</p> <p>Construction: Soil erosion and associated</p>	<ul style="list-style-type: none"> Any stormwater within the site must be handled in a suitable manner, i.e. trap sediments, and reduce flow velocities Run-off generated from cleared and disturbed areas such as access roads and slopes that 	Contractor, ECO to control	<ul style="list-style-type: none"> Design-Layout taking into account the location and nature of the specific infrastructure as well as the location, nature and 	<ul style="list-style-type: none"> To minimise erosion of soil from site during construction 	<p>Prior to commencement of construction activities and throughout the</p>

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degradation of ecosystems	<p>drain into rivers, streams or wetlands must be controlled using erosion control and sediment trapping measures. These control measures must be established at regular intervals perpendicular to the slope to break surface flow energy and reduce erosion as well as trap sediment.</p> <ul style="list-style-type: none"> Sediment barriers (e.g. silt fences, sandbags, hay bales, earthen filter berms or retaining walls) must be established to protect downstream watercourses from erosion and sedimentation impacts from upslope. Sediment barriers should be regularly maintained and cleared so as to ensure effective drainage. 		<p>morphology of the area wherein the infrastructure will be placed.</p> <ul style="list-style-type: none"> Additionally, the ECO will need to be responsible for conducting regular site-inspections of the construction, and operation footprint areas, identifying any additional areas that will have to be addressed. Prompt and appropriate response, from the contractor, following any additional recommendations from the ECO. 	<ul style="list-style-type: none"> To minimise deposition of soil into downslope freshwater resource features. To minimise damage to vegetation by erosion or deposition No accelerated overland flow related surface erosion as a result of a loss of vegetation cover No reduction in the surface area or natural functionality of natural freshwater resource features as a result of the establishment of infrastructure 	construction and decommissioning phases.

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ASPECT/ IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
				<ul style="list-style-type: none"> No increase in runoff into downslope freshwater resource features as a result of construction of project related infrastructure No increase in runoff into downslope freshwater resource features as a result of road construction 	

9.4.8 Transportation

This section deals with the issues relative to transportation during the decommissioning phase.

Table 55: Transportation

IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
Additional Traffic Generation: Increase in Traffic	<ul style="list-style-type: none"> Ensure staff transport is done in the 'off peak' periods and by bus. Stagger material, component and abnormal loads. 	Holder of the EA/Contractor	All staff members are aware of the	Continuous

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IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
	<ul style="list-style-type: none"> Construction of an on-site concrete batching plant to reduce trips. 		<p>EMPr requirements relevant to them</p> <p>Ensure the EMPr is adhered to.</p>	
Additional Traffic Generation: Increase of Incidents with pedestrians and livestock	<ul style="list-style-type: none"> Reduction in speed of vehicles Adequate enforcement of the law Implementation of pedestrian safety initiatives Regular maintenance of farm fences & access cattle grids 	Holder of the EA/Contractor	<p>All staff members are aware of the EMPr requirements relevant to them</p> <p>Ensure the EMPr is adhered to.</p>	Continuous
Additional Traffic Generation: Increase in Dust from gravel roads	<ul style="list-style-type: none"> Reduction in the speed of the vehicles. Appropriate, timely and high-quality maintenance required in terms of TRH20. Possible use of approved dust suppressant techniques. Implement a road maintenance program under the auspices of the respective transport department. Construction of an on-site sorter and pressing machine to reduce trips. 	Holder of the EA/Contractor	<p>All staff members are aware of the EMPr requirements relevant to them</p> <p>Ensure the EMPr is adhered to.</p>	Continuous
Additional Traffic Generation: Increase in Road Maintenance	<ul style="list-style-type: none"> Implement a road maintenance program under the auspices of the respective transport department. 	Holder of the EA/Contractor	<p>All staff members are aware of the EMPr requirements relevant to them</p> <p>Ensure the EMPr is adhered to.</p>	Continuous
Additional Abnormal Loads	<ul style="list-style-type: none"> Ensure abnormal vehicles travel to and from the proposed development in the 'off peak' periods or stagger delivery. Adequate enforcement of the law 	Holder of the EA/Contractor	<p>All staff members are aware of the</p>	Continuous

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IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
			EMPr requirements relevant to them Ensure the EMPr is adhered to.	
Internal Access Roads: Increase in Dust from gravel roads	<ul style="list-style-type: none"> Enforce a maximum speed limit on the development. Appropriate, timely and high-quality maintenance required in terms of TRH20. Possible use of approved dust suppressant techniques. 	Holder of the EA/Contractor	All staff members are aware of the EMPr requirements relevant to them Ensure the EMPr is adhered to.	Continuous
Internal Access Roads: New / Larger Access points	<ul style="list-style-type: none"> Adequate road signage according to the SARTSM Approval from the respective roads department 	Holder of the EA/Contractor	All staff members are aware of the EMPr requirements relevant to them Ensure the EMPr is adhered to.	Continuous

9.4.9 Visual

This section deals with the issues relative to visual during the decommissioning phase.

Table 56: Visual

ASPECT/ IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
Compaction of larger areas can result in soil sterilisation and landscape degradation.	<ul style="list-style-type: none"> Post construction, the laydown areas and other construction areas no longer needed for operational management, should be ripped (0.5m depth) to restore compacted topsoil, and then rehabilitated to natural vegetation under the supervision of the rehabilitation specialist. 	Project management and EPC with inputs from rehabilitation specialist.	As defined by the rehabilitation specialist.	Soil sterilization does not take place and large degraded areas do not occur, with overall landscape integrity maintained.	Within 1 year of closure.
Old, unused structures have the potential to significantly degrade the landscape character.	<ul style="list-style-type: none"> All structures not required for agricultural purposes post-closure should be removed and where possible, recycled or reused. Building structures should be broken down (including building foundations but excluding turbine foundations). The rubble should be managed according to the National Environmental Management: Waste Act (Act 59 of 2008) (NEMWA) and deposited at a registered landfill if it cannot be recycled or reused. 	Project management and EPC	As defined by the rehabilitation specialist.	The post operation landscape reverts to rural agricultural without landscape degradation created by un-used/ old structures.	Within 1 year of closure.
Old towers have the potential to significantly degrade the landscape character.	<ul style="list-style-type: none"> Should turbine towers be constructed from concrete, the towers need to be demolished, the rubble buried in pits and the area shaped to appear as a natural dome. The pit areas would need to be rehabilitated to natural veld vegetation with input from a rehabilitation specialist. 	Project management and EPC (within 1 year of closure).	As defined by the rehabilitation and demolition specialist.	The post operation landscape reverts to rural agricultural without landscape degradation	Within 2 years of closure.

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ASPECT/ IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
	<ul style="list-style-type: none"> Steel towers should be removed from site and managed according to the National Environmental Management: Waste Act (Act 59 of 2008) (NEMWA) and deposited at a registered landfill if it cannot be recycled or reused. 			created by un-used/ old structures.	
Old turbine blades and equipment have the potential to significantly degrade the local landscape character.	<ul style="list-style-type: none"> Old turbines and equipment should be removed from site and recycled/ managed according to the National Environmental Management: Waste Act (Act 59 of 2008) (NEMWA) or deposited at a registered landfill if it cannot be recycled or reused. 	Project management and EPC (as the need arises).	Old turbines blades are be removed from site and recycled/ managed according to the National Environmental Management: Waste Act (Act 59 of 2008) (NEMWA) or deposited at a registered landfill if it cannot be recycled or reused.	The project area is not littered with old turbine blades resulting in the management area becoming visually degraded.	Within 1 year of closure.
Windblown dust and dust from moving vehicles have the potential to become a significant nuisance factor to local farms around the site and along the access road.	<ul style="list-style-type: none"> Set up a clear management plan with clear accountability structures with set thresholds for triggering of mitigations. Set up a liaison committee to engage with local farmsteads located within 500m of an access road, with monthly communication with the farm owners on the effectiveness of the dust management procedures. 	Project management and EPC (as the issue arises).	Should excessive dust be generated from the movement of vehicles on the roads such that the dust becomes visible to the immediate surrounds, dust-retardant measures should be implemented under authorisation of the EPC.	Dust generated on site as well as on the access road to the site, is well managed and does not become a nuisance factor for the workers or the surrounding farmsteads.	On-going

10. AMENDMENTS TO THE EMPR

The Environmental Control Officer (ECO) has the right to request (in writing) a method statement to be compiled by the contractor in cases where the Construction EMPr may not adequately address the issue or nature of the activity/site warrants the need thereof. The method statement must be approved in writing by the ECO prior to carrying out the activity.

Any major issues not covered in the EMPr as submitted as well as any layout changes, will be addressed as an addendum to the EMPr and must be submitted for approval prior to implementation.

Authorised officials of the Department reserve the right to review the approved EMPr during the construction and operational phases of the above-mentioned activity and amend/add any condition as it is deemed necessary. Authorised officials also reserve the right to inspect the project during both construction and operational phase of development.

11. ENVIRONMENTAL AWARENESS PLAN

Appendix 4 of GN R326 EIA Regulations 2014 (as amended) requires that an Environmental Awareness Plan describes the manner in which “*the applicant intends to inform his or her employees of any environmental risk which may result from their work; and risks must be dealt with in order to avoid pollution or the degradation of the environment*”. In recognition of the need to protect our environment, environmental management should not only be seen as a legal obligation but also as a moral obligation.

This Environmental Awareness Plan is intended to create the required awareness and culture with personnel and contractor’s / service providers on environmental safety and health issues associated with the development activities.

11.1 Policy on Environmental Awareness

This Environmental Awareness Plan must serve as the basis for the induction of all new employees (as well as contractors depending on the nature of their work on site) on matters as described herein and read in conjunction with the EMPr. The Plan will also be used to hone awareness of all employees on a continuous basis.

Specific environmental awareness performance criteria will also form part of the job descriptions of employees, to ensure diligence and full responsibility at all levels of the organisational work force.

11.2 Implementation of Environmental Awareness

General environmental awareness will be fostered among the project's workforce to encourage the implementation of environmentally sound practices throughout the project’s duration. This will ensure that environmental accidents are minimised and environmental compliance maximised.

Environmental awareness will be fostered in the following manner:

- Induction course for all workers on site, before commencing work on site;

- Refresher courses as and when required;
- Daily toolbox talks with all workers on the site at the start of each day, where workers can be alerted to particular environmental concerns associated with their tasks for that day or the area/habitat in which they are working; and
- Displaying of information posters and other environmental awareness material at the general assembly points.

11.3 Training and awareness

The main contractor is to take responsibility for the management of their staff and subcontractors on the project site during the construction phase and supervise them closely at all times. The onus is on the contractor to make sure that all their staff and subcontractors fully comprehend the contents of the EMPr. The contractor must organise environmental awareness training programmes, which should be targeted at the two levels of employee: management and labour.

11.4 Training of construction workers

All construction staff must receive basic training in environmental awareness, including the storage and handling of hazardous substances, minimisation of disturbance to sensitive areas, management of waste, and prevention of water pollution. They must be informed of how to recognise historical / archaeological artefacts that may be uncovered. They must also be apprised of the EMPr's requirements. Environmental awareness training programmes need to be formulated for these employee levels and must comprise:

- A record of all names, positions and duties of staff to be trained;
- A framework for the training programmes;
- A summarised version of the training course(s); and
- An agenda for the delivery of the training courses.

Such programmes will set out the training requirements, which need to be conducted prior to any construction works occurring and will include:

- Acceptable behaviour with regard to flora and fauna;
- Management and minimising of waste, including waste separation;
- Maintenance of equipment to prevent the accidental discharge or spill of fuel, oil, lubricants, cement, mortar and other chemicals;
- Responsible handling of chemicals and spills;
- Environmental emergency procedures and incident reporting; and
- General code of conduct towards I&APs.

12. CONCLUSION

The environmental and social impacts of the project were identified through the four project phases (pre-construction, construction, operation and decommissioning). The following section briefly describes some of the major impacts and proposed mitigation measures within each of the project phases.

12.1 Pre-Construction Phase

The first site activities before mobilization of equipment will be a survey, required for final design of wind farm foundations. There will be negative impacts on land associated with the construction of camps (temporary loss) and storage of construction materials, and foundations for the buildings (permanent loss) and wind turbines. Expectations of improvement in livelihood among locals should be addressed through public participation. Construction contracts will include environmental monitoring and management procedures and requirements. These must be in place prior to the commencement of any construction activities. Avifauna and Bat Monitoring programmes have been initiated to document the current baseline of avifauna and bat activity on the site and the area surrounding the site. Once the final site has been selected for the wind farm and the layouts plans have been finalised a detailed geotechnical investigation should be undertaken.

12.2 Construction Phase

This phase of the activity will have both positive and negative impacts. The positive impacts are employment opportunities offered to the construction workers and any other labourer who will be hired to provide their services during the construction phase. The negative impacts would include wastes generated, accidents, air, dust and noise pollution, vegetation clearance, soil erosion, socio-environmental issues, loss of vegetation, and compaction of soil. Most of the negative impacts are minor and temporary and the significance of the impacts can be greatly reduced by the implementation of mitigation measures, which are outlined in this EMP. The contractor shall ensure that all staff have adequate protective clothing and are adequately trained. Avifauna and Bat Monitoring should be initiated to document the impact of the construction phase on Avifauna and bat activity on the site and the area surrounding the site.

12.3 Operational Phase

The proposed project will have minimal negative effects which mainly relates to loss of aesthetic value and habitat. The habitat that will be lost is not regarded as pristine and therefore, is not viewed as significant. Most of the negative impacts are minor and the significance of the impacts can be greatly reduced by the implementation of mitigation measures, which are outlined in this EMP.

12.4 Decommissioning Phase

As with any project, the facilities used in this project will have a lifetime after which they may no longer be cost effective to continue with operation. At that time, the project would be decommissioned, and the existing equipment removed.

Potential environmental impacts caused during decommissioning are those, which will be mitigated as provided by the Environmental Management Programme. These include: noise and emissions to the

surrounding environment, removal of hazardous waste and substances, fire, oil spills, wastes and public safety.

The disposal of materials from the decommissioned plant is not viewed as high risk. Much of the material would be recyclable (steel structures and turbine engines etc.) or inert (concrete foundations, etc.). These materials would however, need to be disposed of at a formal waste disposal or recycling centre.

Based on the above information, it is unlikely that the Project will have significant adverse social and environmental impacts. Most adverse impacts will be of a temporary nature during the construction phase and can be managed to acceptable levels with implementation of the recommended mitigation measures for the Project such that the overall benefits from the Project will greatly outweigh the few adverse impacts.

All the negative impacts could be easily mitigated and will either be moderate or less in rating. Generally, the proposed wind farm will result in appreciable benefits to the people in the project area of influence and bring opportunities for development to the country.



Appendix A:
Curriculum Vitae

Name Michelle Guy (née Evans)

Profession Environmental Scientist

Name of Firm SiVEST SA (Pty) Ltd

Present Appointment Environmental Scientist:
Environmental Division

Years with Firm 9 years

Date of Birth 30 September 1986

ID No. 8609300018082

Nationality South African



Education

- Scottburgh High School
- Rhodes University (2006-2011)

Professional Qualifications

- Bachelor of Arts - Rhodes University, Grahamstown (2009)
- BSc Environmental Science (Hons) – Rhodes University, Grahamstown (2010)
- Master of Science in Environmental Science – Rhodes University, Grahamstown (2010-2011)
- Registered Professional Natural Scientist (SACNASP) Pr.Sci.Nat. Registration No. 126338 (2020)
- Registered Environmental Impact Assessment Practitioner (EAPASA). Reg No. 2019/868

Membership to Professional Societies

- International Association for Impact Assessment South Africa (IAIAsa)
- South African Council for Natural Scientific Professions (SACNASP) Pr. Sci.Nat. Reg No. 126338
- Environmental Assessment Practitioners Association of South Africa (EAPASA). Reg No. 2019/868
- South African Wind Energy Association (SAWEA)

Employment Record

Aug 2012- present SiVEST SA (Pty) Ltd – Environmental Division: Environmental Scientist
2010 Graduate assistant in the Environmental Science Department of Rhodes University

2009 Graduate assistant in the Environmental Science Department of Rhodes University

Language Proficiency

LANGUAGE	SPEAK	READ	WRITE
English	Fluent	Fluent	Fluent
Afrikaans	Fair	Fair	Fair

Years of Working Experience: 9 YEARS

Countries of Work Experience

- South Africa

Fields of Specialisation

- Project Management
- Environmental Impact Assessments
- Environmental Compliance Monitoring
- Water Use Licence Applications
- GIS analysis (ARCGIS)

Overview

Michelle has been with SiVEST Environmental Division since August 2012 and is an experienced Environmental Scientist. Michelle has completed her Master of Science degree in Environmental Science (with distinction). She has also completed a Bachelor of Science honours degree in Environmental Science and Geography. She is a registered Professional Natural Scientist (SACNASP) and a registered Environmental Assessment Practitioner (EAPASA). Michelle has extensive experience in the compilation of environmental impact assessments, water use licensing, prefeasibility assessments, environmental management programmes, environmental auditing as well as GIS Mapping.

Key Projects Experience

ENVIRONMENTAL CONSULTING (August 2012 – present)

Environmental Impact Assessment Reports

- Wirtz Road Water Reticulation for Ethekwini Municipality – Basic Assessment and monthly auditing for a 6500m of 160mm diameter pipeline.
- Mixed-use Residential Estate Development – Appointed by Barkomotive (Pty) Ltd, a wholly-owned subsidiary of Ellingham Estate (Pty) Ltd, to undertake an EIA Report for the proposed mixed-use Rorqual Estate Development near Park Rynie, South Coast, KwaZulu-Natal (October 2012).
- Integrated Rapid Public Transport Network (IRPTN) – Appointed by the Ethekwini Transport Authority, responsible for the planning, implementation and operations of public transport in the City, to undertake an EIA report for the IRPTN Corridor 1, Bridge City to Durban CBD, and Corridor 9, Bridge City to Umhlanga.
- Shayamoya Phase 3 Housing Development – Appointed by the Greater Kokstad Local Municipality to undertake the EIA process for the housing development.
- Greater Amaoti Housing Project – Appointed by the Department of Human Settlements to undertake the EIA process for the development of 20 000 housing units in Amaoti. eThekweni Municipality.
- Koup 1 and 2 Wind Energy Facilities – Appointed by Genesis Eco-Energy (Pty) Ltd to undertake the EIA processes for the renewable wind energy facilities.
- Beaufort West Wind Energy Facilities – Appointed by South Africa Mainstream Renewable Power Developments to undertake EIA processes for the renewable wind energy facilities.
- Pofadder 1, 2 and 3 Wind Energy Facilities – Appointed by Atlantic Energy Partners to undertake EIA processes for renewable wind energy facilities.

Basic Assessment Reports

- Integrated Rapid Public Transport Network (IRPTN) – Appointed by the Ethekwini Transport Authority, responsible for the planning, implementation and operations of public transport in the City, to undertake a BA report for the IRPTN Corridor 3, Bridge City to Pinetown.
- Low cost housing project (Assessment Centre Housing Project) – Appointed by the Woodglaze Trading (Pty) Ltd, to provide additional housing in the Phoenix area.
- Intersite Precinct Development – Appointed by the Passenger Rail Association of South Africa for the construction of an Intersite Precinct in Scottburgh, located on the KwaZulu-Natal South Coast.
- Petrol Filling Station – Appointed by Cadismart (Pty) Ltd to for the construction of a petrol filling station, convenience store, dealership show room and farm stall situated on The Farm Grantham no 17754 in Felixton.
- School – Appointed by Renishaw Property Development (Pty) Ltd for the construction of a school containing sporting facilities, parking areas and engineering services in Scottburgh.

- Housing Development – Marianridge Housing Development – Appointed by Oxygen Infrastructure Solutions for development of the Marianridge Housing Development in Marianridge, KwaZulu-Natal.
- Logistics – Appointed by the Cato Ridge Logistics Hub Consortium (Pty) Ltd for the Cato Ridge Pilot Intermodal Project in Cato Ridge, KwaZulu-Natal.
- Pipeline - Northern Aqueduct Augmentation Pipeline – Appointed by Aurecon Consulting Engineers for the construction of a pipeline from Ntuzuma to Ogunjini.
- Renewable Energy Facilities to include Battery Energy Storage Systems (BESS) – Appointed by South Africa Mainstream Renewable Power Developments.
- Koup 1 and 2 Wind Energy Facilities and associated infrastructure – Appointed by Genesis Eco-Energy (Pty) Ltd to undertake the BA processes for the renewable wind energy facilities associated infrastructure.
- Beaufort West Wind Energy Facilities and associated infrastructure – Appointed by South Africa Mainstream Renewable Power Developments to undertake BA processes for the renewable wind energy facilities associated infrastructure.
- Ceres Wind Energy Facilities and associated infrastructure – Appointed by South Africa Mainstream Renewable Power Developments to undertake BA processes for the renewable wind energy facilities and associated infrastructure.
- Skilpad 1, 2 and 3 Solar PV Energy Facilities – Appointed by ABO Wind Renewable Energies (Pty) Ltd to undertake the BA processes for three Solar PV Facilities.
- Pofadder 1, 2 and 3 Wind Energy Facilities – Appointed by Atlantic Energy Partners to undertake BA processes for renewable wind energy facilities grid infrastructure.

Amendment Applications

- Integrated Rapid Public Transport Network (IRPTN) C3B – Appointed by eThekweni Transport Authority to amend the Environmental Authorisation to include a deviation in the transport route as well as to add an additional depot site to the authorisation.
- Mandela Crossroads Development – Appointed by eThekweni Municipality to amend the Environmental Authorisation to exclude certain parties from a condition of the EA.
- Zamani Low Cost Housing Development – Appointed by the eThekweni Municipality Housing Department to amend/extend the validity of the Environmental Authorisation.
- Bridge City Depot – Appointed by the eThekweni Municipality to amend the Environmental Authorisation to extend the footprint of the development and apply for construction within wetland buffers.
- Kindelwood Housing Expansion – Appointed Tongaat Hulett to amend the Environmental Authorisation to include additional residential units.
- Northern Aqueduct Augmentation Pipeline – Appointed by Aurecon Consulting Engineers to amend the Environmental Authorisation for changes in the pipeline alignment from Ntuzuma to Ogunjini.
- Mandela Crossroads Development – Appointed by eThekweni Municipality to amend the Environmental Authorisation to include an amended layout.
- EA Amendment Processes for six (6) renewable energy facilities in the Northern Cape – Appointed by South Africa Mainstream Renewable Power Developments.

Environmental Auditing

- Rocky Park Integrated Residential Development – Appointed by KwaDukuza Municipality to undertake an environmental audit of the Rocky Integrated Residential Development currently under development in Stanger, KwaZulu-Natal (August 2012).
- Mount Edgecombe (Camden 2) Residential Development – Appointed by Rocro Property Development (Pty) Ltd to undertake an environmental audit of Camden 2 Residential Development currently under development in Mount Edgecombe Golf Estates, Mount Edgecombe, KwaZulu-Natal (August 2012).
- Trenance Park Low Cost Housing – Appointed by eThekweni Municipality Housing Department to undertake an environmental audit of the Trenance Park Housing Project in Verulam, KwaZulu-Natal (August 2012).
- Vulamehlo Rural Housing Development – Appointed by the Vulamehlo Municipality to undertake an environmental audit of the Vulamehlo Rural Housing Development in Kenterton, KwaZulu-Natal (January 2013).
- Witz Road Water Reticulation for Ethekewini Municipality – Appointed by the Ethekewini Water and Sanitation Department to undertake the auditing of the sewer reticulation installation.

- Integrated Rapid Public Transport Network (IRPTN) – Appointed by MCA Joint Venture, to undertake an environmental audit for the implementation and operations of the IRPTN Corridor 3, Bridge City to Pinetown (June 2014-December 2018).
- Zamani 1B Phase B1 and B2 Low Cost Housing Project – Appointed by Shula Construction to undertake an environmental audit of the Zamani Low Cost Housing Development in Inanda, KwaZulu-Natal (June 2017).
- Mandela Crossroads Redevelopment Project – Appointed by Ethekwini Municipality to undertake the environmental auditing for the implementation of a taxi rank and associated infrastructure in KwaMashu (January 2018-April 2018).
- Umhlanga Town Lodge – Appointed by City Lodge Hotel Group to undertake the environmental auditing for the implantation of a new Town Lodge Hotel in Umhlanga (January 2018 - present).
- DTPC Support Zone (Double Basement Construction) – Appointed by Dube Tradeport to undertake the environmental auditing for the construction of the double basement in La Mercy (June 2019 – present)

Pre-feasibility Assessments and GIS

- Florence Nightingale Drive Precinct Plan, Chatsworth KwaZulu Natal. Ethekwini Municipality. Preliminary Environmental Investigation and Mapping.
- Proposed Forest Estate Development in Ballito, South Coast. Trencon Projects. Environmental Prefeasibility Investigation and Mapping.
- Cato Ridge Development Project. SMEC South Africa. Desktop Biophysical Prefeasibility Assessment and Mapping.
- Hammarsdale Link Road Project. SMEC South Africa. Desktop Environmental Screening Assessment and Mapping.
- Edgewood New Teaching and Learning Building. University of KwaZulu Natal. Desktop Environmental Screening Assessment and Mapping.
- Izotsha Hub Development, Izotsha. LDM. Desktop Environmental Prefeasibility Assessment and Mapping.
- Maryvale, Westville Prefeasibility. SLB Consulting. Desktop Environmental Prefeasibility Assessment and Mapping.
- Percy Osborne Road Prefeasibility. SLB Consulting. Desktop Environmental Prefeasibility Assessment and Mapping.
- Mayors Walk Road Upgrade Prefeasibility. SMEC. Desktop Environmental Prefeasibility Assessment and Mapping.
- UKZN High Level Assessment (Westville, Edgewood, Pietermaritzburg, Howard College). LDM. Desktop Environmental Prefeasibility Assessment and Mapping.
- Gledhow Compound Housing Development. Ngeja Consulting Engineers. Environmental Screening Assessment and Mapping.
- Marianridge Housing Development – Appointed by Oxygen Infrastructure Solutions to undertake the Departmental Enquiries, High Level Screening and Mapping for the Marianridge Housing Development in Marianridge.
- Reddam House – Prefeasibility and GIS Mapping for Reddam House School in Umhlanga.

Wetland Assessments

- Proposed construction of the Integrated Rapid Public Transport Network (IRPTN) from Durban CBD to KwaMashu and from Kwa-Mashu to Umhlanga. Ethekwini Transport Authority. Wetland Delineation and Impact Assessment.
- Bridge City Depot in KwaMashu. Ethekwini Transport Authority. Wetland Delineation Report.
- Amanzimtoti River Trunk Sewer Project, KwaZulu Natal. Environmental Planning and Design CC. Surface Water Delineation, Functional Impact Assessment and Rehabilitation and Monitoring Report.
- Ntuzuma Sewer Alignment Project, KwaZulu Natal Province. Environmental Planning and Design CC. Wetland Delineation, Functional and Impact Assessment, Rehabilitation and Monitoring Plan.
- Proposed Kanku Road Housing Development. Map Africa Consulting Engineers. Wetland Delineation, Health and Functional Assessment.

Wetland Rehabilitation Plan

- Izindophe Wetland, Eshowe. Tongaat Hulett Sugar South Africa. Soil and Wetland Rehabilitation Plan.
- John Ross Highway Petrol Filling Station. Union Square Properties. Wetland Rehabilitation Plan and Alien Invasive Plant Removal Programme.

Water Use Licenses

- Malandela Crossroads Water Use License. Ethekwini Municipality. Compilation and Submission of Water Use license.
- Bridge City Depot Water Use License. Ethekwini Municipality. Compilation and Submission of Water Use license.
- Zamani 1B Phase B1 Water use License. Ethekwini Municipality. Compilation and Submission of Water Use license.
- Zamani 1B Phase B2 Water use License. Ethekwini Municipality. Compilation and Submission of Water Use license.
- Cato Ridge Pilot Intermodal Project in Cato Ridge (Zone 1), KwaZulu-Natal. Appointed by the Cato Ridge Logistics Hub Consortium (Pty) Ltd. Compilation and Submission of Water Use License.
- Greater Amaoti Housing Project – Appointed by the Department of Human Settlements to undertake the WULA process for the development of 20 000 housing units in Amaoti. eThekweni Municipality.

Strategic Planning Projects

Provision of database, analysis and GIS mapping support for the following:

- Commissioned by CoGTA as an O&M support plan to the municipalities. Database management and mapping to verify the assets of 6 KZN municipalities
- Commissioned by Focus Project Management on behalf of the Department of Public Works, Province of KwaZulu-Natal as Project Managers for the Department of Education drought programme for mapping of borehole infrastructure at 870 schools in the North Coast region of KwaZulu-Natal.

Project and Research Experience

BACHELOR OF ARTS (BA)

Earth Science 101, Geography 102, 2 & 3, Anthropology 1 & 2, Zoology 101, Psychology 1, Cell Biology, History and Appreciation of Music, Environmental Science 2 & 3.

Research Project: Dams as Green Spaces: Environmental Implications of Recreational Activities in and around Grahamstown

Field Work: site inspections, the distribution of a questionnaire, aerial photograph analysis and an assessment of relative water quality constituents related to recreational use.

BACHELOR OF SCIENCE HONOURS DEGREE IN ENVIRONMENTAL SCIENCE (BSC HONS)

Environmental Impact Assessment, Statistics, Rehabilitation and Disturbance Ecology, Wetland Ecology, Strategic Conservation Assessment.

Research Project: Fluvial style of the Baviaans River

Field Work: Extensive surveying using dumpy level surveying techniques, particle size distribution.

MASTER OF SCIENCE BY THESIS IN ENVIRONMENTAL SCIENCE WITH DISTINCTION

Research Project: The LUNA (Livelihoods, Urbanization, Natural Resources in Africa) Project was started in 2009 as a partnership between five African and three German research institutions, funded by the Volkswagen Foundation. LUNA aims to analyze the impact of urbanization on the use of natural resources and livelihoods in five African countries, namely South Africa, Botswana, Tanzania, Cameroon and Cote d'Ivoire. In addition to examining the overall aims of the LUNA project, my masters

project has an individual focus entitled “Livelihood and coping strategy changes along rural-urban continua, with an emphasis on natural resources”.

Field Work: Administration of a standardized survey instrument to capture household details and livelihood activities.

As part of the LUNA project, Summer Schools were organized for 2010 and 2011 to encourage research partnerships, enhance skills training and monitor the overall progress of the project in each country. The Summer Schools were held in three different countries and the themes planned according to the host institution’s strengths, with student planning and participation forming an intricate part of the process. International trips and conferences:

- Moshi (Tanzania) 24 May – 4 June 2010.
- Freiburg (Germany) 6 September – 19 September 2010.
- Gaborone (Botswana) 18 – 27 May 2011.

Bursaries and Publications

- Full bursary to study Master of Science degree. Volkswagen Germany ZAR 150 000

Publications and Conference Presentations

Popular Publications and Reports

Urbanisation and Natural Resource Use in Phalaborwa, South Africa.

Available: <http://gnetmail.co.za/members/link.php?M=7264235&N=4254&L=4191&F=H>

LUNA Summer Schools, The Spekboom, Rhodes University.

Available: http://www.ru.ac.za/static/departments/environsci/documents/newsletter/Issue_12.pdf

CURRICULUM VITAE

Michelle Nevette

Name	Michelle Nevette
Profession	Environmentalist
Name of Firm	SiVEST SA (Pty) Ltd
Present Appointment	Divisional Manager: SiVEST Environmental Division
Years with Firm	21 Years
Date of Birth	18 March 1975
ID No.	7503180357085
Nationality	South African



Professional Qualifications

- BA (Economics), Honours in Environmental Management
- MEnvMgt. (Environmental Management) - University of South Africa
- ISO 14001:2015 Introduction and Implementation of an EMS (03/2018)
- Cert.Nat.Sci. reg. No. 120356 (July 2020)

Membership to Professional Societies

- International Association for Impact Assessment South Africa (IAIAsa)
- Environmental Assessment Practitioners Association of South Africa (EAPSA) Reg No.2019/1560
- South African Council for Natural Scientific Professions (SACNASP) Cert. Sci.Nat. Reg No. 120356

Employment Record

Aug 2009 – to date	SiVEST SA (Pty) Ltd Environmental Division: Divisional Manager
April. 1999 – Aug 2009	SiVEST Environmental Division: Senior Environmental Project Manager

Language Proficiency

LANGUAGE	SPEAK	READ	WRITE
English	Fluent	Fluent	Fluent
Afrikaans	Good	Good	Good

Years of Working Experience: 21 years

Countries of Working Experience

- South Africa
- Zimbabwe

Fields of Specialisation

- Environmental Project Management
- Environmental Impact Assessment
- Environmental Management and Auditing
- Environmental Planning including ISO14001:2015

CURRICULUM VITAE

Michelle Nevette

Overview

Michelle's strong managerial skills have been extensively used in setting up and running projects and in establishing and monitoring documentation systems. Responsible for the management of a team of environmental impact assessment practitioners, including financial management of the division in conjunction with the Managing Director, and ongoing responsibilities on various environmental projects.

Michelle has a keen interest in strategic planning and has been responsible for undertaking Strategic Environmental Assessments and for preparing Integrated Environmental Management Programs and Environmental Management Frameworks for various municipalities and private developers. Extensive experience in following the Basic Assessment and Environmental Impact procedure, as well as in preparing Environmental Management Plans, consulting with authorities and conducting Audits.

Expertise gained in a variety of environmental issues relating to municipal planning, mixed use development, agro-industrial developments, business parks, petrol filling stations, the housing sector, and infrastructural projects.

Projects Experience (by Sector)

ENVIRONMENTAL PLANNING /STRATEGIC PROJECTS

- Appointed by the Cato Ridge Logistical Hub Consortium (Pty) Ltd for the Cato Ridge Pilot Intermodal Project in Cato Ridge, KwaZulu-Natal (planning, BA/EIA and WULA).
- Appointed by Royal Shaka Estate (Pty) Ltd to project manage and obtain the necessary town planning and environmental rights the proposed 2155ha Royal Shaka Estate, North Coast.
- Port of Richards Bay – Strategic Environmental Assessment for Transnet National Ports Authority, (Aug 2018 – May 2019).
- Appointed by SMEC, on behalf of KZN COGTA, to undertake a High-level Environmental Status Quo & Recommendations Report for the Strategic Corridor Plan – Strategic Infrastructure Projects 2: Durban – Free State – Gauteng Development Region (June 2014 – present).
- Appointed by Finningley to assist with finalising the EIA and post authorisation work (including bulk servicing to the site on a mixed use development) which included provision for an Autobody Supply Park.
- Advised Toyota SA on the EIA requirement for a proposed site for a Toyota Autobody
- Preparation of a Strategic Environmental Assessment (SEA) for the Airports Company South Africa (ACSA) for a portion of property known as the Eastern Precinct.
- Appointed by ACSA to undertake an EIA for a portion of property known as the Eastern Precinct to house an automotive park.
- Appointed by Crookes Brothers Limited to prepare an EMF and subsequently an EIA for two properties comprising 1800ha in extent.
- Appointed by the KwaDukuza Municipality to undertake an SEA for KwaDukuza.
- Appointed by the uThungulu District Municipality to prepare an Integrated Environmental Management Plan (IEMP) for the District

Pre-feasibility Studies/Screening

- Appointed by Process Projects to undertake an environmental screening of Site Selection for Lithium ION NMC Precursor Materials Production (IDC project).
- Edgewood New Teaching and Learning Building. University of KwaZulu Natal. Desktop Environmental Screening Assessment and Mapping.
- Izotsha Hub Development, Izotsha. LDM. Desktop Environmental Prefeasibility Assessment and Mapping.
- Cato Ridge Development Project. SMEC. Desktop Biophysical Prefeasibility Assessment.
- Hammarsdale Link Road Project. SMEC. Desktop Environmental Screening Assessment.
- Msinga Cwaka New Town Centre – Appointed by LDM Consulting to undertake an Environmental Pre-feasibility Study for the Cwaka New Town Centre in Msinga Municipality, KwaZulu-Natal (Dec 2014).
- Avondale Forest Estate – Appointed by Trencon to undertake an Environmental Pre-feasibility Study for the Residential Eco-Estate adjacent Zimbali in Ballito, KwaZulu-Natal (Sep 2014).

CURRICULUM VITAE

Michelle Nevette

Climate Change

- Durban Climate Change Strategy – Appointed by eThekweni Municipality Environmental Planning and Climate Protection Department to establish a city status quo and recommendations to facilitate the implementation of climate change work within the city (May – Sep 2018).

Natural Resource Management (Environmental Rehabilitation)

- Renishaw Estate – Appointed by the Department of Environmental Affairs: Natural Resource Management Directorate to undertake the rehabilitation of the 1,833ha Mpambanyoni Conservation Development and Renishaw Estate (a mixed-use estate development with a strong conservation ethic) near Scottburgh, South Coast, KwaZulu-Natal (Dec 2017 – present).

POLICY & LEGISLATION

Review of Section 22 ECA Applications

- Appointed by DEAT to review and assess the pending Environmental Impact Assessment Applications for KZN submitted in terms of Section 22 of Environmental Conservation Act, Act 73 OF 1989.

Alien Vegetation

- Appointed to develop an auditing framework and to audit the eThekweni Municipality Production and Display Nurseries to determine their compliance with the Conservation of Agriculture Resources Act, 1983 (ACT No. 43 OF 1983) (CARA)

Coastal Zone Management

- Environmental Impact of the Alleged Illegal Cottages along the Wild Coast (former Transkei)

Telecommunication Policy for Urban Areas in KwaZulu-Natal

- Prepared on behalf of the Town and Regional Planning Commission. This policy involved extensive stakeholder consultation and included extensive research on the impact of telecommunication towers and associated infrastructure in urban areas. Assisted in the collection and preparation of data.

Training

- Appointed by uThungulu District Municipality to prepare training manuals and operational procedures manuals on EIA's which provided guidelines and principles for the District and Local Municipalities.

Advisory Services

- Appointed by Oxygen to provide environmental advisory services and assistance to municipal projects that have become 'stuck' on behalf of KZN PROV TREASURY for MUNICIPAL INFRASTRUCTURE

BUSINESS/INDUSTRY PROJECTS

- Audit of AMR to review their waste management practice and EMPr on behalf of Hillside Aluminium South 32
- ISO14001:2015 Internal Audit of Hillside Aluminium South 32
- ISO14001: 2015 Compilation of Legal Compliance Register and Aspects and Impacts Register for Technipaint (Pty) Ltd
- Appointed by Richards Bay Minerals (RBM) to conduct a performance assessment of RBM's approved EMPr and compile a legal liability report
- Permit/license external compliance audit for Bayside Aluminium
- Permit/license external compliance audit for Hillside Aluminium
- Permit/license external compliance audit for Metalloys Manganese Smelter in Meyerton

CURRICULUM VITAE

Michelle Nevette

Ports/Marine Infrastructure:

- Basic Assessment Report and EMP for the construction of marine infrastructure required for a floating dry dock in the Port of Richards Bay (Operation Phakisa)
- Preparation of a Sustainability Report and Environmental/Community Interface Report for new CO1 Conveyor for Transet Capital Project as FEL3 phase of Project Life Cycle process.

Petrol Filling Stations:

- Appointed by Engen Petroleum Limited to undertake BAs for the following Service Stations: Engen Ottawa, Engen Tongaat and Engen Galleira
- Appointed by Engen Petroleum Limited to undertake EIAs for the following Service Stations: Engen Umhlali; Engen Riverhorse 1; Engen Riverhorse 2; Engen CBD Downs and Engen Stapleton,;
- Appointed by Shell SA Marketing (PTY) Ltd to undertake EIAs for a petrol filling station, convenience stores and ATM at Mkuze, Phoenix and Hans Dettman.
- Appointed by Shell SA Marketing (Pty) Ltd to undertake the scoping process for a petrol filling station, convenience stores and ATM at Chatsworth, Marionhill, Verulam, Hannaford, Northcroft, Eastbury and Brookdale within Durban.
- Appointed by Shell SA Marketing (Pty) Ltd to undertake application for Exemptions for the upgrade of existing petrol filling stations at Bayhead and Gateway, Durban.
- Appointed by Caltex Oil South Africa (Pty) Ltd to prepare a Scoping Report and EMP for a petrol filling station, convenience stores and ATM at Brackenham, Richards Bay
- Preparation of Scoping Report and EMP for Philani Valley Petrol Station and Commercial Centre
- Preparation of Scoping Report and EMP for Umlazi Valley Petrol Station and Commercial Centre

Crude storage:

- Preparation for the Airports Company South Africa (ACSA) of an EIA for a proposed subdivision and rezoning of a portion of their property for future use by NATCOS (crude storage facility).

Mixed use/Business Park/Logistics/Shopping Centre:

- Appointed by the Cato Ridge Logistisc Hub Consortium (Pty) Ltd for the Cato Ridge Pilot Intermodal Project in Cato Ridge, KwaZulu-Natal (planning, BA/EIA and WULA).
- Preparation of an EIA for a mixed use development at Renishaw
- Appointed by Finningley to assist with finalising the EIA and post authorisation work (including bulks servicing to the site on a mixed use development) which included provision for an autosupply park.
- Advised Toyota SA on the EIA requirement for a proposed site for a Toyota Autobody
- Appointed by Barkomotive (Pty) Ltd, a wholly-owned subsidiary of Ellingham Estate (Pty) Ltd, to undertake an EIA Report for the proposed mixed-use Rorqual Estate Development near Park Rynie, South Coast, KwaZulu-Natal (October 2012).
- Appointed by the Passenger Rail Association of South Africa for the construction of an Intersite. Precinct in Scottburgh, located on the KwaZulu-Natal South Coast.
- Preparation of Duty of Care, Basic Assessment and EMP for Shoprite Distribution Center in Canelands.
- Preparation of a Basic Assessment for Sakhisizwe Holdings (Pty) Ltd for the proposed Warwick Mall as part of the 2010 World Cup Initiatives.
- Preparation of a Basic Assessment Prime Spot Trading 9 (Pty) Limited for the proposed Sithole Mall Shopping Centre in Osizweni
- Basic Assessment Report for a warehouse in Alton, Richards Bay, Briardale Trading
- Basic Assessment Report and EMP for a convenience centre in Gingindlovu
- Basic Assessment Report for the Amangwane Shopping Centre in Ulundi
- Preparation of an EIA for the Airports Company South Africa (ACSA) for a proposed Business Park on a portion of property known as the Eastern Precinct to house an automotive park.
- Preparation of an application for exemption for the Airports Company South Africa (ACSA) to lease a portion of their property to Shoprite-Checkers

CURRICULUM VITAE

Michelle Nevette

Waste License Applications

- Appointed by Richards Bay Minerals to undertake the waste license application for the salvage yard and ZN4.
- Appointed by Richards Bay Coal Terminal to undertake the waste license application for their existing operations.

COMMUNITY UPLIFTMENT PROJECTS

- Appointed by Renishaw Property Development (Pty) Ltd for the construction of a school containing sporting facilities, parking areas and engineering services in Scottburgh.
- Appointed by Industrial Development Corporation (IDC) to undertake an EIA Report for the proposed Nonoti Beach Tourism Development near Blythedale, North Coast, KwaZulu-Nata
- Basic Assessment Report and EMP for the uMhlathuze Multi-Purpose Sport Stadium in Richards Bay, uThungulu District Municipality
- Appointed by the Department of Works to prepare a Scoping Report and EMP for the rezoning of an “open space” area in Port Shepstone to “public administration”
- Appointed by the Department of Works to prepare an Application for Exemption for a police station and community hall in Khenani, Richards Bay.

RESIDENTIAL PROJECTS

Low Cost Housing

- Greater Amaoti Housing Project – Appointed by the Department of Human Settlements to undertake the EIA process for the development of 20 000 housing units in Amaoti. eThekweni Municipality.
- Shayamoya Phase 3 Housing Development – Appointed by the Greater Kokstad Local Municipality to undertake the EIA process for the housing development.
- Appointed by Oxygen Infrastructure Solutions for development of the Marianridge Housing Development in Marianridge, KwaZulu-Natal.
- Appointed by eThekweni to undertake an EIA for Madimeni, Lower Langefontein and Molweni Low Cost Housing.
- Appointed by eThekweni to undertake an EIA for Trenance Park 2B and Redcliffe Low Cost Housing
- Appointed by eThekweni to undertake a Basic Assessment for Philani Valley Phase 17-25 Low Cost Housing
- Appointed by the Ethekweni Housing Department to prepare Environmental Scoping Reports, EMPs and to undertake auditing for the following low cost housing projects:
 - Africa, Inanda
 - Stop 8/Nambia, Emtshabeni
 - Kwamashu Newland
 - Mshayazafe
 - Kwadabeka C
 - Verulam: Trenance Park 2B and Redcliffe
 - Lamontville North West
- Appointed to undertake an Environmental Considerations report for Vulemehlo Low cost Housing

Medium – High Income Housing:

- Appointed by Canboria Developments to prepare a Scoping Report for the proposed medium income housing project at Broadlands.
- Appointed by Midnight Storm Investors to prepare an Environmental Considerations Report for the development of a new multi-storey residential development on Lots 739 – 744, Tongaat.
- Appointed by Midnight Storm Investors to prepare an EMP and undertake auditing for Simbhiti Eco-Estate

CURRICULUM VITAE

Michelle Nevette

LINEAR DEVELOPMENT / INFRASTRUCTURE PROJECTS

- Project management and preparation of a range of Environmental Applications for the uMhlathuze Municipality Engineering Department for the financial year 2003/2004: This included environmental applications and auditing for road, water, canal, subdivisions and informal trading facilities projects.

Water Supply Schemes:

- Northern Aqueduct Augmentation Pipeline: Appointed by Aurecon Consulting Engineers for the construction of a pipeline from Ntuzuma to Ogunjini.
- Appointed by VGC to provide environmental services (environmental application, EMP and auditing) for a range of water supply projects, e.g. Mhlana, Madlebe, Khoza Water Supply Projects.
- Witz Road Water Reticulation for Ethekwini Municipality – Basic Assessment and monthly auditing for a 6500m of 160mm diameter pipeline.
- Appointed by uThungulu to undertake a scoping process for Middeldrift water supply
- Mtamvuna River Irrigation Potential Investigation, Izingolweni Sub-region, KwaZulu-Natal.

Roads and Bridges:

- Basic Assessment & EMPr for the upgrade of the Theunissen Road, Stanger
- Basic Assessment & EMPr for the proposed construction of a pedestrian bridge in Burbreeze, Tongaat
- Basic Assessment & EMPr for the proposed construction of a pedestrian bridge in Emansomini, Umlazi
- Integrated Rapid Public Transport Network (IRPTN) – Appointed by the Ethekwini Transport Authority, responsible for the planning, implementation and operations of public transport in the City, to undertake an EIA report for the IRPTN Corridor 1, Bridge City to Durban CBD, and Corridor 9, Bridge City to Umhlanga
- Integrated Rapid Public Transport Network (IRPTN) – Appointed by the Ethekwini Transport Authority, responsible for the planning, implementation and operations of public transport in the City, to undertake a BA report for the IRPTN Corridor 3, Bridge City to Pinetown.
- Appointed by eThekweni to undertake a Basic Assessment for the proposed Warwick Flyover (inbound and outbound) in Warwick Precinct as part of the 2010 World Cup Initiative.
- Appointed by eThekweni to undertake a Basic Assessment for the proposed Inwabi Road I Umlazi.
- Appointed by Umhlathuze Municipality to undertake an application for Exemption for the upgrade of a 1,5km gravel road (including a proper river crossing) within the existing alignment of the road in Ngwelezane.
- Appointed to undertake an application for Exemption for the Greytown Road Upgrade, KwaZulu-Natal
- Appointed to undertake a scoping process (including EMP) for the upgrading of Broadway, Durban North on behalf of the eThekweni Municipality Appointed to undertake an application for Exemption, EMP and auditing for the upgrading of the Wick/Todd Street in Verulam

Electricity/ Power lines

- Appointed by appointed by TRANS-AFRICA PROJECTS to manage the environmental process for the proposed Spoornet Coalink Upgrade Project. The project consists of the upgrade of existing infrastructure and three new transmission sub-stations, in order to increase the supply of electricity for new locomotives that Spoornet have ordered to add to the export capacity of coal. The proposed project crosses provincial borders starting in Empangeni (Natal) and extends across Newcastle to Ermelo (Mpumalanga)
- Appointed by uMhlathuze Municipality to undertake an EIA for the proposed Cygnus Electricity Substation project.
- Appointed by Eskom to undertake the scoping process (including the preparation of an EMP) for a substation and associated powerlines in Mtunzini
- Electricity Supply through Mhlanga Forest Estate Development EMP, KwaZulu-Natal, South Africa

CURRICULUM VITAE

Michelle Nevette

Renewable energy projects

- Koup 1 and 2 Wind Energy Facilities and associated infrastructure – Appointed by Genesis EcoEnergy (Pty) Ltd to undertake the BA processes for the renewable wind energy facilities associated infrastructure.
- Beaufort West Wind Energy Facilities and associated infrastructure – Appointed by South Africa Mainstream Renewable Power Developments to undertake BA processes for the renewable wind energy facilities associated infrastructure.
- Ceres Wind Energy Facilities and associated infrastructure – Appointed by South Africa Mainstream Renewable Power Developments to undertake BA processes for the renewable wind energy facilities and associated infrastructure.
- Skilpad 1, 2 and 3 Solar PV Energy Facilities – Appointed by ABO Wind Renewable Energies (Pty) Ltd to undertake the BA processes for three Solar PV Facilities.
- EA Amendment Processes for six (6) renewable energy facilities in the Northern Cape – Appointed by South Africa Mainstream Renewable Power Developments.

Pipelines

- Sezela Marine Outfall Pipeline, Scoping Report & Environmental Management Plan, KZN
- Petronet Re-Routing of existing DJP Pipeline around Pietermaritzburg EIA Scoping Report & Environmental Management Plan, KwaZulu-Natal

Cemeteries

- Basic Assessment & EMPr for the proposed Dannhauser Cemetery, Dannhauser

WATER USE LICENSES

- Cato Ridge Pilot Intermodal Project in Cato Ridge (Zone 1), KwaZulu-Natal. Appointed by the Cato Ridge Logistics Hub Consortium (Pty) Ltd. Compilation and Submission of Water Use License.
- Mandela Crossroads Water Use License. eThekweni Municipality. Compilation and Submission of Water Use license.
- Bridge City Depot Water Use License. eThekweni Municipality. Compilation and Submission of Water Use license.
- Zamani 1B Phase B1 and B2 Water use License. eThekweni Municipality. Compilation and Submission of Water Use license.

AMENDMENT APPLICATIONS

- Amendment of the Renishaw Mixed Use Development Environmental Authorisation, Phase 3
 - Amendment of the environmental authorisation for the Engen Galleria Petrol Filling Station
 - Mandela Crossroads Development – Appointed by eThekweni Municipality to amend the Environmental Authorisation to include an amended layout.
 - Northern Aqueduct Augmentation Pipeline – Appointed by Aurecon Consulting Engineers to amend the Environmental Authorisation for changes in the pipeline alignment from Ntuzuma to Ogunjini.
 - Bridge City Depot – Appointed by the eThekweni Municipality to amend the Environmental Authorisation to extend the footprint of the development and apply for construction within wetland buffers.
 - Zamani Low Cost Housing Development – Appointed by the eThekweni Municipality Housing Department to amend/extend the validity of the Environmental Authorisation
 - Mandela Crossroads Development – Appointed by eThekweni Municipality to amend the Environmental Authorisation to exclude certain parties from a condition of the EA.
 - Integrated Rapid Public Transport Network (IRPTN) C3B – Appointed by eThekweni Transport Authority to amend the Environmental Authorisation to include a deviation in the transport route as well as to add an additional depot site to the authorisation.
-

CURRICULUM VITAE

Michelle Nevette

Courses Attended

- 2021: Project Management Course
- 2018: ISO 14001:2015 Introduction and Implementation of an EMS
- 2018: Risk ZA
- 2017: Amendments to the EIA Regulations
- 2017: NEC 3 Course



Appendix C:

Complaints Record Sheet

Complaints Record Sheet

COMPLAINTS RECORD SHEET	File Ref:	DATE:
	Page of
COMPLAINT RAISED BY:		
CAPACITY OF COMPLAINANT:		
COMPLAINT RECORDED BY:		
COMPLAINT:		
PROPOSED REMEDIAL ACTION:		
EO: _____ Date: _____		
NOTES BY ECO:		
EO: _____ Date: _____ Site Manager: _____ Date: _____		



Appendix D:
Stormwater Management Plan



POFADDER WIND FACILITY 3 (PTY) LTD

POFADDER WIND ENERGY FACILITY 3

Transportation Study

Issue Date: 27th July 2022
Revision No: 2
Project No: 16876
Document No: TS_P3

Date:	27 th July 2022	
Document Title:	Pofadder Wind Energy Facility 3	
	Transportation Study	
Revision Number:	1	
Author:	Merchandt Le Maitre (Pr. Tech Eng.)	
Signature:	Pr. N°: 2018300094	Date: 27 th July 2022
Reviewed:	Richard Hirst (Pr Tech Eng.)	
Signature:	Pr. N°: 2018300110	Date: 27 th July 2022
For:	POFADDER WIND FACILITY 3 (PTY) LTD	
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EXECUTIVE SUMMARY

Objective

Pofadder Wind Facility 3 (Pty) Ltd proposes constructing and operating the Pofadder Wind Energy Facility (WEF) 3 and associated grid infrastructure ±35 km south-east of Pofadder in the Northern Cape Province. The proposed facility will have a contracted generating capacity of up to 248 MW. The overall objective is to generate electricity through renewable energy technology, capturing wind energy to feed into the national grid.

The proposed Pofadder WEF 3 forms part of a cluster development with two additional developments adjacent to this facility as separate EIA applications: - Pofadder Wind Energy Facility 1 and Pofadder Wind Energy Facility 2. Although this report only focuses on the Pofadder WEF 3, all three developments are considered for this study as they share common boundaries and access points from Road DR2986.

The main objective of the 'Transportation Study' is to determine the impact/s of the proposed development on the immediate and greater area concerning transportation. The assessment will comprise a site assessment and include preliminary transportation-related matters arising during the construction phase, through the operation & maintenance phase, up to and including the decommissioning phase of the development. The assessment of these phases will take into account the transportation of normal and abnormal vehicles, which are made up of, among other things; - WEF components, construction materials, equipment, construction workers and employees.

Key Findings

We don't foresee any major risks concerning the proposed development and therefore include our recommendations in the report to take note of before and during the detailed design and construction stages. It should, however, be noted that several recommendations were highlighted and therefore stated as important.

The development is located in close proximity to an existing road network. Several new access points are proposed along Road DR2986 to accommodate the adjusted land use and obtain the recommended sight distances of 250m between the chosen access positions. Pofadder WEF 3 obtains access through Pofadder WEF 1 and Pofadder WEF 2. Approval and a wayleave application will be required from the Northern Cape Department of Public Works & Roads (NCdr&pw) before work commences.

The construction phase for this development will typically generate the highest number of additional vehicles. However, it will be temporary, and impacts are considered nominal.

Several mitigation measures are proposed to accommodate the development and reduce the impact on the surrounding road network.

Recommendation

Concerning this report, associated assessment and the findings made within, it is SiVEST's opinion that the Pofadder WEF 3 will have a nominal impact on the existing traffic network. The project is therefore deemed acceptable from a transportation perspective, provided the recommendations and mitigation measures in this report are implemented. Hence, Environmental Authorisation (EA) should be granted for the EIA application.

DECLARATION BY SPECIALIST

I, MERCHANDT LE MAITRE, declare that –

- I act as the independent specialist in this application;
- I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant;
- I declare that there are no circumstances that may compromise my objectivity in performing such work;
- I have expertise in conducting the specialist report relevant to this application, including knowledge of the Act, Regulations and any guidelines that have relevance to the proposed activity;
- I will comply with the Act, Regulations and all other applicable legislation;
- I have no, and will not engage in, conflicting interests in the undertaking of the activity;
- I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing - any decision to be taken with respect to the application by the competent authority; and - the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority;
- all the particulars furnished by me in this form are true and correct; and
- I realise that a false declaration is an offence in terms of regulation 48 and is punishable in terms of section 24F of the Act.

Signature of Specialist:

Name of Company: SiVEST SA (PTY) Ltd

Date: 27th July 2022

NATIONAL ENVIRONMENTAL MANAGEMENT ACT, 1998 (ACT NO. 107 OF 1998) AND ENVIRONMENTAL IMPACT REGULATIONS, 2014 (AS AMENDED) - REQUIREMENTS FOR SPECIALIST REPORTS (APPENDIX 6)

Regulation GNR 326 of 4 December 2014, as amended 7 April 2017, Appendix 6	Section of Report
1. (1) A specialist report prepared in terms of these Regulations must contain- a) details of- i. the specialist who prepared the report; and ii. the expertise of that specialist to compile a specialist report including a curriculum vitae;	Refer to Section 4 and Appendix A
b) a declaration that the specialist is independent in a form as may be specified by the competent authority;	Refer above
c) an indication of the scope of, and the purpose for which, the report was prepared;	Refer to Section 3
(cA) an indication of the quality and age of base data used for the specialist report;	Refer to Section 7.1
(cB) a description of existing impacts on the site, cumulative impacts of the proposed development and levels of acceptable change;	Refer to Section 10 Refer to Section 11
d) the date and season of the site investigation and the relevance of the season to the outcome of the assessment;	Refer to Section 3
e) a description of the methodology adopted in preparing the report or carrying out the specialised process inclusive of equipment and modelling used;	Refer to Section 3
f) details of an assessment of the specifically identified sensitivity of the site related to the proposed activity or activities and its associated structures and infrastructure, inclusive of a site plan identifying site alternatives;	Refer to Section 12
g) an identification of any areas to be avoided, including buffers;	N/A
h) a map superimposing the activity including the associated structures and infrastructure on the environmental sensitivities of the site including areas to be avoided, including buffers;	Refer to Figure 11:1
i) a description of any assumptions made and any uncertainties or gaps in knowledge;	Refer to Section 5
j) a description of the findings and potential implications of such findings on the impact of the proposed activity, (including identified alternatives on the environment) or activities;	Refer to Section 7 Refer to Section 13
k) any mitigation measures for inclusion in the EMPr;	Refer to Section 10
l) any conditions for inclusion in the environmental authorisation;	Refer to Section 10
m) any monitoring requirements for inclusion in the EMPr or environmental authorisation;	Refer to Section 10
n) a reasoned opinion- i. (as to) whether the proposed activity, activities or portions thereof should be authorised; (iA) regarding the acceptability of the proposed activity or activities; and ii. if the opinion is that the proposed activity, activities or portions thereof should be authorised, any avoidance,	Refer to Section 13

management and mitigation measures that should be included in the EMPr, and where applicable, the closure plan;	
o) a description of any consultation process that was undertaken during the course of preparing the specialist report;	N/A
p) a summary and copies of any comments received during any consultation process and where applicable all responses thereto; and	N/A
q) any other information requested by the competent authority.	N/A
2) Where a government notice gazetted by the Minister provides for any protocol or minimum information requirement to be applied to a specialist report, the requirements as indicated in such notice will apply.	N/A

POFADDER WIND FACILITY 3 (PTY) LTD

POFADDER WIND ENERGY FACILITY 3

TRANSPORTATION STUDY

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1. INTRODUCTION

SiVEST Civil Engineering Division has been appointed by the Pofadder Wind Facility 3 (Pty) Ltd. (hereafter referred to as "Pofadder 3" or "Pofadder WEF 3") to complete a Transportation Study for the proposed Pofadder WEF 3 and associated grid infrastructure (hereafter refer to as the "proposed facility / facilities"). The facility is situated ± 35 km south-east of Pofadder within the Kai !Garib Local Municipality and the Z F Mgcawu District Municipality in the Northern Cape Province.

The proposed facility and associated grid infrastructure between Springbok and Upington will not be located within a Renewable Energy Development Zones (REDZ).

The proposed Pofadder WEF 3 forms part of cluster development with two additional developments adjacent to this facility as separate EIA applications: - Pofadder Wind Energy Facility 1 and Pofadder Wind Energy Facility 2. Although this report only focuses on the Pofadder WEF 3, all three developments are considered for this study as they share common access points from Road DR2986 through Pofadder WEF 1 and Pofadder WEF 2.

2. WIND ENERGY FACILITY COMPONENTS

The WEF will consist of the following:

2.1 WEF Components

At this stage, the proposed Pofadder 3 WEF will comprise up to thirty-one (31) wind turbines with a maximum total energy generation capacity of up to approximately 248 MW. In summary, the proposed Pofadder WEF 3 development will include the following components:

- Up to 31 wind turbines, each with a maximum of 8 MW output per turbine, with a maximum export capacity of approximately 248 MW. This will be subject to allowable limits in terms of the Renewable Energy Independent Power Producer Procurement Programme (REIPPPP).
- Each wind turbine will have a maximum hub height and a rotor diameter of up to approximately 200 m;
- Concrete turbine foundations and turbine hardstands;
- Each turbine will have a circular foundation with a diameter of up to 32 m. The turbine foundation will be placed alongside the 45 m wide hardstand, resulting in an area of about 45 m x 32 m that will be permanently disturbed for the foundation. The combined permanent footprint for the turbines will be approximately 4.2 ha.
- Each turbine will have a crane hardstand of approximately 70 m x 45 m. The permanent footprint for turbine crane hardstands will be ± 9 ha.
- Each turbine will have a blade hardstand of approximately 80 m x 45 m (3 600 m²). The combined permanent footprint for blade hardstands will be ± 10.8 ha.
- One (1) new 33/132 kV on-site substation occupies an area of approximately 1.6 ha.
- The wind turbines will be connected to the proposed on-site substation via medium voltage (33 kV) underground cables, mainly running alongside the access roads. Where burying of cables is not possible due to technical, geological, environmental or topographical constraints, cables will be overhead via 33 kV monopoles.
- The main access road will be between 8 – 12 m wide (to allow vehicles to pass).
- Internal roads with a width of 6 – 8 m will provide access to each wind turbine. Existing farm roads will be upgraded and used wherever possible, although new site roads will be constructed where necessary.

- A 12 m wide corridor may be temporarily impacted during construction and rehabilitated to a 6 m wide corridor after construction. The internal gravel roads will have a 6 – 8 m wide surface and a 12 m wide road clearance during construction. Additional space might be required for cut and fill, side drains and other stormwater control measures, turning areas and vertical and horizontal turning radii to ensure the safe delivery of the turbine components.
- Pofadder WEF 3 will have a total road network of approximately 48 km.
- One (1) construction laydown / staging area of up to approximately 7 ha (to be rehabilitated following construction). It should be noted that no on-site labour camps will be required to house workers overnight as all workers will be accommodated in the nearby towns and transported daily to the site (by bus);
- The gatehouse and security house will occupy an area of up to 0.5 ha.
- One (1) permanent Operation and Maintenance (O&M) building (including offices, warehouses, workshops, canteen, visitors centre and staff lockers) occupying an area of up to 1 ha;
- The temporary establishment of a site camp and concrete batching plant occupying an area of up to 1.6 ha.
- Galvanised palisade fencing to be used at the substations with the maximum height of the fencing to be up to 3.5 m;
- Water will be sourced from either the Local Municipality, supplied from a private contractor and trucked in, from existing boreholes within the application site or from a new borehole if none of these options are available.

2.2 Grid Connection Components

In order to evacuate the energy generated by the WEF's to supplement the national grid, Pofadder Grid (Pty) Ltd is proposing two grid connection alternatives which will be assessed in a separate Integrated Grid Basic Assessment Reports (BAR).

3. OBJECTIVES AND SCOPE OF WORK

The main objective of the 'Transportation Study' is to determine the impact/s of the proposed development on the immediate and greater area concerning transportation. The assessment will comprise a site assessment and include preliminary transportation-related matters arising during the construction phase, through the operation and maintenance phase, up to and including the decommissioning phase of the development. The assessment of these phases will take into account the transportation of normal and abnormal vehicles, which are made up of, among others; - WEF components, construction materials, equipment, construction workers and employees.

The scope of work consisted of the following:

- a) A site investigation (completed on the 15th July 2022).
- b) Consultations with the relevant authorities and / or stakeholders include collecting traffic data and information.
- c) Desktop analysis of traffic data and information from the various authorities and / or stakeholders. The analysis includes the evaluation of the road network's capacity (if required).
- d) Evaluate the impact of the proposed development on the existing road network / traffic volumes and populate a suitable 'Impact Rating System'.
- e) Determine specific traffic needs during the different phases of implementation.

- f) Conclude and propose possible mitigation measures.
- g) Identify the position and suitability of the preferred access road alternatives.
- h) Confirm the required clearances for the necessary equipment to be transported from the point of delivery to the various sites.
- i) Confirm freight and transport requirements during construction, operation and maintenance period.
- j) Propose origins and destinations of equipment.
- k) Determine Abnormal load requirements (if any).
- l) Seasonal impacts do not affect the assessment.

3.1 Legal Requirement & Guidelines

Key legal requirements and guidelines for the proposed facilities are as follows:

- o Government Notice 509 (GN509), as published in Government Gazette 40229 of 2016 and refers to the National Water Act, 1998 (Act No. 36 of 1998)
- o National Environmental Management Act, 1998 (Act No 107 of 1998) (NEMA)
- o National Water Act, 1998 (Act No 36 of 1998) (NWA)
- o Road Safety Act (Act No 93 of 1996)
- o National Road Traffic Regulations, 2000

4. SPECIALIST CREDENTIALS

Merchandts Le Maitre from SiVEST Consulting Engineers compiled this Transportation Study. He has a B Tech (Baccalaureus Technologiae) in Civil Engineering with over 17 years of experience, with 12 years in renewable energy. His extensive experience in the different facets of Civil Engineering means he can advise clients in the renewable energy sector in; geotechnical engineering, topographical studies, stormwater management, water demand, transportation studies, access / layout designs and glint & glare assessments. A full Curriculum Vitae is included in 'Appendix A.'

Table 4.1 Specialist Credentials & Experience

Company	SiVEST (Pty) Ltd
Contact Details	merchandtm@sivest.co.za
Qualifications	B Tech (Baccalaureus Technologiae) in Civil Engineering
Professional Registrations & Memberships	<ul style="list-style-type: none"> • Pr. Tech Eng – Engineering Council of South Africa • MSAICE – Member of South African Institute of Civil Engineers • SAWEA – South African Wind Energy Association
Expertise to carry out the Transportation Study	<ul style="list-style-type: none"> • Tooverberg WEF • Umsobomvu PV • Droogfontein 3 PV • Mierdam PV • Dwarsrug PV • Platsjambok West PV

	<ul style="list-style-type: none"> • Platsjambok East PV • Loeriesfontein 3 PV • Koeris BESS • Koup 1 & 2 WEF • Beaufort West WEF • Lephalale Solar Project
--	---

5. ASSUMPTIONS AND LIMITATIONS

The following assumptions and limitations are to be noted:

- The analysis is based on the information provided at the time by Pofadder Wind Facility 3 (Pty) Ltd and its representatives.
- Digital Terrain Model: 25 m DEM from NGI (2014) & 2 m DEM from GeoSmart (2016:2919BA, 2919BB, 2919BC & 2919BD)
- Technical Specifications for the Facility are:

Table 5.1 Technical Specification for Pofadder WEF 3

Technical Component	Dimensions
Number of Turbines	Maximum of 31
Capacity	≤ 248 MW _{ac}
Hub Height	≤ 200m
Rotor Diameter	≤ 200m
Construction Period (assumed)	± 24 – 30 months (TBC)
Expected Lifespan	20 - 25 years (TBC)
Road Width	Up to 8 m
Length of Internal Roads	±48 km

- Traffic Station Data / Counts and trip generation calculations are for one direction only and do not include return trips unless indicated.
- Peak Hour Trip Generations:
 - Weekday AM peak hour - 07:00 to 08:00
 - Weekday Midday peak hour - 11:00 to 14:00
 - Weekday PM peak hour - 16:00 to 17:00
- Traffic Station Data / Counts and trip generation calculations are for one direction only and do not include return trips unless indicated.
- This assessment is limited to the impact of the development traffic on the network, not the wider impacts known as background traffic. Such impacts can only be addressed in a detailed Traffic Impact Study, which considers actual traffic counts undertaken during peak periods.
- The information provided in this report is an informed estimate. However, construction-related traffic may vary and differ from the information provided during construction phases because of supplier delivery schedule changes.
- Some of the figures provided are indicative as many of the components are still at the design stage and will only be confirmed closer to the construction time.

6. PROJECT DESCRIPTION

6.1 Locality

Pofadder WEF 3 and associated infrastructure is located ± 35 km south-east of Pofadder in the Northern Cape Province. The facility is ± 22 km from Road R358 regional road (P0736) on Road P2986 and 29 km from the N14 Freeway between Springbok and Upington in the Kai !Garib Local Municipality and the Z F Mgcawu District Municipality as indicated in **Figure 6:1**.

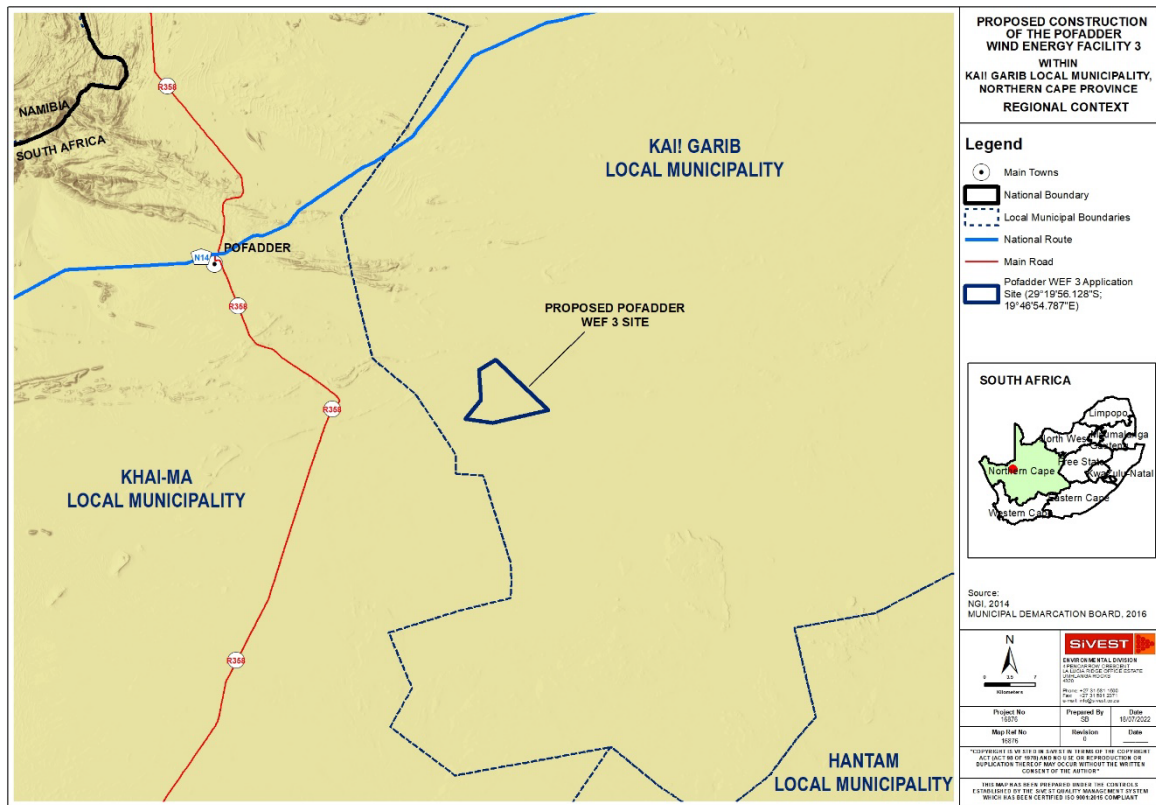


Figure 6.1 Pofadder WEF 3 - Regional Context

The closest urban nodes to the Pofadder WEF are:

Table 6.1 Distance to Urban Nodes

Urban Nodes	Distance	Estimated Travel Time
Pofadder	± 51 km	40min
Kakamas	± 183 km	1hr 55min
Brandvlei	± 196 km	2hr 12min
Kenhardt	± 153 km	1hr 54min
Kliprand	± 191 km	2hr 15min

* Distance and Travel times according to Google Maps

The WEF will be located on the following properties (Refer to **Figure 6:2**):

- Remaining Extent of the Farm Ganna-Poort No. 202

- Remaining Extent of the Farm Lovedale No. 201
- Portion 3 of the Farm Sand-Gat No. 150

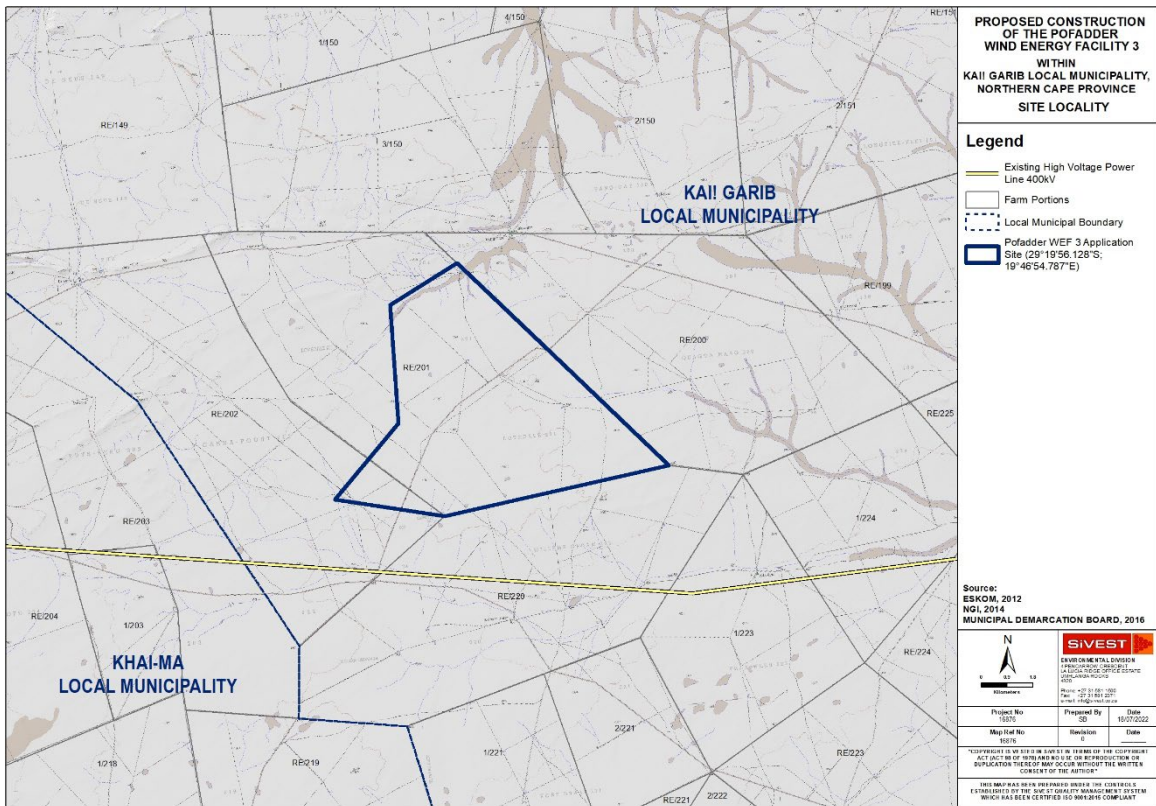


Figure 6.2 Pofadder WEF 3 - Site Locality

7. TRANSPORTATION

Road DR2986 bisects the Pofadder WEF 1 development with existing and new access positions linking the proposed development to the surrounding road network. An internal road network will then provide access to Pofadder WEF 3 through Pofadder WEF 2. The future development and adjusted land use will require access upgrades and / or new access positions to accommodate the proposed development.

Road DR2986 is a District Road and falls under the jurisdiction of the Northern Cape Department of Roads & Public Works (NCdr&pw).

The site, respective access points and internal layouts will be discussed in more detail in the sections below. It should be noted that this report only focuses on Pofadder WEF 3 development; however, all three developments will be considered and analysed as a combined assessment as they share common access points from Road DR2986.

7.1 Existing Road Network

The existing road network surrounding the proposed development is well established and provides a high degree of mobility and access. The mobility roads join the major centres and towns with each other, while access roads provide access roads to serve smaller nodes and individual properties.

The Northern Cape is the largest province in South Africa, covering 31% of the country's surface area in a semi-desert climate. However, the Northern Cape only has 2.2% of the country's population, resulting in the province with a low population density and low vehicle ownership. The existing road

networks are predominantly mobility roads; in most cases, the arterials and collector roads are gravel roads. The gravel roads are generally in a fair to good condition as the low rainfall in the semi-desert climate requires less maintenance. This development is located ± 51 km from the N14 Freeway through Pofadder; ± 50 km of this section is a gravel surface.

Roads which impact this development have been summarised in **Table 7.1** below and indicated in **Figure 6.2** above.

Table 7.1 Existing Road Network

Route	Surface	RCAM Class	Section	Jurisdiction
N014	Asphalt	R1	Springbok - Kakamas	SANRAL
MR0736 (R358)	Gravel	R4	Pofadder - Bitterfontein	NCdr&pw
DR2986	Gravel	R4	Bakerville - Kenhardt	NCdr&pw

7.2 Existing Traffic Conditions

Existing traffic data for Road N007 and N014 was obtained from the SANRAL and indicate the highest vehicles per hour (vph) rates for routes surrounding the development. The figures noted in the tables below are well below the capacity of a typical two-lane two-roads of 2500 vph.

Table 7.2 Traffic Counts on N014 Freeway

Route	Site ID	Distance (Km)	Location	Traffic Stream (TS) to		Lanes	Light Vehicles	Heavy Vehicles (ADTT)	Total Vehicles (ADT)	Highest Vol (Time of Day)	
				TS1	TS2					TS1	TS2
N014 (01)	205	2.50	Springbok	Pofadder	Springbok	2	1510	170	1680	176 (18:00)	162 (18:00)
N014 (02)	19322	160.30	Pofadder	Pofadder	Springbok	2	885	166	1051	80 (18:00)	77 (07:00)
N014 (02)	19321	120.00	Upington & Pofadder	Upington	Pofadder	2	676	143	818	59 (14:00)	55 (16:00)

Table 7.3 Traffic Counts on N007 Freeway

Route (Section)	Site ID	Distance (Km)	Location	Traffic Stream (TS) to		Lanes	Light Vehicles	Heavy Vehicles (ADTT)	Total Vehicles (ADT)	Highest Vol (Time of Day)	
				TS1	TS2					TS1	TS2
N007 (07)	209	101.00	Sprinkbok	Springbok	Cape Town	2	857	275	1132	101 (12:00)	130 (12:00)
N007 (06)	18010	4.70	WC Border	WC Border	Cape Town	2	522	249	771	55 (17:00)	50 (17:00)
N007 (06)	18009	3.70	WC Border	T/O Pofadder	Bitterfontein	2	559	255	814	60 (17:00)	51 (17:00)
N007 (05)	18008	79.40	Nuwerus & Bitterfontein	Bitterfontein	Nuwerus	2	638	260	898	58 (17:00)	55 (17:00)
N007 (05)	18008	8.00	Vanrhynsdorp & Nuwerus	Springbok	Vanrhynsdorp	2	759	276	1035	120 (14:00)	147 (14:00)
N007 (04)	208	64.20	Clanwilliam & Vanrhynsdorp	Vanrhynsdorp	Clanwilliam	2	989	414	1403	92 (16:00)	82 (15:00)
N007 (04)	18079	21.40	Clanwilliam & R363	Vanrhynsdorp	Clanwilliam	2	1614	726	2340	144 (17:00)	153 (13:00)
N007 (03)	5015	76.00	Citrusdal & Clanwilliam	Clanwilliam	Citrusdal	2	2640	793	3433	410 (17:00)	523 (14:00)

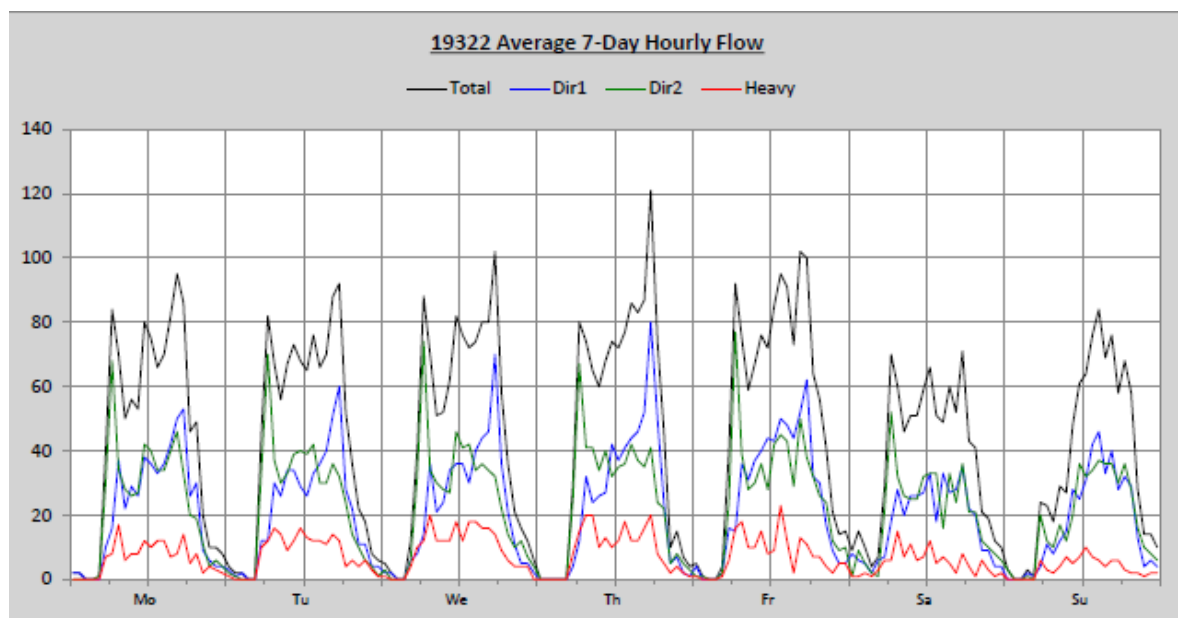
Route (Section)	Site ID	Distance (Km)	Location	Traffic Stream (TS) to		Lanes	Light Vehicles	Heavy Vehicles (ADTT)	Total Vehicles (ADT)	Highest Vol (Time of Day)	
				TS1	TS2					TS1	TS2
N007 (03)	18078	60.20	Poterville & Eendekuil	Citrusdal	Piketberg	2	2859	791	3650	269 (17:00)	292 (16:00)
N007 (03)	18077	42.20	Piketberg & Poterville	Citrusdal	Piketberg	2	2602	742	3344	241 (17:00)	265 (17:00)
N007 (03)	18078	30.40	Mooreesburg & Piketberg	Springbok	Cape Town	2	3473	947	4420	538 (17:00)	607 (15:00)

The closest counting station to the proposed development, where the most significant impact will occur, is Molino (Station No. 19322) to the west of Pofadder. Additional information on the station is included below in **Table 7.4**.

Table 7.4 Traffic Data Summary – Station No. 19322

	Light Vehicles	Heavy Vehicles	Total Vehicles	Directional Split (East : West)
N01401E Km 160.30 Station No: Temporary Date: 2019/08/11 – 2019/08/22				
Morning 7:00-8:00	76	12	88	16.5 : 83.5
Afternoon 16:00-17:00	88	14	102	68.5 : 31.5
Average Annual Daily Trips	885	166	1051	48.4 : 51.6

Station Count Chart



Based on the table above, it can be concluded that the existing peak traffic on this section of road is in the morning (AM) and afternoon (PM). Therefore, it is recommended that the transportation of labour and the delivery of material and abnormal loads be completed in the off-peak periods.

7.3 Additional Traffic Generation

The construction / BOP phase will typically generate the highest number of trips for the proposed facility. Construction will typically involve access roads, foundations, Wind Turbine Generators (WTG), electrical cables / transformers / switch gears / substations / BESS installations and the delivery of these materials / equipment / abnormal loads on the public road network.

It is assumed that no staff or labour will reside on the construction site, other than security, and therefore all will reside in the town Pofadder or nearby hostels.

7.3.1 Construction Phase

Calculations and experience from previous WEF developments confirm the construction phase will generate the greatest additional traffic to the surrounding road network. The impact will be on the surrounding road network, increasing dust generation, noise, and road maintenance.

Referring to **Table 7.5** below, the civil construction period for WEF developments with steel towers (hybrid towers in brackets) typically takes place between 2 – 16 months on a development of this size. This development of ± 5 100 ha will generate a maximum of ± 84 (103) additional vehicle trips per day on the surrounding road network (external). Of these vehicle trips, ± 74 (86) vehicle trips will occur at the peak of the construction phase transporting staff and labour. Typically, these trips will be in the morning between 6:00 – 7:00 and the afternoons between 17:00 – 18:00. These trips will occur before and after the 'morning' & 'afternoon' peak periods, respectively.

The deliver of construction material and abnormal loads will equate to ± 11 (15) vehicle trips and will occur during the 'weekday midday' period. The abnormal loads, however, only account for three (2) trips per day of the construction phase and is elaborated further in **Section 7.3.1.1** below. Assuming a 9 hr workday, the ± 11 (15) vehicles during the 'weekday midday' period will equate to ± 2 (2) vehicle trips / hour.

The resultant impact of this development on the surrounding road network during the construction period for both steel and hybrid tower methods are seen as minimal.

The specific traffic needs for this phase of the development.

- Reduction in vehicle speed
- Reduction in dust generation
- Adequate law enforcement
- Appropriate, timely and high-quality maintenance of roads
- Implementation of pedestrian safety initiatives
- Regular maintenance of farm fences and access cattle grids
- Continuous engagement with the Northern Cape Department of Public Works & Roads (NCdr&pw).

Table 7.5 Typical Trip Generation Sheet for 31 WTG's

		Month																							
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
Construction Phase																									
1	Balance of Plant Construction																								
1.1	Civil Balance of Plant																								
1.1.1	- Site Establishment	1																		1				1	
1.1.2	- Transport - Skilled		19	21	22	22	22	22	22	21	19	18	16	14	12	10	8	7	6	4	3	3	2	2	2
1.1.3	- Transport - Semi Skilled			12	12	13	13	13	13	13	12	12	11	10	8	7	6	5	4	3	3	2	2	1	
1.1.4	- Transport - Unskilled			3	3	3	4	4	4	4	4	4	4	4	4	4	3	3	3						
1.1.5	- Construction - Foundation (External)		2	2	2	2	2	3	3	3	3	3	3	3	3	2	2	2	2						
1.1.6	- Construction - Foundation (Local)		39	42	46	48	50	51	52	51	50	48	46	42	39	35	31	28	24						
1.1.7	- Construction - Road & Platform (External)		6	6	7	7	7	7	7	7	7	7	7	6	6	5	5	4	4						
1.1.8	- Construction - Road & Platform (Local)		6	7	7	7	8	8	8	8	8	7	7	7	6	6	5	4	4						
1.2	Electrical Balance of Plant																								
1.2.1	- Site Establishment			1																1				1	
1.2.2	- Transport - Skilled				12	13	14	14	14	14	14	13	12	11	10	9	8	7	5	4	4	3	2	2	
1.2.3	- Transport - Semi Skilled				10	11	11	11	11	11	11	11	10	9	8	7	6	5	4	4	3	2	2	2	
1.2.4	- Transport - Unskilled				2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	1	1			
1.2.5	- Construction - MV Collector																								
1.2.6	- Construction - Substation				1	1	1	1	1	1	1	1	1	1	1	1	1	1	1						
1.2.7	- Construction - HV Transmission																								
2	Wind Turbine Generator Assembly (Steel Towers)																								
2.1	Delivery - Bolt Cage			1																					
2.2	Delivery - WTG														3	3	3	3	3	3	3				
2.3	Site Establishment														1										1
2.4	Install / Assemble / Erect																								
2.4.1	- Transport - Skilled															18	20	21	22	22	22	22	21	20	18
2.4.2	- Transport - Semi Skilled																		21	22	22	22	22	21	
2.4.3	- Transport - Unskilled																		3	4	4	4	4	3	
	TOTAL	1	72	95	123	129	134	136	137	135	131	126	119	109	100	109	100	116	110	70	65	59	55	53	19
2	Wind Turbine Generator Assembly (Hybrid Towers)																								
2.1	Construction - Foundation (External)									4	4	4	4	4	4	4	4								
2.2	Construction - Foundation (Local)									1	5	6	7	7	7	7	6	5							
2.2.1	- Transport - Skilled									5	6	6	6	6	6	6	6	5							
2.2.2	- Transport - Semi Skilled									2	2	2	2	2	2	2	2	2							
2.2.3	- Transport - Unskilled									1	1	1	1	1	1	1	1	1							
2.3	Delivery - WTG															2	2	2	2	2	2				
2.4	Site Establishment													1											1
2.5	Install / Assemble / Erect																								
2.5.1	- Transport - Skilled														17	19	21	22	22	22	22	22	21	19	17
2.5.2	- Transport - Semi Skilled																22	22	22	22	22				
2.5.3	- Transport - Unskilled																4	4	4	4	4				
	TOTAL	1	72	94	123	129	134	136	137	135	144	144	138	130	136	127	146	137	122	69	64	33	29	28	18

7.3.1.1 Abnormal Loads

Abnormal loads are described as loads that, for all practical purposes, cannot be transported on a vehicle or vehicle without exceeding the limitations described in the 'National Road Traffic Regulations (2000)'.

These vehicles exceed the limitations as a result of one of the following.

- Dimension Abnormality
 - Length
 - Width
 - Height
 - Overhangs
 - Load Projections
 - Wheelbase
- Mass Abnormality

The delivery of WTG's in South Africa is primarily from two ports, Port of Saldanha and Ngqura. Both ports are uniquely positioned to accommodate the unique project cargo / abnormal loads of WTG's and are the only ports in South Africa that are not city-locked. The distance between the proposed facility and each port is indicated in **Table 7.6** below.

Table 7.6 Pofadder WEF – Port Distances

Port	Distance
Port of Saldanha	731 km
Port of Ngqura	1165 km

For this development, the transportation of abnormal loads for WTG's from their origin (ports) to the proposed facility has been assumed primarily from the Port of Saldanha. Examples of the transportation methods for the Steel Tower Sections (**Figure 7.1**), Hybrid Concrete Tower Sections (**Figure 7.2**) Nacelle (**Figure 7.3**), Rotor Hub (**Figure 7.4**), and Rotor Blade (**Figure 7.5**) is included below. The transportation of abnormal loads for electrical transformers is assumed to be from Gauteng.



Figure 7.1 Example of Steel Tower Sections Transport (Nooteboom)



Figure 7.2 Example of Hybrid Tower Sections (Nordex)



Figure 7.3 Example of Nacelle Transport (*Recharge News*)

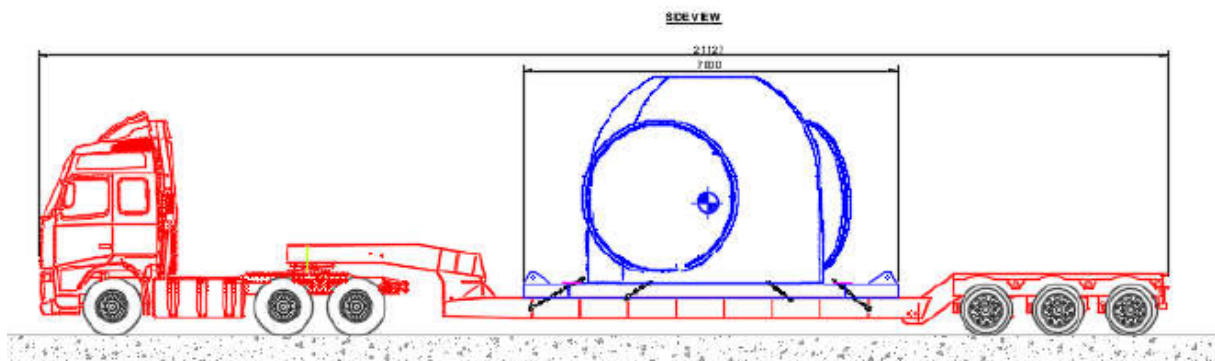


Figure 7.4 Example of Hub

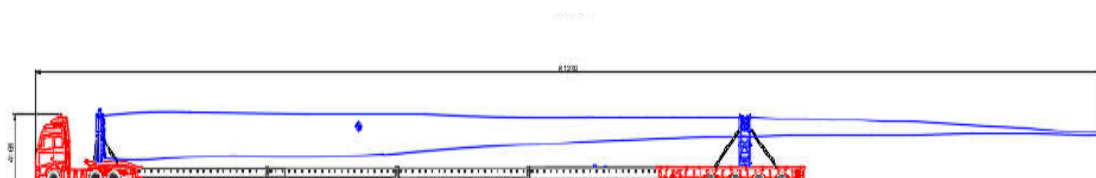


Figure 7.5 Example of Rotor Blades

The Geometric clearance requirements associated with these abnormal loads transporting the equipment types are shown in **Table 7.7**. However, it should be noted that the figures above and table below are indicative as many of the components are still at a design stage and will only be confirmed closer to the construction.

Table 7.7 Abnormal Load Dimensions

Description of Load	No. per WTG	Typical Dimensions (m)		
		Length	Width	Height
Tower Sections	8	<31	<4.5	<4.5
Nacelle	1	7	<4	3.8
Drive Train	1	6.6	3.5	3.3
Rotor Blades	3	95	4.4	3.9
Rotor Hub	1	4.8	4.4	4.0

Table 7.8 Abnormal Load Trips

Proposed WTG Delivery Schedule	Month (Period)			Origin
	1-14	15-20	21-24	
Tower Sections	0	3 (2)	0	Saldanha
Nacelle				Saldanha
Drive Train				Saldanha
Rotor Blades				Saldanha
Rotor Hub				Saldanha
Trips/Day for period	0	3 (2)	0	

* Please note the values above are estimates based on data currently available

Before any Abnormal Load conveying equipment is delivered to the facility, approval must be obtained through a permit from the Department of Transport (DoT). The permit application will be completed by specialists in the transportation of Abnormal loads and will conform to 'The Road Traffic Act, 1996 (Act No 93 of 1996)'. The application includes route clearances from Telkom and Eskom, after which the application is submitted to DoT. They, in turn, consult with the SANRAL and each Local Municipality and Provincial Authority travelling through before issuing a permit.

7.3.1.2 Permitting for Abnormal Loads– General Rules

The limits recommended in *TRH 11 - Guidelines for Granting of Exemption Permits for the Conveyance of Abnormal Loads and for other Events on Public Roads* are intended to serve as a guide to the Permit Issuing Authorities. It must be noted that each Administration has the right to refuse a permit application or modify the conditions under which a permit is granted. It is understood that:

- A permit is issued at the sole discretion of the Issuing Authority. The permit may be refused because of the condition of the road, the culverts and bridges, the nature of other traffic on the road, and abnormally heavy traffic during specific periods or for any other reason.
- A permit can be withdrawn if the vehicle is found unsuitable to be operated upon inspection.
- During specific periods, such as school holidays or long weekends, an embargo may be placed on the issuing of permits. Embargo lists are compiled annually and are obtainable from the Issuing Authorities.

7.3.1.3 Proposed Normal & Abnormal Load Routes

The transportation of Normal & Abnormal goods has been indicated in **Figure 7.6** below and will be primarily from the Port of Saldanha / Cape Town and Gauteng.



Figure 7.6 Normal & Abnormal Load Transport Route

An approved Abnormal Load route exists between the Port of Saldanha and the Springbok REDZ. The Pofadder WEF is, however, located ± 48 km east of the Springbok REDZ. Therefore, the abnormal load route following the N7 Freeway north and N14 Freeway east will extend past Aggeneys towards Pofadder and ultimately south on Road MR0736 (R358).

The approved abnormal load route leaves the Port of Saldanha on the R45 towards Moorreesburg via the R311. Leaving Moorreesburg will continue north on the N7 Freeway towards Springbok. Before the town of Springbok, take the Kokerboom Rd / N14 / R355 ramp east, and then after crossing over the freeway, turn north towards the N14 Freeway / Voortrekker St intersection. At the intersection, continue east on the N14 Freeway towards Pofadder.

Several routes through Pofadder from the N14 Freeway to Road MR0736 exist. The direct route through Pofadder on Voortrekker Rd can be used for a majority of the additional trips generated by the development. Abnormal Loads and, more specifically, the transportation of rotor blades will require more detailed analysis in this section. Based on our desktop assessments, rotor blades will be able to negotiate the intersection of Voortrekker & Springbok Rd, taking into account the existing memorial. Alternative routes have been indicated below in **Figure 7.7** with their possible shortcomings.

- Alternative A via Buitekant Street – An abnormal rotor blade load could have difficulty negotiating the intersection of the N14 and Buitekant St.
- Alternative B via Nuwe Street – An abnormal rotor blade load could have difficulty negotiating the intersection of the N14 and Nuwe St.

- Alternative C via old Springbok / Upington road – This road is currently decommissioned and will require additional approvals and possible road upgrades.

We recommend completing a more comprehensive route analysis before construction to understand better the works required and the potential risks.

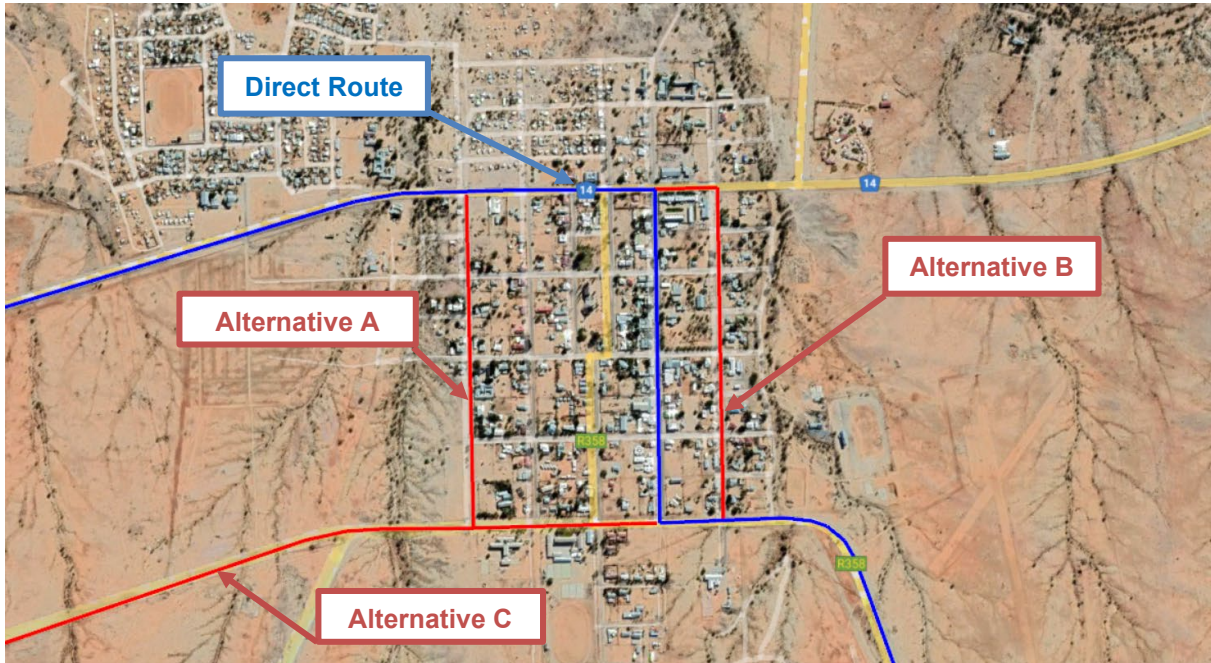


Figure 7.7 Pofadder Route Diversion

7.3.2 Operation & Maintenance Phase (O&M)

The Pofadder WEF 3 has been designed with a 20 – 25 year lifespan and could increase if financially viable. The O&M during the 20 – 25 year period will typically be in the form of a small general maintenance team during the O&M period. Any maintenance required, including a new transformer or switch gear, will be classified as an abnormal load, and the traffic generated by this will be negligible in the greater scheme of the development. The most significant contributor of traffic in this phase will therefore only comprise employees commuting to and from the site.

We assume a maximum number of ± 50 employees will be employed during the project's 20 – 25 year life span. Therefore, the assumption is that the employees will commute together; hence, a total of ± 25 additional trips will be added to the existing road network during the morning and afternoon. In addition to the staff, commuting will be the collection of waste and sanitation. These are assumed to generate an additional ± 2 vehicles / week onto the existing road network; therefore, the sum of this phase will have a low to negligible impact.

The specific traffic needs for this phase of the development.

- Reduction in vehicle speed.
- Reduction in dust generated.
- Adequate law enforcement.
- Appropriate, timely and high-quality maintenance of gravel roads.
- Implementation of pedestrian safety initiatives.

- Regular maintenance of farm fences and access cattle grids; and
- Continuous engagement with the Northern Cape Department of Public Works & Roads (NCdr&pw).

7.3.3 Decommissioning Phase

Decommissioning the Pofadder WEF 3 will generate fewer trips than the construction phase. It is estimated that the decommissioning phase will generate an additional ± 10 vehicles / day over a period of 12 – 14 months. The material removed will be transported back to Gauteng or the Western Cape for recycling. The impact of this phase will therefore be low.

The specific traffic needs for this phase of the development.

- Reduction in vehicle speed.
- Reduction in dust generated.
- Adequate law enforcement.
- Appropriate, timely and high-quality maintenance of gravel roads.
- Implementation of pedestrian safety initiatives.
- Regular maintenance of farm fences and access cattle grids; and
- Continuous engagement with the Northern Cape Department of Public Works & Roads (NCdr&pw).

7.4 External Access

The Pofadder WEF 3 forms part of two other developments, Pofadder WEF 1 and Pofadder WEF 2. All three developments share common access points from Road DR2986 in Pofadder WEF 1. Pofadder WEF 3 obtains access through Pofadder WEF 1 and Pofadder WEF 2. The development located on the Remaining Extent of Farm Ganna-Poort No. 202, Remaining Extent of Farm Lovedale No. 201 and Portion 3 of the Farm Sand-Gat No. 150 has existing farm access points from Road DR2986 with new access points proposed on Road DR2986.

These new access points are as follows:

Table 7.9 Pofadder WEF 3 - Proposed Access Positions

Access No.	Road No.	Position	Access Status	Location	
Access 1	DR2986	Km 153.99	New Gravel	29°17'13.40" S	19°37'48.95" E
Access 2	DR2986	Km 148.11	New Gravel	29°16'42.93" S	19°41'23.36" E
Access 3	DR2986	Km 146.82	New Gravel	29°16'40.92" S	19°42' 7.43" E
Access 4	DR2986	Km 142.80	New Gravel	29°16'40.81" S	19°44'37.86" E

The provincial road DR2986 is maintained under the auspices of the NCdr&pw and classified as a Class R4 in terms of the RCAM Classification – Collector Road with an average road reserve width of 42 m (in some cases 22 m) and a gravel road surface of 8.0 m wide and a 1 m wide gravel shoulder on both sides. The road has a design speed of 80 km/h.

The proposed access points are located along Road DR2986, with images of each point included below. The minimum required sight distance applicable to a road at 80 km/h is 250 m. Hence, the current sight distance of >350 m eastern and western approaches are achieved at all the proposed access locations.

Upgrades to the proposed access will be required, and approval will need to be obtained from the NCdr&pw.



Figure 7.8 Existing Road DR2986 @ Km 153.99 – West Approaching



Figure 7.9 Existing Road DR2986 @ Km 153.99 – Proposed Access (South Approaching)



Figure 7.10 Existing Road DR2986 @ Km 153.99 – West Approaching



Figure 7.11 Existing Road DR2986 @ Km 148.11 – East Approaching



Figure 7.12 Existing Road DR2986 @ Km 148.11 – Proposed Access (South Approaching)



Figure 7.13 Existing Road DR2986 @ Km 148.11 – Proposed Access (North Approaching)



Figure 7.14 Existing Road DR2986 @ Km 148.11 – West Approaching



Figure 7.15 Existing Road DR2986 @ Km 146.82 – West Approaching



Figure 7.16 Existing Road DR2986 @ Km 146.82 – Proposed Access (North Approaching)



Figure 7.17 Existing Road DR2986 @ Km 146.82 – East Approaching



Figure 7.18 Existing Road DR2986 @ Km 142.80 – East Approaching



Figure 7.19 Existing Road DR2986 @ Km 142.80 – Proposed Access (North Approaching)



Figure 7.20 Existing Road DR2986 @ Km 142.80 – Proposed Access (South Approaching)



Figure 7.21 Existing Road DR2986 @ Km 142.80 – West Approaching

7.5 External Road Upgrades

Most of the additional traffic generated from the Pofadder WEF and associated grid infrastructure can be accommodated on the existing road network and include both normal and abnormal vehicles with minor modifications.

Road MR0736 and DR2986 are in reasonably good condition, with minor areas requiring upgrading or remedial action. The majority of both roads require remedial action in the form of light blading and reshaping of side drains, and mitre drains.

In almost all cases, the vertical alignment of the sag curves through minor drainage lines will result in problem areas for Abnormal Loads. Abnormal Loads require a minimum vertical curve of 400 m with an arc length of 30 m. Some drainage lines have eroded the wearing course and base course of the gravel roads, and therefore we recommend these drainage lines be upgraded with suitable-sized culverts or concrete causeways. Refer **Figure 7.22** and **Figure 7.23** below.



Figure 7.22 Typical erosion in drainage lines on External Roads

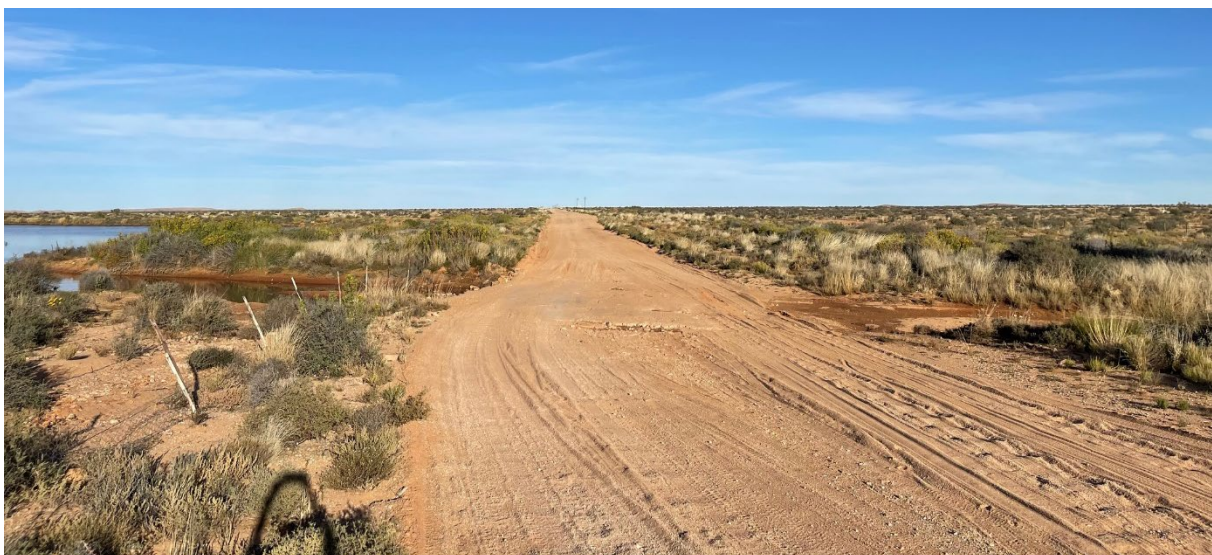


Figure 7.23 Typical drainage line requiring upgrades on External Roads

7.6 Design Considerations

Based on our recent discussions with the NCdr&pw, new Land Use applications must be sent to their departments for approval with the proposed new / upgraded access position. As part of the application, the expected traffic during construction and the O&M phase, available sight distances including photographs and the affected stormwater structures are to be included. The OEM's and the NCdr&pw minimum requirements will need to be considered during the design stage.

The access points from Road DR2986 fall within the jurisdiction of NCdr&pw; their standard access requirement is based on TRH 17, TRH 4 and TRH 26. An example of the Western Cape Department of Transport and Public Works – Typical Farm Access Detail is included in **Figure 7.24** and stormwater drainage in **Figure 7.25** below.

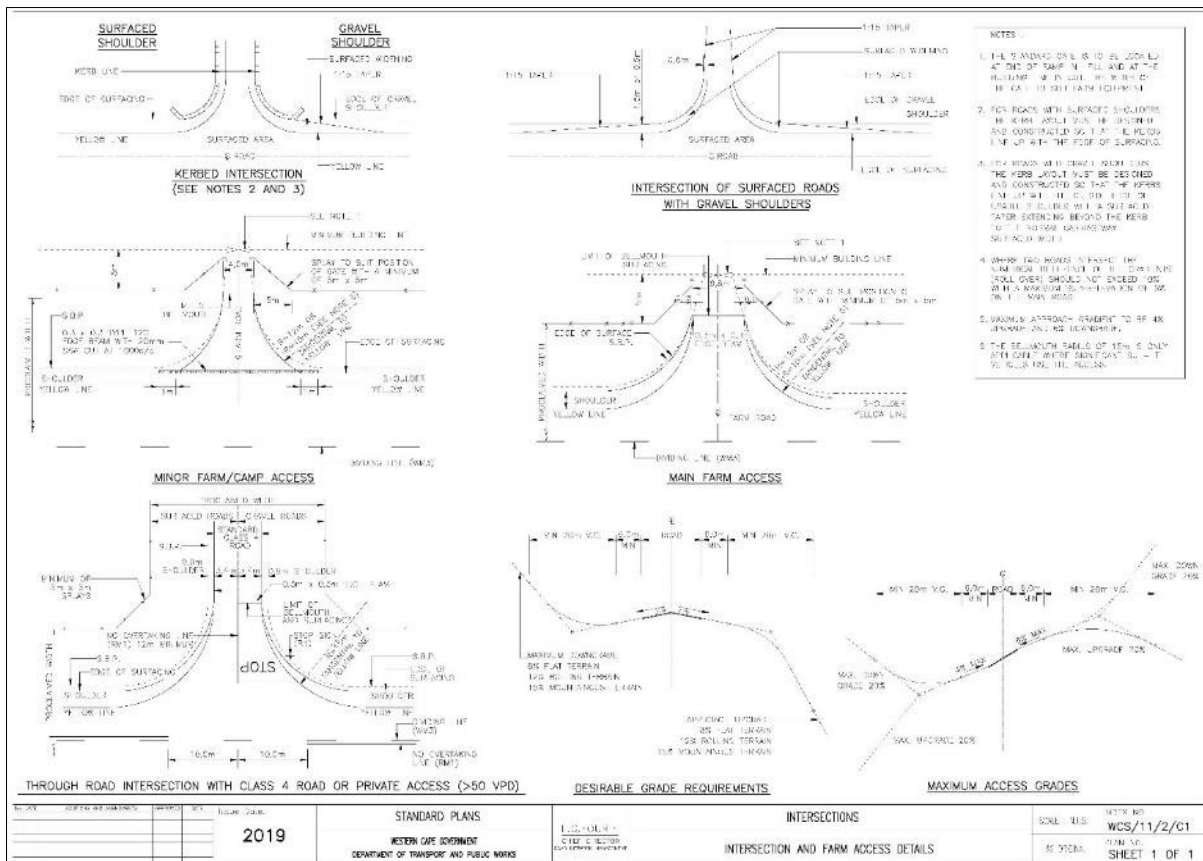


Figure 7.24 Typical Intersection and Farm Access Detail

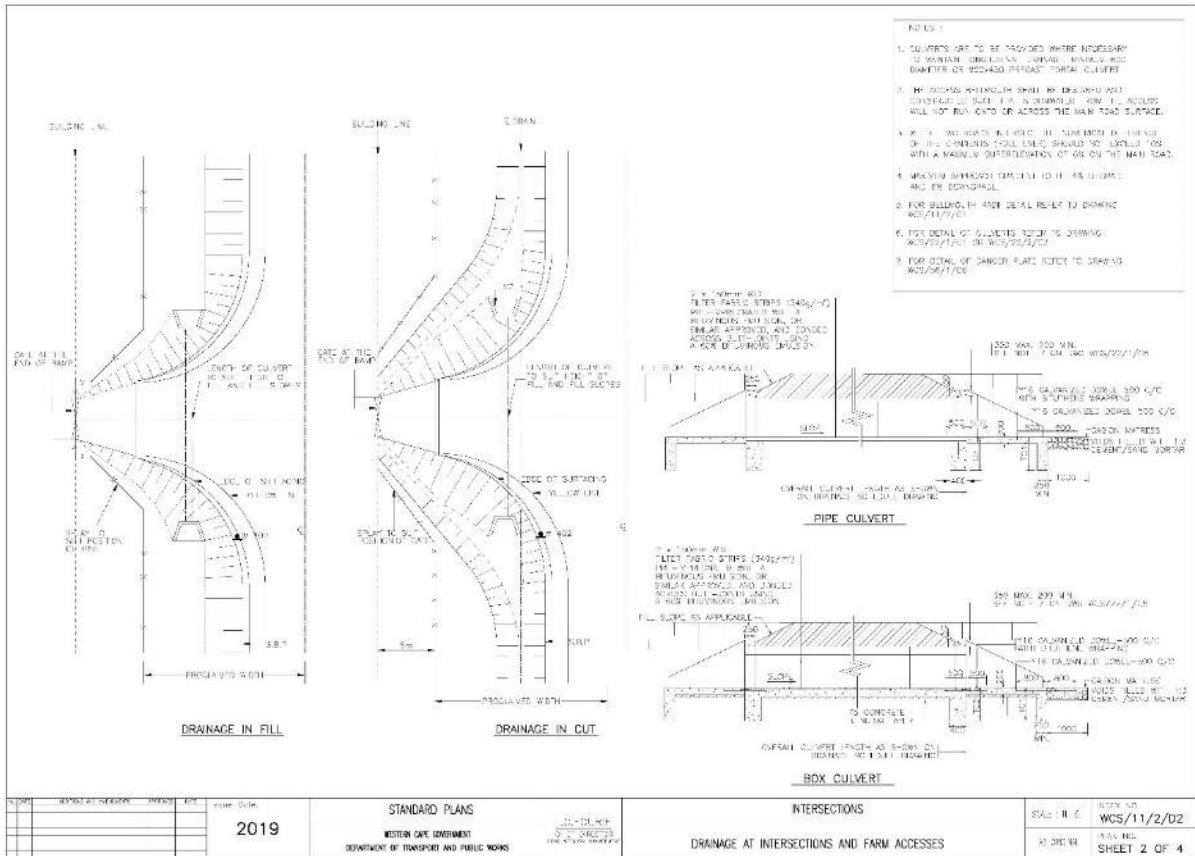


Figure 7.25 Typical Drainage at Farm Access / Intersections

Typical cross-sections for gravel roads have been indicated in **Figure 7.26** below and need to take into account the minimum requirements from OEM's.

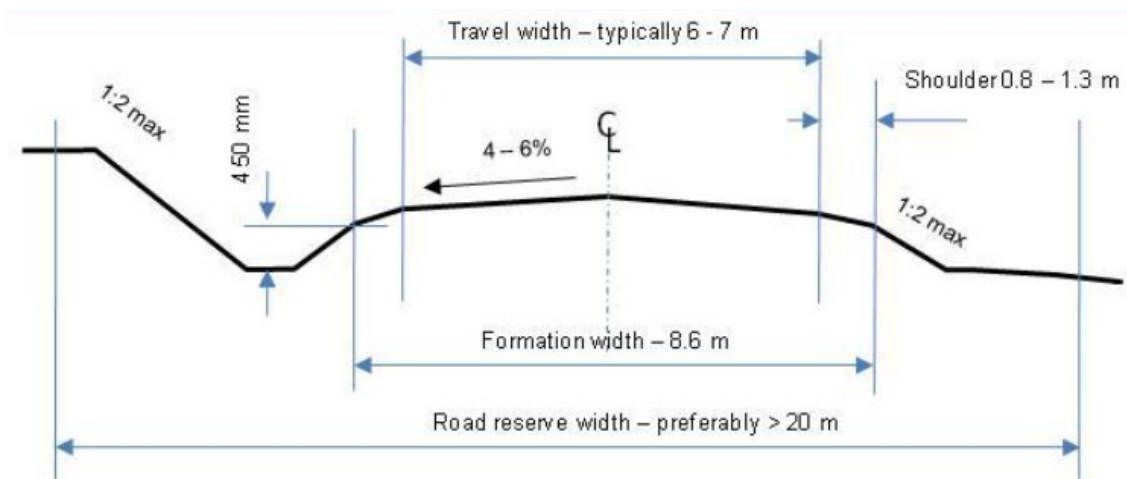


Figure 7.26 Typical Provincial Gravel Road Cross Section

The location and angles of intersections should preferably meet at 90° or nearly at right angles. Angles between 60° and 120° produce only a small reduction in visibility for drivers of passenger vehicles. However, for trucks, the range between 60° and 75° should be avoided because the driver entering the intersection from a minor road to his left would find his view obstructed. The maximum deviations have therefore been included below in **Figure 7.27**.

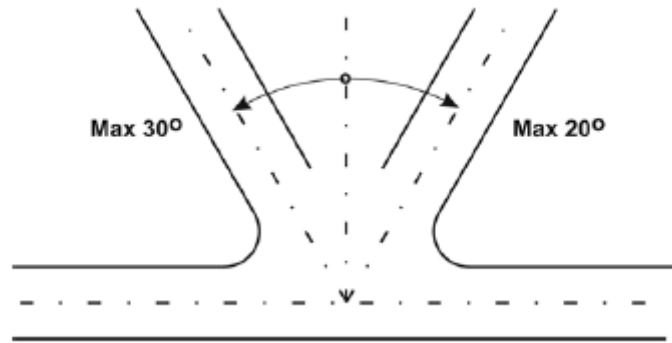


Figure 7.27 Angle of intersection deviation

The specific design considerations for this development are:

- Reduction in vehicle speed.
- Adequate law enforcement.
- Implementation of pedestrian safety initiatives.
- Regular maintenance of farm fences and access cattle grids.
- Adequate road signage as per the latest South African Road Traffic Sign Manual (SARTSM) edition.
- Possible use of approved dust suppressant techniques.
- Appropriate, timely and high-quality maintenance of existing gravel roads in terms of TRH20.
- Design and construction of new gravel roads in terms of TRH20.
- Continuous engagement with OEM and Abnormal Load specialists; and
- Constant engagement with the Northern Cape Department of Public Works & Roads (NCdr&pw).

However, we should note that the figures indicated above are indicative as many of the components are still at the design stage and will only be confirmed closer to the construction time.

8. INTERNAL LAYOUTS

The layout of the internal infrastructure is such that the environmental impact is kept to a minimum. Therefore proposed access positions have been kept to a minimum and all temporary and permanent buildings and infrastructure are located close to the access point. Refer to **Figure 8:1** for the layout and access points.

All internal access roads should be designed to have a minimal impact on the environment and thus are, in most cases, parallel to the contours to keep drainage line crossings to a minimum. Using roads perpendicular to the contours for long sections should be avoided, as the risk of possible erosion is increased. Existing gravel roads should be considered in order to reduce the environmental impact.

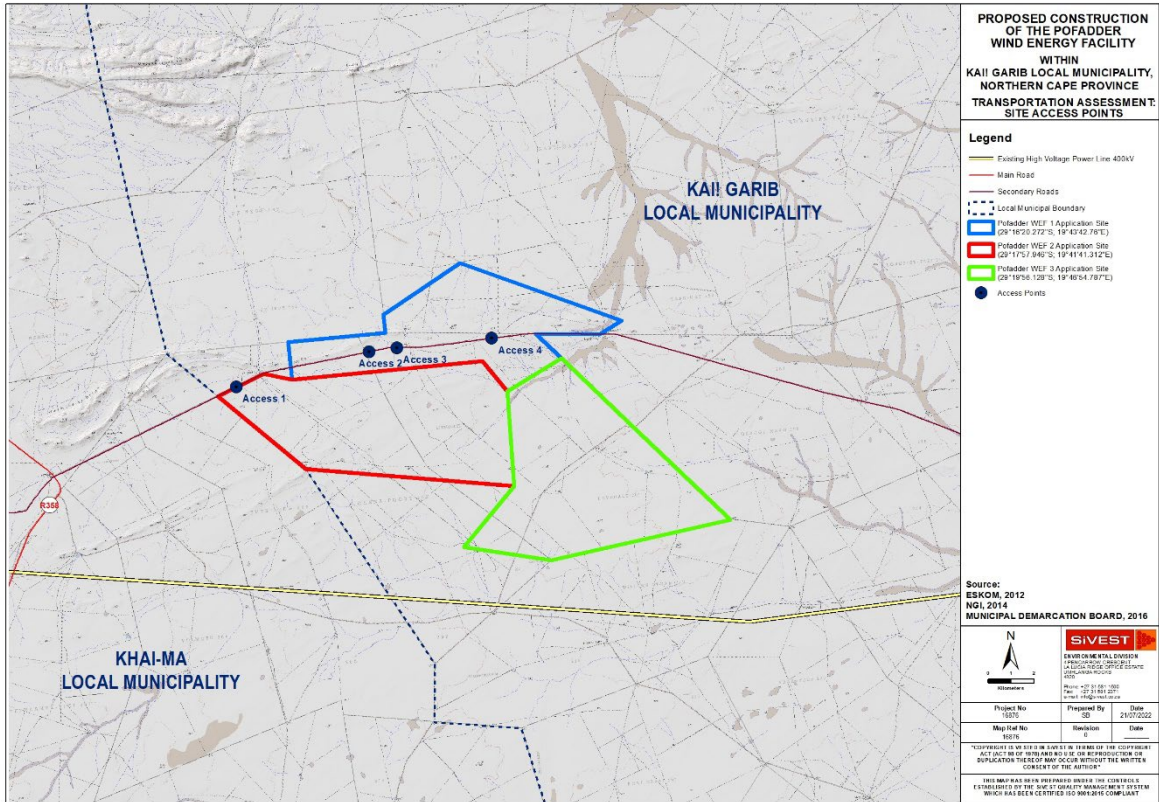
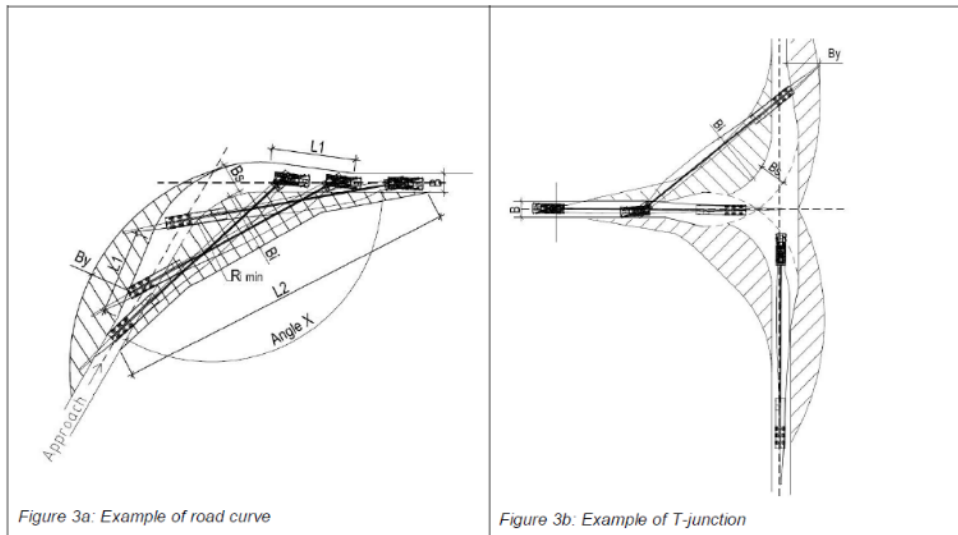


Figure 8.1 Pofadder WEF 3 - Internal Layouts showing access point

An internal network of minimum 6 m wide gravel roads will connect all the WTG and ancillary equipment to each other. The roads will have a horizontal and vertical alignment to accommodate vehicles and more specifically abnormal vehicles intended to use these roads for the delivery of the WTG equipment. A typical intersection and horizontal alignment would consist of radii and clearances similar to the requirements in **Figure 8.2**. We note that the larger WTG's are planned for these facilities and will need to be simulated once additional information becomes available.



The hatched areas on the figure are areas that the Employer shall clear of obstacles and level to allow overhang.

Angle X	R _{i min}	B _y	B _s	B _i	L ₁	L ₂
160°	14 m	4 m	4,5 m	3 m	10 m	35 m
120°	28 m	6 m	5 m	5 m	12 m	40 m
90°	38 m	7 m	7 m	6 m	18 m	52 m

Figure 8.2 Typical Horizontal Design Standards for a 101 m Rotor Diameter

We recommend that all internal access roads take the WEF stormwater management plan into account, where possible and applicable, to reduce potential erosion risks.

In addition, we recommend that all internal access roads are constructed according to *TRH20 – Unsealed Roads: Design Construction and Maintenance*. For this assessment, we have assumed that the in-situ material below the topsoil is of 'G7' quality and can be used as a suitable road subgrade material, followed by an imported 'Gravel Wearing Course' material.

A suitable geotechnical study will however be required at predesign stage to understand better the design limitations on the development, followed by a preliminary design to 'value' Engineer the project.

9. GRID CONNECTION

The proposed grid connection infrastructure to evacuate the power from Pofadder WEF 3 will be completed in a separate Integrated Grid Basic Assessment Reports (BAR).

10. IMPACT RATING ASSESSMENT

The 'Impact Rating System' takes into account the nature, scale and duration of the effects on the environment whether such effects are positive (beneficial) or negative (detrimental). Each issue / impact is also assessed according to the project stages:

- Planning
- Construction
- Operation
- Decommissioning

A rating points-based system is applied to the potential environmental impacts and includes objective evaluations of the impact mitigation. These impacts can be found in **Table 10.1** below.

In summary, all impacts were classified as 'Medium to Low' with a large majority of the impacts changing to 'Low' after implementing suitable mitigation measures. This rating applies to all alternatives considered.

10.1 Rating System Used to Classify Impacts

The rating system is applied to the potential impact on the receiving environment and includes an objective evaluation of the possible mitigation of the impact. Impacts have been consolidated into one (1) rating. In assessing the significance of each issue the following criteria (including an allocated point system) are used:

Table 10.1 Rating of Impacts Criteria

ENVIRONMENTAL PARAMETER		
A brief description of the environmental aspect likely to be affected by the proposed activity (e.g. Surface Water).		
ISSUE / IMPACT / ENVIRONMENTAL EFFECT / NATURE		
Include a brief description of the impact of the environmental parameter being assessed in the context of the project. This criterion includes a brief written statement of the environmental aspect being impacted by a particular action or activity (e.g., an oil spill in surface water).		
EXTENT (E)		
This is defined as the area over which the impact will be expressed. Typically, the severity and significance of an impact have different scales and as such bracketing ranges are often required. This is often useful during the detailed assessment of a project in terms of further defining the determined.		
1	Site	The impact will only affect the site
2	Local/district	Will affect the local area or district
3	Province/region	Will affect the entire province or region
4	International and National	Will affect the entire country
PROBABILITY (P)		
This describes the chance of occurrence of an impact		
1	Unlikely	The chance of the impact occurring is extremely low (Less than a 25% chance of occurrence).
2	Possible	The impact may occur (Between a 25% to 50% chance of occurrence).
3	Probable	The impact will likely occur (Between a 50% to 75% chance of occurrence).
4	Definite	The impact will certainly occur (With greater than a 75% chance of occurrence).
REVERSIBILITY (R)		
This describes the degree to which an impact on an environmental parameter can be successfully reversed upon completion of the proposed activity.		
1	Completely reversible	The impact is reversible with the implementation of minor mitigation measures
2	Partly reversible	The impact is partly reversible but more intense mitigation measures are required.
3	Barely reversible	The impact is unlikely to be reversed even with intense mitigation measures.

4	Irreversible	The impact is irreversible and no mitigation measures exist.
IRREPLACEABLE LOSS OF RESOURCES (L)		
This describes the degree to which resources will be irreplaceably lost as a result of a proposed activity.		
1	No loss of resources.	The impact will not result in the loss of any resources.
2	Marginal loss of resource	The impact will result in marginal loss of resources.
3	Significant loss of resources	The impact will result in a significant loss of resources.
4	Complete loss of resources	The impact results in a complete loss of all resources.
DURATION (D)		
This describes the duration of the impacts on the environmental parameter. Duration indicates the lifetime of the impact as a result of the proposed activity.		
1	Short term	The impact and its effects will either disappear with mitigation or will be mitigated through a natural process in a span shorter than the construction phase (0 – 1 years), or the impact and its effects will last for the period of a relatively short construction period and a limited recovery time after construction, thereafter it will be entirely negated (0 – 2 years).
2	Medium term	The impact and its effects will continue or last for some time after the construction phase but will be mitigated by direct human action or by natural processes thereafter (2 – 10 years).
3	Long term	The impact and its effects will continue or last for the entire operational life of the development but will be mitigated by direct human action or by natural processes thereafter (10 – 50 years).
4	Permanent	The only class of impact will be non-transitory. Mitigation either by man or natural process will not occur in such a way or such a period that the impact can be considered transient (Indefinite).
INTENSITY / MAGNITUDE (I / M)		
Describes the severity of an impact (i.e. whether the impact can alter the functionality or quality of a system permanently or temporarily).		
1	Low	Impact affects the quality, use and integrity of the system/component in a way that is barely perceptible.
2	Medium	Impact alters the quality, use and integrity of the system/component but the system / component continues to function in a moderately modified way and maintains general integrity (some impact on integrity).
3	High	The impact affects the continued viability of the system/component, and the quality, use, integrity and functionality of the system or component is severely impaired and may temporarily cease. High costs of rehabilitation and remediation.

4	Very high	The impact affects the continued viability of the system/component and the quality, use, integrity and functionality of the system or component permanently ceases and is irreversibly impaired (system collapse). Rehabilitation and remediation are often impossible. If possible rehabilitation and remediation are often unfeasible due to the extremely high costs of rehabilitation and remediation.
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SIGNIFICANCE (S)

Significance is determined through a synthesis of impact characteristics. Significance is an indication of the importance of the impact in terms of both physical extent and time scale, and therefore indicates the level of mitigation required. This describes the significance of the impact on the environmental parameter. The calculation of the significance of an impact uses the following formula:

Significance = (Extent + probability + reversibility + irreplaceability + duration) x magnitude/intensity.

The summation of the different criteria will produce a non-weighted value. By multiplying this value with the magnitude/intensity, the resultant value acquires a weighted characteristic which can be measured and assigned a significance rating.

Points	Impact Significance Rating	Description
5 to 23	Negative Low impact	The anticipated impact will have negligible negative effects and will require little to no mitigation.
5 to 23	Positive Low impact	The anticipated impact will have minor positive effects.
24 to 42	Negative Medium impact	The anticipated impact will have moderate negative effects and will require moderate mitigation measures.
24 to 42	Positive Medium impact	The anticipated impact will have moderately positive effects.
43 to 61	Negative High impact	The anticipated impact will have significant effects and will require significant mitigation measures to achieve an acceptable level of impact.
43 to 61	Positive High impact	The anticipated impact will have significant positive effects.
62 to 80	Negative Very high impact	The anticipated impact will have highly significant effects and are unlikely to be able to be mitigated adequately. These impacts could be considered "fatal flaws".
62 to 80	Positive Very high impact	The anticipated impact will have highly significant positive effects.

Table 10.2 Pofadder WEF 3 & Grid Connection – Impact Rating Table

POFADDER WEF 3																				
ENVIRONMENTAL PARAMETER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION									RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION								
		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S
Construction Phase																				
Additional Traffic Generation	Increase in Traffic	2	4	1	2	1	3	30	-	Medium	<ul style="list-style-type: none"> • Ensure staff transport is done in the 'off peak' periods and by bus, if possible • Stagger material, component, and abnormal loads delivery. • Construction of an on-site batching plant and tower construction to reduce trips. 	2	4	1	2	1	2	20	-	Low
	Increase of Incidents with pedestrians and livestock	2	3	2	4	1	2	24	-	Medium	<ul style="list-style-type: none"> • Upgrade of existing / new access points. • Reduction in the speed of vehicles. • Adequate enforcement of the law. • Implementation of pedestrian safety initiatives. • Regular maintenance of farm fences & access cattle grids. • Construction of an on-site batching plant and tower construction to reduce trips. 	2	3	2	4	1	1	12	-	Low
	Increase in dust from gravel roads	2	3	2	2	1	2	20	-	Low	<ul style="list-style-type: none"> • Upgrade of existing / new access point. • Reduction in the speed of the vehicles. • Construction of gravel roads in terms of TRH20. • Implement a road maintenance program under the auspices of the respective transport department. • Possible use of approved dust suppressant techniques. • Construction of an on-site batching plant and tower construction to reduce trips. 	2	3	2	2	1	2	20	-	Low
	Increase in Road Maintenance	2	3	2	2	2	2	22	-	Low	<ul style="list-style-type: none"> • Implement a road maintenance program under the auspices of the respective transport department. • Construction of an on-site batching plant to reduce trips. 	2	3	2	2	1	2	20	-	Low
Abnormal Loads	Additional Abnormal Loads	3	3	1	2	1	1	10	-	Low	<ul style="list-style-type: none"> • Ensure abnormal vehicles travel to and from the proposed development in the 'off peak' periods or stagger delivery. • Adequate enforcement of the law. 	3	2	1	2	1	1	9	-	Low

POFADDER WEF 3																				
ENVIRONMENTAL PARAMETER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION									RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION								
		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S
Internal Access Roads	Increase in dust from gravel roads	1	4	1	1	1	2	16	-	Low	<ul style="list-style-type: none"> Enforce a maximum speed limit on the development. Appropriate, timely and high-quality maintenance required in terms of TRH20. Possible use of approved dust suppressant techniques. 	1	3	1	1	1	2	14	-	Low
	New / Larger Access points	1	4	1	2	1	1	9	-	Low	<ul style="list-style-type: none"> Adequate road signage according to the SARTSM. Approval from the respective roads department. 	1	4	1	2	1	1	9	-	Low
Operational Phase																				
Additional Traffic Generation	Increase in Traffic	2	1	1	2	3	1	9	-	Low	<ul style="list-style-type: none"> The increase in traffic for this phase of the development is negligible and will not have a significant impact. 	2	1	1	2	3	1	9	-	Low
	Increase of Incidents with pedestrians and livestock	2	1	1	2	3	1	9	-	Low	<ul style="list-style-type: none"> The increase in traffic for this phase of the development is negligible and will not have a significant impact. 	2	1	1	2	3	1	9	-	Low
	Increase in dust from gravel roads	2	1	1	2	3	1	9	-	Low	<ul style="list-style-type: none"> The increase in traffic for this phase of the development is negligible and will not have a significant impact. 	2	1	1	2	3	1	9	-	Low
	Increase in Road Maintenance	2	1	1	2	3	1	9	-	Low	<ul style="list-style-type: none"> The increase in traffic for this phase of the development is negligible and will not have a significant impact. 	2	1	1	2	3	1	9	-	Low
Abnormal Loads	Additional Abnormal Loads	3	1	1	2	3	1	10	-	Low	<ul style="list-style-type: none"> The increase in traffic for this phase of the development is negligible and will not have a significant impact. 	3	1	1	2	3	1	10	-	Low
Internal Access Roads	New / Larger Access points	1	1	1	2	3	1	8	-	Low	<ul style="list-style-type: none"> Adequate road signage according to the SARTSM. Approval from the respective roads department. 	1	1	1	2	3	1	8	-	Low

POFADDER WEF 3																				
ENVIRONMENTAL PARAMETER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION									RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION								
		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S
Decommissioning Phase																				
Additional Traffic Generation	Increase in Traffic	2	4	1	2	1	3	30	-	Medium	<ul style="list-style-type: none"> • Ensure staff transport is done in the 'off peak' periods and by bus. • Stagger material, component, and abnormal loads removal. • Construction of an on-site sorter and pressing machine to reduce trips. 	2	4	1	2	1	2	20	-	Low
	Increase of Incidents with pedestrians and livestock	2	3	2	4	1	2	24	-	Medium	<ul style="list-style-type: none"> • Reduction in the speed of vehicles. • Adequate enforcement of the law. • Implementation of pedestrian safety initiatives • Regular maintenance of farm fences & access cattle grids. 	2	3	2	4	1	1	12	-	Low
	Increase in dust from gravel roads	2	3	2	2	1	2	20	-	Low	<ul style="list-style-type: none"> • Reduction in the speed of the vehicles. • Appropriate, timely and high-quality maintenance required in terms of TRH20. • Possible use of approved dust suppressant techniques. • Implement a road maintenance program under the auspices of the respective transport department. • Construction of an on-site sorter and pressing machine to reduce trips. 	2	3	2	2	1	2	20	-	Low
	Increase in Road Maintenance	2	3	2	2	2	2	22	-	Low	<ul style="list-style-type: none"> • Implement a road maintenance program under the auspices of the respective transport department. 	2	3	2	2	1	2	20	-	Low
Abnormal Loads	Additional Abnormal Loads	3	2	1	2	1	1	9	-	Low	<ul style="list-style-type: none"> • Ensure abnormal vehicles travel to and from the proposed development in the 'off peak' periods or stagger delivery. • Adequate enforcement of the law. 	3	2	1	2	1	1	9	-	Low
Internal Access Roads	Increase in dust from gravel roads	1	4	1	1	1	1	8	-	Low	<ul style="list-style-type: none"> • Enforce a maximum speed limit on the development. • Appropriate, timely and high-quality maintenance required in terms of TRH20. • Possible use of approved dust suppressant techniques. 	1	3	1	1	1	2	14	-	Low
	New / Larger Access points	1	4	1	2	1	1	9	-	Low	<ul style="list-style-type: none"> • Adequate road signage according to the SARTSM. • Approval from the respective roads department. 	1	4	1	2	1	1	9	-	Low

POFADDER WEF 3																				
ENVIRONMENTAL PARAMETER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION									RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION								
		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S
Cumulative																				
Additional Traffic Generation	Increase in Traffic	2	4	1	2	1	4	40	-	Medium	<ul style="list-style-type: none"> • Ensure a large portion of vehicles travelling to and from the proposed development travels in the 'off peak' periods or by bus. • Construction of an on-site batching plant and tower construction to reduce trips. • Coordination between all developers in the area. 	2	4	1	2	1	3	30	-	Medium
	Increase of Incidents with pedestrians and livestock	2	3	2	4	1	3	36	-	Medium	<ul style="list-style-type: none"> • Reduction in the speed of vehicles. • Adequate enforcement of the law. • Implementation of pedestrian safety initiatives. • Regular maintenance of farm fences, and access cattle grids. • Construction of an on-site batching plant and tower construction to reduce trips. • Coordination between all developers in the area. 	2	3	2	4	1	2	24	-	Medium
	Increase in dust from gravel roads	2	3	2	2	1	4	40	-	Medium	<ul style="list-style-type: none"> • Reduction in the speed of the vehicles. • Construction of gravel roads in terms of TRH20. • Implement a road maintenance program under the auspices of the respective transport department. • Possible use of approved dust suppressant techniques. • Construction of an on-site batching plant and tower construction to reduce trips. • Coordination between all developers in the area. 	2	3	2	2	1	2	20	-	Low
	Increase in Road Maintenance	2	3	2	2	2	2	22	-	Low	<ul style="list-style-type: none"> • Implement a road maintenance program under the auspices of the respective transport department. • Construction of an on-site batching plant and tower construction to reduce trips. • Coordination between all developers in the area. 	2	3	2	2	2	2	22	-	Low

POFADDER WEF 3																				
ENVIRONMENTAL PARAMETER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION									RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION								
		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S
Abnormal Loads	Additional Abnormal Loads	3	3	1	2	1	4	40	-	Medium	<ul style="list-style-type: none"> • Ensure abnormal vehicles travel to and from the proposed development in the 'off peak' periods. • Adequate enforcement of the law. • Coordination between all developers in the area. 	3	2	1	2	1	2	18	-	Low
Internal Access Roads	Increase in dust from gravel roads	1	4	1	1	1	3	24	-	Medium	<ul style="list-style-type: none"> • Enforce a maximum speed limit on the development. • Appropriate, timely and high-quality maintenance required in terms of TRH20. • Possible use of approved dust suppressant techniques. 	1	3	1	1	1	2	14	-	Low
	New / Larger Access points	1	4	1	2	1	2	18	-	Low	<ul style="list-style-type: none"> • Adequate road signage according to the SARTSM. • Approval from the respective roads department. 	1	4	1	2	1	1	9	-	Low

11. CUMULATIVE IMPACT ASSESSMENT

SiVEST undertook every effort to obtain the information (including specialist studies, BA / EIA / Scoping and EMPr Reports) for the surrounding developments within 35 km of the proposed WEF and associated grid infrastructure; however, many of the documents are not currently publicly available. To this extent, the information obtained from the surroundings and planned renewable energy developments were considered part of the cumulative impact assessment. Six (6) renewable energy projects were identified within a 35 km radius of the proposed development, as shown in **Table 11:1** below. The renewable energy developments considered as part of this Transportation Study are as follows:

Table 11.1 Proposed Renewable Energy developments within a 35 km radius.

Applicant	Project	Technology	Capacity	Status of Application / Development
South African Mainstream Renewable Power Developments (Pty) Ltd	Korana 1 WEF (Pty) Ltd	Wind	Unknown	Approved
South African Mainstream Renewable Power Developments (Pty) Ltd	Poortjies & Namies South WEF	Wind	Unknown	EIA Process underway
South African Mainstream Renewable Power Developments (Pty) Ltd	Poortjies WEF	Wind	Unknown	EIA Process underway
Paulputs WEF (RF) (Pty) Ltd	Paulputs WEF	Solar	300 MW	Approved
Unknown	Scuitklip 92 SEF	Solar	Unknown	Unknown
Juwi Renewable Energies (Pty) Ltd	Paulputs PV2 North and East	Solar	100 MW	Approved

The information obtained for other planned renewable energy developments in the surroundings is indicated in **Figure 11:1** below.

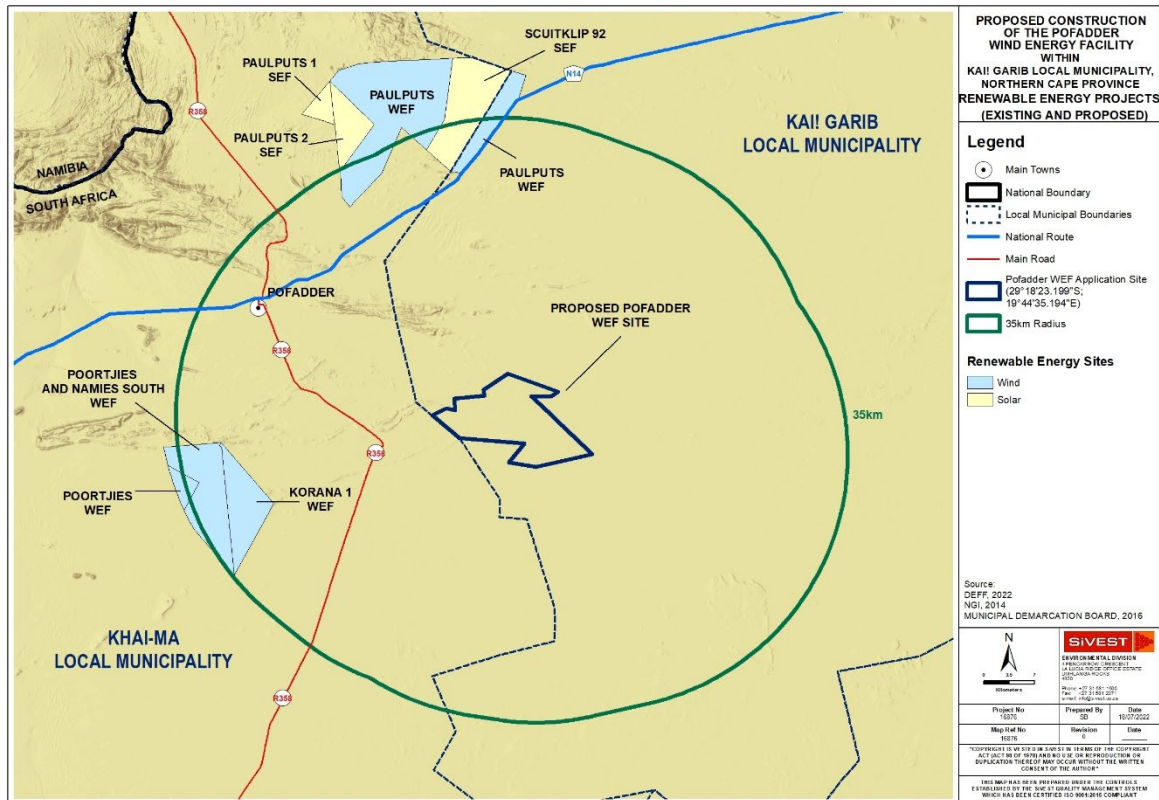


Figure 11.1 Proposed Renewable Energy Developments within a 35 km radius

Based on the above, this Transportation Study has considered the cumulative impacts, which were further assessed in **Section 10** above.

12. COMPARATIVE ASSESSMENT OF ALTERNATIVES

No alternative options were provided.

13. CONCLUSIONS AND IMPACT STATEMENT

The main objective of the 'Transportation Study' is to determine the impact/s the proposed Pofadder WEF 3 development and associated grid infrastructure will have on the immediate and greater area concerning transportation. The proposed development is located in a rural part of the Northern Cape Province, with the existing road network providing access to the development. Several other renewable energy developments have already been completed or are in the process of being completed in the immediate area.

The construction phase for this development will typically generate the highest number of additional vehicles. For steel towers, an additional ±84 trips / hour will occur in the morning and afternoon outside of the peak period, while for hybrid towers ±103 trips / hour will occur. For construction material and abnormal loads ±2 trips / hour will occur during the midday peak for both steel towers and hybrid towers. The impact will, however, be temporary and is considered to be nominal if adequately mitigated. During the operation phase, it is expected that the facility will accommodate ±50 employees and generate an additional ±20 trips / day in the morning and afternoon peak period. This impact is considered to be nominal.

- In conclusion.
 - The Pofadder WEF 3 consists of one EIA application, while the Grid connection infrastructure will be undertaken as a separate Basic Assessment application.
 - All proposed access points from Road DR2986 has sufficient sight distance of >350 m and are not located within and / or near any drainage lines.
 - Access upgrades are required at the chosen access points.
 - Access for Pofadder WEF 3 will be obtained through Pofadder WEF 1 and Pofadder WEF 2.
 - All external road upgrades require approval and a wayleave application from the Northern Cape Department of Public Works & Roads (NCdr&pw) before work commences.
 - Mitigation measures to be included in the construction phase:
 - Ensure staff transport is done in the 'Off Peak' period and by bus to reduce impact in the peak periods.
 - Stagger material, component, and abnormal loads deliveries.
 - Adequate road signage on all external roads carrying development traffic according to the South African Road Traffic Sign Manual (SARTSM).
 - Reduction in the speed of vehicles.
 - Adequate enforcement of the law.
 - Implementation of pedestrian safety initiatives.
 - Regular maintenance of farm fences & access cattle grids.
 - Construction of gravel roads in terms of Technical Recommendations for Highways (TRH20).
 - Implement a road maintenance program under the auspices of the respective transport department; and
 - Possible use of approved dust suppressant techniques.
 - A more comprehensive route analysis be completed before construction to get a better understanding of the works required and the potential risks.
 - The 'No Go' alternative would result in no transportation impacts.
 - No fatal flaws or preferences were identified for any proposed site alternatives, construction laydown areas, substation locations or Power line routes.
 - No environmentally sensitive areas have been identified; therefore, no areas are to be avoided from a Transportation perspective.
- Impact Statement;
 - Concerning this report, associated assessment and the findings made within, it is SiVEST's opinion that the Pofadder WEF 3 and associated grid infrastructure will have a nominal impact on the existing traffic network. The project is therefore deemed acceptable from a transport perspective, provided the recommendations and mitigation measures in this report are implemented. Hence, Environmental Authorisation (EA) should be granted for the EIA application.

14. REFERENCES

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Technical Recommendations for Highways (TRH17) – *Geometric Design of Rural Roads (1988)*

Technical Recommendations for Highways (DRAFT-TRH20) – *Unsealed Roads: Design, Construction and Maintenance (2013)*

Technical Recommendations for Highways (TRH26) – *South African Road Classification and Access Management Manual (2012)*

APPENDIX A: SPECIALIST CURRICULUM VITAE

APPENDIX B: SPECIALIST DECLARATION



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Appendix E:

Summary of Specialist Findings and Recommendations

POFADDER WEF 3

SUMMARY OF SPECIALIST FINDINGS AND RECOMMENDATIONS

Specialist Study	Findings	Recommendations
Aquatic / Freshwater	<p>According to the guidelines specified within GN509 of 2016 all wetlands within a radius of 500m of the facility footprint were identified and mapped.</p> <ul style="list-style-type: none"> • A total of 43 freshwater resource features were identified and delineated and include: • One (1) large primary/major ephemeral wash namely the Kaboet River; • Ten (10) smaller ephemeral washes (mainly third order streams); • Twenty-three (23) drainage lines; and • Nine (9) depression wetlands. <p>Overall, with the exception of erosion, dams and present road crossings (most prominent impacts), these freshwater systems are still in a fairly natural, functional condition.</p>	<p>The recommended buffers are in line with the watercourse and wetland buffers that have been recommended in the Strategic Environmental Assessment for Wind and Solar Photovoltaic Energy in South Africa (CSIR, 2015) and are deemed appropriate to the aquatic features and the proposed activities within the project site.</p> <ul style="list-style-type: none"> • For the Kaboep River and larger ephemeral washes, 100m buffer areas, measured from the outer edge of channel or delineated floodplain is recommended (whichever is the furthest). • For the minor ephemeral washes, 50m buffer areas, measured from the outer edge of channel or delineated floodplain is recommended (whichever is the furthest) • For the depression wetlands, 50m buffer areas, measured from the outer edge of delineated wetland is recommended. • For the small drainage channels, 32m buffer areas, measured from the outer edge of channel is recommended. <p>With mitigation measures in place, impacts on the freshwater resource features' integrity and functioning can be potentially reduced to sufficiently low levels. This would be best achieved by incorporating the recommended management & mitigation measures into an Environmental Management Programme (EMPr) for the site, together with appropriate rehabilitation guidelines and ecological monitoring recommendations.</p> <p>Based on the outcomes of this study it is my considered opinion that the proposed project detailed in this report could be authorised from a freshwater resource perspective.</p>
Terrestrial Ecology	<p>Due to the vast extent of intact, natural vegetation still present within both mentioned vegetation types and the fact that only a very small extent of these vegetation types will be impacted within the project site along with the fact that the development footprint itself will be much smaller, it is highly unlikely that this development will have an</p>	<p>With mitigation measures in place, impacts on terrestrial ecological resource integrity and functioning can be potentially reduced to a sufficiently low level. This would be best achieved by incorporating the recommended management & mitigation measures into an Environmental</p>

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	<p>impact on the status and conservation targets set out for these vegetation types.</p> <p>Due to the high importance of the primary ephemeral wash, this feature is regarded as Very High Sensitive. This feature will however be avoided by the proposed development, and direct impacts on this feature is highly unlikely.</p> <p>Based on the ecology and behaviour of the potential Mammal SCC that may occur within the region, as well as the general design and layout of the WEF (avoiding sandy alluvial washes and floodplains as well steep slopes and tall ridges) it is highly unlikely that this development will threaten local individual and populations of Mammal SCC.</p>	<p>Management Programme (EMPr) for the site, together with appropriate rehabilitation guidelines and ecological monitoring recommendations.</p> <p>Based on the outcomes of this study it is my considered opinion that the proposed project detailed in this report could be authorised from a terrestrial ecological perspective.</p>
Agricultural	<p>The site has very low agricultural potential predominantly because of climate constraints, but also because of soil constraints. As a result of the constraints, the site is unsuitable for crop production, and agricultural production is limited to low capacity grazing. The land impacted by the development footprint is verified in this assessment as being of low agricultural sensitivity.</p>	<p>The recommended mitigation measures are implementation of an effective system of storm water run-off control; maintenance of vegetation cover; and stripping, stockpiling and re-spreading of topsoil.</p>
Avifauna	<p>The proposed Pofadder WEF 3 will have several potential impacts on priority avifauna. These impacts are the following:</p> <ul style="list-style-type: none"> • Displacement of priority species due to disturbance linked to construction activities in the construction phase - The impact is rated as medium but could be mitigated to low levels. • Displacement due to habitat transformation in the construction phase - The impact is rated as low both pre- and post-mitigation. • Collision mortality caused by the wind turbines in the operational phase - The impact is rated as medium pre-mitigation and low post-mitigation. • Electrocution on the 33kV MV overhead lines (if any) in the operational phase - The impact is rated as medium pre-mitigation and low post-mitigation. 	<p><u>Very High Sensitivity Zones</u></p> <p>The construction of all infrastructure in these zones should be avoided completely:</p> <ul style="list-style-type: none"> • 500m buffer zone around water troughs to prevent the displacement of Sclater's Larks due to disturbance and habitat transformation, and to reduce the risk of turbine collisions for priority species using the water troughs for drinking and bathing. Alternatively, water troughs could be relocated to maintain a minimum distance of 500m from the closest turbine. • All identified breeding areas for Sclater's Lark. <p><u>High Sensitivity Zones</u></p> <p>The construction of turbines in these zones should be avoided to eliminate the risk of turbine collisions. Other infrastructure is permitted:</p>

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	<ul style="list-style-type: none"> • Collisions with the 33kV MV overhead lines (if any) in the operational phase - The impact is rated as medium pre-mitigation and low post-mitigation. • Displacement of priority species due to disturbance linked to dismantling activities in the decommissioning phase. 	<ul style="list-style-type: none"> • 2.8km turbine exclusion zone around the vulture roost on the Aries – Aggeneys 400kV powerline. <p><u>Medium Sensitivity Zones</u></p> <p>The construction of turbines in these zones should be restricted to a minimum to reduce the risk of turbine collisions. If restriction is not possible, additional mitigation measures will be required, e.g., increasing cut in speeds or shutdown on demand:</p> <ul style="list-style-type: none"> • Highly suitable Red Lark habitat: Placement of turbines in highly suitable Red Lark habitat to be avoided where possible. If avoidance is not possible, turbine cut in-speeds should be increased to 3m/s (measured at ground level) during daylight hours when a rainfall event of 10mm or higher is recorded at the site, for turbines located in areas of highly suitable Red Lark habitat, as determined by the avifaunal specialist. The increased cut-in speeds to be maintained for a period of six weeks after the rainfall event.
Bat	<p>Bat activity was low or medium overall for most of the study period across the site. Only during February and March did bat activity increase to relatively high levels for the Nama Karoo. Thus, bats are at greatest risk to wind energy impacts during specific parts of summer and autumn. However, risk levels vary across a night, by height and meteorological conditions.</p>	<p>Buffers have been placed around key habitat features as per best practice resulting in the identification of several No-Go areas for turbine placement. The turbine layout adheres to the bat constraints as no project infrastructure (except roads) are located in bat buffers.</p> <p>Bat fatality must be monitored for a minimum of two years from commencement of operation and estimated fatality levels compared to the thresholds set for the project. If these thresholds are exceeded, an adaptive management plan for bats must be developed which will outline the use of curtailment and/or acoustic deterrents to reduce fatality to below threshold levels.</p>
Social	<p>It is evident that the cumulative impacts associated with changes to the social environment of the region are more significant than those attached to any one project.</p>	<p>Considering all social impacts associated with the project, it is evident that, at the social level, the positive elements outweigh the negative and that the project carried with it a significant social benefit at a national level and is therefore supported. In addition, no compelling preference emerges in</p>

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	<p>The initiative to address these cumulative impacts lies at a far higher level than at an individual project level. In this regard conclusions are drawn to the findings of this assessment conducted for the proposed Pofadder Wind Energy Facility 3 which indicates that during the construction and the operational phase of the proposed development, various employment opportunities, with different levels of skills will be created. In addition this will create local business opportunities benefitting the socio-economic development of the local community of Pofadder.</p>	<p>respect of the revised proposed layout and considerable sensitives have been avoided and it would be socially acceptable for the authorisation of Pofadder WEF 3. All negative impacts are low and can be effectively addressed through the mitigation measures provided.</p>
Heritage	<p>The main heritage concern for this project is the cultural landscape. No significant archaeological sites are located within the current layout. Impacts to the landscape are unavoidable and mitigation can only deal with impacts at a very localised level. The remaining concern is the introduction of the red flashing lights at night which would cause a considerable change in the night time sense of place with the lights being strongly visible in an otherwise very dark landscape, and potentially over great distances.</p> <p>There are no highly significant concerns for this project and the expected impacts can largely be mitigated. The remaining concerns are likely outweighed by the socio-economic benefits of the project.</p>	<p>It is recommended that the proposed Pofadder WEF 3 be authorised, but subject to the following:</p> <ul style="list-style-type: none"> • The LSA archaeological sites at waypoints 519 and 520 must be excavated with at least 25-50 m² sampled at each; • All unsurveyed parts of the final approved layout must be surveyed for archaeological sites and graves prior to construction to determine whether further mitigation measures are required; and • If any archaeological material or human burials are uncovered during the course of development then work in the immediate area should be halted. The find would need to be reported to the heritage authorities and may require inspection by an archaeologist. Such heritage is the property of the state and may require excavation and curation in an approved institution.
Heritage (Palaeontology)	<p>Most of the area is on non-fossiliferous rocks of the Namaqua-Natal Suite. Most of the project area is of zero to insignificant palaeo sensitivity but there are parts that are moderately sensitive. These are on the Mbizane Formation (Dwyka Group, Karoo Supergroup) and the Tertiary calcretes. Fossils are rare and their distribution unpredictable so a Fossil Chance Find Protocol should be followed once excavations for foundations and infrastructure commence.</p>	<p>A Fossil Chance Find Protocol should be followed once excavations for foundations and infrastructure commence.</p> <p>As far as the palaeontology is concerned there are no preferred areas and NO no-go areas because the Significance Rating of the Impact is Negative low. The project should be authorised.</p>
Noise	<ul style="list-style-type: none"> • There will be a short-term increase in noise in the vicinity of the site during the construction phase. • The area surrounding the construction sites will be affected for short periods of time in all directions, should numerous construction equipment be used simultaneously. 	<p>On site monitoring at the noise sensitive area is recommended. Mitigation measures to be implemented if the noise impact exceeds the 35 dB(A) night noise rating limit, such as running the turbines in low power mode at certain wind speeds at night. It is unlikely that the indoor limit will be exceeded as the residents buildings will attenuate some sound.</p>

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	<ul style="list-style-type: none"> • The day time SANS 10103:2008 noise limit of 45 dB(A) will not be exceeded at any of the noise sensitive areas. • The night time outdoor guideline noise rating limit of 35 dB(A) will in all likelihood not be exceeded at any of the noise sensitive areas, except at NSA 38 when the windspeed is above 5m/s. There will most likely be some wind noise masking at this windspeed that will mitigate the effect. • The cumulative impacts will not exceed the day time SANS 10103:2008 noise limit of 45 dB(A). • The cumulative impacts will exceed the night time SANS 10103:2008 noise limit of 35 dB(A) at NSA 38,40,41,43, and 45. There will most likely be some wind noise masking at this windspeed that will mitigate the effect. <p>The construction phase and operational phase will have a low noise impact on the noise sensitive receptors.</p>	<p>Due to the potential low noise impacts associated with the construction and operational phases of the proposed project, it is recommended the project receive Environmental Authorisation, from a noise impact perspective.</p>
Visual	<p>For the close proximity views as seen by the receptors using the local farm access road, the wind turbines will appear dominating in the landscape due to the strong line, colour and texture contrast generated by the town, hub and moving blades.</p> <p>Some colour and texture contrast would be created by the white flashing Aircraft Warning Lights (AWL) during the day, but strong red colour contrast would be generated by the night-time AWL. With mitigation, the dominating effect of multiple AWL lights taking place repeatedly during the night, can be reduced by placing the lights only on the strategic corners of the total wind farm. For these receptors, the Class III Visual Objective would not be met, without or with mitigation. However, the road is seldom used, and unlikely to see much night-time traffic. While the Visual Objectives would not be met, this is not a Fatal Flaw given the limited usage of the farm road and the remote location.</p> <p>For the approximately three farmstead receptors located in the Mid-Ground/ Background interface, with distance ranging from 7.8 km to 12 km, the Class III Visual Objective would be met with mitigation. At the distance and with arid area atmospheric influences restricting</p>	<ul style="list-style-type: none"> • The area is remote, and only four farmstead receptors were located within the project Zone of Visual Influence (ZVI), with Medium to Low Exposure (approximately 8km). • No significant landscape resources were identified within the ZVI, and no tourist related activities are making use of the visual resources of the surrounding landscapes. • As such, Landscape and Visual Impacts can be moderated with mitigation, specifically with regards to the management of night-time AWL. • The nearest other proposed renewable energy project is Namies Suid and Poortjies WEF (authorised, unbuilt), with location approximately 350km east where intervisibility is highly unlikely and cumulative effects rated Low (with mitigation). • While the proposed collective views of the combined 90 turbines will be a dominating landscape feature, the effect is limited to the local landscape context. With the arid environment, the atmospheric influences reduce clear visibility during the day to the Mid-ground distance region. • No Shadow Flicker impact will take place.

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	<p>clear view over distance, the Form contrast would not be seen, Line and Texture Contrast would be Moderate to Low, but Colour from the AWL would still be Strong without mitigation. With mitigation, the AWL at night can be reduced to Moderate levels.</p> <p>No Shadow Flicker impacts will take place.</p>	<p>Mitigations have been provided and should be implemented as part of authorisation, with special attention to the management of AWL. Clear methodology should also be provided on the demolishing of the concrete towers and associated rehabilitation, should concrete towers be utilised.</p>
<p>Traffic</p>	<p>The traffic specialist doesn't foresee any major risks concerning the proposed development.</p> <p>The development is located in close proximity to an existing road network. Several new access points are proposed along Road DR2986 to accommodate the adjusted land use and obtain the recommended sight distances of 250 m between the chosen access positions.</p> <p>Approval and a wayleave application will be required from the Northern Cape Department of Public Works & Roads (NCdr&pw) before work commences.</p> <p>The construction phase for this development will typically generate the highest number of additional vehicles. However, it will be temporary, and impacts are considered nominal. Several mitigation measures are proposed to accommodate the development and reduce the impact on the surrounding road network.</p>	<p>Mitigation measures to be included in the construction phase:</p> <ul style="list-style-type: none"> • Ensure staff transport is done in the 'Off Peak' period and by bus to reduce impact in the peak periods. • Stagger material, component, and abnormal loads deliveries. • Adequate road signage on all external roads carrying development traffic according to the South African Road Traffic Sign Manual (SARTSM). • Reduction in the speed of vehicles. • Adequate enforcement of the law. • Implementation of pedestrian safety initiatives. • Regular maintenance of farm fences & access cattle grids. • Construction of gravel roads in terms of Technical Recommendations for Highways (TRH20). • Implement a road maintenance program under the auspices of the respective transport department; and • Possible use of approved dust suppressant techniques. <p>It is the traffic specialist opinion that the Pofadder WEF 3 will have a nominal impact on the existing traffic network. The project is therefore deemed acceptable from a transportation perspective, provided the recommendations and mitigation measures in this report are implemented. Hence, Environmental Authorisations (EAs) should be granted for the EIA applications.</p>



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