Koup 1 Wind Farm (Pty) Ltd

VOLUME I – ENVIRONMENTAL MANAGEMENT PROGRAMME

EMPr & Site Layout: Koup 1 Wind Energy Facility, Western Cape Province

18 September 2024

Project No.: 5200 Koup

EMPR REFERENCE:
14/12/16/3/3/2/2120/EMPR

DFFE REFERENCE:
14/12/16/3/3/2/2120

DRAFT FOR PUBLIC COMMENT

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Document details	
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Date	18 September 2024
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Author	Stephen Burton & Lucien Barbeau
Client Name	Koup 1 Wind Farm (Pty) Ltd

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				ERM approval to issue		
Version	Revision	Author	Reviewed by	Name	Date	Comments
1.0	00	Stephen Burton & Lucien Barbeau	Stephanie Gopaul	Dieter Rodewald		Draft for client comment
2.0	00	Stephen Burton & Lucien Barbeau	Stephanie Gopaul	Dieter Rodewald		Final for Department Decision

Development Details

DFFE EMPr Reference	To be Confirmed
DFFE Reference	14/12/16/3/3/2/2120
Title	Environmental Management Programme for the Koup 1 Wind Energy Facility, near Beaufort West, Western Cape Province
EAP	Michelle Guy - SiVEST, 2019 Stephanie Gopaul – Environmental Resource Management Southern Africa (Pty) Ltd, 2024
Consultant	Katherine Wiles – SiVEST, 2022 Lucien Barbeau - Environmental Resource Management Southern Africa (Pty) Ltd, 2024
Project Developer (Applicant)	Koup 1 Wind Power (Pty) Ltd
Report Status	Draft of Final EMPr and Site Layout for comment Version 1.0 – Submission in Compliance with Conditions 13, 14, 15 and 16 of the Environmental Authorisation

Public Participation Details

This Environmental Management Programme (EMPr) has been updated based on the relevant conditions in the Environmental Authorisation (EA) and final design layout of the development.

Invitation to Comment: Members of the public, local communities, and stakeholders are invited to comment on this final EMPr and site layout which is available for public review and comment at the following locations.

Location	Physical Address
Hard Copy / CD Copy Location	
Library	Beaufort West Library, 15 Church Street, Beaufort West, Western Cape, South Africa
Electronic Copy Locations	
ERM Website	https://www.erm.com/public-information-sites/genesis-koup-wind-energy-facility-1-beaufort-west-province/
Electronic Transfer	I&APs can request for copies to be shared via a One Drive folder.
Comment Submission	
Contact Person	Anathi Manyakanyaka
Company	ERM SA (Pty) Ltd
Via Post	240 Main Road, 1st Floor Great Westerford, Rondebosch, 7700
Via Telephone	+27105963502 / +27 (0) 72 595 0104
Via E-mail	ERM.SouthAfricaProjectKoup@erm.com
Via Online Portal	https://886828.aidaform.com/stakeholder-engagement

Following the 30-day public consultation period, the Final EMPr including the Final Site Layout, will be submitted to the Department of Forestry, Fisheries and the Environment for approval prior to commencement of any activity.

Signature Page

18 September 2024

VOLUME I – ENVIRONMENTAL MANAGEMENT PROGRAMME

EMPr & Site Layout: Koup 1 Wind Energy Facility, Western Cape Province

Stephanie Gopaul
Registered EAP and Associate Partner

Dieter Rodewald
Partner

Environmental Resources Management South Africa (Pty) Ltd

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Glossary of Terms

Construction Phase: The activities pertaining to the preparation for and the physical construction of the proposed development.

Contractor: Persons/organisations contracted by the Developer to carry out parts of the work for the proposed project

Engineer / Project Director (PD): Person/organisation appointed by the Developer to oversee the work of all consultants, sub-developers, contractors, residents, and visitors.

Environment: The environment is defined as the surroundings within which humans exist and that are made up of – the land, water and atmosphere of the earth; micro-organisms, plant and animal life; any part or combination of (i) and (ii) and the interrelationships among and between them; and the physical, chemical, aesthetic and cultural properties and conditions of the foregoing that influence human health and well-being.

Environmental and Social Manager (ESM) also known as the Environmental Control Officer (ECO): Person/organisation appointed by the Developer who will provide direction to the Principal Agent concerning the activities within the Construction site. The ECO will also be responsible to liaise with the independent auditor who will conduct an environmental audit during the construction phase of the project according to the provisions of the Environmental Management Programme.

Independent Auditor: The person or entity who will conduct an environmental audit during the construction phase of the project according to the provisions of the Environmental Management Programme and Environmental Authorisation.

Environmental Management Programme (EMPr): The EMPr is a detailed plan for the implementation of the mitigation measures to minimise negative environmental impacts during the life cycle of a project. The EMPr contributes to the preparation of the contract documentation by developing clauses to which the contractor must adhere for the protection of the environment. The EMPr specifies how the construction of the project is to be carried out and includes the actions required for the Post-Construction Phase to ensure that all the environmental impacts are managed for the duration of the project's life cycle.

Therefore, the EMPr will be a working document, which will be reviewed when necessary, or if required by the authorities. A revision will be done once the detailed design of the proposed development has been completed.

Operational Phase (Post Construction): The period following the Construction Phase, during which the proposed development will be operational.

Pre-Construction Phase: The period prior to commencement of the Construction Phase, during which various activities associated with the preparation for the Construction Phase: detailed final designs, micro siting, etc. will be undertaken.

Rehabilitation: Rehabilitation is defined as the return of a disturbed area to a state which approximates the state (where possible) which it was before disruption. Rehabilitation for the purposes of this specification is aimed at post-reinstatement revegetation of a disturbed area and the insurance of a stable land surface. Revegetation should aim to accelerate the natural succession processes so that the plant community develops in the desired way, i.e., promote rapid vegetation establishment.

Site Manager: The person, representing the Contractor, responsible for all the Contractor's activities on the site including supervision of the construction staff and activities associated with the Construction Phase.

Project Area: This refers to the authorised area for the proposed development to take place. Farm portions numbers are outline in the EMPr.

Local Community: People residing or present in the region and near the construction activities, including the owners and/or managers of land affected by construction, workers on the land, and people in nearby towns and villages.

Public: Any individual or group concerned with or affected by the Project and its consequences, including the local community, local, regional, and national authorities, investors, workforce, customers, consumers, environmental interest groups, and the general public.

Construction Area / Site: The land on which the Project is to be located. It includes the site, construction campsite, access roads and tracks, as well as any other area affected or disturbed by construction activities. The EMPr (particularly the specifications for rehabilitation) are relevant for all areas disturbed during construction.

Access Roads and Tracks: All newly established roads and tracks, and areas cleared or driven over to provide access to / from the construction areas, and for the transportation of the construction workforce, equipment, and materials.

Environmental Impact: The effect of an activity on the environment, whether desirable or undesirable. Undesirable or negative environmental impacts will result in damage and/or pollution of, or detriment to the environment, or in danger to the public, whether immediate or delayed.

Environmental Incident: An unexpected or sudden occurrence related to the Project, including major emissions, spills, fires, explosions, floods or erosion leading to serious or potentially serious negative environmental impacts.

Fugitive Dust: Can be defined as natural and/or human-associated dust becoming airborne due to the forces of wind or human activity.

Fauna and Flora / Plants and Animals: Any individual or group of micro-organisms, plants or animals.

General Waste and Construction Rubble: It includes wastepaper, board, cardboard, benign organic and domestic waste and uncontaminated construction debris such as used bricks, wood, waste concrete, unused subsoil and rubble from excavations or demolished structures.

Heritage Sites and Artefacts: Heritage sites and artefacts can be defined as any object or site of cultural, historical, archaeological, or palaeontological significance found in or on the land. Historical objects are objects older than 50 years with architectural, historical, scientific, cultural, social, spiritual, linguistic, technological, or aesthetic value. For example: buildings or parts thereof, graves or burial sites, milestones, numismatic objects (i.e. coins and beads), and military objects.

Archaeological objects include material remains resulting from human activity which are older than 100 years and which are in a state of disuse, such as tools, artefacts, human and hominoid remains and artificial features and structures.

Palaeontological objects include any fossilised remains of animals or plants.

Hazardous Substances: Substances which are potentially dangerous and may affect human and/or environmental health. This would be because of the substances' inherent chemical and physical composition, which could be toxic, poisonous, flammable, explosive, carcinogenic or radioactive. Hazardous waste includes, but is not limited to: human excrement, the by-products and wastes associated will the use of hazardous substances (i.e. used fuel, oil, lubricants and solvents), as well as items such as spent batteries, old oil filters, light bulbs, tyres, circuit boards, etc. which requires special collection and handling. When left abandoned, even substances such as scrap metal, wire, tins, broken glass and plastic could be harmful to people, wild and domestic animals. For example: plastic could be ingested by animals; people and animals could be injured by broken glass or metal objects; and animals could get trapped in drums, tins and bottles or get entangled in plastic or metal wiring. Even if buried, such objects may become exposed over time due to wind erosion, scavengers or future human activities. Because of the sensitive nature of the area, these substances are all regarded as 'hazardous waste' for the purposes of this EMPr.

Hydrological Features: Hydrological features include, but are not limited to:

- wetlands;
- open water;
- vegetated drainage channels;
- subterranean water;
- marine environments;
- estuarine environments.

Life Support Systems: Life support systems include but are not limited to: an ecological system in which its outputs are vital for sustaining specialised habitats; an ecological system in which its outputs are vital for sustaining human life (e.g., water purification).

Mitigation: Environmental management measures designed to avoid, limit or remedy undesirable environmental impacts.

Monitoring: Structured observation, measurement, and evaluation of environmental data over a period of time to assess the efficiency of environmental mitigation and rehabilitation measures.

Rehabilitation: Measures implemented to restore a damaged Environment.

Sensitive Sites: Environmentally sensitive sites include, but are not limited to:

- Areas with high conservation value due to the presence of important plant specimens, pristine habitats, high biodiversity, important water resources or heritage features and artefacts;
- Areas particularly prone to erosion once disturbed (i.e., steep slopes);
- Vulnerable areas with low potential for rehabilitation / slow rate of recovery (i.e. rock outcrops, steep slopes); and
- Areas in close proximity of sensitive receptors, such as farm homesteads, viewpoints or tourist stopovers.

Specialised habitats: Specialised habitats include, but are not limited to, areas which are:

- Priority breeding habitats;
- Refuge areas;
- Vital for species survival (important for, part, or all of its life cycle);
- Essential for species performance;
- Cryptic habitats, etc.

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Acronyms and Abbreviations

Name	Description
BAR	Basic Assessment Report
BESS	Battery Energy Storage System
CA	Competent Authority
CARA	Conservation of Agricultural Resources, 1983 (Act No. 43 of 1983)
CBA	Critical Biodiversity Area
EA	Environmental Authorisation
EAP	Environmental Assessment Practitioner
I&AP	Interested and Affected Party

1. INTRODUCTION

Genesis Koup 1 Wind Farm (Pty) Ltd ('K2WF' – the Applicant / Developer), received environmental authorisation (EA) to develop the Koup 1 Wind Energy Facility (WEF) and associated infrastructure, located near the town of Beaufort West in the Beaufort West and Prince Albert Local Municipalities, which falls within the Central Karoo District Municipality of the Western Cape Province.

The EA includes approval for the development and operation of a WEF, a Battery Energy Storage System (BESS), and associated infrastructure.

Following an Environmental Impact Assessment (EIA) process conducted by SiVEST Environmental Division in April 2022, the Koup 1 WEF application received EA, issued by the Department of Forestry, Fisheries and the Environment (DFFE), on 12 September 2022 (i.e., DFFE Reference 14/12/16/3/3/2/2120).

This Environmental Management Programme (EMPr) for the development (ERM, 2024) represents the updates to the previous EMPr submitted with the Final EIA Report (SiVEST, 2022) and is prepared as part of the requirements of the EIA Regulations promulgated under the National Environmental Management Act 107 of 1998 (NEMA, 1998), as amended. The EMPr outlines measures to be implemented in order to minimise adverse environmental degradation associated with the various phases of the development. It 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.

This document must be seen as dynamic, and be updated when and if required, throughout the lifecycle of the project.

1.1 Details of the Developer

Details of the Developer (Applicant)	
Project Applicant	Koup 1 Wind Farm (Pty) Ltd
Company Registration	
Contact Person	Mr Davin Chown
Postal Address	PO Box 363, Newlands, Cape Town
Telephone	083 460 3898
Email	davin@genesis-eco.com

1.2 Details of the Environmental Impact Assessment Practitioner

The main authors of the draft EMPr were the SiVEST EAP (Michelle Guy, 2022), and SiVEST project lead (Michelle Nevette 2022). The co-authors of the draft EMPr were the specialists involved in the assessment of potential impacts identified during the EIA process. The name and role of all authors and co-authors are included in Table *1-1* below.

The EMPr has been revised and updated based on the final EMPr and Site Layout by Environmental Resource Management Southern Africa (Pty) Ltd ('ERM'). Authors of this approval process are provided in Table 1-2 below.

Table 1-1: Draft EMPr Authors and Co-authors

EIA Management Team 2022

Author	Organisation	Responsibility
Michelle Guy	SiVEST	Author (EAPASA Certified)
Katherine Wiles	SiVEST	Consultant
Michelle Nevette	SiVEST	EMPr Approver Manager

Specialist Team 2022

Specialist Name	Specialist Company	Specialist Study
Kerry Schwartz	SiVEST SA (Pty) Ltd	Visual Impact Assessment
Merchandt Le Maitre	SiVEST SA (Pty) Ltd	Transportation Impact Assessment
Wouter Fourie	PGS Heritage (Pty) Ltd Independent Consultant	Heritage Impact Assessment
John Almond		Palaeontological Impact Assessment
Nikki Mann		Archaeological Impact Assessment
Emmylou Bailey		Cultural Landscape Assessment
Khuthadzo Bulala	JG Afrika (Pty) Ltd	Geotechnical Assessment (Desktop)
Johann Lanz	Johann Lanz Consulting	Agriculture and Soils Impact Assessment (Desktop)
Morné de Jager	Enviro Acoustic Research	Noise Impact Assessment
Dr Neville Bews	Dr. Neville Bews & Associates	Social Impact Assessment (Desktop)
Dr Brian Colloty	EnviroSci (Pty) Ltd	Surface Water Impact Assessment
Simon Todd	3Foxes Biodiversity Solutions	Biodiversity Impact Assessment
Chris van Rooyen	Chris Van Rooyen Consulting	Avifaunal Impact Assessment
Albert Froneman		
Stephanie Dippenaar	Stephanie Dippenaar Consulting	Bat Impact Assessment

Table 1-2: Final EMPr Authors and Co-authors

Final EMPr and Site Layout Approval Management Team 2023

Author	Organisation	Responsibility
Stephanie Gopaul	ERM	Partner and EAP (Registered EAP)
Stephen Burton	ERM	Project Manager
Lucien Barbeau	ERM	Consultant

Final EMPr and Site Layout Specialist Team 2023

Specialist Name	Specialist Company	Specialist Study
Dr Brian Colloty	EnviroSci (Pty) Ltd	Surface Water Impact Assessment
Jamie Pote	Independent Consultant	Ecology (Flora and Fauna)
Chris van Rooyen	Chris Van Rooyen Consulting	Avifaunal Impact Assessment
Albert Froneman		
Craig Campbell	ERM	Bats

John Gribble	ACO Associates	Heritage and Archaeology
Dr John Almond	Natura Viva	Palaeontology
Morné de Jager	Enviro Acoustic Research	Noise Impact Assessment
Johann Lanz	Independent Consultant	Soil Agricultural Potential

1.3 Purpose and Aims of the EMPr

An EMPr is required in terms of Appendix 4 of the NEMA, 1998, EIA Regulations of 2014 (GNR 326), as amended.

As per the Provincial Government of the Western Cape, Department of Environmental Affairs & Development Planning (DEA&DP) Guideline for Environmental Management Plans (Lochner 2005), the over-arching objectives of an EMPr is (1) to ensure compliance with regulatory authority stipulations and guidelines, (2) to ensure sufficient allocation of resources on the project budget, (3) to verify environmental performance through information on impacts as they occur, (4) to respond to changes in project implementation not considered in the EIA, (5) to respond to unforeseen events and (6) to provide feedback for continual improvement in environmental performance.

The aim of this EMPr is to achieve the above objectives by:

- Defining the environmental management objectives to be realised during the life of the project, in order to enhance benefits and minimise adverse environmental impacts;
- Describing detailed actions needed to achieve these objectives, and mechanisms that address changes in the project implementation, emergencies and unexpected events;
- Clarifying institutional structures, roles, communication and reporting processes;
- Describing the link between the EMPr and associated legislated requirements; and
- Describing requirements for record keeping, reporting, review and auditing.

The purpose of the EMPr is to:

- Encourage good management practices through planning and commitment to environmental issues;
- Define how the management of the environment is reported and performance evaluated;
- Provide rational and practical environmental guidelines to:
    - Minimise disturbance of the natural environment;
    - Prevent pollution of land, air and water;
    - Protect indigenous flora and fauna;
    - Prevent soil erosion and facilitate re-vegetation;
- Comply with all applicable laws, regulations, standards and guidelines for the protection of the environment;
- Adopt the best practicable means available to prevent or minimise adverse environmental impacts;
- Identify and mitigate against any potential impact on ecology;
- Describe all monitoring procedures required to identify impacts on the environment; and
- Train employees and contractors with regard to environmental obligations.

This EMPr will be updated to include inputs from interested and affected parties (I&APs) during the public review and comment period before final approval from the DFFE. Moreover, it should be considered critical that the EMPr be updated to include site-specific information and specifications as

required throughout the life cycle of the facility - this will ensure that project activities are planned and implemented taking into account a changing environment and sensitive environmental features.

Table 1-3: Content of the EMPr in terms of the NEMA and Appendix 4 of the EIA Regulations, 2014 (as amended).

Appendix 4 Requirements NEMA, 1998 (Act No. 107 of 1998)		EMPr Reference
(1) An EMPr must comply with section 24N of the Act and include-details of		
(a)	*the EAP who prepared the EMPr; and* *the expertise of the EAP to prepare an EMPr, including a curriculum vitae;*	Section 1.2
(b)	*A detailed description of the aspects of the activity that are covered by the EMPr as identified by the project description;*	Section 1
(c)	*a map at an appropriate scale which superimposes the proposed activity, its associated structures, and infrastructure on the environmental sensitives of the preferred site, indicating any areas that should be avoided, including buffers;*	Section 2
(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 processed for all phased of the development including-* *planning and design;* *pre-construction activities;* *construction activities;* *rehabilitation of the environment after construction and where applicable post closure; and* *where relevant, operation activities;*	Section 6 - 28
(f)	*a description of proposed impact management actions, identifying the manner in which the impact management outcomes and contemplated in paragraph (d) will be achieved, and must, where applicable, include actions to-* *avoid, modify, remedy, control or stop any action, activity or process which causes pollution or environmental degradation;*	Section 6 - 28
	comply with any prescribed environmental management standards or practices;	
	comply with any applicable provisions of the Act regarding closure, whre applicable; and	
	comply with any provisions of the Act regarding financial provision for rehabilitation, where applicable;	
(g)	*the method of monitoring the implementation of the impact management actions contemplated in paragraph (f);*	Section 6 - 28
(h)	*the frequency of monitoring the implementation of the impact management actions contemplated in paragraph (f);*	Section 6 - 28
(i)	*an indication of the persons who will be responsible for the implementation of the impact management actions;*	Section 6 - 28
(j)	*the time periods within which the impact management actions contemplated in paragraph (f) must be implemented;*	Section 6 - 28
(k)	*the mechanism for monitoring compliance with the impact management actions contemplated in paragraph (f);*	Section 6 - 28
(l)	*a program for reporting on compliance, taking into account the requirements as prescribed by the Regulations;*	Section 6 - 28
(m)	*an environmental awareness plan describing 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; and*	Section 6 - 28
(n)	*any specific information that be required by the competent authority.*	Section 6 - 28

1.4 Updates to the EMPr by ERM

ERM were appointed by K2WF to act as the project manager and EAP to obtain approval of the final EMPr and Site Layout for the Koup 1 WEF and associated infrastructure. Table *1-4* below reflects updates made to the EMPr by ERM.

The Generic EMPr for the development of substations has been appended to this EMPr as Appendix C.

Table 1-4: Updates to the EMPr by ERM

Section No.	Section	Updates by ERM	Revised Section No.
1	Introduction	Includes the respective change in project status; Includes details of the Project Company; Includes details of the ERMand specialist team which was part of the Final EMPr and Site Layout approval process; and Reflects the updates made by ERM within the EMPr.	1
2	Details of the Applicant	Section summarised and merged with Section 1.	-
3	Details and Expertise of the EAP	Section summarised and merged with Section 1.	-
4	Activity Information	Section renamed and included final Koup 1 WEF specifications.	2
5	Location of the Activity	The location of the activity, including- i.the 21-digit Surveyor General code of each cadastral land parcel; ii.where available, the physical address and farm name; iii.where the required information in items (i) and (ii) is not available, the co-ordinates of the boundary of the property or properties.	3
6	Environmental Management Programme	The Environmental Management Programme including – Environmental Awareness and Compliance; Project Responsibilities; Frequency for auditing of compliance and submission of reports; Training and Induction of employees Complaints Register and Environmental Incident books; Construction Environmental Monitoring; Dealing with Non-compliance with the EMPr And EMPr amendments and instruction	4
7	Legal and Other Requirements	A description of the policy and legislative context within which the development is proposed, including an identification of all legislation, policies, plans,	5

Section No.	Section	Updates by ERM	Revised Section No.
		guidelines, spatial tools, municipal development planning frameworks and instruments that are applicable to this activity and are to be considered in the	
8	Project Responsibilities	The appointed contractors will be responsible for environmental management on site during all phases of the development. Specific roles and responsibilities are highlighted in this section	Section 5.2
5	Environmental Authorisation and Complaints Record Sheet	Any complaints received from the community must be brought to the attention of the ECO / ESO, who will respond accordingly.	Section 5.5
9	Environmental Incidents	Impact Management and Mitigation are detailed in these sections	Section 6, 7 and 8
10	Amendments to the EMPr	Fulfilment of the Environmental Authorization requirement for separate approval of the Final EMPr and Final layout as amended following specialist site walkdowns. i.e., Micro-siting	-
11	Environmental Awareness Plan	Details of the Environmental Awareness Plan is stated in this section such as a development must be socially, economically and environmentally sustainable. Sustainable development requirements follow in this section	Section 5.1
12	Conclusion	A concluding statement indicating the potential mitigation measures and management actions to follow within this EMPr.	Section 29
6	Management plan for design phase	Updated to include additional mitigation measures and conditions as per the EA.	Section 6
7	Management plan for construction phase	Updated to include additional mitigation measures by the Avifaunal, Bats, Noise and Socio-Economic specialists, and conditions as per the EA.	Section 7
8	Management plan for operational phase	Updated to include additional mitigation measures by the Socio-Economic, bats and Noise specialists, and conditions as per the EA.	Section 8
9	Management plan for decommissioning phase	Updated to include additional mitigation measures and conditions as per the EA.	Section 9
10	Invasive Alien Plant Management Plan	Added as per EA requirements.	Section 12
11	Plant Rescue and Protection Plan	Added as per EA requirements.	Section 13

Section No.	Section	Updates by ERM	Revised Section No.
12	Open Space Management Plan	Added as per EA requirements.	Section 16
13	Traffic Management Plan	Added as per EA requirements.	Section 19
14	Transportation Management Plan	Added as per EA requirements.	Section 20
15	Stormwater Management Plan	Added as per EA requirements.	Section 18
16	Erosion Management Plan	Added as per EA requirements.	Section 15
17	Fire Management Plan	Added as per EA requirements.	Section 21
18	Fuel Storage Measures	Added as per EA requirements.	Section 22
19	Avifauna Management Plan	Added as per EA requirements and updated in accordance with the latest best practice guidelines.	Section 24
-	Archaeological/Heritage Management Plan	Added as per EA requirements and updated in accordance with the latest best practice guidelines.	Section 27
20	Bat Management Plan	Updated as per Bats Amendment Report and in accordance with the latest best practice guidelines.	Section 25
21	BESS Management	Added due to inclusion in the application.	Section 11
22	Conclusion	Section added.	Section 29
-	Appendix A	Added generic EMPr for the development of the on-site substation.	-
-	Appendix B	EMPr Figures	-
-	Appendix C	Environmental Authorisation	-
-	Appendix D	Specialist Walkdown Reports	-

2. THE KOUP 1 WEF DEVELOPMENT

Section 2.1 presents the co-ordinates and technical details of the Koup 1 WEF layout as approved in the EA, and Section 2.2 presents the co-ordinates and technical details of the final Koup 1 WEF layout.

2.1 Specifications as per the EA

This section presents the summary tables of the Koup 1 WEF specifications as included In the EA. Table *2-1* and

Table *2-2* below provides the co-ordinates and technical details of the development as authorised in the EA. Figure 2.1 shows the final layout map of 28 turbine positions determined during the finalisation of this EMPr.

Table 2-1: Co-ordinates of the Koup 1 WEF Site and Infrastructure Locations as approved in the EA

Koup 1 WEF Site Boundary Corner Points

Feature	Point	Latitude	Longitude
Site Boundary	1	32° 50' 36.020"S	22° 26' 37.756"E
Site Boundary	2	32° 50' 51.961S	22° 28' 4.418"E
Site Boundary	3	32° 51' 0.932"S	22° 28' 6.002"E
Site Boundary	4	32° 50' 36.319"S	22° 28' 38.215"E
Site Boundary	5	32° 50' 49.589"S	22° 31' 22.688"E
Site Boundary	6	32° 50' 1.777"S	22° 32' 34.613"E
Site Boundary	7	32° 50' 5.053"S	22° 32' 51.295"E
Site Boundary	8	32° 52' 58.325"S	22° 33' 7.497"E
Site Boundary	9	32° 52' 39.135"S	22° 31' 9.123"E
Site Boundary	10	32° 52' 37.782"S	22° 30' 31.526"E
Site Boundary	11	32° 52' 36.445"S	22° 30' 27.738"E
Site Boundary	12	32° 52' 36.917"S	22° 30' 6.930"E
Site Boundary	13	32° 52' 36.054"S	22° 30' 0.458"E
Site Boundary	14	32° 52' 28.521"S	22° 29' 47.703"E
Site Boundary	15	32° 52' 27.937"S	22° 29' 41.656"E
Site Boundary	16	32° 52' 12.336"S	22° 29' 19.904"E
Site Boundary	17	32° 52' 35.465"S	22° 27' 20.433"E
Site Boundary	18	32° 52' 18.646"S	22° 23' 48.772"E
Site Boundary	19	32° 51' 1.495"S	22° 26' 12.579"E

Koup 1 WEF Substation and BESS Centre Points

Feature	Latitude	Longitude
BESS Centre Point	32°52'3.51"S	22°31'49.39"

Koup 1 WEF Construction Laydown / Operation and Maintenance (O&M) Building

Feature	Latitude	Longitude
Laydown	32°52'0.45"S	22°31'56.02"E
O&M	32°51'59.65"S	22°31'52.20"E

Table 2-2: Technical Details of the Koup 1 WEF as per the EA

Technical Component	Component Detail
Holder of the authorisation (also referred to as the Developer / Applicant)	Koup 1 Wind Farm (Pty) Ltd
Location of the site	32°51'41.01"'S, 22°27'24.65" E
21 Digit SG Code	C06100000000023100000 C00900000000037400011 C00900000000037400015 C00900000000038000005 C00900000000038000010 C00900000000038000011
Site Access	Access to the Koup 1 WEF site will be from the existing access, located ±1 430m west from the surfaced N12 National Road (Road No: TR03305) and falls under the jurisdiction of the Western Cape Provincial Administration. The existing access is located at Km 51.80 and provides access to the farms situated on both east and west of the N12 Freeway. The access to this development is towards the west from the N12 Freeway and traverses over the Remainder of Portion 4 of the farm 374 as a gravel access road up to the existing farm access.
Export Capacity	Up to 184 MW
Proposed technology	Wind turbines and associated infrastructure
Number of Turbines	A total of 28 wind turbines
Hub Height from ground level	Up to 200 m
Rotor Diameter	Up to 200 m
Substation	Approximately 1.50 hectare (ha)
Construction laydown area / O&M building	Approximately 2.25 hectare (ha)
Hard stand areas	Approximately 4 500 m^2
Battery Energy Storage System (BESS)	A Battery Energy Storage System (BESS) will be located next to the onsite 33/132kV substation. Up to 40MW of batteries using solid state / liquid flow batteries with hazardous material of more than 80m^3 will be used but most likely will comprise an array of containers, outdoor cabinets and / or storage tanks.

Width of internal roads	Between approximately 8m and 10m
Width and length of internal roads	Between approximately 8m and 10m
Height of fencing	Approximately 1m -1.5m high
Proximity to grid connection	Approximately 1km from application site
Type of fencing	Galvanized steel

2.2 Specialist Micro-siting Findings

Condition 14 of the EA established that the EMPr was not approved and should be amended to include measures as dictated by the final site lay-out map and micro-siting, and the provisions of the EA.

The following specialists conducted a walkthrough of the site to assist with micro-siting the layout of turbines and other infrastructure:

- Aquatic Specialist;
- Flora and Fauna Specialist;
- Archaeological Specialist;
- Palaeontology Specialist;
- Avifaunal Specialist; and
- Bat Specialist

The following specialists conducted a desk-top analysis of the final site layout to assist with micro-siting the layout of turbines and other infrastructure:

Noise Specialist

This EMPr represents the requested update to the previous EMPr submitted, including any new mitigation measures that were incorporated in the specialist's assessments, 2022, and Specialist Assessments based on the Conditions of the EA, 2023. A Final Layout (Figure 2.1) is attached to this EMPr.

Based on the results of the above-mentioned specialist's walk-through and desk-based assessments, the sections below provide their recommendations used for the final site layout and micro siting and this EMPr. The specialist walkthrough assessment reports are included as Volume II.

Figure 2-1 Final layout including the 28 turbine positions for the Koup 1 WEF

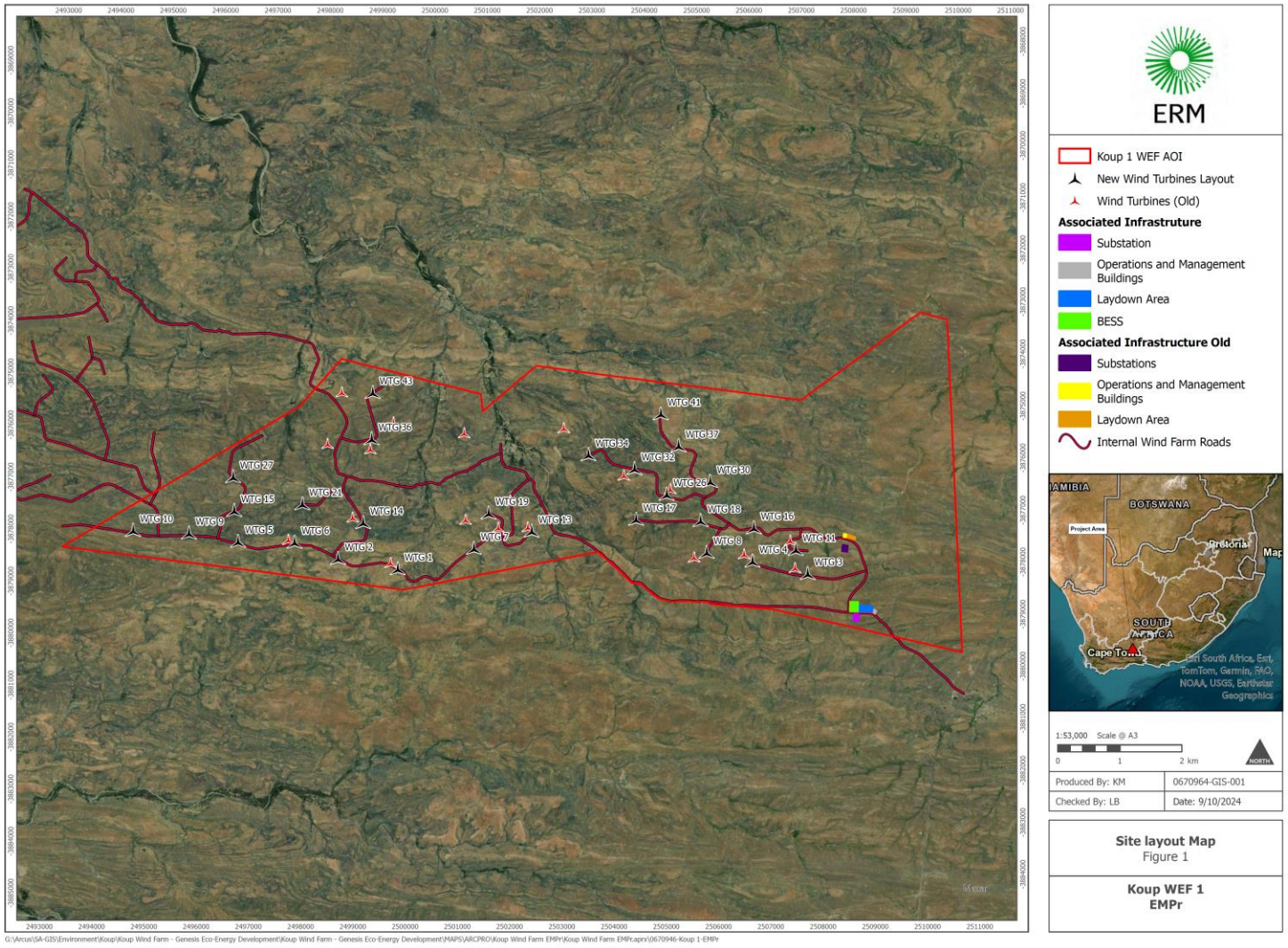
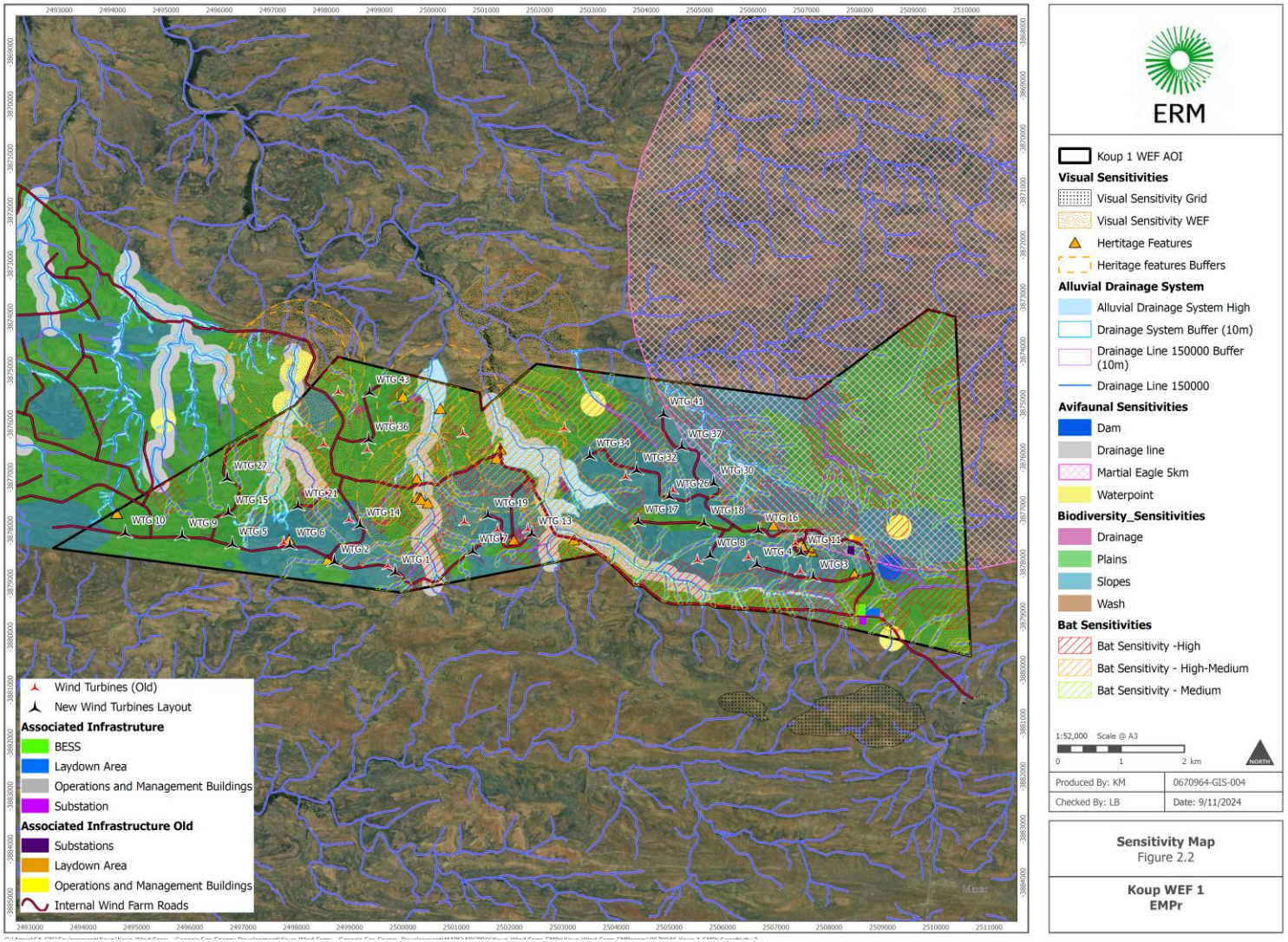


Figure 2-2 Environmental Sensitivities for Koup 1 WEF



2.2.1 Freshwater and Wetlands (Aquatic)

The study area does contain a variety of aquatic features associated, and were characterised as follows:

1. Non perennial rivers alluvial dominated channels with or without riparian vegetation. These ranged from narrow channels within small canyons with steep cliffs to broad flood plain areas in the lower valleys. Some of these did contain small seeps/fountains which sustained small pools of water inhabited by invertebrates and amphibians. However, broad riparian zones are only found within the lower valley areas, dominated by a small number of trees, while obligate instream vegetation is limited to a small number of sedges (nut grasses).

2. Minor drainage lines, with no obligate aquatic vegetation and were mostly 2 – 8m in width

3. Dams or weirs with no wetland or aquatic features, although not many of these were located within the study area.

The features listed above, drain the study area in a north westerly region, forming part of a tributary of the Veldmans River (J21E) and Groot River (J23B) Quinary Catchment of the Great Karoo Ecoregion in the Breede-Gouritz Catchment Management Agency (George Regional Office). The Veldmans and Groot rivers in turn drain into the Gamka River.

No wetlands were found within the proposed development areas, only the riverine features such as alluvial floodplains and riparian thickets dominated by *Vachellia karroo, Searsia lancea, Euclea undulata, Gymonsporia buxifolia Ficinia nodusa, Carex spp, Centella asiatica, Erianthus capensis, Sporobolus fimbriatus, Cynodon incompletes, Prosopis* spp (Exotic,) *Eragrostis curvula, Erharta calcynia, Merxmuellera disticha*, and *Cynodon dactylon* are found in close proximity to any of the proposed infrastructure.

Currently there are no formalised riverine or wetland buffer distances provided by the provincial authorities and as such the buffer model as described Macfarlane & Bredin (2017) for wetlands, rivers and estuaries was used. These buffer models are based on the condition of the waterbody, the state of the remainder of the site, coupled to the type of development, as wells as the proposed alteration of hydrological flows. Based then on the information known for the site the buffer model provided the following:

- Construction period: 10 m
- Operation period: 8 m
- Final: 10 m

Artificial dams were not buffered.

Therefore, various watercourse units may be affected by the new internal roads, hardstands, laydown areas, site camps.

All wind turbine towers, substation, laydowns, camps and O/M buildings, were confirmed to be outside of these areas.

2.2.2 Biodiversity (Flora and Fauna)

The following general recommendations are made based on the findings of the walkdown, with reference to the summary of WEF and infrastructure vegetation and sensitivities and recommended layout adjustments:

- No turbine positions were noted to conflict with any sensitive areas as per original assessment;
- Site walkdown determined that several turbines and roads were near sensitive features, including several drainage lines, watercourses and grassy veli like areas. While not directly of a terrestrial nature these features do none the less have potential indirect terrestrial habitat sensitivities, being

in an arid environment where the aquatic and terrestrial environment are closely linked. Several minor alignment recommendations have been implemented in the latest spatial development plan in this regard. These have reduced the very high sensitivity footprint slightly;

- No specific sensitivities were identified relating to the Grid Connection Option 2 (South) route;
- The following specific recommendations should be included in any updated EMPr for the project
  - A flora and fauna search and rescue (relocation) must be undertaken before commencement of any vegetation clearing. A comprehensive (updated) list of species for which permits will be required will be included in permit applications, including several species not identified during the initial assessment.
  - Where there are further changes/updates to the vertical and horizontal alignments of the road network and site laydown area, such sections/areas may require reassessed in order to determine any further risks and impacts to the ecology and/or species.

2.2.3 Avifauna

The recommendations below were put forward for inclusion in the Final Environmental Management Programme (EMPr). These recommendations are based on the pre-construction monitoring conducted from October 2019 to July 2020 and the walk-through exercise in February 2023 and Dec (Van Rooyen et al. 2021):

Design phase

- It is recommended that a 5km turbine exclusion zone is implemented around the Martial Eagle nest a Tower 108 on the Droërivier – Protheus 400kV transmission line. The current turbine lay-out has taken this into account.
- It is recommended that a 150m turbine exclusion zone is implemented around all drainage lines at the project site, and a 200m turbine exclusion zone around dams and water troughs as a pre-cautionary measure against SCC and other priority species collisions. The current turbine lay-out has taken this into account.
- It is recommended that all internal medium voltage cables are buried if technically possible.
- Those sections where the 33kV medium voltage cable cannot be trenched due to technical or environmental reasons, but needs run on overhead poles, the proposed pole designs must be approved by the avifaunal specialist, to ensure that the designs are raptor-friendly.
- It is recommended that bird flight diverters are fitted to all internal 33kV overhead lines according to the applicable Eskom engineering standard at the time.
- Consideration should be given to painting one third of one blade on each turbine signal red as a mitigation measure against avifaunal collisions, if feasible. While this mitigation measure is still considered experimental, data from Norway indicates a high level of effectiveness, even up to 100% for large raptors. If this can be done during the manufacturing phase, it can be done inexpensively.

Construction phase

- Construction activity should be restricted to the immediate footprint of the infrastructure as far as possible, and in particular to the proposed road network. Access to the remainder of the site should be strictly controlled to prevent unnecessary disturbance of SCC.
- Removal of vegetation must be restricted to a minimum.
- Construction of new roads should only be considered if existing roads cannot be upgraded.
- The recommendations of the ecological and botanical specialist studies must be strictly implemented, especially as far as limitation of the activity footprint is concerned.

Operational phase

- Vehicle and pedestrian access to the site should be controlled and restricted to access roads to prevent unnecessary disturbance of SCC.
- Formal monitoring should be resumed once the turbines have been constructed, as per the most recent edition (2015) of the best practice guidelines (Jenkins et al. 2011). The exact time when post-construction monitoring should commence, will depend on the construction schedule, and will be agreed upon with the site operator once these timelines and a commercial operational date have been finalised.
- As a minimum, post-construction monitoring should be undertaken for the first two years of operation, and then repeated again in Year 5, and again every five years thereafter for the operational lifetime of the facility. The exact scope and nature of the post-construction monitoring will be determined on an ongoing basis by the results of the monitoring through a process of adaptive management.
- Depending on the results of the carcass searches, a range of mitigation measures will have to be considered if mortality levels of SCC turn out to be biologically significant, including Shutdown on Demand (SDoD).
- Dismantling 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.
- It is confirmed that the above recommendations have been adhered to with regards to the design phase and will be adhered to through the construction and operational phases.

2.2.4 Archaeology

The walkdown survey noted the same widespread but fairly thin occurrence of mainly Middle Stone Age archaeological material of relatively low significance reported across much of the study area by PGS Heritage and concluded that the overall impacts to this material arising from the construction, operation and decommissioning of the wind energy facility will be low.

The survey found that although the bulk of the archaeological occurrences identified in 2021-2022 were assessed to be not conservation-worthy, all these sites have been avoided in the final layout of the wind energy facility and no impacts to these previously identified archaeological sites and materials are anticipated.

A handful of additional archaeological occurrences were recorded during the walkdown survey, the bulk of which were ephemeral scatters of Middle Stone Age flaked stone, with some Later Stone Age lithics also present. Most of these scatters were ungradable and are considered not to be conservation-worthy. Two, more dense lithic scatters (JG014 and G003) were graded 3C and should be avoided during the construction and use of the nearby turbine access road.

In respect of the built environment, the 2021 PGS Heritage survey identified a number of historical structures located close to the current farm access road which runs through the wind energy facility. PGS Heritage recommended 30 m buffers around three of these structures which the final wind energy facility layout has addressed.

It should be noted that the proposed overhead powerline passes almost directly over a modern labourers' cottage (KO-04), and while this is not a heritage issue, given the building's age, it may be health / living environment issue.

The walkdown survey identified three additional historical buildings at Arbeid on Portion 10 of Farm 380 but none of these will be directly affected by the construction or operation of the wind energy facility.

The final Koup 1 wind energy facility layout avoids the formal graveyard (KO-07), and possible grave (KO-08) associated with the Kareerivier farm complex and the informal graveyard (KO-06) possibly associated with the Platdoring complex. The proposed access road and overhead powerline are more than 200 m from these two sites and well beyond the 50 m buffer recommended in the heritage impact assessment.

The informal graveyard (KO-06), however, is approximately 45 m from the roadway and while this is likely to be sufficient to ensure that it is not impacted by the access road, it means that the imposition of the recommended 50 m buffer is not practical. It is also possible that the proposed final cable alignment will pass almost directly over the graves and the potential for impacts is high.

The single isolated grave, KO-09, is directly adjacent to the access road and is very likely to be impacted by its upgrade for the wind energy facility unless the road alignment is amended.

The walkover survey identified an apparent isolated grave (G001) inside a wire fence next to the road to the Arbeid farm werf. This grave will not be affected by activities associated with the construction, operation or decommissioning of the wind energy facility.

2.2.5 Bats

The original sensitivity buffers defined in the pre-construction monitoring and impact assessment report defined high sensitivity zones as areas where all turbine components (including the full blade length) should be placed outside of such zones (i.e no-go areas). The motivation for these no-go zones were mostly due to the occurrence of suitable bat foraging and roosting habitat. High-Medium sensitivity zones were defined as areas mainly comprising thicket vegetation bordering high sensitivity zones but demonstrated lower bat activity levels – which negated the need for such areas to be defined as being highly sensitive. Placement of wind turbines within these areas would be allowed, provided that strict mitigation measures are adhered to. Medium sensitivity zones were defined as areas whereby a 35m buffer was applied around first and second order gullies, which are known to mostly contain water when there is run-off during periods of rain. These areas, in general, do not support thicket or riparian vegetation and have been associated with lower bat activity. They are subsequently not deemed relevant enough to be assigned with a higher sensitivity rating and do not warrant curtailment from the onset of the project. Turbines are however recommended to be placed outside of these zones, as far as possible. Where turbines are placed inside such zones, then results from the operational bat monitoring campaign should inform whether or not further mitigation is required, and implemented as soon as it becomes relevant.

The above recommendation has been adhered to in the final Spatial Development Plan.

2.2.6 Noise

This review assessment considers the potential noise impact on the surrounding environment due to the construction, operational and future decommissioning activities associated with the Project. It makes use of conceptual scenarios to develop noise propagation models to estimate potential noise levels. Considering the ambient sound levels measured onsite, the proposed noise limits as well as the calculated noise levels, it was determined that the significance of the potential noise impacts would be:

- of a medium significance for the construction of access roads (or upgrading of existing roads). This finding relates to the very low ambient sound levels measured during the site visit, as well as the strict EIA criteria employed in this assessment. Mitigation however is available that could reduce the probability of the impact occurring as well as the intensity/magnitude of the noise level;
- of a medium significance relating to noises from construction traffic. This finding relates to the very low ambient sound levels measured during the site visit, as well as the strict EIA criteria employed in this assessment. Mitigation however is available that could reduce the probability of the impact occurring as well as the intensity/magnitude of the noise level;

- of a medium significance for the daytime construction activities (hard standing areas, excavation and concreting of foundations and the assembly of the WTG and other infrastructure). This finding relates to the very low ambient sound levels measured during the site visit, as well as the strict EIA criteria employed in this assessment. Mitigation however is available that could reduce the probability of the impact occurring as well as the intensity/magnitude of the noise level;
- of a potential medium significance for the night-time construction activities (the potential pouring of concrete, erection of WTG). This finding relates to the very low ambient sound levels measured during the site visit, as well as the strict EIA criteria employed in this assessment. Mitigation however is available that could reduce the probability of the impact occurring as well as the intensity/magnitude of the noise level;
- of a medium significance for daytime operational activities (noises from wind turbines) when considering the worst-case SPL. Mitigation is available that could reduce the probability of the impact occurring as well as the intensity/magnitude of the noise level; and
- of a high significance for night-time operational activities (noises from wind turbines) when considering the worst-case SPL. Mitigation is available and included in this assessment that could reduce the probability of the impact occurring as well as the intensity/magnitude of the noise level.

There is a slight potential for a cumulative noise impact to occur during the operational phase. NSR 3, 4 and 5 are located between the WTG of the proposed Koup 1 and Koup 2 WEFs and there is a slight cumulative impact at these NSR. Total cumulative noise levels are higher than 45 dBA at these NSR, but this noise impact mainly relates to noises from operating WTG of the Koup 1 WEF (potential noise levels due to the WTG of the Koup 2 WEF will be less than 40 dBA).

2.3 Specifications for Approval

The final site layout (Figure 2) for the development has been refined based on the specialists' site walkthroughs and their recommendations discussed in Section 2.2.

The co-ordinates of the wind turbines, permanent and temporary areas, as well as the access roads have all been finalised. Upon approval of the final layout and this EMPr by the DFFE, if any changes are made to the layout or EMPr this must be submitted to the DFFE for approval.

Table *2-3* and Table *2-4* below provides the co-ordinates and technical details of the final development layout that is being submitted for approval.

Table 2-3: Co-ordinates of the Final Koup 1 WEF Site and Infrastructure Locations

Koup 1 WEF Site Boundary Corner Points

Feature	Point	Latitude	Longitude
Site Boundary	1	32° 50' 36.020"S	22° 26' 37.756"E
Site Boundary	2	32° 50' 51.961S	22° 28' 4.418"E
Site Boundary	3	32° 51' 0.932"S	22° 28' 6.002"E
Site Boundary	4	32° 50' 36.319"S	22° 28' 38.215"E
Site Boundary	5	32° 50' 49.589"S	22° 31' 22.688"E
Site Boundary	6	32° 50' 1.777"S	22° 32' 34.613"E
Site Boundary	7	32° 50' 5.053"S	22° 32' 51.295"E

Site Boundary	8	32° 52' 58.325"S	22° 33' 7.497"E
Site Boundary	9	32° 52' 39.135"S	22° 31' 9.123"E
Site Boundary	10	32° 52' 37.782"S	22° 30' 31.526"E
Site Boundary	11	32° 52' 36.445"S	22° 30' 27.738"E
Site Boundary	12	32° 52' 36.917"S	22° 30' 6.930"E
Site Boundary	13	32° 52' 36.054"S	22° 30' 0.458"E
Site Boundary	14	32° 52' 28.521"S	22° 29' 47.703"E
Site Boundary	15	32° 52' 27.937"S	22° 29' 41.656"E
Site Boundary	16	32° 52' 12.336"S	22° 29' 19.904"E
Site Boundary	17	32° 52' 35.465"S	22° 27' 20.433"E
Site Boundary	18	32° 52' 18.646"S	22° 23' 48.772"E
Site Boundary	19	32° 51' 1.495"S	22° 26' 12.579"E

Koup 1 WEF Substation and BESS Centre Points

Feature	Latitude	Longitude
BESS Centre Point	32° 52' 13.48872905" S	22° 31' 52.41582594" E

Koup 1 WEF Construction Laydown / Operation and Maintenance (O&M) Building

Feature	Latitude	Longitude
Laydown	32° 52' 10.24608506" S	22° 31' 51.32826138" E
O&M	32° 52' 14.58069515" S	22° 31' 55.12921350" E
Switching Station	32° 52' 20.01467094" S	22° 31' 53.08775461" E
Substation	32° 52' 17.23800422" S	22° 31' 53.20563542" E

Table 2-4: Technical Details of the Final Koup 1 WEF Development

Technical Component	Component Detail
Holder of the authorisation (also referred to as the Developer / Applicant)	Koup 1 Wind Farm (Pty) Ltd
Location of the site	32°51’41.01”’S, 22°27’24.65” E
21 Digit SG Code	C00900000000037400011 C00900000000037400015 C00900000000038000010 C00900000000038000015
Site Access	Access to the Koup 1 WEF site will be from the existing access, located ±1 430m west from the surfaced N12 National Road (Road No: TR03305) and falls under the jurisdiction of the Western Cape Provincial Administration. The existing access is located at Km 51.80 and provides access to the farms situated on both east and west of the N12 Freeway. The access to this development is towards the west from the N12 Freeway and traverses over the

	Remainder of Portion 4 of the farm 374 as a gravel access road up to the existing farm access.
Export Capacity	184MW
Proposed technology	Wind turbines and associated infrastructure
Number of Turbines	A total of 28 wind turbines
Hub Height from ground level	Up to 200 m
Rotor Diameter	Up to 200 m
Substation	Approximately 1.50 hectare (ha)
Construction laydown area / O&M building	Approximately 2.25 hectare (ha)
Hard stand areas	Approximately 4 500 m^2
Battery Energy Storage System (BESS)	A Battery Energy Storage System (BESS) will be located next to the onsite 33/132kV substation. Up to 40MW of batteries using solid state / liquid flow batteries with hazardous material of more than 80m^3 will be used but most likely will comprise an array of containers, outdoor cabinets and / or storage tanks.
Area occupied by both permanent and construction laydown areas	• A hard stand area of 4 500 m^2 (90 m x 50 m) will be established adjacent to each turbine position; • Twenty-eight (28) turbines will be constructed for operation. The turbines will be placed on steel and concrete foundations which will each occupy an area of 15 m by 15 m in total; • One (1) construction laydown / staging area of up to 2.25 ha will be developed; and • The on-site substation will occupy an area of up to 1.5 ha
Width of internal roads	Between approximately 8m and 10m
Width and length of internal roads	Between approximately 8m and 10m
Height of fencing	Approximately 1m -1.5m high
Proximity to grid connection	Approximately 1km from application site
Type of fencing	Galvanized steel

2.4 Facility Components for Approval

The development will comprise components as described below.

2.4.1 Turbines

Twenty-eight (28) turbines will be constructed for operation. The turbines will be placed on steel and concrete foundations which will each occupy an area of 15 m by 15 m in total (which includes the maximum total area that may need to be disturbed during construction of the foundation) and approximately 3 m deep and may include concrete and steel plinths depending on local ground conditions.

Once construction is complete, much of the foundation area will be rehabilitated.

Furthermore, the existing four turbines will undergo staged decommissioning once the two new turbines are in operation.

2.4.2 Hard Stand Areas

Each turbine requires a hard stand area adjacent to the turbine foundation. This provides a flat, stable base on which to lay down the turbine components for assembly and erection and to site the two cranes necessary to lift the tower sections, nacelle and rotor into place.

A hard stand area of 4 500 m^2 (90 m x 50 m) will be established adjacent to each turbine position. This will be used to provide a platform for cranes to operate during construction (and unscheduled maintenance), as well as a clear area to lay out turbine components prior to erection.

The crane hard stand area will be kept post construction in order to allow for use of similar cranes, should major components need replacing during the operational phase of the development.

2.4.3 Laydown Areas

One (1) construction laydown / staging area of up to 2.25 ha will be developed. This area will include one (1) permanent O&M building, including an on-site spares storage building, a workshop and an operations building, will be located within the laydown area footprint. Temporary infrastructure would include a laydown area and a batching plant. Additional temporary laydown areas will be required for equipment and component storage during construction across the site. These areas will be levelled and compacted and used for component storage.

It should be noted that no construction camps will be required to house workers overnight as all workers will be accommodated in the nearby town.

2.4.4 Electrical Cabling and Onsite Substation

Each turbine will have an electrical transformer adjacent to it, of up to approximately 2m x 2m, to step up the voltage to 33kV.

The electricity from the turbines will be transferred via a 33 kV electrical network to the proposed 33 / 132 kV on-site substation. Detailed construction and trenching specifications will depend on the ground conditions encountered during construction. Typically, cables would be laid in accordance with the relevant standards and also as per manufacturer's installation manuals. To minimise ground disturbance, cables will be buried along access roads wherever technically feasible from the turbine positions to the on-site substation.

The on-site substation will occupy an area of up to 1.5 ha and will house electrical infrastructure such as switching gear to enable the energy to be transferred into the existing national grid.

2.4.5 Access

The application site will be accessed via an existing gravel road from the N12 National Route.

Internal roads with a width of between 8 m and 10 m will provide access to each wind turbine. Existing site roads will be used wherever possible, although new site roads will be constructed where necessary. Turns will have a radius of up to 50 m for abnormal loads (especially turbine blades) to access the various wind turbine positions.

2.4.6 Ancillary Equipment

In addition to the key components outlined above, the WEF will also require:

- Meteorological masts;
- Security fencing; and
- CCTV monitoring equipment.

3. COMPLIANCE WITH THE CONDITIONS OF THE KOUP 1 WIND FARM EA

This section of the EMPr indicates compliance with the conditions (Table *3-1*) and notes specific conditions (Section 3.2 – Section 3.8) of the EA, dated 22 September 2022 (DFFE Reference 14/12/16/3/3/2/2121), for which action is required by the developer and contractors / staff.

3.1 Compliance with the Conditions of the EA in the EMPr

Table 3-1: Compliance with the Conditions of the EA in the EMPr

EA Condition	EMPr Reference
Management of the Activity	
13. A final site layout plan for the Koup 1 Wind Energy Facility, substation and all associated infrastructure, as determined by the detailed engineering phase and micro-siting of the wind turbine positions, and all mitigation measures as dictated by the final site layout plan, must be submitted to the Department for approval prior to construction. A copy of the final site layout map must be made available for comments to registered Interested and Affected Parties and the holder of this Environmental Authorisation must consider such comments. Once amended, the final development layout map must be submitted to the Department for written approval prior to commencement of the activity. All available biodiversity information must be used in the finalisation of the layout map. Existing infrastructure must be used as far as possible e.g., roads. The layout map must indicate the following: The position of wind turbines and associated infrastructure; Internal and access roads indicating width; The BESS, substation(s) invertors and /or transformer(s) sites including their entire footprints; Connection routes (including pylon positions) to the distribution/transmission network; Buildings, including accommodation; All existing infrastructure on the site; Wetlands, drainage lines, rivers, stream and water crossing of roads and cables; All sensitive features e.g., Important Bird Areas, Critical Biodiversity Areas, Ecological Support Areas, heritage sites, wetlands, pans and drainage channels that will be affected by the facility and associated infrastructure; and All "no-go" and buffer areas.	Section 2, Figure 2-1 and Table 2-4.
14. The Environmental Management Programme (EMPr) submitted as part of the final EIAr (Appendix 8) dated June 2022 is not approved and must be amended to include measures as dictated by the final site lay-out map and micro-siting; and the provisions of this Environmental Authorisation. The EMPr must be made available for comments by registered Interested and Affected Parties and the holder of this Environmental Authorisation must consider such comments. Once amended, the final EMPr must be submitted to the Department for written approval prior to commencement of the activity.	N/A
15. The EMPr must include the following:	
15.1 All recommendations and mitigations measures recorded in the EIAr and the specialist reports as included in the final EIAr dated June 2022.	Section 2
15.2 The requirements and conditions of this authorisation.	Section 3.8 below
15.3 The final site layout map.	Figure 2-1
15.4 A construction and operational avifaunal and bat monitoring plan.	Section 25
15.5 An alien invasive management plan to be implemented during construction and operation of the facility. The plan must include mitigation measures to reduce the invasion of alien species and ensure that the continuous monitoring and removal of alien is undertaken.	Section 12

EA Condition	EMPr Reference
Management of the Activity	
15.6 A plant rescue and protection plan which allows for the maximum transplant of conservation important species from areas to be transformed. This plan must be compiled by a vegetation specialist familiar with the site in consultation with the ECO and be implemented prior to commencement of the construction phase.	Section 13
15.7 A re-vegetation and habitat rehabilitation plan to be implemented during the construction and operation of the facility. Restoration must be undertaken as soon as possible after completion of construction activities to reduce the amount of habitat converted at any one time and to speed up the recovery to natural habitats.	Section 14
15.8 A transportation plan for the transport of turbine components, main assembly cranes and other large equipment.	Section 20
15.9 A traffic management plan for the site access roads to ensure that no hazards would results from the increased truck traffic and that traffic flow would not be adversely impacted. This plan must include measures to minimize impacts on local commuters e.g. limiting construction vehicles travelling on public roadways during the morning and late afternoon commute time and avoid using roads through densely populated built-up areas so as not to disturb existing retail and commercial operations.	Section 19
15.10 A storm water management plan to be implemented during the construction and operation of the facility. The plan must ensure compliance with applicable regulations and prevent off-site migration of contaminated storm water or increased soil erosion. The plan must include the construction of appropriate design measures that allow surface and subsurface movement of water along drainage lines so as not to impede natural surface and subsurface flows. Drainage measures must promote the dissipation of storm water run-off.	Section 18
15.11 An erosion management plan for monitoring and rehabilitating erosion events associated with the facility. Appropriate erosion mitigation must form part of this plan to prevent and reduce the risk of any potential erosion.	Section 15
15.12 An effective monitoring system to detect any leakage or spillage of all hazardous substances during their transportation, handling, use and storage. This must include precautionary measures to limit the possibility of oil and other toxic liquids from entering the soil or storm water systems.	Section 22
15.13 A fire management plan to be implemented during the construction and operational phases.	Section 21
15.14 Measures to protect hydrological features such as streams, rivers, pans, wetlands, dams and their catchments, and other environmental sensitive areas from construction impacts including the direct or indirect spillage of pollutants.	Section 22
15.15 An environmental sensitivity map indicating environmental sensitive areas and features identified during the EIA process.	Figure 2-1
15.16 A map combining the final layout map superimposed (overlain) on the environmental sensitivity map. This map must reflect the proposed location of the turbines as stated in the EIAr in the amended layout and this authorisation.	Figure2-1
16. The generic EMPr (Appendix 8) for the substations and all associated infrastructure, submitted as part of the final EIAr dated June 2022, is not approved. Part C must be amended to include measures as dictated by the final site lay-out map and micro-siting, and the provisions of this Environmental Authorisation. Part C of the generic EMPr must be made available for comments to registered Interested and Affected Parties and the holder of this Environmental Authorisation must consider such comments. Once amended, the generic EMPr must be submitted to the Department for written approval of Part C prior to commencement of the activity. Part C of the generic EMPr must be amended to include the following: The requirements and conditions of this Environmental Authorisation; Measures as dictated by the final site lay-out map and micro-siting; All recommendations and mitigation measures recorded in the EIAr and the specialist reports as included in the final EIAr dated June 2022; All recommendations and mitigation measures to be implemented for the operational phase of the dangerous goods facility;	Appendix A

EA Condition	EMPr Reference
Management of the Activity	
An effective monitoring system to detect any leakage or spillage of any hazardous substances during their transportation, handling, use or storage. This must include precautionary measures to limit the possibility of oil and other toxic liquids from entering the soil or storm water systems; A fire management plan to be implemented during the construction and operation of the facility; A re-vegetation and habitat rehabilitation plan. The plan must provide for restoration to be undertaken as soon as possible after completion of construction activities, to reduce the amount of habitat converted at any one time and to speed up the recovery to natural habitats; An aquatic rehabilitation and monitoring plan, particularly for watercourse features that will be infilled and/ or excavated; A stormwater management plan; and The final site layout map.	
17. Once approved the EMPrs must be implemented and adhered to. They shall be seen as dynamic documents and shall be included in all contract documentation for the development.	
18. Changes to the approved EMPrs must be submitted in accordance with the EIA Regulations applicable at the time.	
19. The Department reserves the right to amend the approved EMPrs should any impacts that were not anticipated or covered in the EIAr be discovered.	

3.2 Frequency and Process of Updating the EMPr

- Condition 20: The EMPr must be updated where the findings of the environmental audit reports, contemplated in Condition 27 below, indicate insufficient mitigation of environmental impacts associated with the undertaking of the activity, or insufficient levels of compliance with the Environmental Authorisation or EMPr.
- Condition 21: The updated EMPr must contain recommendations to rectify the shortcomings identified in the environmental audit report.
- Condition 22: The updated EMPr must be submitted to the Department for approval together with the environmental audit report, as per Regulation 34 of GNR. 982, as amended. The updated EMPr must have been subjected to a public participation process, which process has been agreed to by the Department, prior to submission of the updated EMPr to the Department for approval.
- Condition 23: In assessing whether to grant approval of an EMPr which has been updated as a result of an audit, the Department will consider the processes prescribed in Regulation 35 of GNR. 982. Prior to approving an amended EMPr the Department may request such amendments to the EMPr as it deems appropriate to ensure that the EMPr sufficiently provides avoidance, management, and mitigation of environmental impacts associated with the undertaking of the activity.
- Condition 24: The holder of the authorisation may apply for an amendment of an EMPr, if such amendment is required before an audit is required. The amendment process is prescribed in Regulation 37 of the EIA Regulations, 2014, as amended. The holder of the authorisation must request comments on the amendments to the impact management outcomes of the EMPr or amendments to the closure objectives of the closure plan from potentially interested and affected parties, including the competent authority, by using any of the methods provided for in the Act for a period of at least 30 days.

3.3 Monitoring

- Condition 25: The holder of the authorisation must appoint an experienced Environmental Control Officer (ECO) for the construction phase of the development that will have the responsibility to

ensure that the mitigation / rehabilitation measures and recommendations referred to in this Environmental Authorisation are implemented and to ensure compliance with the provisions of the approved EMPr.

- Condition 25.1: The ECO must be appointed before the commencement of any authorised activities.
- Condition 25.2: Once appointed, the name and contact details of the ECO must be submitted to the Director: Compliance Monitoring of the Department.
- Condition 25.3: The ECO must keep record of all activities on site, problems identified, transgressions noted and a task schedule of tasks undertaken by the ECO.
- Condition 25.4: The ECO must remain employed until all rehabilitation measures, as required for implementation due to construction damage, are completed and the site is ready for operation.

3.4 Recording and Reporting of the Department

- Condition 26: All documentation e.g., audit / monitoring / compliance reports and notifications, required to be submitted to the Department in terms of this Environmental Authorisation, must be submitted to the Director: Compliance Monitoring.
- Condition 27: The holder of the Environmental Authorisation must, for the period during which the Environmental Authorisation and EMPr remain valid, ensure that project compliance with the conditions of the Environmental Authorisation and the EMPr are audited, and that the audit reports are submitted to the Director: Compliance Monitoring of the Department.
- Condition 28: The frequency of auditing and of submission of the environmental audit reports must be per the frequency indicted in the EMPr, taking into account the processes for such auditing as prescribed in Regulation 34 of the EIA Regulations, 2014, as amended.
- Condition 29: The holder of the environmental authorisation must, in addition, submit environmental audit reports to the Department within 30 days of completion of the construction phase (i.e., within 30 days of site handover) and a final environmental audit report within 30 days of completion of rehabilitation activities.
- Condition 30: The environmental audit reports must be compiled in accordance with Appendix 7 of the EIA Regulations, 2014, as amended, and must indicate the date of the audit, the name of the auditor and the outcome of the audit in terms of compliance with the Environmental Authorisation conditions as well as the requirements of the approved EMPr.
- Condition 31: Records relating to monitoring and auditing must be kept on site and made available for inspection to any relevant and competent authority in respect of this development.

3.5 Notification to Authorities

- Condition 32: A written notification of commencement must be given to the Department no later than fourteen (14) days prior to the commencement of the activity. Commencement for the purposes of this condition includes site preparation. The notice must include a date on which it is anticipated that the activity will commence, as well as a reference number.

3.6 Operation of the Activity

- Condition 33: A written notification of operation must be given to the department no later than fourteen (14) days prior to the commencement of the activity operational phase.

3.7 Site closure and decommissioning

- Condition 34: Should the activity ever cease or become redundant, the holder of the authorisation must undertake the required actions as prescribed by legislation at the time and comply with all relevant legal requirements administered by any relevant and Competent Authority at that time.

3.8 Specific Environmental Authorisation Conditions

- Conditions 35 – 128 in the EA, dated 22 September 2022 (DFFE Ref 14/12/16/3/3/2/2121) (Appendix D), are specific to the Koup 1 WEF and must be implemented and adhered to.

Table 3-2: Specific EA Conditions to be implemented for the Koup 1 WEF

EA Condition No.	Condition in the EA	Status	EMPr Reference
Avifauna and bats			
35.	The results of the pre-construction bird monitoring assessment including all recommendations proposed by the reports dated June 2022, must inform the final layout and the construction schedule of the WEF.	Complete	Section 2
36.	The facility must be designed in a manner that, infrastructure components that could be used as perching or roosting substrates by birds and bats must be prohibited.	Complete	Section 2
37.	The holder of this Environmental Authorisation must restrict the construction activities to the footprint area. No access to the remainder of the property is allowed.	Pending for construction	Section 2
38.	Anti-collision devices such as bird flappers must be installed where power lines cross avifaunal corridors (e.g. grasslands, rivers, wetlands, and dams). The input of an avifaunal specialist must be obtained for the fitting of the anti-collision devices onto specific sections of the line once the exact positions of the towers have been surveyed and pegged. Additional areas of high sensitivity along the preferred alignment must also be identified by the avifaunal specialist for the fitment of anti-collision devices. These devices must be according to Eskom's Transmission and EWT's Guidelines.	Pending for construction	Section 2
39.	A pre-construction walk through of the approved power line alignment and turbine positions by a bat specialist, avifaunal specialist and ecologist, must be conducted to ensure that the micro-siting of the turbines, pylons and power line alignment have the least possible impact, there are no nests sites of priority species on or close to the construction corridor, and all protected plant species impacted are identified.	Complete	Section 2
40.	A construction monitoring plan must be developed and be implemented to survey impacts resulting from the infrastructure installation on the bird communities with focus on assessing the displacement and disturbance effects of the development on the bird communities, as well as continue to gather information on the bird communities present in the area and monitor the effectiveness of the mitigation measures for a minimum duration of at least three years during operation.	Complete	Section 24
41.	A bat monitoring program to determine the actual impacts on the bat community must be carried out for a minimum of three years, and utilization of red lights in the turbines to minimize insect attraction and bat foraging behaviours near the turbines is encouraged.	Complete	Section 25
42.	All bird monitoring must be conducted in accordance with the latest Birdlife South Africa/Endangered Wildlife Trust: Best practice guidelines for avian monitoring and impact mitigation	Pending for Operation	Section 24

	at proposed wind energy development sites in Southern Africa.		
Vegetation, wetlands and water resources			
43.	The 'no-go' areas of the development property must be clearly demarcated and must be excluded from the final layout plan.	Complete	Section 2
44.	All watercourses and associated wetlands are regarded as sensitive. All developments within 500m of watercourses must comply with the National Water Act.	Pending application	Section 3
45.	No transmission line towers, substations and construction camps will be placed within the delineated water courses as well as their respective buffers without obtaining the required approvals. A 32m buffer must be applied along all identified watercourses and a 50m buffer must be applied along all identified wetlands.	Pending application	Section 3
46.	A pre-construction survey of the final development footprint must be conducted by a qualified floral specialist to identity protected species affected by the proposed development. Prior to the commencement of construction, a rescue and rehabilitation operation for these species which could survive translocation must be conducted.	Complete	Section 2
47.	Construction activities must be restricted to demarcated areas to restrict the impact on sensitive environmental features.	Pending for Construction	Section 7
48.	All areas of disturbed soil must be reclaimed using only indigenous grass and shrubs. Reclamation activities shall be undertaken according to the rehabilitation plan to be included in the final EMPr.	Complete	Section 14
49.	Topsoil from all excavations and construction activities must be salvaged and reapplied during reclamation.	Pending for Construction	Section 7
50.	No exotic plants may be used for rehabilitation purposes; only indigenous plants of the area may be utilised.	Pending for Construction	Section 14
51.	Cleared alien vegetation must not be dumped on adjacent intact vegetation during clearing but must be temporarily stored in a demarcated area.	Pending for Construction	Section 12
52.	Removal of alien invasive species or other vegetation and follow-up procedures must be in accordance with the Conservation of Agricultural Resources Act, 1983 (Act 43 of 1983).	Pending for Construction	Section 12
53.	Contractors and construction workers must be clearly informed of the no-go areas.	Pending for Construction	Section 7
54.	Where roads pass right next to major water bodies, provision shall be made for fauna such as toads to pass under the roads by using culverts or similar structures.	Pending for Construction	Section 7
55.	Bridge design must be such that it minimises impact to riparian areas with minimal alterations to water flow and must allow the movement of fauna and flora.	Pending for Construction	Section 7
56.	The final development area should be surveyed for species suitable for search and rescue, which should be trans-located prior to the commencement of construction.	Pending for Construction	Section 13

57.	Electric fencing should not have any strands within 30cm of the ground, which should be sufficient to allow smaller mammals, reptiles and tortoises to pass through, but still remain effective as a security barrier.	Pending for Construction	Section 7
58.	Disturbed areas must be rehabilitated as soon as possible after construction with locally indigenous plants to enhance the conservation of existing natural vegetation on site.	Pending for Construction	Section 7
59.	Wetlands, rivers and river riparian areas must be treated as "no-go" areas and appropriately demarcated as such. No vehicles, machinery, personnel, construction material, fuel, oil, bitumen or waste must be allowed into these areas without the express permission of and supervision by the ECO, except for rehabilitation work in these areas.	Pending for Construction	Section 7
60.	Workers must be made aware of the importance of not destroying or damaging the vegetation along rivers and in wetland areas and this awareness must be promoted throughout the construction phase.	Pending for Construction	Section 7
61.	Freshwater ecosystems located in close proximity to the construction areas must be inspected on a regular basis by the ECO for signs of disturbance from construction activities. If signs of disturbance are noted, immediate action must be taken to remedy the situation and, if necessary, a freshwater ecologist must be consulted for advice on the most suitable remediation measures.	Pending for Construction	Section 7
62.	No discharge of effluents or polluted water must be allowed into any rivers or wetland areas.	Pending for Construction	Section 7
63.	If construction areas are to be pumped of water (e.g. after rains), this water must be pumped into an appropriate settlement area, and not allowed to flow into any rivers or wetland areas.	Pending for Construction	Section 7
64.	Workers must be made aware of the importance of not polluting rivers or wetlands and of not undertaking activities that could result in such pollution, and this awareness must be promoted throughout the construction phase.	Pending for Construction	Section 7
65.	Freshwater ecosystems located in close proximity to the site must be inspected on a regular basis (but especially after rainfall) by the ECO for signs of sedimentation and pollution. If signs of sedimentation or pollution are noted, immediate action must be taken to remedy the situation and, if necessary, a freshwater ecologist must be consulted for advice on the most suitable remediation measures.	Pending for Construction	Section 7
Roads and transportation			
66.	Signs must be placed along construction roads to identify speed limits, travel restrictions, and other standard traffic control information. To minimize impacts on local commuters, consideration should be given to limiting construction vehicles travelling on public roadways during the morning and late afternoon commute time.	Pending for Construction	Section 20
67.	All structures crossing streams must be located and constructed so that they do not decrease channel stability or increase water velocity.	Pending for Construction	Section 20
68.	A designated access to the site must be created and clearly marked to ensure safe entry and exit.	Pending for Construction	Section 20

69.	Signage must be erected at appropriate points warning of turning traffic and the construction site.	Pending for Construction	Section 20
70.	Construction vehicles carrying materials to the site should avoid using roads through densely populated built-up areas so as not to disturb existing retail and commercial operations.	Pending for Construction	Section 20
71.	Road borders should be regularly maintained to ensure that vegetation remains short and that they therefore serve as an effective firebreak.	Pending for Construction	Section 20
72.	Roads must be designed so that changes to surface water runoff are avoided and erosion is not initiated.	Pending for Construction	Section 20
73.	All construction vehicles should adhere to a low speed limit to avoid collisions with susceptible species such as snakes and tortoises.	Pending for Construction	Section 20
Noise			
74.	The potential noise impact be re-evaluated should the layout be changed such that any wind turbines are located closer than 1,000m from a confirmed noise sensitive area.	Complete	Section 2
75.	The holder of this authorisation must ensure that the construction staff working in areas where the 8-hour ambient noise levels exceed 75dBA must wear ear protection equipment.	Pending for Construction	Section 7
76.	The holder of this authorisation must ensure that all equipment and machinery are well maintained and equipped with silencers.	Pending for Construction	Section 7
77.	The holder of this authorisation must provide a prior warning to the community when a noisy activity e.g. blasting is to take place.	Pending for Construction	Section 7
78.	Positions of turbines jeopardizing compliance with accepted noise levels should be revised during the micro-siting of the units in question and predicted noise levels re-modelled by the noise specialist, in order to ensure that the predicted noise levels are less than 45dB(A).	Complete	Section 2
79.	Construction staff must be trained in actions to minimise noise impacts.	Pending for Construction	Section 7
Visual resources			
80.	The holder of this authorisation must reduce visual impacts during construction by minimising areas of surface disturbance, controlling erosion, using dust suppression techniques and restoring exposed soil as closely as possible to their original contour and vegetation.	Pending for Construction	Section 7
81.	A lighting engineer must be consulted to assist in the planning and placement of light fixtures in order to reduce visual impacts associated with glare and light trespass.	Pending for Construction	Section 7
82.	Lighting of main structures (turbines) and ancillary buildings should be designed to minimise light pollution without compromising safety, and turbines must be lit according to Civil Aviation Regulations.	Pending for Construction	Section 7
83.	Signage on or near wind turbines must be avoided unless they serve to inform the public about wind turbines and their function.	Pending for Construction	Section 7

84.	Commercial messages and graffiti on turbines are prohibited.	Pending for Construction	Section 8
Human health and safety			
85.	A health and safety programme must be developed to protect both workers and the general public during construction, operation and decommissioning of the energy facility. The programme must establish a safety zone for wind turbines from residences and occupied buildings, roads, right-of-ways and other public access areas that is sufficient to prevent accidents resulting from the operation of the wind turbines.	Pending for Construction	Section 7
86.	Potentials interference with public safety communication systems (e.g. radio traffic related to emergency activities) must be avoided.	Pending for Construction	Section 7
87.	The holder of this authorisation must obtain approval from the South Africa Civil Aviation Authority that the wind facility will not interfere with the performance of aerodrome radio Communication, Navigation and Surveillance (CNS) equipment, especially the radar, prior to commencement of the activity. A copy of the approval must be kept on site by the ECO.	Pending for Construction	Section 7
88.	The holder of this authorisation must obtain approval from the South Africa Weather Services (WeatherSA) that the energy facility will not interfere with the performance of their equipment, especially radar, prior to commencement of the activity. A copy of the approval must be kept on site by the ECO.	Pending for Construction	Section 7
89.	The holder of this authorisation must train safety representatives, managers and workers in workplace safety. The construction process must be compliant with all safety and health measures as prescribed by the relevant act.	Pending for Construction	Section 7
90.	Liaison with land owners/farm managers must be done prior to construction in order to provide sufficient time for them to plan agricultural activities.	Pending for Construction	Section 7
91.	No unsupervised open fires for cooking or heating must be allowed on site.	Pending for Construction	Section 7
Hazardous materials and waste management			
92.	Areas around fuel tanks must be bunded or contained in an appropriate manner as per the requirements of SASS 089:1999 Part 1.	Pending for Construction	Section 7
93.	Leakage of fuel must be avoided at all times and if spillage occurs, it must be remedied immediately.	Pending for Construction	Section 7
94.	Hazardous waste such as bitumen, oils, oily rags, paint tins etc. must be disposed of at an approved waste landfill site licensed to accept such waste.	Pending for Construction	Section 7
95.	No dumping or temporary storage of any materials may take place outside designated and demarcated laydown areas, and these must all be located within areas of low environmental sensitivity.	Pending for Construction	Section 7
96.	Hazardous substances must not be stored where there could be accidental leakage into surface or subterranean water.	Pending for Construction	Section 7

97.	Hazardous and flammable substances must be stored and used in compliance to the applicable regulations and safety instructions. Furthermore, no chemicals must be stored nor may any vehicle maintenance occur within 350m of the temporal zone of wetlands, a drainage line with or without an extensive floodplain or hillside wetlands.	Pending for Construction	Section 7
98.	Temporary bunds must be constructed around chemical storage to contain possible spills.	Pending for Construction	Section 7
99.	Spill kits must be made available on-site for the clean-up of spills.	Pending for Construction	Section 7
100.	An integrated waste management approach must be implemented that is based on waste minimisation and must incorporate reduction, recycling and re-use options where appropriate. Where solid waste is disposed of, such disposal shall only occur at a landfill licensed in terms of section 20(b) of the National Environment Management Waste Act, 2008 (Act 59 of 2008).	Pending for Construction	Section 7
101.	The holder of this authorisation must provide sanitation facilities within the construction camps and along the road so that workers do not pollute the surrounding environment. These facilities must be removed from the site when the construction phase is completed as well as associated waste to be disposed of at a registered waste disposal site.	Pending for Construction	Section 7
102.	The holder of this authorisation must take note that no temporary site camps will be allowed outside the footprint of the development area as the establishment of such structures might trigger a listed activity as defined in the Environmental Impact Assessment Regulations, 2014.	Pending for Construction	Section 7
Excavation and blasting activities			
103.	Underground cables and internal access roads must be aligned as much as possible along existing infrastructure to limit damage to vegetation and watercourses.	Pending for Construction	Section 7
104.	Foundations and trenches must be backfilled with originally excavated materials as much as possible. Excess excavation materials must be disposed of only in approved areas or, if suitable, stockpiled for use in reclamation activities.	Pending for Construction	Section 7
105.	Borrow materials must be obtained only from authorised and permitted sites. Permits must be kept on site by the ECO.	Pending for Construction	Section 7
106.	Anti-erosion measures such as silt fences must be installed in disturbed areas.	Pending for Construction	Section 7
Air emissions			
107.	Dust abatement techniques must be used before and during surface clearing, excavation, or blasting activities.	Pending for Construction	Section 7
108.	Appropriate dust suppression techniques must be implemented on all exposed surfaces during periods of high wind. Such measures may include wet suppression, chemical stabilisation, the use of a wind fence, covering surfaces with straw chippings and re-vegetation of open areas.	Pending for Construction	Section 7
Historical / cultural / paleontological resources			
109.	A 30m buffer must be applied around all identified archaeological sites.	Pending for Construction	Section 27

110.	After initial vegetation clearance has taken place but before the ground is levelled for construction, a professional palaeontologist must undertake a walkthrough and document any identified paleontological findings. The survey/walkthrough must be conducted as per the South African Heritage Resources Agency (SAHRA) requirements.	Pending for Construction	Section 27
111.	Should any archaeological sites, artefacts, paleontological fossils or graves be exposed during construction work, work in the immediate vicinity of the find must be stopped, SAHRA must be informed and the services of an accredited heritage professional obtained for an assessment of the heritage resources to be made.	Pending for Construction	Section 27
112.	Construction managers/foremen must be informed before construction starts on the possible types of heritage sites and cultural material they may be encountered and the procedures to follow when they find sites.	Pending for Construction	Section 27
113.	All buffers and no-go areas stipulated in this report must be adhered to for both the facilities and all roads and power lines.	Pending for Construction	Section 27
114.	Should any human remains be uncovered during development they must be immediately protected in situ and reported to the heritage authorities or to an archaeologist. The remains will need to be exhumed at the cost of the developer.	Pending for Construction	Section 27
115.	All construction and maintenance crew and vehicles (except small vehicles which may use existing farm tracks) should be kept out of the buffer zones.	Pending for Construction	Section 27
116.	The final layout should be shown to the appointed archaeologist before implementation to confirm that all significant heritage resources have been adequately protected.	Pending for Construction	Section 27
Turbines position			
117.	The approved turbines must be placed in a manner to avoid all designated, "no-go" areas as well as its buffers.	Complete	Section 2
118.	The final placement of turbines must follow a micro siting procedure involving a walk-through and identification of any sensitive areas by botanical and avifaunal specialists.	Complete	Section 2
119.	Exclusion of sensitive ecological, heritage and paleontological areas from construction activities must inform micro siting of all development activities.	Complete	Section 2
General			
120.	The recommendations of the EAP in the EIAr dated June 2022 and the specialist studies attached must be adhered to. In the event of any conflicting mitigation measures and conditions of the Environmental Authorisation, the specific condition of this Environmental Authorisation will take preference.	Complete	Section 2, 3 & 7
121.	A copy of this Environmental Authorisation, the audit and compliance monitoring reports, and the approved EMPr, must be made available for inspection and copying - 127.1. at the site of the authorised activity; 127.2. to anyone on request; and	Pending for construction	Section 7

	127.3. where the holder of the Environmental Authorisation has a website, on such publicly accessible website.		
122.	National government, provincial government, local authorities or committees appointed in terms of the conditions of this authorisation or any other public authority shall not be held responsible for any damages or losses suffered by the holder of the authorisation or his/her successor in title in any instance where construction or operation subsequent to construction be temporarily or permanently stopped for reasons of non-compliance by the holder of the authorisation with the conditions of authorisation as set out in this document or any other subsequent document emanating from these conditions of authorisation.	Noted	

4. LEGAL FRAMEWORK

The Koup 1 WEF, in terms of the NEMA, 1998, EIA Regulations, 2014, as amended, has been approved for the following listed activities.

Table 4-1: The NEMA,1998 EIA Regulations 2014, as amended, listed activities authorised for the Koup 1 WEF

Listing Notices 1 - 3 07 April 2017	Listed Activity	Project Description
Listing Notice 1 **GN R 327** **Activity 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.*	One (1) new on-site substation and/or collector substation will be constructed within the proposed application site as part of the proposed development. The proposed substation will be located outside urban areas and will have a capacity of 33/132kV (33kV yard subject to this EIA / application). In addition, the substation will occupy a footprint of up to approximately 1.5 hectares (ha). The proposed development will also involve the construction of medium voltage (i.e. 33kV) cables which will connect the wind turbines to the proposed substation. These cables will be located outside an urban area and will be buried along access roads, wherever technically feasible.
Listing Notice 1 **GN R 327** **Activity 12**	*The development of: ii) infrastructure or structures with a physical footprint of 100 square metres or more; where such development occurs- (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 development will entail the construction of a WEF and associated infrastructure (including an on-site substation and BESS) within the proposed application site which will have a physical footprint of approximately 100m^2 or more and will occur within some of the surface water features / watercourses identified within the application site or within 32m of some of the surface water features / watercourses identified within the application site. The infrastructure associated with the proposed development will avoid the surface water features / watercourses identified within the application site where possible, although some structures (such as internal site roads) will occur within some of the surface water features / watercourses identified within the application site and/or within 32m of some of the surface water features / watercourses identified within the application site.
Listing Notice 1 **GN R 327** **Activity 14**	*The development and related operation of facilities or infrastructure, for the storage, or for the storage and handling, of a dangerous good, where such storage occurs in containers with a combined capacity of 80 cubic meters or more but not exceeding 500 cubic meters.*	The proposed development will include the construction of an on-site Battery Energy Storage System (BESS). Up to 40MW of batteries using solid state / liquid flow batteries with hazardous material of more than 80m3 will be used during the development phase and will most likely comprise an array of containers, outdoor cabinets and/or storage tanks. The preferred technology is Lithium Ion.

		It should be noted that no stand-alone facilities for the storage of dangerous goods external to the BESS will be constructed as part of the proposed development.
Listing Notice 1 **GN R 327** **Activity 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 involves the construction of a WEF as well as other associated infrastructure (including an on-site substation and BESS) within the proposed application site. The Surface Water Impact Assessment revealed that there are surface water features / watercourses located within the application site. As such, the proposed development will involve the infilling or depositing of any material of more than 10m3 into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than $10m^3$ from some of the identified surface water features / watercourses. Although the layout of the proposed development has been designed to avoid the identified surface water features / watercourses as far as possible, some of the internal site roads to be constructed (as required) will need to traverse some of the identified surface water features / watercourses. In addition, during construction of these roads (as required), soil will need to be removed from some of the identified surface water features / watercourses.
Listing Notice 1 **GN R 327** **Activity 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;*	Internal roads are required within the application site in order to provide access to each wind turbine, the on-site and/or collector substation and the BESS, as well as to facilitate access throughout the WEF. Existing site roads will be used wherever possible, although new site roads will be constructed where necessary. In addition, turns will have a radius of up to approximately 50m for abnormal loads (especially turbine blades) to access the various wind turbine positions. As such, the proposed development will involve the construction of new internal roads within the application site, as required. It is proposed that these new internal access roads will be between approximately 8m and 10m wide.
Listing Notice 1 **GN R 327** **Activity 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: (ii) will occur outside an urban area, where the total land to be developed is bigger than 1 hectare;*	The proposed development site is currently zoned for agricultural land use, however, the property is no longer actively used for agricultural activities. The proposed development will result in special zoning being required, as an area greater than 1ha will be transformed into industrial / commercial use.

Listing Notice 1 **GN R 327** **Activity 48**	*The expansion of- (i) infrastructure or structures where the physical footprint is expanded by 100 square metres or more; where such expansion occurs— (a) within a watercourse; or (c) if no development setback exists, within 32 metres of a watercourse, measured from the edge of a watercourse;*	Internal roads are required within the application site in order to provide access to each wind turbine, the on-site and/or collector substation and the BESS, as well as to facilitate access throughout the WEF. Existing site roads will be used wherever possible, and will be upgraded and expanded where necessary. The Surface Water Impact Assessment revealed that there are surface water features / watercourses located within the application site. 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. As such, the proposed development will entail the expansion (upgrading) of roads and other infrastructure by 100m^2 or more within some of the surface water features / watercourses identified within the application site or within 32m from the edge of a surface water features / watercourses identified within the application site.
Listing Notice 1 **GN R 327** **Activity 56**	*The widening of a road by more than 6 metres, or the lengthening of a road by more than 1 kilometre-* *(ii) where no reserve exists, where the existing road is wider than 8 metres; excluding where widening or lengthening occur inside urban areas.*	Internal roads are required within the application site in order to provide access to each wind turbine, the on-site and/or collector substation and the BESS, as well as to facilitate access throughout the WEF. Existing site roads will be used wherever possible, although new site roads will be constructed where necessary. The existing internal roads will need to be upgraded by widening them more than 6m, or by lengthening them by more than 1km.

Listing Notice 2 **GN R 325** **Activity 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 development of a WEF, on-site substation and BESS with a maximum generation capacity of up to 184MW. In addition, the proposed development will be located outside an urban area.
Listing Notice 2 **GN R 325** **Activity 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 on-site substation, BESS, internal roads and other associated infrastructure.

Listing Notice 3 **GN R 324** **Activity 4**	*The development of a road wider than 4 metres with a reserve less than 13,5 metres.* *i. Western Cape:* *ii. Outside urban areas:* *(aa) Areas containing indigenous vegetation*	Internal roads are required within the application site in order to provide access to each wind turbine, the on-site and/or collector substation and the BESS, as well as to facilitate access throughout the WEF. Existing site roads will be used wherever possible, although new site roads will be constructed where necessary. It is proposed that these new internal access roads will be between approximately 8m and 10m wide. In addition, turns will have a radius of up to approximately 50m for abnormal loads (especially turbine blades) to access the various wind turbine positions. The above-mentioned internal roads (existing and new roads to be constructed, where required) within the application site will occur within the Western Cape Province, outside urban areas. In addition, the proposed development site contains indigenous vegetation.
Listing Notice 3 **GN R324** **Activity 14**	*The development of—* *(ii) infrastructure or structures with a physical footprint of 10 square metres or more; where such development occurs—* *(a) within a watercourse;* *(b) in front of a development setback; or* *(c) if no development setback has been adopted, within 32 metres of a watercourse, measured from the edge of a watercourse; excluding the development of infrastructure or structures within existing ports or harbours that will not increase the development footprint of the port or harbour.* *i. Western Cape* *i. 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;*	The proposed energy facility will entail the development of roads and other infrastructure with a physical footprint of $10m^2$ or more within a watercourse or within 32m from the edge of a watercourse. Although the layout of the proposed development will be designed to avoid the identified surface water features as far as possible, some of the internal and access roads, will likely need to traverse the identified surface water features.
Listing Notice 3 **GN R324** **Activity 18**	*The widening of a road by more than 4 metres, or the lengthening of a road by more than 1 kilometre.* *i. Western Cape* *ii. All areas outside urban areas:* *(aa) Areas containing indigenous vegetation*	Internal roads are required within the application site in order to provide access to each wind turbine, the on-site and/or collector substation and the BESS, as well as to facilitate access throughout the WEF. Existing site roads will be used wherever possible, although new site roads will be constructed where necessary. It is proposed that these new internal access roads will be between approximately 8m and 10m. Existing internal roads will thus need to be upgraded as part of the proposed development (where required). Internal roads will be widened by more than 4m or lengthened by more than 1km. These roads

		located within the application site will occur within the Western Cape Province, outside urban areas. In addition, the proposed development site contains indigenous vegetation. wide.
Listing Notice 3 **GN R324** **Activity 23**	*The expansion of—* *(ii) infrastructure or structures where the physical footprint is expanded by 10 square metres or more; where such expansion occurs—* *(a) within a watercourse;* *(b) in front of a development setback adopted in the prescribed manner; or* *(c) if no development setback has been adopted, within 32 metres of a watercourse, measured from the edge of a watercourse; excluding the expansion of infrastructure or structures within existing ports or harbours that will not increase the development footprint of the port or harbour.* *i. Western Cape* *i. 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;*	The proposed development will entail the development and expansion of roads and other infrastructure by 10m^2 or more within a watercourse or within 32m from the edge of a watercourse. Although the layout of the proposed development will be designed to avoid the identified surface water features as far as possible, some of the existing internal and access roads may likely need to traverse some of the identified surface water features. The proposed development occurs within CBAs and is located outside an urban area. An ecological impact assessment was undertaken to assesses the impacts of the proposed development on CBAs. In addition, a surface water impact assessment was undertaken to assesses the impacts of the proposed development on the identified surface water features.

5. ENVIRONMENTAL MANAGEMENT PROGRAMME

This section forms the core of the EMPr and outlines the specific mitigation measures for those key impacts identified for the development of the Koup 1 WEF.

The objectives of the EMPr 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.

The EMPr identifies the four phases of development as:

- Management Plan for Design Phase (Section 6);
- Management Plan for Construction Phase (Section 7);

- Management Plan for Operational Phase (Section 8);
- Management Plan for Decommissioning Phase (Section 9).

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 EMPr is considered an evolving document and may be amended at any time by the relevant authorities (DFFE, DWS etc.).

It further identifies the:

- BESS Risk Assessment and Management Plan (Section 10), and
- Management Plan for Cumulative Phase (Section 11).

5.1 Environmental Awareness and Compliance

The philosophy that has been used for the compilation of this management programme is derived from the principles of the NEMA, 1998 (Act No. 107 of 1998) which states that development must be socially, economically and environmentally sustainable. Sustainable development requires that:

- The disturbance of ecosystems and loss of biodiversity are avoided (minimised or remedied).
- Pollution and degradation of the environment are avoided or minimised and remedied.
- Waste is avoided or minimised and re-used or re-cycled where possible and otherwise disposed of in a responsible manner.
- A risk averse and cautious approach is applied.
- Negative impacts on the environment and on people's environmental rights be anticipated, and, prevented and where they cannot altogether be prevented, are minimised and remedied.

The Act makes provision that anyone who causes pollution or degradation of the environment is responsible for preventing impacts occurring, continuing or recurring and for the costs of repair of the environment.

5.1.1 Legally Binding Documents

A copy of the EA (Appendix D), the audit and compliance monitoring reports, and the approved EMPr, must be made available for inspection and copying-

- At the site of the authorised activity;
- To anyone on request; and
- Where the holder of the EA has a website, on such publicly accessible website.

5.2 Project Responsibilities

The developer, together with each appointed contractor will be responsible for environmental management on site during all phases of the development. Specific roles and responsibilities are highlighted below.

5.2.1 Environmental Manager - Developer Representative

- Review and approve final EMPr prior to authorisation by the DFFE.
- Review and approve any EMPr updates or amendments post approval of the EMPr.
- Ensure environmental requirements are integrated into the project plans, method statements and tender processes.

- Support the site environmental control officer (ECO) during the construction phase, to ensure implementation of the EMPr.
- Follow up and close out all environmental incidents and non-conformances.
- Appoint a suitably qualified independent ECO during the construction phase.

5.2.2 Environmental Control Officer - Principal Contractor Representative

An independent ECO will work along-side the Environmental Site Officer (ESO) to conduct the required inspections of the construction activities and EMPr implementation throughout the construction phase. After each monthly inspection, the ECO will produce a monitoring report that will be submitted to Developer / Applicant, the DFFE, and any other person(s) if required. Relevant sections of the minutes of customary (monthly) site meetings will be attached to the monitoring report.

The ECO will be responsible for overseeing the implementation of the EMPr during the construction and operations phases, and for monitoring, reviewing and verifying compliance of the ESO and contractor with the EMPr, record-keeping and updating of the EMPr as and when necessary.

The ECO will:

- Be fully knowledgeable with the contents of the EMPr.
- Be fully knowledgeable with the contents of all relevant environmental legislation and ensure compliance with them.
- Ensure that the contents of the EMPr are communicated to the contractor, all site staff, and the contractor and /or site manager are made aware of the contents of the EMPr, through presentations and discussions.
- Ensure that compliance to the EMPr is monitored by regular and comprehensive inspection of the site and surrounding areas.
- Report on any incidents of non-compliance and ensure mitigation measure are implemented as soon as practical.
-

During construction, the ECO will be responsible for the following:

- Meeting on site with the Construction Manager and ESO prior to the commencement of construction activities to confirm the construction procedure and designated activity zones.
- Ensuring that daily / weekly (depending on the extent of construction activities, at any given time) monitoring of site activities take place by the ESO to ensure adherence to the specifications contained in the EMPr. The ESO should use a monitoring checklist that is to be prepared by an independent environmental assessment practitioner (EAP) at the start of the construction phase.
- Preparation of the monitoring report based on the site visits and feedback by the ESO.
- Conducting an environmental inspection on completion of the construction period and signing off the construction process with the Construction Manager and ESO.
- Ensuring that the ESO maintains an Incidents Register and Complaints Register on site.

During operation, the Environmental Control Officer will be responsible for:

- Overseeing the ESO during the implementation of the EMPr for the operation phase.
- Ensure that the necessary environmental monitoring takes place as specified in the EMPr.
- Update the EMPr and ensure that records are kept of all monitoring activities and results.
- Ensuring that the ESO maintains an Incidents Register and Complaints Register on site.

During decommissioning, the Environmental Control Officer will be responsible for:

- Overseeing the ESO during the implementation of the EMPr for the decommissioning phase.
- Conducting an environmental inspection on completion of decommissioning and "signing off" the site rehabilitation process.

5.2.3 Environmental Site Officer

The ECO must appoint a nominated representative of the contractor as the Environmental Site Officer (ESO). The independent ESO is required to be on site at all times and will conduct the required inspections of the construction activities and ensure implementation of the EMPr throughout the construction phase. After each inspection, the ESO is required to submit a completed monitoring checklist to the ECO.

The ESO will be responsible for ensuring the implementation of the EMPr during the construction and operations phases by the contractor and providing feedback to the ECO regarding the compliance of the contractor with the EMPr and any updates required to the EMPr as and when necessary.

The ESO will:

- Be fully knowledgeable with the contents of the EMPr.
- Be fully knowledgeable with the contents of all relevant environmental legislation and ensure compliance with them.
- Ensure that the contents of the EMPr are implemented by the contractor, all site staff.
- Ensure that compliance to the EMPr is monitored by regular and comprehensive inspection of the site and surrounding areas.
- Report on any incidents of non-compliance to the ECO and ensure mitigation measures are implemented as soon as practical.

5.2.4 Contractor

An independent contractor be responsible for the implementation of the EMPr in accordance with the requirements of the EA.

The Contractor will:

- Be fully knowledgeable with the contents of the EMPr.
- Ensure that the contents of the EMPr are understood by all site staff.
- Report on any incidents of non-compliance to the ESO and ensure mitigation measures are implemented as soon as practical.

5.2.5 Environmental Auditor

The Developer must appoint an Independent Environmental Auditor. The independent Auditor is required to undertake bi-monthly (every two months) site visits to conduct the required inspections of the compliance with the EA and EMPr during the construction and post construction phase of the activities. After each inspection, the auditor is required to submit an environmental audit report to the DFFE.

The Environmental Site Officer will be responsible for ensuring compliance of the EA and EMPr providing feedback to the ECO regarding the compliance and any updates required to the EMPr as and when necessary.

The Auditor will:

- Be fully knowledgeable with the contents of the EMPr.

- Be fully knowledgeable with the contents of all relevant environmental legislation and monitoring compliance with them.
- Submit reports to the DFFE.

5.3 Frequency for Auditing of Compliance and Submission of Reports

The developer must, for the period during which the EA and EMPr remain valid, ensure that compliance of the EA and EMPr are audited by an Independent Auditor. The Auditor will arrange for inspections of the activities and EMPr implementation throughout the construction and post construction phase. After each inspection, the auditor will produce an environmental audit report that will be submitted to the client, DFFE, Western Cape Department of Environmental Affairs and Development Planning (DEA&DP), and any other stakeholder as required. The monitoring reports, recommended to be produced by the ECO must be appended to the audit reports for submission.

The frequency of auditing and submission of the environmental audit reports must be on a bi-monthly (once every two months) basis, or what is deemed necessary in consultation with the ECO during times of heavy earth works and vegetation clearing, to ensure compliance with all aspects of the EA and EMPr.

5.4 Training and Induction of Employees

The ECO has a responsibility to ensure that all personnel involved in the project are aware of and are familiar with the environmental requirements for the project. The EMPr shall be part of the terms of reference (ToR) for all contractors, sub-contractors and suppliers. All Contractors have to give some assurance that they understand the EMPr and that they will undertake to comply with the conditions therein. All senior and supervisory staff members shall familiarise themselves with the full contents of the EMPr. They shall know and understand the specifications of the EMPr and be able to assist other staff members in matters relating to the EMPr.

The ECO and / or ESO must ensure that all staff working on site have an environmental induction. The presentation can include the following topics;

- 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 militate against such impacts?
- Awareness of emergency and spills response provisions.
- Social responsibility during construction e.g. being considerate to local residents.

A detailed environmental management and training program must be developed. The purpose of this is to ensure that all staff and workers understand what is required of them. The main components of the program can incorporate the following:

- Concept of sustainability and the reasons for good environmental management and practice.
- Potential environmental impacts.
- Mitigation measures.
- Establishing a chain of responsibility and decision making.
- Specific training requirements of certain staff, and the potential hazardous associated with the job.
- Methodologies to be used for field sampling.
- Training in the use of field equipment.

- Training in identification of non-compliance situations and procedures to be followed in such instances.
- Reporting requirements.
- Healthy and Safety.
- Fire management.
- HIV/AIDS.

5.5 Complaints Register and Environmental Incidents Book

Any complaints received from the community must be brought to the attention of the ECO / ESO, who will respond accordingly.

The following information will be recorded:

- Time, date and nature of the complaint;
- Response and investigation undertaken; and
- Actions taken and by whom.

All complaints received will be investigated and a response (even if pending further investigation) will be given to the complainant within 7 days.

All environmental incidents occurring on the site will be recorded. The following information will be provided:

- Time, date, location and nature of the incident; and
- Actions taken and by who.

5.6 Construction Environmental Monitoring

In order to facilitate communication between the Environmental Manager, the ECO (and the ESO), it is vital that a suitable chain of command is structured that will ensure that the ECO's recommendations have the full backing of the project team before being conveyed to the Contractor. In this way, penalties as a result of non-compliances with the EMPr may be justified as failure to comply with instruction from the highest authority.

5.7 Dealing with Non-Compliance with the EMPr

There may be difficulties encountered with carrying out the mitigation measures within the EMPr, this may result in non-compliance with the EMPr. It may be possible that the contractor and or the developer put in place procedures to motivate staff members to comply with the EMPr and to deal with non-compliance. The developer must make this known to the contractor at the earliest stage possible, even during the tender phase. When dealing with non-compliance, the following process is recommended to take place:

- A notice of transgression should be issued to the transgressor;
- It must be documented in a designated register; and
- It must be reported in a monthly report and made available to I&APs and DFFE upon request.

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

out in this document or any other subsequent document emanating from these conditions of authorisation.

5.8 EMPr Amendments and Instructions

No EMPr amendments shall be allowed without the approval of the DFFE. Amendments may be possible, following discussions with the relevant ECO, who may propose EMPr amendments on behalf of the developer or issue EMPr instructions, corrective actions, remediation or rehabilitation. These correction actions must be completed within the specified timeframes.

6. MANAGEMENT PLAN FOR DESIGN PHASE

The objectives of the pre-construction phase are:

- To promote environmental awareness;
- To define roles and responsibilities for environmental management;
- To ensure suitable environmental training and induction to all contractors, sub-contractors and labourers;
- To ensure that all legal obligations and contractual conditions have been met prior to commencing of construction;
- To ensure that the facility design responds to the identified environmental constraints and opportunities; and
- To implement effective communication methods and practices.

Table 6-1 below presents a summary of the potential impacts as assessed by specialists for the design phase of the WEF.

Recommended persons as provided in Table 6-2 below should take responsibility for the implementation and monitoring to ensure that all operational mitigation measures outlined in this document, and all revisions thereof, are complied with.

Table 6-1: Summary of the Design Phase Impacts and Significance Ratings

Impact	Pre- mitigation	Post- mitigation
Impacts on Biophysical Systems / Components during the Design Phase		
Avifaunal – none identified		
Ecological – none identified		
Bat – none identified		
Geotechnical – none identified		
Surface Water – none identified		
Impacts to Socio-Economic Component during the Design Phase		
Heritage		
The graves and burial grounds are mostly localised near farm roads within the proposed development area. The expansion of existing farm roads may impact these sites.	Negative	Negative
One structure (KO-05) is located near farm roads within the proposed development area. The expansion of existing farm roads may impact the site.	Negative Medium	Negative Low
Due to the size of the area assessed, there's a possibility of encountering heritage features in un-surveyed areas does exist.	Negative Medium	Negative Low
Disturbance, damage or destruction of fossils at or beneath the ground surface due to surface clearance and bedrock excavations	Negative Medium	Negative Low
Archaeological		
The graves and burial grounds are mostly localised near farm roads within the proposed development area. The expansion of existing farm roads may impact these sites.	Negative Medium	Negative Low
One structure is located near farm roads within the proposed development area. The expansion of existing farm roads may impact the site.	Negative Medium	Negative Low

Two sites are located within the proposed grid corridor area.	Negative Medium	Negative Low
Due to the size of the area assessed, there's a possibility of encountering heritage features in un-surveyed areas.	Negative Medium	Negative Low
Cultural Landscape		
Inappropriate infrastructure layout planning degrades ecological elements of the cultural landscape.	Negative Medium	Negative Low
Inappropriate infrastructure layout planning negates aesthetic and sense of place requirements of the cultural landscape.	Negative Very High	Negative Low
Inappropriate infrastructure layout planning degrades historic elements of the cultural landscape.	Negative Very High	Negative Medium
Non-landowner residents' lack of representation in planning and public participation process leads to loss of local knowledge, socio-economic empowerment and character of the cultural landscape.	Negative Very High	Positive Low
Noise		
Light delivery vehicles moving around onsite.	Negative Low	Negative Low
Paleontological – none identified		
Social– none identified		
Transportation – none identified		
Biodiversity – none identified		
Visual – none identified		

Table 6-2: Design Phase Impact Management

ASPECT / IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
General Measures during the Design Phase					
Specialist Investigations	1. An avifaunal walk-through must be undertaken by the avifaunal specialist prior to the construction commencing, to confirm the location and status of all priority species nests within the area of influence of the wind farm. 2. Preconstruction biodiversity walk-through of the facility to micro-site roads and turbines. 3. A preconstruction micro-survey for access roads, substations, laydown areas and gridlines should be completed with CLA specialist to ensure appropriate buffers are maintained during operational activities. 4. Turbine layouts must adhere to the sensitivity areas and buffers, and the layout should be approved by a bat specialist upon finalisation of turbine specifications. 5. A pre-construction walkthrough with an aquatic specialist is recommended and they can assist with the development of the stormwater management plan and Aquatic Rehabilitation and Monitoring plan, coupled to micro-siting of the final layout.	Holder of the EA Relevant specialists	As per specialist requirements.	Ensure the EMPr is adhered to.	Pre-construction

	6. Pre-construction Walk down must be undertaken by the flora specialist in order to locate species of conservation concern that can be translocated as well as comply with the local permit conditions. 7. A walk down of the final approved layout by the Heritage specialist will be required before construction commences. 8. Any heritage features of significance identified during this walk down will require formal mitigation or where possible a slight change in design could accommodate such resources. 9. A pre-construction palaeontological heritage walkdown of the final WEF and grid connection layout by a suitably qualified palaeontologist is recommended here. a. The recommended palaeontological walkdown should involve the recording and judicious collection of valuable fossil material as well as relevant geological data (e.g. on stratigraphic context, preservation style / taphonomy) within or close to (within ~10 m) the project footprint. This mitigation phase is essential because all fossil heritage resources in the RSA are protected by law and it is illegal to disturb, damage or destroy fossils here without a permit from the relevant provincial				

	heritage resources agency (South African Heritage Resources Act, Act No. 25 of 1999). The palaeontological heritage mitigation report would then make recommendations for further studies and mitigation (if any are necessary) during the construction phase of the renewable energy project. Since mitigation through recording and collection is almost invariably feasible, late-stage modifications to the final WEF / grid infrastructure layout (e.g. micro-siting changes to access roads, turbine or pylon locations) are not anticipated here. The palaeontologist responsible for the mitigation work will be required to submit a Work Plan for approval by Heritage Western Cape (HWC) and a Mitigation Report must be submitted to HWC for consideration. All fieldwork and reporting should meet the standards of international best practice as well as those developed for PIA reports by SAHRA (2013) and Heritage Western Cape (2021). Fossil material collected must be safeguarded and curated within an approved palaeontological repository (e.g. museum or university				

	collection) with full collection data. 10. It is recommended that a 5km turbine exclusion zone is implemented around the Martial Eagle nest a Tower 108 on the Droërivier – Protheus 400kV transmission line (see Figure 4). The current 28 turbine lay-out has taken this into account. 11. It is recommended that a 150m turbine exclusion zone is implemented around all drainage lines at the project site, and a 200m turbine exclusion zone around dams and water troughs as a pre-cautionary measure against SCC and other priority species collisions (Figure 4). The current 28 turbine lay-out has taken this into account. 12. It is recommended that all internal medium voltage cables are buried if technically possible. 13. Those sections where the 33kV medium voltage cable cannot be trenched due to technical or environmental reasons, but needs run on overhead poles, the proposed pole designs must be approved by the avifaunal specialist, to ensure that the designs are raptor-friendly. 14. It is recommended that bird flight diverters are fitted to all internal 33kV overhead lines according to the applicable Eskom engineering standard at the time. 15. Consideration should be given to painting one third of one blade on each turbine signal red as a				

	mitigation measure against avifaunal collisions, if feasible. While this mitigation measure is still considered experimental, data from Norway indicates a high level of effectiveness, even up to 100% for large raptors. If this can be done during the manufacturing phase, it can be done inexpensively.				
Appointment of ECO	16. Appoint an Environmental Control Officer. 17. 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	Avoid construction delays. Ensure the EMPr is adhered to.	Continuous.
Site demarcation	18. Before construction begins, all areas to be developed must be clearly demarcated with fencing or orange construction barrier where applicable. 19. 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. 20. 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	Prevent unauthorized impact on the environment. Ensure safety of the workers, public and prevent loss/ damage to equipment. Ensure the conditions of the EA are adhered to. Compliance to all legislative requirements.	Continuous

Site clearing	21. Site clearing must take place in a phased manner, as and when required. 22. Areas which are not to be constructed on within two months must not be cleared to reduce erosion risks. 23. The area to be cleared must be clearly demarcated and this footprint strictly maintained. 24. Spoil that is removed from the site must be removed to an approved spoil site or a licensed landfill site. 25. 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	26. 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. 27. All construction equipment must be stored within the construction camp. 28. All associated oil changes etc. (no servicing) must take place within the camp over a sealed surface such as a concrete slab. 29. 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 30. All Construction Camps shall be provided with portable fire extinguishing equipment, in	Contractor	Undertake regular audits	Prevent unauthorized impact on the environment. Ensure safety of the public and prevent loss/ damage equipment Ensure EMPr is adhered to Compliance to all legislative requirements	Continuous

	accordance with all relevant legislation and must be readily accessible. 31. 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-yearflood line. A sufficient number of toilets shall be provided to accommodate the number of personnel working in the area. 32. The Contractor shall inform all site staff to make use of supplied ablution facilities and under no circumstances shall indiscriminate sanitary activities be allowed. 33. 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.				
Training of site staff	34. Environmental awareness training for construction staff,	Contractor	Undertake regular audits	All staff members are aware of the EMPr	Continuous

	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. 35. Staff operating equipment (such as loaders, etc.) shall be adequately trained and sensitised to any potential hazards associated with their tasks. 36. 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. 37. 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. 38. Staff must be trained in the hazards and required precautionary measures for dealing with these substances. 39. Spillage packs must be available at construction areas.			requirements relevant to them. All waste managed according to approved the Method Statement compiled by the contractor and approved by the engineer and reviewed by ECO.	
Consultation During the Design Phase					
Consultation	1. Provide a mechanism through which information could be	Holder of the EA	n/a	Clear communication channels established.	Continuous

	exchanged between the project proponent and stakeholders. 2. Identify relevant stakeholders and engage them at applicable stages of the EIA process. 3. Inform the public about the proposed construction process. 4. Surrounding communities must be kept informed, through the identified and agreed consultation channels, of the commencement of construction. 5. Work on site to be restricted to work hours. 6. Financial provision must be included for rehabilitation in terms of the REIPPP financial model requirements. 7. 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.	Contractor			
Noise	8. At all stages, surrounding receptors should be informed about the project, providing them with factual information without setting unrealistic expectations. 9. The developer must implement a line of communication (i.e. a help line where complaints could be lodged). All potential sensitive receptors should be made aware of these contact numbers. 10. The proposed WEF should maintain a commitment to the local community (people staying within 2,000 m from construction	Holder of the EA Contractor	n/a	Clear communication channels established.	Continuous

	or operational activities) and respond to noise concerns in an expedient fashion. Sporadic and legitimate noise complaints could be raised. For example, sudden and sharp increases in sound levels could result from mechanical malfunctions or perforations or slits in the blades. Problems of this nature can be corrected quickly and it is in the developer's interest to do so. 11. Noise generated from all the proposed activities must comply with the Western Cape Noise Control Regulations promulgated in Provincial Notice 200/2013 ("WCNCR").				
Specialist Specific Mitigation Measures					
Erosion					
Protection of soil resources	1. Design 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	Ensure that the storm water 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.
Visual					
• Potential alteration of the visual character and sense of place.	1. Ensure that wind turbines are not located within 1km of any farmhouses in order to minimise visual impacts on these dwellings.	Holder of the EA Contractor	Undertake regular audits	Ensure the EMPr is adhered to.	Continuous

• Potential visual impact on receptors in the study area. • Potential visual impact on the night time visual environment.	2. Where possible, fewer but larger turbines with a greater output should be utilised rather than a larger number of smaller turbines with a lower capacity. 3. Where possible, the operation and maintenance buildings and laydown areas should be consolidated to reduce visual clutter. 4. Where possible, underground cabling should be utilised				
Biodiversity					
Vegetation and protected plant species	1. There should be no turbines within the Very High Sensitivity areas. 2. The footprint within drainage lines should be minimized as much as possible. 3. Preconstruction walk-though of the approved development footprint to ensure that sensitive habitats and species are avoided where possible. 4. Ensure that lay-down and other temporary infrastructure is within low sensitivity areas, preferably previously transformed areas if possible. 5. Minimise the development footprint and rehabilitate disturbed areas that are no longer required by the operational phase of the development. 6. A large proportion of the impact of the development stems from the access roads and the	Holder of the EA Contractor	Construction Monitoring and audit reports.	Impacts avoided or managed as per specialist recommendations. Alien Plant Management Plan Implemented. Plant Rehabilitation Implemented. Ensure the conditions of the EA are adhered to.	Continuous

	number of roads should be reduced to the minimum possible and routes must also be adjusted to avoid areas of high sensitivity, as informed by a preconstruction walk-though survey. 7. Preconstruction environmental induction for all construction staff on site to ensure that basic environmental principles are adhered to. This includes topics such as no littering, appropriate handling of pollution and chemical spills, avoiding fire hazards, minimizing wildlife interactions, remaining within demarcated construction areas etc. 8. Demarcate all areas to be cleared with construction tape or other appropriate and effective means. However, caution should be exercised to avoid using material that might entangle fauna.				
Aquatic Systems					
Impact on aquatic systems through the possible increase in surface water runoff on form and function: Increase in hard surface areas, and roads that require stormwater management will increase through the concentration of surface water flows that could result in localised changes to flows	1. A stormwater management plan must be developed in the preconstruction phase, detailing the stormwater structures and management interventions that must be installed to manage the increase of surface water flows directly into any natural systems. This stormwater control systems must be inspected on an annual basis to ensure these are functional. Effective stormwater management must include effective stabilisation (gabions	Holder of the EA Contractor	All staff members are aware of the EMPr requirements relevant to them. Align to Strom Water Plan.	Impacts avoided or managed as per specialist recommendations. Ensure the conditions of the EA are adhered to.	Continuous

(volume) that would result in form and function changes within aquatic systems, which are currently ephemeral. This then increases the rate of erosions and sedimentation of downstream areas.	and Reno mattresses) of exposed soil and the re-vegetation of any disturbed riverbanks.				
Surface Water Damage or loss of riparian and or drainage line systems i.e. disturbance of the waterbodies in the construction phase.	2. A detailed monitoring plan must be developed in the pre-construction phase by an aquatic specialist, where any delineated system occurs within 50 m of existing crossings.	Holder of the EA to appoint aquatic specialist to implement.	Construction Monitoring and audit reports.	Impacts avoided or managed as per specialist recommendations. Ensure the conditions of the EA are adhered to.	Continuous
Heritage					
Damage to 2 sites containing burial grounds and graves (KO-06 and KO- 09).	1. Demarcate sites as no-go areas (50m buffer). 2. Demarcate and fence during construction if construction activities area to happened within 50 meters from a site. 3. A management plan, after a walkdown of the final layout, for the heritage resources needs then to be compiled and approved for implementation during construction and operations.	Applicant ECO Environmental Control Officer (ECO) Heritage / Archaeological specialist	n/a	Ensure the EMPr is adhered to.	Continuous
Damage to 3 historical farmsteads/structures (One structure is located near farm roads within the proposed development area. The expansion of existing	4. Demarcate sites as no-go areas (30m buffer). 5. Demarcate and fence during construction if construction activities area to happened within 30 meters from a site.	Applicant ECO Environmental Control Officer (ECO)	n/a	Ensure the EMPr is adhered to.	Continuous

farm roads may impact the site, two sites are located within the proposed grid corridor area).	6. A management plan, after a walkdown of the final layout, for the heritage resources needs then to be compiled and approved for implementation during construction and operations.	Heritage / Archaeological specialist			
Unidentified heritage resources	7. A management plan, after a walkdown of the final layout, for the heritage resources needs then to be compiled and approved for implementation during construction and operations.	Applicant ECO Environmental Control Officer (ECO) Heritage / Archaeological specialist	n/a	Ensure the EMPr is adhered to.	Continuous
Fossil heritage resources: Disturbance, damage or destruction of fossils at or beneath the ground surface due to surface clearance and bedrock excavations.	8. Pre-construction walkdown (with fossil recording / collection) of final footprint by specialist palaeontologist. 9. Chance Fossil Finds Procedure during construction phase.	Applicant ECO Environmental Control Officer (ECO) Heritage / Archaeological specialist	n/a	Ensure the EMPr is adhered to.	Continuous
Cultural landscape - Ecological	10. Ecological Support Areas (along drainage lines) should be protected from development of the wind turbines or any associated development during all phases. 11. No wind turbines should be placed within the 1:100-year flood line of the watercourses. In the context of the sensitivity to soil erosion in the area, as well as potential archaeological resources, it would be a risk to include any structures close to these drainage lines.	Holder of the EA	n/a	Ensure the EMPr is adhered to.	Continuous

	12. Identified medicinal plants used for healing or ritual purposes should be conserved during all phases if threatened for use and continued access to these resources be maintained. 13. Careful planning should incorporate areas for storm water runoff where the base of the structure disturbed the natural soil. Local rocks found on the site could be used to slow storm water (instead of concrete, or standard edge treatments), and prevent erosion that would be an unfortunate consequence that would alter the character of the site. By using rocks from site it helps to sensitively keep to the character.				
Cultural landscape - Aesthetic	14. Where additional infrastructure (i.e. roads) is needed, the upgrade of existing roads to accommodate the development should be the first consideration. 15. Avoid development of infrastructure (such as buildings, wind turbines and power lines), on crests or ridgelines due to the impact on the visual sensitivity of skylines. The visual impact of turbines can be reduced by distancing them from viewpoints such as roads and farmsteads and placing them in lower lying plains to reduce their impact on the surrounding sensitive cultural landscape. 16. Significant and place-making view sheds of surrounding ridgelines and distant mountain	Holder of the EA	n/a	Ensure the EMPr is adhered to.	Continuous

	should be maintained by limiting the placement of turbines or associated infrastructure on opposing sides of any of the regional roads, so that at any time a turbine-free view can be found when travelling through the landscape or at the historic farmsteads. Retain view-lines and vistas focused on prominent natural features such as mountain peaks or hills, such as the Platdoring se Kop and the Koup 1 poort, as these are important place making and orientating elements for experiencing the cultural landscape. 17. Prevent the construction of new buildings/structures/ new roads on visually sensitive, steep, elevated or exposed slopes, ridgelines and hillcrests. 18. Turbine and new road placement to avoid slopes steeper than 10% with existing farm roads to be used for access to turbines as far possible. 19. Proposed turbines 4, 5 and 8 are not feasible in their current proposed locations due to steep slope gradients and high and visually prominent ridge lines in these locations which will have an overwhelming negative impact on the historic farm road. 20. Proposed turbine 9 is not feasible in the current proposed location due to a combination of factors that cumulatively				

	overwhelm the cultural landscape: ■ Prominent location in relation to the Koup 1 landscape poort. ■ Location at the top of a steep slope classified as 10% and higher. ■ Location at one of the highest points in the Koup 1 landscape at close to 1050masl. 21. Due to the scenic and historic significance of the regional road, a buffer of 1000m to either side of the N12 should be maintained for no development associated with the WEF other than sensitive road upgrades, which must not impact on the views from the road. The visual impact of the turbines will be 50% less at 1km distance and therefore this distance will greatly reduce the negative visual impact of the turbines on the experience of the historic road and the values that give it significance. 22. Due to the nature of the landscape being largely devoid of high vertical elements such as the proposed turbines, and the introduction of these turbines fundamentally altering the sense of place and character of the landscape for those living there, location of turbines should be limited to an 800m buffer around the farmsteads. The current turbine layout supports this recommendation in that there is nowhere more than a single				

	turbine at the edge of these buffer zones. 23. Due to the historic and local experience of the landscape from the farm roads, which link the historically significant farmsteads across the region, a buffer of 300m from the farm roads should be maintained for no development associated with the WEF other than sensitive road upgrades which must not impact on the views from the road. 24. Alternatives Option 1(sub1) for the grid corridor and Option 1 for the laydown area, are preferred in terms of cultural landscape assessment as they limit the construction to a smaller footprint on the landscape and locate the infrastructure far enough from the N12 and out of the Koup 1 landscape as far possible. They should be moved as far away from the farm road as possible without impacting on a riverine corridor flood line or a slope over 3%. 25. The substation location should be located on the same side as other development infrastructure and to the north of the farm road so as to limit the visual impact to one viewshed. As there is a ridge behind this development area, for which turbine placement is proposed, location of the substation to the north of the farm road contains the impact to one side of the road and the infrastructure will not interrupt				

	view lines of the mountain ranges in the distance. 26. The impact of WEF turbine night lighting on the wilderness landscape is intrusive and overwhelms the rural character of the landscape, giving it an industrial sense of place after dark. Reduce the impact of turbine night lighting by minimizing the number of turbines with lighting to only those necessary for aviation safety, such as a few identified turbines on the outer periphery, or use aircraft triggered night lighting. Due to the reduced receptors on the roads at night, the impact of the lighting at night is reserved mainly for farmsteads and other places of overnight habitation such as the surrounding tourist facilities, which would be heavily impacted by the light pollution on a long term and ongoing basis.				
Cultural landscape - Historic	27. Due to the scenic and historic significance of the regional road, a buffer of 1000m to either side of the N12 should be maintained for no development associated with the WEF other than sensitive road upgrades, which must not impact on the views from the road. The visual impact of the turbines will be 50% less at 1000m distance and therefore this distance will greatly reduce the negative visual impact of the turbines on the experience of the	Holder of the EA	n/a	Ensure the EMPr is adhered to.	Continuous

	historic road and the values that give it significance. 28. The integrity of the historic farmsteads and their associated cultivated areas and relationship to the riverine corridors and other natural elements, such as the ridgelines and poorts, should be maintained and protected. Due to the nature of the landscape being largely devoid of high vertical elements such as the proposed turbines, the introduction of turbines will fundamentally alter the sense of place and character of the landscape for those living there. Location of proposed turbines and power lines should be limited to an 800m buffer around the farmsteads as far possible to limit impact to the farmsteads. The current turbine layout supports this recommendation in that there is nowhere more than a single turbine at the edge of these buffer zones. 29. Any development that impacts the inherent character of the werf component should be discouraged and a development buffer of 50m around the outer boundary of farm werfs and 200m around any graded heritage structure, must be maintained, including the associated cultivated areas, cemeteries and unmarked graves, for all new infrastructure. A preconstruction micro-survey for access roads, substations, laydown areas and gridlines				

	should be completed with CLA specialist to ensure appropriate buffers are maintained. 30. The significant historical cultural element of the Bloemendal – Reynartskraal Poort settlement, graded IIIA, should be protected from heavy construction vehicles, WEF infrastructure, construction and operational traffic dust or water exploitation as this will impact heavily on the continued sustainable land use patterns and crop cultivation. A 500m buffer around this area is for all infrastructure, including laydown areas, other than minor sensitive road widening or upgrades. 31. No infrastructure or operational upgrades, such as boreholes, should impact negatively or reduce natural, on-site water quality, quantity or access for the residents within or around the development site. Any borehole or other water resource upgrade should also be made freely accessible to the residents living on site. 32. Due to the historic and local experience of the landscape from the farm roads, which link the historically significant farmsteads across the region, a buffer of 300m from the farm roads should be maintained for no development associated with the WEF other than sensitive road upgrades which must not impact on the views from the road. A preconstruction micro-				

	survey for access roads, substations, laydown areas and gridlines should be completed with CLA specialist to ensure appropriate buffers are maintained. 33. Buffers from identified stone markers and foundations must be in accordance with the AIA (PGS, 2021) where they are not directly associated with an historic farmstead. 34. The existing names of places, routes, watercourses and natural features in the landscape that are related to its use, history and natural character must be retained and used as heritage resources related to intangible heritage. 35. Burial grounds and places of worship are automatically regarded as Grade IIIa or higher. Any development that threatens the inherent character of family burial grounds must be assessed and should be discouraged. No development closer than 100m from the boundary of any burial grounds or unmarked graves. No turbines have been proposed for placement near known unmarked burials or family cemeteries. A preconstruction micro-survey for access roads, substations, laydown areas and gridlines should be completed with CLA specialist to ensure appropriate buffers are maintained. A preconstruction micro-survey of each turbine footprint and any new access				

	roads should be conducted to ensure no further unmarked graves are threatened. 36. Commonages and outspans were located at water points, and these places were likely gathering points before the arrival of colonists and continued to provide communal resources. In the mid-20th century, many old commonages came under the ownership of the Municipality and have since been rented out to private individuals or organisations. The Municipality should facilitate the use of common land in a way that promotes the well-being and quality of life of the public. These sites can play a restorative role within the community, for instance for those who have limited alternative opportunities for recreation. 37. Respect existing patterns, typologies and traditions of settlement-making by promoting the continuity of heritage features. These include: (a) indigenous; (b) colonial; and (c) current living heritage in the form of tangible and intangible associations to place. 38. Alterations and additions to conservation-worthy structures should be sympathetic to their architectural character and period detailing.				
Cultural landscape - Socio-economic	39. The findings of this report must be shared with identified interested and affected parties in	Holder of the EA	n/a	Ensure the EMPr is adhered to.	Continuous

	the public participation process, including non-landowner residents on the development properties, in the EIA public participation process in order to further ascertain any intangible cultural resources that may exist on the landscape that have not been identified. A specialist qualified in recognising and discussing significance of intangible heritage resources should be present during the public meetings. The findings should inform the recommendations for appropriate mitigation for impacts to the cultural landscape. 40. The public participation process must include the non-owner residents on and surrounding the development site, which will be impacted on by the proposed WEF as identified by the SIA and VIA. The PPP must consider fully issues of sense of place in its process. A specialist qualified in recognising and discussing significance of intangible heritage resources should be present during the public meetings. The findings should inform the recommendations for appropriate mitigation for impacts to the cultural landscape. 41. The continued use of the landscape for human habitation and cultivation by historic residents of the area, should be retained and encouraged as far possible to sustain the continual				

	use pattern and human-environment relationship which is the ultimate significance of this cultural landscape element. The WEF development must allow and support this, including financially, and not degrade this continued relationship. 42. No infrastructure or operational upgrades, such as boreholes, should impact negatively or reduce natural, on-site water quality, quantity or access for the residents within or around the development site. Preferably any borehole or other water resource upgrade should also be made freely accessible to the residents living on site. 43. The local community on and around the development should benefit from job opportunities created by the proposed development and the development should not cause reduction in economic viability of surrounding properties in excess of those offered by the development. Short-term job opportunities at the expense of long-term economic benefit and local employment opportunities must be prevented. 44. Local residents must be offered employment on the construction/ decommissioning and operational phases before 'importing' staff from elsewhere. 45. Local residents must be offered employment-training opportunities associated with				

	WEF developments at all phases.				
Avifauna					
Mortality of priority avifauna due to collisions with the wind turbines.	1. The results of the pre-construction monitoring must guide the lay-out of the turbines, especially as far as proposed no-turbine zones are concerned. No turbines must be constructed in the buffer zones which were identified based on the results of the pre- construction monitoring, with a specific view to limiting the risk of collisions to a variety of birds, including several Red Data species.	Project Developer	Design the facility with 200m buffers around dams and water troughs, and 150m buffers around major drainage lines.	Prevent mortality of priority avifauna.	Once-off during the planning phase.
Electrocution of raptors on the internal 33kV poles.	2. Use underground cabling as much as is practically possible. 3. Where the use of overhead lines is unavoidable due to technical reasons, the Avifaunal Specialist must be consulted to ensure that a raptor friendly pole design is used, and that appropriate mitigation is implemented pro-actively for complicated pole structures e.g. insulation of live components to prevent electrocutions on terminal structures and pole transformers. 4. Use Bird flight diverters on all internal 33kV overhead lines according to the applicable Eskom engineering standard at the time.	Project Developer	Design the facility with underground cabling. Consult with Avifaunal Specialist during the design phase of the overhead lines.	Prevent electrocutions.	Once-off during the planning phase.
Bats					
Impact			**Monitoring**		

	Mitigation / Management Objectives	**Mitigation / Management Actions**	**Method**	**Frequency**	**Responsibility**
Future Impacts on Bats	1. Mitigate impacts on Bat Habitat caused by destruction, disturbance, and displacement.	Ensure the design of the WEF takes the sensitivity mapping of the bat specialist into account to avoid and reduce impacts on bat species and bat important features. Maintain buffers around these sensitive areas.	Ensure that No Go and high sensitivity areas are identified and excluded from turbine placement during the planning and design phase.	Prior to construction during design and planning phase.	Project Developer
	2. Mitigate impacts leading to bat population decline in future project phases.	Conduct one year of bat monitoring at height.	Relevant SABAA bat guidelines (Sowler, et al, 2017).	Prior to construction.	Project Developer
	3. Minimize footprint of the construction to an acceptable level i.e., no placement of turbines in sensitive areas as well as spacing of turbines.	Turbines need to be approximately 250 m apart from blade tip to blade tip.	Final layout design.	During design and prior to construction.	Project Developer
	4. Avoid attracting bats to sensitive areas.	Plan to minimise artificial light at night.	Choice and light placement on turbines.	Final design.	Project Developer

7. MANAGEMENT PLAN FOR CONSTRUCTION PHASE

Table 7-1 below presents a summary of the potential impacts as assessed by specialists for the construction phase of the WEF.

Table 7-1: Summary of the Construction Phase Impacts and Significance Ratings

Impact	Pre- mitigation	Post- mitigation
Impacts on Biophysical Systems / Components during the Construction Phase		
Avifaunal		
Displacement due to disturbance associated with the construction of the wind turbines and associated infrastructure.	Negative Medium	Negative Low
Displacement due to habitat transformation associated with the construction of the wind turbines and associated infrastructure.	Negative Low	Negative Low
Ecological		
Vegetation clearing for access roads, turbines and their service areas and other infrastructure will impact on vegetation and protected plant species.	Negative Medium	Negative Low
Increased levels of noise, pollution, disturbance and human presence during construction will be detrimental to fauna. Sensitive and shy fauna are likely to move away from the area during the construction phase as a result of the noise and human activities present, while some slow-moving species would not be able to avoid the construction activities and might be killed.	Negative Medium	Negative Medium
Bat		
The destruction of active bat roosts and/or features that could serve as potential roosts, such as rock formations and the removal of trees on site. The destruction of derelict holes, such as aardvark holes and any fragmentation of woody habitat which include dense bushes. The removal of limited trees and bushes would have an impact on all bats that could potentially roost in trees and on the foraging of clutter and clutter-edge species.	Negative Low	Negative Low
Creating new habitat amongst the turbines which might attract bats. This includes buildings with roofs that could serve as roosting space or open water sources from quarries or excavation where water could accumulate.	Negative Low	Negative Low
Construction noise, especially during night-time, as well as lightening disturbance.	Negative Low	Negative Low
Geotechnical		
Displacement of natural earth material and overlying vegetation. ■ Increase stormwater velocity. ■ Increase in soil and wind erosion due to clearing of vegetation. ■ Construction and earthmoving vehicles may displace soil during operations.	Negative Low	Negative Low

Impact	Pre- mitigation	Post- mitigation
■ Creation of drainage paths along access tracks. ■ Potential oil spillages from heavy plant. ■ Sedimentation of nonperennial features and excessive dust. ■ Potential groundwater and drainage feature contamination.		
Surface Water		
During construction activities within watercourses could result in the disturbance or destruction of any listed and or protected plant or animal species. However, none of these aquatic obligate species were observed during this assessment.	Negative Low	Negative Low
Construction could result in the loss of drainage systems that are fully functional and provide an ecosystem services within the site especially where new access roads are required or road upgrades will widen any current bridges or drifts. Loss can also include a functional loss, through change in vegetation type via alien encroachment for example.	Negative Medium	Negative Low
During construction earthworks will expose and mobilise earth materials, and a number of materials as well as chemicals will be imported and used on site and may end up in the surface water, including soaps, oils, grease and fuels, human wastes, cementitious wastes, paints and solvents, etc. Any spills during transport or while works area conducted in proximity to a watercourse has the potential to affect the surrounding biota. Although unlikely, consideration must also be provided for the proposed Battery Energy Storage System (BESS), with regard safe handling during the construction phase. This to avoid any spills or leaks from this system.	Negative Medium	Negative Low
Impacts to Socio-Economic Component during the Construction Phase		
Heritage		
Construction and decommissioning activity degrades the character of the cultural landscape and the sense of place	Negative Medium	Negative Low
Integrity of farmsteads and farm roads degraded by insensitive construction or decommissioning activities.	Negative Medium	Negative Low
Integrity of local residents to continue their patterns of land use is degraded by the construction and decommissioning activities.	Negative Medium	Negative Low
Disturbance, damage or destruction of fossils at or beneath the ground surface due to surface clearance and bedrock excavations	Negative Medium	Negative Low
Archaeological		
The fieldwork conducted for the evaluation of the possible impact of the new Koup 1 WEF and associated grid connection infrastructure has revealed the presence of 18 heritage resources. One archaeological site (KO_18) was rated as having low heritage significance. Four graves, burial grounds and possible graves (KO-06 – KO-09) were rated as having high heritage significance. Two structures (KO-03, KO-05) were rated as having medium heritage significance, 1 structure (KO-02) was rated as having low heritage significance and 2 structures (KO-01; KO-04) were rated as having no heritage significance.	Negative High	Negative Low

Impact	Pre- mitigation	Post- mitigation
Eight find spots (KO_10 – KO_17) comprise several low-density Stone Age surface artefact scatters and were rated as having low heritage significance. These are primarily from the MSA, although both LSA and earlier ESA material was identified. All of the artefact assemblages (including KO-18) occur in heavily deflated and eroded areas, so their scientific potential and heritage significance is somewhat lowered. Based on findings from a range of other heritage reports in the area, these types of sites are to be expected in this region.	Negative High	Negative Low
Cultural Landscape		
Fragmentation and destruction of the landscape degrading the environment and thus continuous relationship between man and environment	Negative High	Negative Low
WEF infrastructure construction and decommissioning activity degrades the character of the cultural landscape and the sense of place	Negative Very high	Negative High
Integrity of farmsteads and farm roads degraded by insensitive construction or decommissioning activities.	Negative Very high	Negative Medium
Integrity of local residents to continue their patterns of land use is degraded by the construction and decommissioning activities.	Negative Very High	Positive Low
Paleontological		
Disturbance, damage or destruction of fossils at or beneath the ground surface due to surface clearance and bedrock excavations	Negative Medium	Negative Low
Noise		
Construction activities relating to hardstand areas, digging of foundations for wind turbines, civil works as well as erection of wind turbines	Negative Low	Negative Low
Construction activities relating to civil works as well as erection of wind turbines	Negative Medium	Negative Low
Construction of access roads	Negative Medium	Negative Low
Noises relating to construction traffic	Negative Medium	Negative Low
Social		
Air quality	Negative Low	Negative Low
Noise	Negative Low	Negative Low
Increase in crime	Negative Low	Negative Low
Increased risk of HIV infections	Negative High	Negative Medium
Influx of construction workers	Negative Low	Negative Low
Hazard exposure	Negative Low	Negative Low
Disruption of daily living patterns	Negative Low	Negative Low
Disruptions to social and community infrastructure	Negative Low	Negative Low
Job creation and skills development	Positive Medium	Positive Medium
Socio-economic stimulation.	Positive Medium	Positive Medium

Impact	Pre- mitigation	Post- mitigation
Transportation		
Increase in Traffic	Negative Low	Negative Low
Increase of Incidents with pedestrians and livestock	Negative Medium	Negative Low
Increase in Dust from gravel roads	Negative Low	Negative Low
Increase in Road Maintenance	Negative Low	Negative Low
Additional Abnormal Loads	Negative Low	Negative Low
Increase in Dust from gravel roads	Negative Low	Negative Low
Increase in Traffic	Negative Low	Negative Low
Visual		
Large construction vehicles, equipment and construction material stockpiles will alter the natural character of the study area and expose visual receptors to impacts associated with construction. Construction activities may be perceived as an unwelcome visual intrusion, particularly in more natural undisturbed settings. Dust emissions and dust plumes from increased traffic on gravel roads serving the construction site may evoke negative sentiments from surrounding viewers. Surface disturbance during construction would expose bare soil resulting in visual scarring of the landscape and increasing the level of visual contrast with the surrounding environment. Vegetation clearance required for the construction of the proposed substation is expected to increase dust emissions and alter the natural character of the surrounding area, thus creating a visual impact. Temporary stockpiling of soil during construction may alter the flat landscape. Wind blowing over these disturbed areas could result in dust which would have a visual impact.	Negative Low	Negative Low

Table 7-2: Construction Phase Impact Management

ASPECT / IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
Construction Camp					
Construction Camp: Site of construction camp	1. The size of the construction camp must be aligned to the approved laydown area. 2. 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. 3. Suitable control measures over the Contractor's yard, plant and material storage to mitigate any visual impact of the construction activity must be implemented. 4. No construction should occur in an area of high or unique agricultural value, or in an area under cultivation.	Holder of the EA Contractor	As per specialist requirements.	Ensure the conditions of the EA are adhered to. Compliance to all legislative requirements. Impacts avoided or managed as per specialist recommendations.	Once-off
Construction Camp: Storage of materials (including hazardous materials)	5. 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. 6. Storage areas must be designated, demarcated and fenced if necessary. 7. Storage areas should be secure so as to minimize the risk of crime. They should also be safe from	Holder of the EA Contractor	As per specialist requirements.	Choice of storage areas carefully considered to avoid impact to environment. Correct handling, storage and/or disposal and/or cleanup of all materials to prevent impact to environment. All hazardous substances managed according to approved Method Statement.	Continous

ASPECT / IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
	access by unauthorised persons i.e. children / animals etc. 8. Fire prevention facilities must be present at all storage facilities. 9. Storage areas containing chemical substances / materials must be clearly sign posted. 10. 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. 11. 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.				

ASPECT / IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
	12. All fuel storage areas must be roofed to avoid creation of dirty stormwater. 13. 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. 14. Staff dealing with these materials / substances must be aware of their potential impacts and follow the appropriate safety measures. 15. 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. 16. All excess cement and concrete mixes are to be contained on the construction site prior to disposal off site. 17. All major spills as specified in the contractor emergency response procedure of any materials, chemicals, fuels or other potentially				

ASPECT / IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
	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. 18. Concrete mixing be undertaken in a bunded area outside watercourse buffer areas to ensure that no accidental runoff will enter watercourses. 19.				
Construction Camp: Drainage of construction camp	20. Surface drainage measures must be established in the Construction Camps so as to prevent: Ponding of water. Erosion as a result of accelerated runoff; and, 21. Uncontrolled discharge of polluted runoff.	Holder of the EA Contractor	As per specialist requirements.	Storm Water Management Plan provided and accepted prior to construction commencing. Storm Water Management Plan implemented. Erosion plan implemented and hydrological measures in place.	Continuous.
Construction Traffic and Access					
Construction Traffic	1. Construction routes and required access roads must be clearly defined. 2. Recommendations of the stormwater management plan must be implemented.	Holder of the EA Contractor	n/a	A traffic management strategy developed and implemented throughout the construction and operation phases.	Continuous.

ASPECT / IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
	3. Delivery of equipment must be undertaken with the minimum amount of trips to reduce the carbon footprint of these activities 4. Access of all construction and material delivery vehicles should be strictly controlled, especially during wet weather to avoid compaction and damage to the topsoil structure. 5. Damping down of the un-surfaced roads must be implemented to reduce dust and nuisance. 6. Vehicles and equipment shall be serviced regularly to avoid the contamination of soil from oil and hydraulic fluid leaks etc. 7. Servicing must be done in dedicated service areas on site or else off site if no such area exists. 8. Oil changes must take place on a concrete platform and over a drip tray to avoid pollution. 9. Soils compacted by construction shall be deep ripped to loosen compacted layers and re-graded to even running levels.			Storm Water Management Plan implemented. Ensure the EMPr is adhered to.	
Construction Access	10. The main routes on the site must be clearly sign posted and printed delivery maps must be issued to all suppliers and Sub-contractors. 11. Planning of access routes to the site for construction purposes shall be done in conjunction with the Contractor and the Landowner. All agreements reached should be	Holder of the EA Contractor	n/a	A traffic management strategy developed and implemented throughout the construction and operation phases.	Continuous.

ASPECT / IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
	documented and no verbal agreements should be made. The Contractor shall clearly mark all access roads. Roads not to be used shall be marked with a “NO ENTRY for construction vehicles" sign. 12. Access to the site must be via secondary roads as requested by SANRAL.				
Road Maintenance	13. suitable measures shall be taken to rehabilitate damaged areas. 14. Contractors should ensure that access roads are maintained in good condition by attending to potholes, corrugations, and stormwater damages as soon as these develop. 15. If necessary, staff must be employed to clean surfaced roads adjacent to construction sites where materials have spilt. 16. Recommendations of the surface water report must be taken into consideration.	Holder of the EA Contractor	n/a	A traffic management strategy developed and implemented throughout the construction and operation phases.	Continuous.
General	17. The contractor shall meet safety requirements under all circumstances. All equipment transported shall be clearly labelled as to their potential hazards according to specifications. All the required safety labelling on the containers and trucks used shall be in place. 18. The Contractor shall ensure that all the necessary precautions against	Holder of the EA Contractor	n/a	A traffic management strategy developed and implemented throughout the construction and operation phases. Adhere to Health and Safety Regulations.	Continuous.

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	damage to the environment and injury to persons are taken. 19. Care for the safety and security of community members crossing access roads should receive priority at all times. 20. Where there are further changes/updates to the vertical and horizontal alignments of the road network and site laydown area, such sections/areas may require reassessed in order to determine any further risks and impacts to the ecology and/or species. 21. Wind conditions should be considered prior to the commencement of the construction activities and such activities should be suspended during periods of high wind speeds. 22. All the no-go areas identified by the various specialists must be clearly demarcated, not disturbed or impacted upon, and may not be used for storage purposes during the construction or the operational phases of the authorised development. 23.				
Environmental Education and Training					
Environmental Training	1. Ensure that all site personnel have a basic level of environmental awareness training. The Contractor must submit a proposal for this	Contractor	n/a	Throughout induction to site.	Continuous

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	training to the ECO for approval. Translators are to be used. Topics covered should include: ■ 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. 2. 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. 3. Training should be provided to the staff members in the use of the appropriate fire-fighting equipment. 4. Use should be made of environmental awareness posters on site. 5. The need for a "clean site" policy also needs to be explained to the workers. 6. Staff operating equipment (such as loaders, etc.) shall be adequately trained and sensitized to any				

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	potential hazards associated with their tasks.				
Monitoring of environmental training	7. 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	n/a	Throughout induction to site.	Continuous
Waste Management					
Litter management / general waste	1. Refuse bins must be placed at strategic positions to ensure that litter does not accumulate within the construction site. 2. 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. 3. A housekeeping team should be appointed to regularly maintain the litter and rubble situation on the construction site. 4. 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.	Contractor The ECO shall monitor the neatness of the work sites as well as the Contractor campsite.	n/a	All waste managed according to approved Method Statement.	Continuous

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	5. Where vegetation is cleared and is suitable, chipping and/or mulching can be considered. 6. Littering by the employees of the Contractor shall not be allowed under any circumstances. 7. Skip waste containers should be maintained on site. These should be kept covered and arrangements made for them to be collected regularly. 8. Any putrescible waste must be stored in containers that can keep out scavengers such as baboons and birds to prevent the spread of litter. 9. 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. 10. The Contractor shall provide a method statement with regard to waste management. 11. A certificate of disposal shall be obtained by the Contractor and kept on file, if relevant. 12. Under no circumstances may solid waste be burnt on site. 13. All waste must be removed promptly to ensure that it does not attract vermin or produce odours.				
Hazardous waste	14. All waste hazardous materials, if present, must be carefully and appropriately stored, and then	Contractor The ECO shall monitor the	n/a	All waste managed according to approved Method Statement.	Continuous

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	disposed of off-site at a licensed landfill site, where practical. 15. Contaminants to be stored safely to avoid spillage. 16. Machinery must be properly maintained to keep oil leaks in check. 17. 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.	neatness of the work sites as well as the Contractor campsite.			
Sanitation	18. The Contractor shall install mobile chemical toilets on the site. 19. The construction of “Long Drop” toilets are forbidden. Rather, portable toilets are to be used. 20. 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. 21. 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	Contractor	n/a	Staff members aware of EMPr requirements and ablutions used and maintained accordingly.	Continuous

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	be accommodated separately where possible. 22. Toilets shall be serviced regularly, and the ECO shall inspect toilets regularly. 23. Potable water must be provided for all construction staff.				
Remedial Actions	24. In the event of an accidental spill or leakage of hazardous substances, such incident(s) must be reported to all relevant authorities, including the Directorate: Pollution and Chemicals Management, in accordance with section 30(5) of the NEMA, 1998 pertaining to the control of incidents. 25. Depending on the nature and extent of the spill, contaminated soil must be either excavated or treated on-site. 26. 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. 27. 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. 28. If a spill occurs on an impermeable surface such as cement or concrete, the surface spill must be	Contractor	n/a	All waste managed according to approved Method Statement.	Continuous

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	contained using oil absorbent material. 29. If necessary, oil absorbent sheets or pads must be attached to leaky machinery or infrastructure. 30. Materials used for the remediation of petrochemical spills must be used according to product specifications and guidance for use. 31. 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.				
Agriculture and Soils					
Erosion	1. 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 construction phase.

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	2. 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.
Topsoil loss	3. 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.
Removal of subsoils (soil and rock): Displacement of natural earth material and overlying vegetation.	4. Identify protected areas prior to construction. 5. Construction of temporary berms and drainage channels to divert surface water. 6. Minimize earthworks and fills. 7. Use existing road network and access tracks. 8. Rehabilitation of affected areas (such as regrassing, mechanical stabilization). 9. Correct engineering design and construction of gravel roads and water crossings. 10. Correct construction methods for foundation installations and cut to fill configurations.	Engineer Contractor	Undertake regular audits	Erosion plan implemented and hydrological measures in place. All waste managed according to approved Method Statement. Ensure the EMPr is adhered to.	Continuous

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	11. Vehicle repairs to be undertaken in designated areas. 12. Control stormwater flow.				
Biodiversity					
Faunal disturbance and habitat loss: Increased levels of noise, pollution, disturbance and human presence during construction will be detrimental to fauna. Sensitive and shy fauna are likely to move away from the area during the construction phase as a result of the noise and human activities present, while some slow- moving species would not be able to avoid the construction activities and might be killed.	1. During construction any fauna directly threatened by the construction activities should be removed to a safe location by the ECO or other suitably qualified person. 2. The illegal 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 construction site. 3. No fires should be allowed within the site as there is a risk of runaway veld fires. 4. No fuelwood collection should be allowed on-site. 5. If any parts of site such as construction camps must be lit at night, this should be done with low-UV type lights (such as most LEDs) as far as practically possible, which do not attract insects, and which should be directed downwards. 6. 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	Holder of the EA	Construction Monitoring and audit reports.	Impacts avoided or managed as per specialist recommendations. Alien Plant Management Plan Implemented. Plant Rehabilitation Implemented Ensure the conditions of the EA are adhered to.	Continuous

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	appropriate manner as related to the nature of the spill. 7. No unauthorized persons should be allowed onto the site and site access should be strictly controlled. 8. All construction vehicles should adhere to a low-speed limit (40km/h for cars and 30km/h for trucks) to avoid collisions with susceptible species such as snakes and tortoises and rabbits or hares. Speed limits should apply within the facility as well as on the public gravel access roads to the site. 9. All personnel should undergo environmental induction with regards to fauna and in particular awareness about not harming or collecting species such as snakes, tortoises and snakes which are often persecuted out of fear or superstition. 10. Prior to construction, once all the areas where topsoil will be removed or areas will be transformed have been demarcated, the ECO with experience in flora and contractor will be responsible to remove all bulbous species from the topsoil, as well as succulents and small indigenous shrubs that can be transplanted. These are to be kept in a raised, protected				

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	position in a designated area until they can be replanted again as part of the rehabilitation process				
Surface Water					
Loss of aquatic species of special concern: During construction activities within watercourses could result in the disturbance or destruction of any listed and or protected plant or animal species. However none of these aquatic obligate species were observed during this assessment	1. Develop and implement an Aquatic Rehabilitation and Monitoring plan post Environmental Authorisation. This must be developed following the finalisation of the turbine / road layout and a walk down has been completed.	Holder of the EA	Construction Monitoring and audit reports	Impacts avoided or managed as per specialist recommendations. Ensure the conditions of the EA are adhered to.	Continuous
Damage or loss of riparian and or drainage line systems i.e. disturbance of the waterbodies in the construction phase: Construction could result in the loss of drainage systems that are fully functional and provide an ecosystem services within the site especially where new access roads are required or road upgrades will widen	■ All alien plant re-growth, which is currently low within the greater region must be monitored and should it occur, these plants must be eradicated within the project footprints and especially in areas near the proposed crossings. *Prosopis* (alien invasive riparian tree) is prevalent in areas to the north of the site, thus care in transporting any material, while ensuring that such materials is free of alien seed, coupled with pre and post alien clearing must be stipulated in the EMPr. Where roads and crossings are upgraded, the following applies:	Holder of the EA	Construction Monitoring and audit reports	Impacts avoided or managed as per specialist recommendations. Ensure the conditions of the EA are adhered to.	Continuous

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any current bridges or drifts. Loss can also include a functional loss, through change in vegetation type via alien encroachment for example.	■ Existing pipe culverts must be removed and replaced with suitable sized box culverts, especially where road levels are raised to accommodate any large vehicles. ■ River levels, regardless of the current state of the river / water course must be reinstated thus preventing any impoundments from being formed. The related designs must be assessed by an aquatic specialist during a pre-construction walkdown. ■ Where large cut and fill areas are required these must be stabilised and rehabilitated during the construction process, to minimise erosion and sedimentation. ■ Suitable stormwater management systems must be installed along roads and other areas and monitored during the first few months of use. Any erosion / sedimentation must be resolved through whatever additional interventions maybe necessary (i.e., extension, energy dissipaters, spreaders, etc).				
Potential impact on localised surface water quality (construction materials and fuel storage facilities) during the construction and decommissioning phases. During construction earthworks will expose	2. All liquid chemicals including fuels and oil, including the BESS must be stored in with secondary containment (bunds or containers or berms) that can contain a leak or spill. Such facilities must be inspected routinely and must have the suitable PPE and spill kits needed to contain likely worst-case scenario leak or spill in that facility,	Holder of the EA Contractor	Construction Monitoring and audit reports	Impacts avoided or managed as per specialist recommendations. Ensure the conditions of the EA are adhered to.	Continuous

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and mobilise earth materials, and a number of materials as well as chemicals will be imported and used on site and may end up in the surface water, including soaps, oils, grease and fuels, human wastes, cementitious wastes, paints and solvents, etc. Any spills during transport or while works area conducted in proximity to a watercourse has the potential to affect the surrounding biota. Although unlikely, consideration must also be provided for the proposed Battery Energy Storage System (BESS), with regard safe handling during the construction phase. This to avoid any spills or leaks from this system	safely. 3. Washing and cleaning of equipment must be done in designated wash bays, where rinse water is contained in evaporation/sedimentation ponds (to capture oils, grease cement and sediment). 4. Mechanical plant and bowsers must not be refuelled or serviced within 100m of a river channel. 5. All construction camps, lay down areas, wash bays, batching plants or areas and any stores should be more than 50 m from any demarcated water courses. Note comment regards Camp A that requires micro-siting. 6. Littering and contamination associated with construction activity must be avoided through effective construction camp management. 7. No stockpiling should take place within or near a water course. 8. All stockpiles must be protected and located in flat areas where run-off will be minimised and sediment recoverable. 9. It is recommended that construction activities should ideally take place within the dry season to reduce the risk of sediment-laden runoff from the construction activities/sites washing into any nearby				

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	watercourses.				
Noise					
Noise Special Conditions	1. The developer must investigate any reasonable and valid noise complaint if registered by a receptor staying within 2,000 m from the location where construction activities are taking place or operational wind turbine is present. A complaints register must be kept on site. 2. The developer must minimize night-time construction traffic if the access roads are closer than 150 m from any NSD, alternatively, the access road must be relocated further than 120 m from NSDs (night-time traffic passing occupied houses). 3. The developer must implement a noise monitoring program that will define the residual levels before the construction of the WEF, as well as to confirm noise levels once the WEF is operational. 4. Noise generated from all the proposed activities must comply with the Western Cape Noise Control Regulations promulgated in Provincial Notice 200/2013 ("WCNCR").	Holder of the EA Contractor	n/a	Noise and lighting managed according to approved Method Statement. Ensure the EMPr is adhered to.	Continuous
Noise impacts during the day: Construction activities relating to hardstand areas, digging of	5. No specific mitigation measures recommended for construction activities at the WTG locations or for substations.	Holder of the EA Contractor	n/a	Noise and lighting managed according to approved Method Statement.	Continuous

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foundations for wind turbines, civil works as well as erection of wind turbines.	6. Continuing management objectives would be: ■ Ensure that total daytime construction noise levels are less than 52 dBA at all potential NSDs (dwellings used for residential purposes); ■ Ensure that total night-time construction noise levels are less than 45 dBA at all potential NSDs (dwellings used for residential purposes); ■ Ensure that total noise levels due to operational activities are less than 45 dBA at all potential NSDs (dwellings used for residential purposes); and ■ Prevent the generation of nuisance noises.			Ensure the EMPr is adhered to.	
Noise impacts at night: Construction activities relating to civil works as well as erection of wind turbines.	7. Night-time construction activities closer than 1,000 m from and NSD to be minimized. Night-time construction activities (closer than 800 m) are not recommended and it should be minimized where possible. If construction activities take place closer than 800 m at night (such as the pouring of concrete), NSD should be notified of the activity that will be taking place at night.	Holder of the EA Contractor	n/a	Noise and lighting managed according to approved Method Statement. Ensure the EMPr is adhered to.	Continuous
Noise impacts during the day: Construction of access roads.	8. Access routes to be relocated further than 120 m from dwellings used for residential purposes at night. If access roads cannot be relocated close to residential dwellings, the projected noise	Holder of the EA Contractor	n/a	Noise and lighting managed according to approved Method Statement.	Continuous

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	levels must be discussed with potentially affected receptors.			Ensure the EMPr is adhered to.	
Noise impacts during the day: Noises relating to construction traffic.	9. Access routes to the relocated further than 120 m from dwellings used for residential purposes at night. If access roads cannot be relocated close to residential dwellings, the projected noise levels must be discussed with potentially affected receptors.	Holder of the EA Contractor	n/a	Noise and lighting managed according to approved Method Statement. Ensure the EMPr is adhered to.	Continuous
Heritage					
Palaeontology	1. During the construction phase the Chance Fossil Finds Protocol summarized in Annexure D should be fully implemented. 2. The Environmental Control Officer (ECO) / Environmental Site Officer (ESO) responsible for the development should be made aware of the possibility of important fossil remains (vertebrate bones, teeth, petrified wood, plant-rich horizons etc.) being found or unearthed during the construction phase of the development. Monitoring for fossil material of all major surface clearance and deeper (>1m) excavations by the Environmental Site Officer on an on-going basis during the construction phase is therefore recommended. Significant fossil finds should be safeguarded and reported at the earliest opportunity to Heritage Western Cape for	Palaeontologist ECO	n/a	Ensure the EMPr is adhered to.	Continuous

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	recording and sampling by a professional palaeontologist (Contact details: Heritage Western Cape. 3rd Floor Protea Assurance Building, 142 Longmarket Street, Green Market Square, Cape Town 8000. Private Bag X9067, Cape Town 8001. Tel: 021 483 5959 Email: ceoheritage@westerncape.gov.za).				
Cultural landscape - Ecological	3. Critical Biodiversity Areas, and Ecological Support Areas (along drainage lines), should be protected from development of the wind turbines or any associated development during all phases. 4. No wind turbines should be placed within the 1:100-year flood line of the watercourses. In the context of the sensitivity to soil erosion in the area, as well as potential archaeological resources, it would be a risk to include any structures close to these drainage lines 5. Remaining areas of endemic and endangered natural vegetation should be conserved. 6. Areas of critical biodiversity should be protected from any damage during all phases; where indigenous and endemic vegetation should be preserved at all cost. 7. Areas of habitat are found among the rocky outcrops and contribute to the character, as well as biodiversity of the area. Care	Holder of the EA Contractor	n/a	Ensure the EMPr is adhered to.	Continuous

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	should be taken that habitats are not needlessly destroyed. 8. Identified medicinal plants used for healing or ritual purposes should be conserved during all phases if threatened for use. 9. Careful planning should incorporate areas for storm water runoff where the base of the structure disturbed the natural soil. Local rocks found on the site could be used to slow storm water (instead of concrete, or standard edge treatments), and prevent erosion that would be an unfortunate consequence that would alter the character of the site. By using rocks from site it helps to sensitively keep to the character.				
Cultural landscape - Aesthetic	10. Encourage mitigation measures (for instance use of vegetation) to 'embed' or disguise the proposed structures within the surrounding tourism and agricultural landscape at ground level, road edges etc.; 11. The continuation of the traditional use of material could be enhanced with the use of the rocks on the site as building material. This would also help to embed structures into the landscape and should not consist of shipping containers or highly reflective untreated corrugated sheeting that clutters the landscape and is exacerbates	Holder of the EA Contractor	n/a	Ensure the EMPr is adhered to.	Continuous

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	the foreign intrusion on the natural matte landscape. 12. Using material found on the site adds to the sense of place and reduces transportation costs of bringing materials to site. 13. The local material such as the rocks found within the area could be applied to address storm water runoff from the road to prevent erosion. 14. Duration and magnitude of construction/ decommissioning activity must be minimized as far possible to reduce the impact of heavy vehicles on the roads as well as the associated dust from the activity. Lightest vehicles possible should be used to reduce degradation to the farm roads and the need to upgrade roads to scale and extent that negatively impacts on the integrity of the historic farm roads. Construction/ decommissioning traffic must operate at speeds that reduce dust and noise as far possible. 15. Any new road network or widening must be returned to its original state at end of the operational time of the WEF, with full environmental and aesthetic rehabilitation to the approval of a qualified cultural landscapes assessment specialist. 16. Turbine sites, substation and laydown areas should be returned to their original state at the end of				

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	the operational time of the WEF, with full environmental and aesthetic rehabilitation to the approval of a qualified cultural landscapes assessment specialist.				
Cultural landscape - Historic	17. Historic farmsteads must be protected from the impacts of heavy construction vehicles and increased numbers of people. No construction traffic should pass through or closer than 50m to the outer boundaries of a farm werf, or 200m from graded structures, which includes the associated historically cultivated lands, cemeteries, unmarked burials. The most appropriate use of existing farm roads must be found to avoid farm werfs and reduce construction impact on these heritage features. 18. A preconstruction micro-survey for turbines, access roads, substations, laydown areas and gridlines should be completed with CLA specialist to ensure appropriate buffers are maintained. 19. Duration and magnitude of construction/ decommissioning activity must be minimized to reduce the impact of heavy vehicles on the roads as well as the associated dust from the activity. Light vehicles should be used to reduce degradation to the farm roads and the need to upgrade roads to scale and extent that negatively impacts on the	Holder of the EA Contractor	n/a	Ensure the EMPr is adhered to.	Continuous

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	integrity of the historic farm roads. Construction decommissioning traffic must operate at speeds that reduce dust and noise. 20. No infrastructure or operational upgrades, such as boreholes, should impact negatively or reduce natural, on site water quality, quantity or access for the residents within or around the development site. Preferably any borehole or other water resource upgrade should also be made freely accessible to the residents living on site. 21. Accommodation of construction staff must not negatively impact on existing farm residents or degrade the integrity of the farmstead complexes and should, without negative impact to ecological or aesthetic resources, be located outside of the farmstead complexes or site. Farm residents should be consulted on the preferable location for construction staff accommodation. 22. Traditional planting patterns should be protected by ensuring that existing trees are not needlessly destroyed, as these signify traces of cultural intervention in a harsh environment. These planting patterns include the trees planted around the werfs and along travel routes. Interpretation of these landscape features as historic remnants should occur. A buffer of				

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	50m around such planting patters should be maintained. 23. Burial grounds and places of worship are automatically regarded as Grade IIIa or higher. Any development that threatens the inherent character of family burial grounds must be assessed and should be discouraged. No turbines have been proposed for placement near known unmarked burials or family cemeteries. A preconstruction micro-survey of each turbine footprint and any new access roads should be conducted to ensure no further unmarked graves are threatened. A preconstruction micro-survey for access roads, substations, laydown areas and gridlines should be completed with CLA specialist to ensure appropriate buffers are maintained. 24. Mountain slopes have been used for traditional practices for many years, and care should be taken that any significant cultural sites, such as burials and veldkos/medicinal plant resources, are not disturbed. 25. Farms in the area followed a system of stone markers to demarcate the farm boundaries in the area. Where these structures are found on the site, care should be taken that they are not				

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	needlessly destroyed, as they add to the layering of the area. 26. Roads running through the area may have historic stone way markers. Where these are found care should be taken that they are left in tact and in place. Road upgrades must not move or threaten their position and they should be visible from the road they are related to by passing travellers. A preconstruction micro-survey for access roads, substations, laydown areas and gridlines should be completed with CLA specialist to ensure appropriate buffers are maintained. 27. Where the historic function of a building/site is still intact, the function has heritage value and should be protected. 28. Surviving examples (wagon routes, outspans, and commonage), where they are owned in some public or communal way (or by a body responsible for acting in the public interest) and where they are found to be actively operating in a communal way, will have cultural and heritage value and should be enhanced and retained. The historic route running through Koup 1 should be maintained and integrity as a communal road for farm residents must be retained.				
Cultural landscape - Socio- economic	29. An updated cultural landscapes impact assessment report must be	Holder of the EA Contractor	n/a	Ensure the EMPr is adhered to.	Continuous

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	completed should the WEF continue to be used after the term granted in this application. This report should include a detailed assessment of the impacts to the cultural landscape and its outcomes and recommendations need to be considered in the decision for recommissioning and be implemented if recommissioning is approved. 30. The continued use of the landscape for human habitation and cultivation by historic residents of the area, should be retained and encouraged as far possible to sustain the continual use pattern and human-environment relationship which is the ultimate significance of this cultural landscape element. The WEF development must allow and support this, including financially, and not degrade this continued relationship. 31. No infrastructure or operational upgrades, such as boreholes, should impact negatively or reduce natural, on site water quality, quantity or access for the residents within or around the development site. Preferably any borehole or other water resource upgrade should also be made freely accessible to the residents living on site. 32. The local community on and around the development should				

ASPECT / IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
	benefit from job opportunities created by the proposed development and the development should not cause reduction in economic viability of surrounding properties in excess of those offered by the development. Short-term job opportunities at the expense of long term economic benefit and local employment opportunities must be prevented. 33. Local residents must be offered employment on the construction/ decommissioning and operational phases before 'importing' staff from elsewhere. 34. Local residents must be offered employment-training opportunities associated with WEF developments at all phases. 35. Sheep, cattle or game farming should be allowed to continue below the wind turbines, or be rehabilitated to increase biodiversity in the area.				
Visual					
Potential alteration of the visual character and sense of place. Potential visual impact on receptors in the study area.	1. Carefully plan to mimimise the construction period and avoid construction delays. 2. Inform receptors within 1km of the WEF development area of the construction programme and schedules.	Holder of the EA Contractor	n/a	Ensure the EMPr is adhered to.	Continuous

ASPECT / IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
	3. Minimise vegetation clearing and rehabilitate cleared areas as soon as possible. 4. Vegetation clearing should take place in a phased manner. 5. Maintain a neat construction site by removing rubble and waste materials regularly. 6. Position storage / stockpile areas in unobtrusive positions in the landscape, where possible. 7. Where possible, underground cabling should be utilised. 8. Make use of existing gravel access roads where possible. 9. Limit the number of vehicles and trucks travelling to and from the construction site, where possible. 10. Ensure that dust suppression techniques are implemented: ■ on all access roads; ■ in all areas where vegetation clearing has taken place; ■ on all soil stockpiles.				
Potential alteration of the visual character and sense of place in the broader area. Potential visual impact on receptors in the study area. Potential visual impact on the night time visual environment.	11. Carefully plan to minimise the construction period and avoid construction delays. 12. Position laydown areas and related storage/stockpile areas in unobtrusive positions in the landscape, where possible. 13. Minimise vegetation clearing and rehabilitate cleared areas as soon as possible.	Holder of the EA Contractor	n/a	Ensure the EMPr is adhered to.	Continuous

ASPECT / IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
	14. Vegetation clearing should take place in a phased manner. 15. Where possible, the operation and maintenance buildings should be consolidated to reduce visual clutter. 16. limit the number of maintenance vehicles which are allowed to access the facility. 17. Ensure that dust suppression techniques are implemented on all gravel access roads. 18. limit the amount of security and operational lighting present on site. 19. Light fittings for security at night should reflect the light toward the ground and prevent light spill. 20. Lighting fixtures should make use of minimum lumen or wattage. 21. Mounting heights of lighting fixtures should be limited, or alternatively foot-light or bollard level lights should be used. 22. If possible, make use of motion detectors on security lighting. 23. The operations and maintenance (O&M) buildings should not be illuminated at night. 24. The O&M buildings should be painted in natural tones that fit with the surrounding environment.				
Social					
Incident register	1. A public grievance and incident register should be established and	Holder of the EA Contractor	n/a	Clear communication channels maintained.	Continuous

ASPECT / IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
	should be monitored internally by the developer and made available for public scrutiny if requested. Any incident should be immediately recorded and reported to management and all actions pertaining to that incident, as well as the final outcome of the complaint, should be recorded and signed off by management. If an independent environmental monitor is appointed, this register should be audited on at least a monthly basis.				
Health and well- being: Air quality	2. Where appropriate apply dust suppression measures on a regular basis. Ensure that vehicles used to transport sand and building materials are fitted with tarpaulins or covers. 3. Ensure that all vehicles are roadworthy and drivers are qualified and made aware of the potential noise and dust issues. 4. Appoint a community liaison officer to deal with complaints and grievances from the public. 5. Dust generated during the proposed development must comply with the National Dust Control Regulations (GN No. R. 827 of 1 November 2013) promulgated in terms of the National Environmental Management: Air Quality Act, 2004 (Act No. 39 of 2004). These regulations prohibit a person from conducting any activity in such a	Holder of the EA Contractor	n/a	Clear communication channels maintained. Compliance to all legislative requirements. Ensure the EMPr is adhered to.	Continuous

ASPECT / IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
	way as to give rise to dust in such quantities and concentrations that the dust, or dust fallout, has a detrimental effect on the environment, including human health.				
Health and well-being: Noise	6. Refer to the mitigation measures suggested by the noise specialist.	Holder of the EA Contractor	n/a	Clear communication channels maintained. Compliance to all legislative requirements. Ensure the EMPr is adhered to.	Continuous
Health and well- being: Increase in crime	7. Ensure that construction workers are clearly identifiable. All workers should carry identification cards and wear identifiable clothing. 8. Fence off the construction sites and control access to these sites. 9. Appoint an independent security company to monitor the site. 10. Encourage local people to report any suspicious activity associated with the construction sites through the establishment of a community liaison forum. 11. Prevent loitering within the vicinity of the construction camp as well as construction sites.	Holder of the EA Contractor	n/a	Clear communication channels maintained. Compliance to all legislative requirements. Ensure the EMPr is adhered to.	Continuous
Health and well- being: Increased risk of HIV infections	12. Ensure that an onsite HIV Infections Policy is in place and that construction workers have easy access to condoms.	Holder of the EA Contractor	n/a	Clear communication channels maintained. Compliance to all legislative requirements.	Continuous

ASPECT / IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
	13. Expose workers to a health and HIV/AIDS awareness educational program. 14. Extend the HIV/AIDS program into the community with a specific focus on schools and youth clubs.			Ensure the EMPr is adhered to.	
Health and well- being: Influx of construction workers	15. Communicate the limitation of opportunities created by the project through Community Leaders and Ward Councillors. 16. Draw up a recruitment policy in consultation with the 17. Community Leaders and Ward Councillors of the area and ensure compliance with this policy.	Holder of the EA Contractor	n/a	Clear communication channels maintained. Compliance to all legislative requirements. Ensure the EMPr is adhered to.	Continuous
Health and well-being: Hazard exposure	18. Ensure that all construction equipment and vehicles are properly maintained at all times. 19. Ensure that operators 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. 20. 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.	Holder of the EA Contractor	n/a	Clear communication channels maintained. Compliance to all legislative requirements. Ensure the EMPr is adhered to.	Continuous

ASPECT / IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
	21. Make staff aware of the dangers of fire during regular toolbox talks.				
Quality of the living environment: Disruption of daily living patterns	22. Ensure that, at all times, people have access to their properties as well as to social facilities.	Holder of the EA Contractor	n/a	Clear communication channels maintained. Compliance to all legislative requirements. Ensure the EMPr is adhered to.	Continuous
Quality of the living environment: Disruptions to social and community infrastructure	23. Regularly monitor the effect that construction is having on infrastructure and immediately report any damage to infrastructure to the appropriate authority. 24. Ensure that where communities' access is obstructed that this access is restored to an acceptable state.	Holder of the EA Contractor	n/a	Clear communication channels maintained. Compliance to all legislative requirements. Ensure the EMPr is adhered to.	Continuous
Economic: Job creation and skills development	25. Wherever feasible, local residents should be recruited to fill semi and unskilled jobs. 26. Women should be given equal employment opportunities and encouraged to apply for positions. 27. A skills transfer plan should be put in place at an early stage and workers should be given the opportunity to develop skills which they can use to secure jobs elsewhere post construction.	Holder of the EA Contractor	n/a	Clear communication channels maintained. Compliance to all legislative requirements. Ensure the EMPr is adhered to.	Continuous
Economic: Socio-economic stimulation.	28. A procurement policy promoting the use of local business should, where possible, be put in place to	Holder of the EA Contractor	n/a	Clear communication channels maintained.	Continuous

ASPECT / IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
	be applied throughout the construction phase.			Compliance to all legislative requirements. Ensure the EMPr is adhered to.	
Traffic and Transportation					
Increase in Traffic	1. Ensure staff transport is done in the 'off peak' periods and by bus. 2. Stagger material, component and abnormal loads. 3. Construction of an on-site concrete batching plant to reduce trips.	Holder of the EA Contractor	n/a	All staff members are aware of the EMPr requirements relevant to them. Ensure the EMPr is adhered to.	Continuous
Increase of Incidents with pedestrians and livestock	4. Reduction in speed of vehicles. 5. Adequate enforcement of the law. 6. Implementation of pedestrian safety initiatives. 7. Regular maintenance of farm fences & access cattle grids. 8. Construction of an on-site concrete batching plant to reduce trips.	Holder of the EA Contractor	n/a	All staff members are aware of the EMPr requirements relevant to them. Ensure the EMPr is adhered to.	Continuous
Increase in Dust from gravel roads	9. Reduction in speed of the vehicles. 10. Use of dust suppressant techniques. 11. Implement a road maintenance program under the auspices of the respective transport department. 12. Construction of an on-site concrete batching plant to reduce trips.	Holder of the EA Contractor	n/a	All staff members are aware of the EMPr requirements relevant to them. Ensure the EMPr is adhered to.	Continuous
Increase in Road Maintenance	13. Implement a road maintenance program under the auspices of the respective transport department.	Holder of the EA Contractor	n/a	All staff members are aware of the EMPr requirements relevant to them.	Continuous

ASPECT / IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
	14. Construction of an on-site batching plant to reduce trips.			Ensure the EMPr is adhered to.	
Additional Abnormal Loads	15. Ensure abnormal vehicles travel to and from the proposed development in the 'off peak' periods or stagger delivery. 16. Adequate enforcement of the law.	Holder of the EA Contractor	n/a	All staff members are aware of the EMPr requirements relevant to them. Ensure the EMPr is adhered to.	Continuous
Increase in Dust from gravel roads	17. Enforce a maximum speed limit on the development. 18. Use of dust suppressant techniques. 19. Adequate watering by means of water bowser.	Holder of the EA Contractor	n/a	All staff members are aware of the EMPr requirements relevant to them. Ensure the EMPr is adhered to.	Continuous
New / Larger Access points	20. Adequate road signage according to the SARTSM. 21. Approval from the respective roads department.	Holder of the EA Contractor	n/a	All staff members are aware of the EMPr requirements relevant to them. Ensure the EMPr is adhered to.	Continuous
Avifauna					
Displacement due to disturbance associated with the construction of the wind turbines and associated infrastructure.	1. 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 apply good environmental practice during construction. The CEMPr must specifically include the following: ■ No off-road driving;	Contractor The ECO shall monitor	1. Implementation of the CEMPr. Oversee activities to ensure that the CEMPr is implemented and enforced via site audits and inspections. Report and record any non-compliance.	Prevent unnecessary displacement of avifauna by ensuring that contractors are aware of the requirements of the Construction Environmental Management Programme (CEMPr.)	On a daily basis

ASPECT / IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
	■ 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. 2. Construction activity must be restricted to the immediate footprint of the infrastructure. Access to the remainder of the area must be strictly controlled to prevent unnecessary disturbance of priority species. 3. Measures to control noise and dust should be applied according to current best practice in the industry. 4. Construction activity should be restricted to the immediate footprint of the infrastructure and in particular to the proposed road network. Access to the remainder of the site should be strictly controlled to prevent unnecessary disturbance of SCC. 5. Removal of vegetation must be restricted to a minimum. 6. Construction of new roads should only be considered if existing roads cannot be upgraded. 7. The recommendations of the ecological and botanical specialist studies must be strictly		2. Ensure that construction personnel are made aware of the impacts relating to off-road driving.		Weekly
			3. Construction access roads must be demarcated clearly. Undertake site inspections to verify.		Weekly
			4. Monitor the implementation of noise control mechanisms via site inspections and record and report non-compliance.		Weekly
			5. Ensure that the construction area is demarcated clearly and that construction personnel are made aware of these demarcations. Monitor via site inspections and report non-compliance.		Weekly

ASPECT / IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
	implemented, especially as far as limitation of the activity footprint is concerned.				
Displacement due to habitat transformation associated with the construction of the wind turbines and associated infrastructure. 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.	8. Develop a Habitat Restoration Plan (HRP) and ensure that it is approved. 9. Monitor rehabilitation via site audits and site inspections to ensure compliance. Record and report any non-compliance. 10. Vehicle and pedestrian access to the site should be controlled and restricted to the facility footprint as much as possible to prevent unnecessary destruction of vegetation. 11. Removal of vegetation must be restricted to a minimum and must be rehabilitated to its former state where possible after construction. 12. Construction of new roads should only be considered if existing roads cannot be upgraded. 13. The recommendations of the ecological and botanical specialist studies must be strictly implemented, especially as far as limitation of the activity footprint is concerned.	Operations Manager SHE Manager	1. Appointment of rehabilitation specialist to develop Habitat Restoration Plan (HRP). 2. Site inspections to monitor progress of HRP.	Prevent unnecessary displacement of avifauna by ensuring that the rehabilitation of transformed areas is implemented by an appropriately qualified rehabilitation specialist, according to the recommendations of the botanical specialist study.	Once-off Once a year

Bats					
Impact	**Mitigation / Management Objectives**	**Mitigation / Management Actions**	**Monitoring**		
			Method	**Frequency**	**Responsibility**
Avoid disturbance of foraging bats	Avoid Habitat loss and destruction caused by clearing vegetation for the working areas, construction and landscape modifications.	1. Construction activities to be kept out of all No-go and High bat sensitive areas. 2. Rock formations occurring along the ridge lines be avoided during construction, as these serve as roosting space for bats. 3. Destruction of limited trees must be avoided during construction and where destruction of trees is unavoidable, careful investigation for any bat roost should be conducted before the tree is removed. 4. Where possible, dense bushes should not be	■ Monitor the efficiency of the EMPR. ■ Monitor whether proposed measures are adhered to. ■ ECO should be trained to recognize bat species and roost locations before construction starts.	■ During construction phase. ■ ECO should be trained before construction commences. ■ Erosion and pollution monitoring during construction phase. ■ Monitoring of off-road driving during construction phase. ■ Monitor before anything is removed that could contain a bat roost.	■ Project Developer ■ Bat specialist and ECO.

Bats					
Impact	**Mitigation / Management Objectives**	**Mitigation / Management Actions**	**Monitoring**		
			Method	**Frequency**	**Responsibility**
		destroyed, but if unavoidable, careful investigation for any bat roost should be conducted before the destruction of any bushes. 5. Aardvark holes or any large derelict holes or excavations should not be destroyed before careful examination for bats. 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.			

Bats					
Impact	**Mitigation / Management Objectives**	**Mitigation / Management Actions**	**Monitoring**		
			Method	**Frequency**	**Responsibility**
Active roost destruction and potential roost destruction and habitat loss	■ Minimise impacts on bats during construction activities ■ Keep construction out of high bat sensitive areas • Try to avoid destruction of rock formations, trees, aardvark holes, derelict holes, excavations investigated for bat roosts before destruction.	6. Adhere to No-go areas incorporated into the Final Layout. 7. Appoint an independent ECO to oversee that the EMPR is being adhered to. 8. Bat specialist to train ECO, if necessary, to identify possible bat roosts or signs of bat presence. 9. Avoid destruction of trees or dense bushes, where possible. 10. All aardvark holes, derelict holes or excavations should be carefully investigated for roosts before any destruction.	■ Visual inspection and continuous monitoring of high sensitivity areas, erosion prevention, chemical pollution and vehicle activity to prevent habitat destruction. ■ If buildings, trees or structures providing potential roosts need to be demolished, the ECO is required to investigate the features before commencement of the works.	■ Throughout construction. ■ ECO to be present during all site clearance activities. ■ Access to bat specialist if ECO needs information or confirmation concerning bat presence.	■ Project Developer. ■ Holder of EA to appoint ECO. ■ Appointed bat specialist to train the ECO, if necessary.

Bats					
Impact	**Mitigation / Management Objectives**	**Mitigation / Management Actions**	**Monitoring**		
			Method	**Frequency**	**Responsibility**
		11. Careful investigation of old telephone poles, before destroying them, if there are any on site. 12. Avoid pollution of water courses. 13. No off-road driving.			
Creating new habitat amongst the turbines that might attract bats.	■ Prevent bats from roosting in high-risk areas close to turbines and infrastructure, such as new roofs. ■ Prevent the creation of features that could attract bats to the terrain.	14. Existing roosts in roofs should be left as such and treated with caution. 15. All roofs of new buildings should be closed off during construction, before bat roosts could move in. 16. Rehabilitate and close excavation holes and quarries where water could accumulate.	■ Continues inspection of sealed roofs – bats can move into holes as small as 1 X 1 cm. ■ Oversee the rehabilitation of any excavation areas.	Throughout construction phase	Project Developer, construction site manager and ECO.

Bats					
Impact	**Mitigation / Management Objectives**	**Mitigation / Management Actions**	**Monitoring**		
			Method	**Frequency**	**Responsibility**
Construction noise, especially during night-time.	■ Prevent disturbance to bat activity and behaviour.	17. Nightly construction activities should be avoided, or if necessary, minimised to the shortest period possible. 18. Except for compulsory civil aviation lightning, artificial lightening during construction should be minimised, especially bright lights or spotlights. Lights should avoid skyward illumination. Turbine tower lights should be switched off when not in operation, where possible.	■ Monitor construction to reduce noise and minimise disturbance in bat sensitive areas. ■ Avoid construction activities at night.	Throughout construction phase.	Project Developer and construction site manager.

8. MANAGEMENT PLAN FOR OPERATIONAL PHASE

Table 8-1 below presents a summary of the potential impacts as assessed by specialists for the operation phase of the WEF.

Table 8-1: Summary of the Operational Phase Impacts and Significance Ratings

Impact	Pre- mitigation	Post- mitigation
Impacts to Biophysical Systems/components during the Operational Phase		
Avifaunal		
Mortality of priority species due to collisions with the wind turbines.	Negative Medium	Negative Medium
Ecological		
Fauna will be negatively affected by the operation of the wind farm due to the human disturbance, the presence of vehicles on the site and possibly by noise generated by the wind turbines as well.	Negative Medium	Negative Low
Following construction, the site will remain vulnerable to soil erosion for some time due to the disturbance created by site clearing and likely low natural revegetation of disturbed areas thereafter. It is important to note that while the site is arid, such areas can experience significant soil erosion as plant cover is low and occasional heavy showers generate large amounts of runoff.	Negative Medium	Negative Low
Increased alien plant invasion during operation.	Negative Medium	Negative Low
Transformation and presence of the grid connection and associated infrastructure will contribute to cumulative habitat loss within CBAs, ESAs and impact on broad-scale ecological processes such as fragmentation.	Negative Medium	Negative Low
Bat		
Fatality through direct collision or barotrauma of resident bats occupying the airspace amongst the turbines. The turning blades of the turbines during operation are the most important aspect of the project that would impact negatively on bats. High flying species have predominantly been confirmed at the proposed Koup 1 WEF site.	Negative High	Negative Medium
Bat fatality during migration. A limited number of calls like Miniopterus natalensis (Natal Long-fingered bat), a Near Threatened migration species, have been recorded. Not much research has been conducted on migration of bats in South Africa, and some of the other species occurring on site could also migrate.	Negative Medium	Negative Low
Loss of bats of conservation value. A limited number of calls like the red *data Miniopterus natalensis* have been recorded, as well as the endemic *Eptesicus hottentotus.*	Negative Medium	Negative Low
Bat mortality due to the attraction of bats to wind turbines. Bats have been shown to sometimes be attracted to wind turbines out of curiosity or reasons still under investigation.	Negative Low	Negative Low
Loss of habitat and foraging space during operation of the wind turbines.	Negative High	Negative Medium

Impact	Pre- mitigation	Post- mitigation
Reduction in the size, genetic diversity, resilience and persistence of bat populations. Bats have low reproductive rates and populations are susceptible to reduction by fatalities other than natural death. Furthermore, smaller bat populations are more susceptible to genetic inbreeding.	Negative High	Negative Medium
Geotechnical		
Displacement of natural earth material. Increase in soil erosion. Potential oil spillages from maintenance vehicles. Sedimentation of non-perennial features caused by soil erosion.	Negative Medium	Negative Low
Surface Water		
Increase in hard surface areas, and roads that require stormwater management will increase through the concentration of surface water flows that could result in localised changes to flows (volume) that would result in form and function changes within aquatic systems, which are currently ephemeral. This then increases the rate of erosions and sedimentation of downstream areas.	Negative Medium	Negative Low
Impacts to Socio-Economic component during the Operational Phase		
Archaeological – none identified		
Heritage – none identified		
Cultural Landscape		
Inappropriate operational activities degrade the significant ecological elements of the cultural landscape	Negative Medium	Negative Low
Inappropriate operational activities degrade the significant aesthetic elements of the cultural landscape altering the character and sense of place	Negative High	Negative High
Inappropriate operational activities degrade the significant historic elements of the cultural landscape altering the character and sense of place	Negative Very High	Negative Medium
Inappropriate operational activities degrade the significant socio-economic opportunities of the cultural landscape	Negative Very High	Positive Medium
Noise		
Noise Impacts during the day from operating wind turbines	Negative Low	Negative Low
Noise Impacts at night from operating wind turbines	Negative Low	Negative Low
Paleontological – none identified		
Social		
Noise WEF only	Negative Low	Negative Low
Shadow flicker WEF only	Negative Low	Negative Low
Blade glint WEF only	Negative Low	Negative Low

Impact	Pre- mitigation	Post- mitigation
Electromagnetic field and RF interference	Negative Low	Negative Low
Hazard exposure	Negative Low	Negative Low
Transformation of the sense of place	Negative High	Negative High
Job creation and skills development	Positive Medium	Positive Medium
Socio-economic stimulation.	Positive Medium	Positive Medium
Transportation		
Increase in Traffic	Negative Low	Negative Low
Increase of Incidents with pedestrians and livestock	Negative Low	Negative Low
Increase in Dust from gravel roads	Negative Low	Negative Low
Increase in Road Maintenance	Negative Low	Negative Low
Additional Abnormal Loads	Negative Low	Negative Low
New / Larger Access points	Negative Low	Negative Low
Increase in Traffic	Negative Low	Negative Low
Visual		
■ The development may be perceived as an unwelcome visual intrusion, particularly in more natural undisturbed settings. ■ The proposed WEF and associated infrastructure will alter the visual character of the surrounding area and expose potentially sensitive visual receptor locations to visual impacts. ■ Dust emissions and dust plumes from maintenance vehicles accessing the site via gravel roads may evoke negative sentiments from surrounding viewers. ■ The night time visual environment will be altered as a result of operational and security lighting at the proposed WEF.	Negative Low	Negative Low
Biodiversity		
Fauna will be negatively affected by the operation of the wind farm due to the human disturbance, the presence of vehicles on the site and possibly by noise generated by the wind turbines as well.	Negative Medium	Negative Low

Impact	Pre- mitigation	Post- mitigation
Following construction, the site will remain vulnerable to soil erosion for some time due to the disturbance created by site clearing and likely low natural revegetation of disturbed areas thereafter. It is important to note that while the site is arid, such areas can experience significant soil erosion as plant cover is low and occasional heavy showers generate large amounts of runoff.	Negative Medium	Negative Low
Ecological degradation due to alien plant invasion.	Negative Medium	Negative Low
Negative impact on ESAs, CBAs and broad-scale ecological processes. Transformation and presence of the facility will contribute to cumulative habitat loss within CBAs and impacts on broad-scale ecological processes such as fragmentation.	Negative Medium	Negative Low

Table 8-2: Operation Phase Impact Management

ASPECT / IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
Construction Site Decommissioning					
Removal of equipment	1. All structures comprising the construction camp are to be removed from site. 2. 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. 3. All hardened surfaces within the construction camp area must 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 the EA Contractor	n/a	Compliance to all legislative requirements. Ensure the EMPr is adhered to.	Following construction

ASPECT / IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
Temporary services	4. The Contractor must arrange the cancellation of all temporary services. 5. Temporary roads must be closed and access across these, blocked. 6. All areas where temporary services were installed are to be rehabilitated to the satisfaction of the ECO.	Holder of the EA Contractor	n/a	Compliance to all legislative requirements. Ensure the EMPr is adhered to.	Following construction
Associated infrastructure	7. Surfaces are to be checked for waste products from activities such as concreting or asphalting and cleared in a manner approved by the Engineer. 8. All surfaces hardened due to construction activities are to be ripped and imported material thereon removed. 9. 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. 10. The site is to be cleared of all litter. 11. The Contractor is to check that all watercourses are free from building rubble, spoil materials and waste materials. 12. Fences, barriers and demarcations associated with the construction phase are to be removed from the site unless stipulated otherwise by the Engineer.	Holder of EA Contractor	n/a	All waste managed according to approved Method Statement.	Following construction

ASPECT / IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
	13. All residual stockpiles must be removed to spoil or spread on site as directed by the Engineer. 14. All leftover building materials must be returned to the depot or removed from the site. 15. 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.				
Rehabilitation plan	16. Rehabilitate and re-vegetate cleared areas with indigenous plant species.	Holder of EA Contractor	n/a	Alien Plant Management Plan Plant Rehabilitation implemented	Following construction
Operation and Maintenance					
Maintenance	1. All applicable standards, legislation, policies and procedures must be adhered to during operation. 2. Noise generated from all the proposed activities must comply with the Western Cape Noise Control Regulations promulgated in Provincial Notice 200/2013 (“WCNCR”). 3. Regular ground inspection of the plants must take place to monitor their status. 4. Compile and adhere to a procedure for the safe handling of battery cells.	Holder of the EA	n/a	Ensure the conditions of the EA are adhered to. Compliance to all legislative requirements.	During operation

ASPECT / IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
	5. 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. 6. Compile an Emergency Response Plan for implementation in the event of a spill or leakage. 7. 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. 8. Frequent and appropriate disposal of both general and hazardous waste must be undertaken to prevent pollution of soil and groundwater. 9. Install leak detection monitoring systems where possible. 10. On-site battery maintenance must only be undertaken on impermeable surfaces with secondary containment measures. Any resulting hazardous substances must be disposed of appropriately. 11. Provide for suitable emergency and safety signage on site, and				

ASPECT / IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
	demarcation of any areas which may pose a safety risk (including hazardous substances). Emergency numbers for the local police, fire department, Eskom and Beaufort West Local Municipality must be placed in a prominent clearly visible area on-site.				
Public awareness	12. 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
Waste Management					
Recycling and litter management	1. The site must be kept clear of litter at all times. 2. Solid waste separation and recycling must take place for the duration of the operational phase for the development at the administration block. 3. Where vegetation is cleared and is suitable, chipping and/or mulching can be considered. 4. Any putrescible waste must be stored in containers that can keep out scavengers such as baboons and birds to prevent the spread of litter. 5. All waste must be removed promptly to ensure that it does not attract vermin or produce odours.	Holder of the EA		All waste managed according to approved Method Statement. Compliance to all legislative requirements.	Continuous

ASPECT / IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
	6. Solid waste must be collected on a regular basis.				
Waste Management					
Protection of soil resources	1. 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
Erosion	2. 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
Displacement of natural earth material	3. Use of existing roads and tracks where feasible. 4. Rehabilitation of affected areas (such as erosion control mats). 5. Correct engineering design and construction of roads and water crossings. 6. Vehicle repairs to be undertaken in designated areas. 7. Maintenance of stormwater system.	Engineer Contractor Holder of EA (rehabilitation)	Undertake regular audits	Erosion plan implemented and hydrological measures in place All waste managed according to approved Method Statement. Ensure the EMPr is adhered to.	Continuous

ASPECT / IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
Avifauna					
Mortality due to collisions with the wind turbines: Bird collisions with the wind turbines	1. No turbines must be located in the buffer zones around major drainage lines, waterpoints and dams. 2. A 5km circular No-Go (no turbines) buffer zone must be implemented around the Martial Eagle nest on Tower 108 of the Droërivier Proteus 1400kV transmission line. 3. 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. 4. If estimated annual collision rates indicate unacceptable mortality levels of priority species, i.e., if it exceeds mortality thresholds as	Operations Manager	1. Appoint Avifaunal Specialist to compile operational monitoring plan, including live bird monitoring and carcass searches. 2. Implement operational monitoring plan. 3. Design and implement mitigation measures if mortality thresholds are exceeded. 4. Compile quarterly and annual progress reports detailing the results of the operational monitoring and progress with any recommended mitigation measures.	Prevention of collision mortality on the wind turbines.	1. 1. Once-off 2. Years 1,2, 5 and every five years after that for the duration of the operational lifetime of the facility.

ASPECT / IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
	determined by the avifaunal specialist in consultation with BLSA and other avifaunal specialists, additional measures will have to be implemented which could include shut down on demand or other proven measures. 5. Vehicle and pedestrian access to the site should be controlled and restricted to access roads to prevent unnecessary disturbance of SCC. 6. Formal monitoring must be resumed once the turbines have been constructed, as per the most recent edition (2015) of the best practice guidelines (Jenkins et al. 2011). The exact time when post-construction monitoring should commence, will depend on the construction schedule, and will be agreed upon with the site operator once these timelines and a commercial operational date have been finalised. 7. As a minimum, post-construction monitoring should be undertaken for the first two years of operation, and then repeated again in Year 5, and again every five years thereafter for the operational lifetime of the facility. The exact scope and nature of the post-construction monitoring will be determined on an ongoing basis by the results of the				

ASPECT / IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
	monitoring through a process of adaptive management. 8. Depending on the results of the carcass searches, a range of mitigation measures will have to be considered if mortality levels of SCC turn out to be biologically significant, including Shutdown on Demand (SDoD). 9. Dismantling activity should be restricted to the immediate footprint of the infrastructure. . Access to the remainder of the area should be strictly controlled to prevent unnecessary disturbance of priority species. 10. Measures to control noise and dust must be applied according to current best practice in the industry.				
Mortality due to collisions and electrocutions on the 33kV network: Bird electrocutions on the overhead sections of the internal 33kV cables	11. Underground cabling must be used as much as is practically possible. 12. If the use of overhead lines is unavoidable due to technical reasons, the Avifaunal Specialist must be consulted timeously to ensure that a raptor friendly pole design is used, and that appropriate mitigation is implemented pro-actively for complicated pole structures e.g., insulation of live components to prevent electrocutions on terminal structures and pole transformers.	Operations Manager	1. Carcass searchers under the supervision of the Avifaunal Specialist. 2. Design and implement mitigation measures if mortality thresholds are exceeded. 3. Compile quarterly and annual progress reports detailing the results of the	Prevention of electrocution mortality on the overhead sections of the 33kV internal cable network.	At least once every two months.

ASPECT / IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
	13. Regular inspections of the overhead sections of the internal reticulation network must be conducted during the operational phase to look for carcasses, as per the most recent edition of the Best Practice Guidelines at the time (Jenkins et al. 2015).		operational monitoring and progress with any recommended mitigation measures.		
Mortality due to collisions with the overhead sections of the internal 33kV cables.	14. Bird flight diverters must be installed on all the overhead line sections for the full span length according to Eskom guidelines - five metres apart. Light and dark colour devices must be alternated to provide contrast against both dark and light backgrounds respectively. These devices must be installed as soon as the conductors are strung.	Holder of the EA	Construction Monitoring and audit reports	Impacts avoided or managed as per specialist recommendations. Ensure the conditions of the EA are adhered to. Adhere to legislative requirements.	Continuous
Biodiversity					
Faunal disturbance and habitat degradation: Fauna will be negatively affected by the operation of the wind farm due to the human disturbance, the presence of vehicles on the site and possibly by noise generated by the wind turbines as well.	1. Management of the site must take place within the context of an Open Space Management Plan. 2. No unauthorized persons should be allowed onto the site. 3. Any potentially dangerous fauna such snakes or fauna threatened by the maintenance and operational activities should be removed to a safe location. 4. The collection, hunting or harvesting of any plants or animals at the site should be strictly forbidden by anyone	Holder of the EA Contractor	Construction Monitoring and audit reports	Impacts avoided or managed as per specialist recommendations. Ensure the conditions of the EA are adhered to. Alien Plant Management Plan Implemented. Plant Rehabilitation Implemented.	Continuous

ASPECT / IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
	except landowners or other individuals with the appropriate permits and permissions where required. 5. If any parts of the site need to be lit at night for security purposes, this should be done with downward-directed low-UV type lights (such as most LEDs or HPS bulbs), which do not attract insects. 6. All hazardous materials must be stored in the appropriate manner to prevent contamination of the site. Any accidental chemical, fuel and oil spills that occur at the site must be cleaned up in the appropriate manner as related to the nature of the spill. 7. All vehicles accessing the site must adhere to a reduced speed limit (30km/h for heavy vehicles and 40km/h for light vehicles) to avoid collisions with susceptible species such as snakes and tortoises. 8. If parts of the facility such as the substation are to be fenced, then no electrified strands must be placed within 30cm of the ground as some species such as tortoises are susceptible to electrocution from electric fences as they do not move away when electrocuted but rather adopt defensive behaviour and are killed by repeated shocks. Alternatively, the electrified				

ASPECT / IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
	strands must be placed on the inside of the fence and not the outside.				
Increased potential for soil erosion Following construction, the site will remain vulnerable to soil erosion for some time due to the disturbance created by site clearing and likely low natural revegetation of disturbed areas thereafter. It is important to note that while the site is arid, such areas can experience significant soil erosion as plant cover is low and occasional heavy showers generate large amounts of runoff.	9. Erosion management at the site must take place according to an Erosion Management Plan and Rehabilitation Plan. 10. All roads and other hardened surfaces should have runoff control features which redirect water flow and dissipate any energy in the water which may pose an erosion risk. 11. Regular monitoring for erosion post construction to ensure that no erosion problems have developed as result of the disturbance, as per the Erosion Management and Rehabilitation Plans for the project. Monitoring should take place every 6 months in the first year after construction and annually thereafter. 12. All erosion problems observed should be rectified as soon as possible, using the appropriate erosion control structures and revegetation techniques. 13. All cleared areas should be revegetated with indigenous perennial shrubs and succulents from the local area. Dead material from site clearing can be used to encourage this process and can be set aside during clearing and later placed on the	Holder of the EA Contractor	Construction Monitoring and audit reports	Impacts avoided or managed as per specialist recommendations. Erosion Management Plan and Rehabilitation Plan Implemented. Ensure the conditions of the EA are adhered to.	Continuous

ASPECT / IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
	cleared areas to encourage recovery.				
Ecological degradation due to alien plant invasion	14. There should be regular monitoring for alien plants within the development footprint as well as adjacent areas which receive runoff from the facility as there are also likely to be prone to invasion problems. Monitoring every 6 months for the first 2 years post-construction is recommended, followed by annual monitoring thereafter. 15. Regular alien clearing should be conducted using the best-practice methods for the species concerned. The use of herbicides must be avoided. .	Holder of the EA Contractor	Construction Monitoring and audit reports	Impacts avoided or managed as per specialist recommendations. Alien Plant Management Plan Implemented. Plant Rehabilitation Implemented. Ensure the conditions of the EA are adhered to.	Continuous
Negative impact on ESAs, CBAs and broad- scale ecological processes. Transformation and presence of the facility will contribute to cumulative habitat loss within CBAs / ESAs and impacts on broad-scale ecological processes such as fragmentation.	16. Minimise the development footprint within the high sensitivity areas. 17. There should be an integrated management plan for the development area during operation, which is beneficial to fauna and flora. 18. All disturbed areas that are not used such as excess road widths, should be rehabilitated with locally occurring shrubs and grasses after construction to reduce the overall footprint of the development. 19. Noise and disturbance on the site should be kept to a minimum	Holder of the EA Contractor	Construction Monitoring and audit reports	Impacts avoided or managed as per specialist recommendations. Alien Plant Management Plan Implemented. Plant Rehabilitation Implemented. Ensure the conditions of the EA are adhered to.	Continuous

ASPECT / IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
	during operation and maintenance activities.				
Surface Water					
Impact on aquatic systems through the possible increase in surface water runoff on form and function during the operational phase: Increase in hard surface areas, and roads that require stormwater management will increase through the concentration of surface water flows that could result in localised changes to flows (volume) that would result in form and function changes within aquatic systems, which are currently ephemeral. This then increases the rate of erosions and sedimentation of downstream areas.	A stormwater management plan must be developed in the preconstruction phase, detailing the stormwater structures and management interventions that must be installed to manage the increase of surface water flows directly into any natural systems. This stormwater control systems must be inspected on an annual basis to ensure these are functional. Effective stormwater management must include effective stabilisation (gabions and Reno mattresses) of exposed soil and the re-vegetation of any disturbed riverbanks.	Holder of the EA Contractor	n/a	All staff members are aware of the EMPr requirements relevant to them Align to Strom Water Plan Ensure the EMPr is adhered to.	Continuous
Heritage					
Cultural landscape: Ecological	1. Areas of endemic and endangered natural vegetation should be conserved. 2. Critical Biodiversity Areas, and Ecological Support Areas (along drainage lines), should be protected. 3. Areas of habitat are found among the rocky outcrops and contribute to the character, as well as biodiversity of the area. Care should be taken that	Holder of the EA Contractor	n/a	Ensure the EMPr is adhered to.	Continuous

ASPECT / IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
	habitats are not needlessly destroyed. 4. Identified medicinal plants used for healing or ritual purposes should be conserved during all phases if threatened for use. Access to these resources should be made available to those who have had historic access to them.				
Cultural Landscape: Aesthetic	5. Infrastructure improvement or maintenance work, including new roads and upgrades to the road network, should be appropriate to the rural context (scale, material etc.) and avoid steep slopes over 10% as well as ridges. 6. Prevent the construction of new buildings/structures on visually sensitive, steep (over 10%), elevated or exposed slopes, ridgelines and hillcrests or within 800m of the farmsteads, 1000m of the N12 and 300m of the farm roads. 7. Avoid visual clutter in the landscape by intrusive signage, and the intrusion of commercial, corporate development along roads. 8. Duration and magnitude of operational activity must be minimized as far possible to reduce the impact of heavy vehicles on the roads as well as the associated dust from the	Holder of the EA Contractor	n/a	Ensure the EMPr is adhered to.	Continuous

ASPECT / IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
	activity. Lightest vehicles possible should be used to reduce degradation to the farm roads and the need to upgrade roads to scale and extent that negatively impacts on the integrity of the historic farm roads. Operational traffic must operate at speeds that reduce dust and noise. 9. The impact of WEF turbine night lighting on the wilderness landscape is intrusive and overwhelms the rural character of the landscape, giving it an industrial sense of place after dark. Reduce the impact of turbine night lighting by minimizing the number of turbines with lighting to only those necessary for aviation safety, such as a few identified turbines on the outer periphery, or use aircraft triggered night lighting. Due to the reduced receptors on the roads at night, the impact of the lighting at night is reserved mainly for farmsteads and other places of overnight habitation such as the surrounding tourist facilities, which would be heavily impacted by the light pollution on a long term and ongoing basis.				
Cultural landscape: Historic	10. Historic farmsteads must be protected from the impacts of operational facility vehicles and increased numbers of people. No	Holder of the EA Contractor	n/a	Ensure the EMPr is adhered to.	Continuous

ASPECT / IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
	WEF operations traffic should pass through or closer than 50m to the outer boundaries of a farm werf, or 200m from graded structures, which includes the associated historically cultivated lands, cemeteries, unmarked burials. The most appropriate use of existing farm roads must be found to avoid farm werfs and reduce construction impact on these heritage features. 11. No infrastructure or operational upgrades, such as boreholes, should impact negatively or reduce natural, on-site water quality, quantity or access for the residents within or around the development site. Preferably any borehole or other water resource upgrade should also be made freely accessible to the residents living on site. 12. Traditional planting patterns should be protected by ensuring that existing trees are not needlessly destroyed, as these signify traces of cultural intervention in a harsh environment. These planting patterns include the trees planted around the werfs and along travel routes. Interpretation of these landscape features as historic remnants should occur. 13. Burial grounds and places of worship are automatically regarded as Grade IIIa or higher.				

ASPECT / IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
	Any development that threatens the inherent character of family burial grounds must be assessed and should be discouraged and a buffer of 100m around all burial ground or unmarked graves should be in place. No turbines have been proposed for placement near known unmarked burials or family cemeteries. A preconstruction micro-survey of each turbine footprint and any new access roads should be conducted to ensure no further unmarked graves are threatened. 14. Mountain slopes have been used for traditional practices for many years, and care should be taken that any significant cultural sites, such as burials and veldkos/medicinal plant resources, are not disturbed. 15. Farms in the area followed a system of stone markers to demarcate the farm boundaries in the area. Where these structures are found on the site, care should be taken that they are not needlessly destroyed, as they add to the layering of the area. 16. Roads running through the area may have historic stone way markers. Where these are found care should be taken that they are left intact and in place. Road upgrades must not move or threaten their position and they				

ASPECT / IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
	should be visible from the road they are related to by passing travellers. 17. Where the historic function of a building/site is still intact, the function has heritage value and should be protected. 18. Surviving examples (wagon routes, outspans, and commonage), where they are owned in some public or communal way (or by a body responsible for acting in the public interest) and where they are found to be actively operating in a communal way, will have cultural and heritage value and should be enhanced and retained. The historic route running through Koup 1 should be maintained and integrity as a communal road for farm residents must be retained. 19. Accommodation of WEF staff must not negatively impact on existing farm residents or degrade the integrity of the farmstead complexes and should, without negative impact to ecological or aesthetic resources, be located outside of the farmstead complexes or site. Farm residents should be consulted on the preferable location for construction staff accommodation. 20. Light vehicles should be used to reduce degradation to the farm				

ASPECT / IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
	roads and the need to upgrade roads to scale and extent that negatively impacts on the integrity of the historic farm roads. Operational traffic must operate at speeds that reduce dust and noise. 21. A preconstruction micro-survey for access roads, substations, laydown areas and gridlines should be completed with CLA specialist to ensure appropriate buffers are maintained during operational activities.				
Cultural landscape: Socio-economic	22. The local community on and around the development should benefit from job opportunities created by the proposed development and the development should not cause reduction in economic viability of surrounding properties in excess of those offered by the development. Short-term job opportunities at the expense of long-term economic benefit and local employment opportunities must be prevented. 23. The continued use of the landscape for human habitation and cultivation by historic residents of the area should be retained and encouraged as far possible to sustain the continual use pattern and human-environment relationship which is the ultimate significance of this cultural landscape element. The	Holder of the EA Contractor	n/a	Ensure the EMPr is adhered to.	Continuous

ASPECT / IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
	WEF development must allow and support this, including financially, and not degrade this continued relationship. 24. No infrastructure or operational upgrades, such as boreholes, should impact negatively or reduce natural, on-site water quality, quantity or access for the residents within or around the development site. Preferably any borehole or other water resource upgrade should also be made freely accessible to the residents living on site. 25. The local community on and around the development should benefit from job opportunities created by the proposed development and the development should not cause reduction in economic viability of surrounding properties in excess of those offered by the development. Short-term job opportunities at the expense of long-term economic benefit and local employment opportunities must be prevented. 26. Local residents must be offered employment on the construction/ decommissioning and operational phases before 'importing' staff from elsewhere. 27. Local residents must be offered employment-training opportunities associated with				

ASPECT / IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
	WEF developments at all phases. 28. Crop cultivation, sheep, cattle or game farming should be allowed to continue below the wind turbines, or be rehabilitated to increase biodiversity in the area.				
Visual					
Potential alteration of the visual character and sense of place. Potential visual impact on receptors in the study area. Potential visual impact on the night time visual environment.	1. Turbine colours should adhere to CAA requirements. Bright colours and logos on the turbines should be kept to a minimum. 2. Inoperative turbines should be repaired promptly, as they are considered more visually appealing when the blades are rotating (or at work) (Vissering, 2011). 3. If turbines need to be replaced for any reason, they should be replaced with the same model, or one of equal height and scale to lessen the visual impact. 4. limit the number of maintenance vehicles which are allowed to access the site. 5. Ensure that dust suppression techniques are implemented on all gravel access roads. 6. limit the amount of security and operational lighting present on site. 7. Light fittings for security at night should reflect the light toward the ground and prevent light spill.	Holder of the EA Contractor	n/a	Noise and lighting managed according to approved Method Statement. All waste managed according to approved Method Statement. Plant Rehabilitation Implemented.	During operation.

ASPECT / IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
	8. Lighting fixtures should make use of minimum lumen or wattage. 9. Mounting heights of lighting fixtures should be limited, or alternatively foot- light or bollard level lights should be used. 10. If possible, make use of motion detectors on security lighting. 11. Where possible, the operation and maintenance buildings should be consolidated to reduce visual clutter. 12. The operations and maintenance (O&M) buildings should not be illuminated at night. 13. The O&M buildings should be painted in natural tones that fit with the surrounding environment.				
Social					
Incident register	1. 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. Any incident should be immediately recorded and reported to management and all actions pertaining to that incident, as well as the final outcome of the complaint, should be recorded and signed off by management. If an independent environmental monitor is appointed, this register should be	Holder of the EA Contractor	n/a	Clear communication channels maintained.	Continuous

ASPECT / IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
	audited on at least a monthly basis.				
Health and social Wellbeing: Noise WEF Only	2. Refer to the mitigation measures suggested by the noise specialist. 3. Noise generated from all the proposed activities must comply with the Western Cape Noise Control Regulations promulgated in Provincial Notice 200/2013 ("WCNCR").	Holder of the EA Contractor	n/a	Clear communication channels maintained.	Continuous
Health and social Wellbeing: Shadow Flicker WEF only	4. Identifying receptor points and applying appropriate technical measures such as computer modelling in siting the wind turbines to limit the effect of shadow flicker. 5. Where appropriate apply tracking technology that will automatically shutoff and restart the affecting wind turbine to eliminate shadow flicker. 6. Consider the application of appropriate screening measures to reduce the effect of shadow flicker.	Holder of the EA Contractor	n/a	Clear communication channels maintained. Social Responsibility Programme implemented.	Continuous
Health and social Wellbeing: Blade glint	7. Calculate and factor in the risk of blade glint in siting the wind turbines. 8. Coat wind turbine blades with non-reflective coating to reduce blade glint. 9. Where appropriate adjust the angle of turbine blades to reduce blade glint.	Holder of the EA Contractor	n/a	Clear communication channels maintained. Social Responsibility Programme implemented.	Continuous

ASPECT / IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
Health and social Wellbeing: Electromagnetic field and RF interference	10. Wind turbine mechanisms will be elevated and the risk of EMFs will be minimal. 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. 11. Ensure that power lines are not routed in close proximity (with 300 meters) of residential areas to limit the effect off EMFs. 12. Consult with the appropriate telecommunication authorities to ensure that the telecommunication installations identified within the vicinity of the project are not compromised through RFI.	Holder of the EA Contractor	n/a	Clear communication channels maintained. Social Responsibility Programme implemented.	Continuous
Health and social Wellbeing: Hazard exposure	13. Install early detection techniques to avoid or reduce structural damage. 14. Install lighting protection systems. 15. Install fire prevention and control measures.	Holder of the EA Contractor	n/a	Clear communication channels maintained. Social Responsibility Programme implemented.	Continuous
Quality of the living Environment: Transformation of the sense of place	16. Apply the mitigation measures suggested in the Visual Impact Assessment Report. 17. Communicate the benefits associated with renewable energy to the broader community.	Holder of the EA Contractor	n/a	Clear communication channels maintained. Social Responsibility Programme implemented.	Continuous

ASPECT / IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
	18. Ensure that all affected landowners and tourist associations are regularly consulted. 19. A Grievance Mechanism must be put in place and all grievances must be dealt with transparently. 20. The mitigation measures recommended in the Heritage and Palaeontology Impact Assessment should be followed.				
Economic: Job creation and skills development	21. Implement a training and skills development programme for locals. 22. Work closely with the appropriate municipal structures regarding establishing a social responsibility programme.	Holder of the EA Contractor	n/a	Clear communication channels maintained. Social Responsibility Programme implemented.	Continuous
Economic: Socio- economic stimulation.	23. Ensure that the procurement policy supports local enterprises. 24. Establish a social responsibility programme either in line with the REIPPP BID guidelines or equivalent. 25. Work closely with the appropriate municipal structures regarding establishing a social responsibility programme. 26. Ensure that any trusts or funds are strictly managed in respect of outcomes and funds.	Holder of the EA	n/a	Clear communication channels maintained. Social Responsibility Programme implemented.	Continuous
Transportation					
Additional Traffic Generation: Increase in Traffic	1. The increase in traffic for this phase of the development is	Holder of the EA Contractor	n/a	All staff members are aware of the EMPr	Continuous

ASPECT / IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
	negligible and will not have a significant impact.			requirements relevant to them. Ensure the EMPr is adhered to.	
Additional Traffic Generation: Increase of Incidents with pedestrians and livestock	2. The increase in traffic for this phase of the development is negligible and will not have a significant impact.	Holder of the EA Contractor	n/a	All staff members are aware of the EMPr requirements relevant to them. Ensure the EMPr is adhered to.	Continuous
Additional Traffic Generation: Increase in Dust from gravel roads	3. The increase in traffic for this phase of the development is negligible and will not have a significant impact.	Holder of the EA Contractor	n/a	All staff members are aware of the EMPr requirements relevant to them. Ensure the EMPr is adhered to.	Continuous
Additional Traffic Generation: Increase in Road Maintenance	4. The increase in traffic for this phase of the development is negligible and will not have a significant impact.	Holder of the EA Contractor	n/a	All staff members are aware of the EMPr requirements relevant to them. Ensure the EMPr is adhered to.	Continuous
Additional Abnormal Loads	5. The increase in traffic for this phase of the development is negligible and will not have a significant impact.	Holder of the EA Contractor	n/a	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	6. Adequate road signage according to the SARTSM.	Holder of the EA Contractor	n/a	All staff members are aware of the EMPr requirements relevant to them. Ensure the EMPr is adhered to.	Continuous

Bats

Impact	Mitigation / Management Objectives	Mitigation / Management Actions	Monitoring		
			Method	**Frequency**	**Responsibility**
Fatality of resident bats through direct collision or barotrauma.	• Mitigate potential impacts on bats during operation of wind farm. • Reduce bat mortality during the operational lifetime of the wind farm. • Supervise all bat monitoring activities. • Stay aware of bat mortality.	1. All turbines and turbine components, including the rotor swept zone, must be kept out of all No-go and high bat sensitivity areas, Annexure E. 2. Mitigation as proposed in Annexure E, must be applied as soon as the turbines start operating for the site as a whole. 3. Mitigation as proposed for High-medium sensitivity zones proposed in Annexure E, must be adhered to as soon as the turbines start turning. Mitigation measures must	• Regular bat monitoring reports, informed by the relevant SABAA operational bat monitoring guidelines. • Adhere to the mitigation measures as indicated by the EA and Section 9 of the Bat Monitoring report. • Maintain a register of bat mortality/injury. • Regular communication between bat specialist and site manager.	Throughout operation and during operational bat monitoring period.	Site manager Project developer

		be adapted by a bat specialist as data is collected during the operational phase. 4. Where high bat mortality occurs, mitigation must be implemented without delay. Specific turbines must be mitigated, using Sections in Annexure E, as a starting point for discussions. 5. Freewheeling must be avoided, to a point where the turbines are not a threat to bats, when turbines do not generate power. 6. Except for compulsory lightning required in terms of civil aviation, artificial lightning must be minimised, especially			

		bright lights. Lights must rather be turned downwards. 7. Turbine tower lights must be switched off when not in operation, if possible, depending on civil aviation laws. 8. At least two years of post-construction bat monitoring is to be conducted and must be performed according to the South Africa Good Practice Guidelines for Operational Monitoring for Bats at Wind Energy facilities (Aronson, et.al., 2020) or later versions of the guidelines valid at the time of monitoring. 9. Prolonged post construction mitigation,			

		beyond the prescribed two years, might be necessary if advised by the operational bat specialist. 10. The use of ultrasound as a mitigation measure to deter bats must be investigated if necessary and as advised by a bat specialist.			
Bat fatality of migratory species.	• Mitigate potential impacts on bats during operation of wind farm. • Reduce bat mortality during the operational lifetime of the wind farm. • Supervise all bat monitoring activities.	11. Care must be taken during post construction monitoring to verify the numbers of this species, especially within the rotor swept area of the turbine blades. 12. All turbines and turbine components, including the rotor swept zone, must be kept out of all No-go and high bat sensitivity areas, Annexure E.	• Regular bat monitoring reports, informed by the relevant SABAA operational bat monitoring guidelines. • Adhere to the mitigation measures as indicated by the EA and Section 9 of the Bat Monitoring report.	• Throughout operation and during operational bat monitoring period.	• Site manager • Project developer

		13. Mitigation as proposed in Annexure E must be applied as soon as the turbines start operating for the site as a whole. 14. Mitigation as proposed for High-medium sensitivity zones proposed in Annexure E, must be adhered to as soon as the turbines start turning. Mitigation measures must be adapted by a bat specialist as data is collected during the operational phase. 15. Where high bat mortality occurs, mitigation must be implemented without delay. Specific turbines must be mitigated, using Annexure			

		E, as a starting point for discussions. 16. Freewheeling must be avoided, to a point where the turbines are not a threat to bats, when turbines do not generate power. 17. Except for compulsory lightning required in terms of civil aviation, artificial lightning must be minimised, especially bright lights. Lights must rather be turned downwards. 18. Turbine tower lights must be switched off when not in operation, if possible, depending on civil aviation laws. 19. At least two years of post-construction bat monitoring			

		is to be conducted and must be performed according to the South Africa Good Practice Guidelines for Operational Monitoring for Bats at Wind Energy facilities (Aronson, et.al., 2020) or later versions of the guidelines valid at the time of monitoring. 20. Prolonged post construction mitigation, beyond the prescribed two years, might be necessary if advised by the operational bat specialist. 21. The use of ultrasound as a mitigation measure to deter bats must be investigated if necessary and as advised by a bat specialist.			

Loss of bats of conservation value.	• Mitigate potential impacts on bats during operation of wind farm. • Reduce bat mortality during the operational lifetime of the wind farm. • Supervise all bat monitoring activities.	22. Care must be taken during post construction monitoring to verify the numbers of this species, especially within the rotor swept area of the turbine blades. 23. All turbines and turbine components, including the rotor swept zone, must be kept out of all No-go and high bat sensitivity areas, Annexure E. 24. Mitigation as proposed in Annexure E must be applied as soon as the turbines start operating for the site as a whole. 25. Mitigation as proposed for High-medium sensitivity zones proposed in Annexure E,	• Regular bat monitoring reports, informed by the relevant SABAA operational bat monitoring guidelines. • Adhere to the mitigation measures as indicated by the EA and Section 9 of the Bat Monitoring report. • Regular communication between bat specialist and site manager.	Throughout operation and during operational bat monitoring period.	Site manager Project developer

		must be adhered to as soon as the turbines start turning. Mitigation measures must be adapted by a bat specialist as data is collected during the operational phase. 26. Where high bat mortality occurs, mitigation must be implemented without delay. Specific turbines must be mitigated, using Annexure E, as a starting point for discussions. 27. Freewheeling must be avoided, to a point where the turbines are not a threat to bats, when turbines do not generate power. 28. Except for compulsory lightning required in			

		terms of civil aviation, artificial lightning must be minimised, especially bright lights. Lights must rather be turned downwards. 29. Turbine tower lights must be switched off when not in operation, if possible, depending on civil aviation laws. 30. At least two years of post-construction bat monitoring is to be conducted and must be performed according to the South Africa Good Practice Guidelines for Operational Monitoring for Bats at Wind Energy facilities (Aronson, et.al., 2020) or later versions of the			

		guidelines valid at the time of monitoring. 31. Prolonged post construction mitigation, beyond the prescribed two years, might be necessary if advised by the operational bat specialist. 32. The use of ultrasound as a mitigation measure to deter bats must be investigated if necessary and as advised by a bat specialist.			
Bat fatality due to the attraction of bats to turbine blades.	• Avoid activities that will attract bats to turbines.	33. Minimise artificial light at night, at the turbines as well as the site management offices. 34. Where possible, lights must shine downwards. 35. Avoid any activities that might attract flying insects to the areas	• Reduce lights	Ongoing	Site manager Project Developer

		amongst the turbines.			
Loss of habitat and foraging space during operation of the wind turbines.	• Mitigate the loss of habitat and foraging space to avoid bat mortality. • Reduce bat mortality during the operational lifetime of the wind farm.	36. Adhere to the sensitivity zones as indicated in the bat monitoring report and bat sensitivity map. 37. No off-road driving on site.	• Adaptive mitigation plan.	During operations.	Site manager Project Developer ECO
Reduction in size, genetic diversity, resilience, and persistence of bat populations.	• Monitor potential impacts on bats during operation of wind farm. • Prevent activities that will attract bats to high-risk areas on site.	38. All turbines and turbine components, including the rotor swept zone, must be kept out of all No-go and high bat sensitivity areas, Annexure E. 39. Mitigation as proposed in Annexure E must be applied as soon as the turbines start operating for the site. 40. Mitigation as proposed for High-medium sensitivity zones proposed in Annexure E, must be adhered to as	• Adaptive mitigation plan.	During operations.	Site manager Project Developer ECO

		soon as the turbines start turning. Mitigation measures must be adapted by a bat specialist as data is collected during the operational phase. 41. Where high bat mortality occurs, mitigation must be implemented without delay. Specific turbines must be mitigated, using Annexure E, as a starting point for discussions. 42. Freewheeling must be avoided, to a point where the turbines are not a threat to bats, when turbines do not generate power. 43. Except for compulsory lightning required in terms of civil aviation,			

		artificial lightning must be minimised, especially bright lights. Lights must rather be turned downwards. 44. Turbine tower lights must be switched off when not in operation, if possible, depending on civil aviation laws. 45. At least two years of post-construction bat monitoring is to be conducted and must be performed according to the South Africa Good Practice Guidelines for Operational Monitoring for Bats at Wind Energy facilities (Aronson, et.al., 2020) or later versions of the guidelines valid			

		at the time of monitoring. 46. Prolonged post construction mitigation, beyond the prescribed two years, might be necessary if advised by the operational bat specialist.			

9. MANAGEMENT PLAN FOR DECOMMISSIONING PHASE

Table 9-1 below presents a summary of the potential impacts as assessed by specialists for the decommission phase of the WEF.

Table 9-1: Summary of the Decommission Phase Impacts and Significance Ratings

Impact	Pre- mitigation	Post- mitigation
Impacts to Biophysical Systems/components during the decommissioning phase		
Avifaunal		
Displacement due to disturbance associated with the dismantling of the wind turbines and associated infrastructure.	Negative Low	Negative Low
Ecological		
Fauna will be negatively affected by the decommissioning of the wind farm due to the human disturbance, the presence and operation of vehicles and heavy machinery on the site and the noise generated.	Negative Medium	Negative Low
Following decommissioning, the site will be highly vulnerable to soil erosion due to the disturbance created by the removal of infrastructure from the site.	Negative Medium	Negative Low
Increased alien plant invasion following decommissioning	Negative Medium	Negative Low
Bat		
Bat disturbance due to decommissioning activities and associated noise, especially during night-time.	Negative Low	Negative Low
Geotechnical		
Decommissioning of the structure will disturb the geological environment. • Increase in soil and wind erosion due to clearance of structures. • Construction and earthmoving vehicles will displace the soil. • Creation of drainage paths. • Potential oil spillages from vehicles. • Excessive sediments in non-perennial features.	Negative Low	Negative Low
Surface Water – same as construction		
Impacts to Socio-Economic component during the decommissioning phase		
Heritage – none identified		
Archaeological		

Impact	Pre- mitigation	Post- mitigation
The extent that the addition of this project will have on the overall impact of developments in the region	Negative Medium	Negative Low
Noise impacts during the day - Decommissioning activities relating to removal of infrastructure and wind turbines, rehabilitation of disturbed areas	Negative Medium	Negative Low
Cultural Landscape – same as construction		
Noise		
Decommissioning activities relating to removal of infrastructure and wind turbines, rehabilitation of disturbed areas	Negative Low	Negative Low
Paleontological – none identified		
Social– none identified		
Transportation		
Increase in Traffic	Negative Low	Negative Low
Increase of Incidents with pedestrians and livestock	Negative Medium	Negative Low
Increase in Dust from gravel roads	Negative Low	Negative Low
Increase in Road Maintenance	Negative Low	Negative Low
Additional Abnormal Loads	Negative Low	Negative Low
Increase in Dust from gravel roads	Negative Low	Negative Low
New / Larger Access points	Negative Low	Negative Low
Visual		
• Vehicles and equipment required for decommissioning will alter the natural character of the study area and expose visual receptors to visual impacts. • Decommissioning activities may be perceived as an unwelcome visual intrusion. • Dust emissions and dust plumes from increased traffic on the gravel roads serving the decommissioning site may evoke negative sentiments from surrounding viewers.	Negative Low	Negative Low

Impact	Pre- mitigation	Post- mitigation
• Surface disturbance during decommissioning would expose bare soil (scarring) which could visually contrast with the surrounding environment. Temporary stockpiling of soil during decommissioning may alter the flat landscape. Wind blowing over these disturbed areas could result in dust which would have a visual impact.		

Bats					
Impact	**Mitigation / Management Objectives**	**Mitigation / Management Actions**	**Monitoring**		
			Method	**Frequency**	**Responsibility**
Decommissioning activities and noise, especially at night-time.	Mitigate disturbance due to decommissioning activities.	1. Develop a decommissioning and remedial rehabilitation plan and adhere to compliance monitoring plan.	Implement a de-commissioning and rehabilitation plan to reduce the development footprint.	During decommissioning phase.	Site manager ECO

Table 9-2: Decommissioning Phase Impact Management

SPECT / IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
On-going Stakeholder Involvement					
Ongoing Stakeholder Involvement	1. Community to be notified, as culturally appropriate, timeously of the planned decommissioning, e.g.: • Proposed decommissioning start date; and • Process to be followed. 2. Recommend that a meeting with community leader(s) be held before decommissioning commence to inform them:	Holder of the EA	n/a	Clear communication channels maintained	During decommissioning

SPECT / IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
	• 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. 3. Regular interaction between the client and community leader(s) during the decommissioning phase 4. A reporting office/ channel to be established must community members experience problems with contractors/ sub-contractors during the decommissioning phase. 5. Formalise agreements or contracts between the landowner and the applicant that will ensure that the rehabilitation does not leave any liability to future landowners. 6. A register to be kept of problems reported by community members and the steps taken to address / resolve it. 7. Noise generated from all the proposed activities must comply with the Western Cape Noise Control Regulations promulgated in Provincial Notice 200/2013 ("WCNCR").				
Waste Management					
Waste Management Mitigation	1. All decommissioned equipment must be removed from site and	Holder of the EA	n/a	All waste managed according to approved Method Statement.	During decommissioning

SPECT / IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
	disposed of at a registered land fill. Records of disposal must be kept. 2. Any putrescible waste must be stored in containers that can keep out scavengers such as baboons and birds to prevent the spread of litter. 3. Wind turbines must be returned to the manufacturer or relevant recycling agent to be recycled.				
Agriculture and Soils					
Aspect: Protection of soil resources Erosion	1. 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.	Environmental Control Officer (ECO)	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.
Erosion	2. Maintain where possible all vegetation cover and facilitate re-vegetation of denuded areas throughout the site, to stabilize disturbed soil against erosion.	Environmental Control Officer (ECO)	Undertake a periodic site inspection to record the occurrence of and 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

SPECT / IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
			progress of all areas that require re-vegetation.		decommissioning, until final sign-off is achieved.
Topsoil	3. If an activity will mechanically disturb the soil below surface in any way, then any available topsoil must 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.	Holder of the EA	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.
Removal of subsoils (soil, rock): Decommissioning of the structure will disturb the geological environment.	4. Use of temporary berms and drainage channels to divert surface water were feasible. 5. Minimize earthworks and demolish footprints. 6. Use of existing roads and tracks were feasible. 7. Rehabilitation of affected areas (such as regrassing). 8. Develop a chemical spill response plan. 9. Develop dust and demolition fly suppression plan. 10. Vehicle repairs to be undertaken in designated areas. 11. Reinstate channelized drainage features.	Holder of the EA	Undertake regular audits	Erosion plan implemented and hydrological measures in place. All waste managed according to approved Method Statement. Ensure the EMPr is adhered to.	Continuous
Avifauna					

SPECT / IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
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.	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 must apply good environmental practice during construction. The EMPr must specifically include the following: • 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.	Contractor ECO	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.	Prevent unnecessary displacement of avifauna by ensuring that contractors are aware of the requirements of the Environmental Management Programme (EMPr.)	1. On a daily basis.
			2. Ensure that construction personnel are made aware of the impacts relating to off-road driving.		2. Weekly.
			3. Construction access roads must be demarcated clearly. Undertake site inspections to verify.		3. Weekly.
			4. Monitor the implementation of noise control mechanisms via site inspections and record and		4. Weekly

SPECT / IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
			report non-compliance.		
			5. Ensure that the construction area is demarcated clearly and that construction personnel are made aware of these demarcations. Monitor via site inspections and report non-compliance.		5. Weekly
Displacement due to disturbance associated with the dismantling of the wind turbines and associated infrastructure.	1. Dismantling activity must be restricted to the immediate footprint of the infrastructure. Access to the remainder of the area should be strictly controlled to prevent unnecessary disturbance of priority species. 2. Measures to control noise and dust must be applied according to current best practice in the industry.	Holder of the EA	Construction Monitoring and audit reports	Impacts avoided or managed as per specialist recommendations. Ensure the conditions of the EA are adhered to. Adhere to legislative requirements	Continuous
Biodiversity					
Faunal disturbance and habitat loss Fauna will be negatively affected by the decommissioning of the wind farm due to the human disturbance, the presence and operation	1. Any potentially dangerous fauna such as snakes or fauna threatened by the decommissioning activities must be removed to a safe location prior to the commencement of decommissioning activities.	Holder of the EA	Construction Monitoring and audit reports	Impacts avoided or managed as per specialist recommendations. Alien Plant Management Plan Implemented.	Continuous

SPECT / IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
of vehicles and heavy machinery on the site and the noise generated.	2. All hazardous materials must be stored in the appropriate manner to prevent contamination of the site. Any accidental chemical, fuel and oil spills that occur at the site must be cleaned up in the appropriate manner as related to the nature of the spill. 3. All vehicles accessing the site must adhere to a low- speed limit (40km/h max) to avoid collisions with susceptible species such as snakes and tortoises. 4. No excavated holes or trenches should be left open for extended periods as fauna may fall in and become trapped. 5. All above-ground infrastructure should be removed from the site. Below-ground infrastructure such as cabling can be left in place if it does not pose a risk, as removal of such cables may generate additional disturbance and impact, however, this should be in accordance with the facilities' decommissioning and recycling plan, and as per the agreements with the land owners concerned.			Plant Rehabilitation Implemented. Ensure the conditions of the EA are adhered to.	
Increased potential for soil erosion Following decommissioning, the site will be highly vulnerable to soil erosion due to the disturbance created by the removal of	6. Any roads that will not be rehabilitated must have runoff control features which redirect water flow and dissipate any energy in the water which may pose an erosion risk. 7. There must be regular monitoring (annual) for erosion for at least 5	Holder of the EA Contractor	Construction Monitoring and audit reports	Impacts avoided or managed as per specialist recommendations. Alien Plant Management Plan Implemented.	Continuous

SPECT / IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
infrastructure from the site.	years after decommissioning by the applicant to ensure that no erosion problems develop as a result of the disturbance, and if they do, to immediately implement erosion control measures. 8. All erosion problems observed must be rectified as soon as possible, using the appropriate erosion control structures and revegetation techniques. 9. All disturbed and cleared areas must be revegetated with indigenous perennial shrubs and grasses from the local area during the rehabilitation process.			Plant Rehabilitation Implemented. Ensure the conditions of the EA are adhered to.	
Ecological degradation due to alien plant invasion.	10. Wherever excavation is necessary for decommissioning, topsoil must be set aside and replaced after construction to encourage natural regeneration of the local indigenous species. 11. Indigenous vegetation seeds that occur naturally in the area must be reintroduced during the rehabilitation process. 12. Due to the disturbance at the site alien plant species are likely to be a long-term problem at the site following decommissioning and regular control will need to be implemented until a cover of indigenous species has returned. 13. Annual monitoring for alien plants within the disturbed areas for at least three years after decommissioning or until alien	Holder of the EA Contractor	Construction Monitoring and audit reports	Impacts avoided or managed as per specialist recommendations. Alien Plant Management Plan Implemented. Plant Rehabilitation Implemented. Ensure the conditions of the EA are adhered to.	Continuous

SPECT / IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
	invasives are no longer a problem at the site. 14. Regular alien clearing must be conducted using the best-practice methods for the species concerned. The use of herbicides must be avoided.				
Surface Water					
Loss of aquatic species of special concern: During decommissioning activities within watercourses could result in the disturbance or destruction of any listed and or protected plant or animal species. However none of these aquatic obligate species were observed during this assessment.	1. Develop and implement an Aquatic Rehabilitation and Monitoring plan post Environmental Authorisation. This must be developed following the finalisation of the turbine / road layout and a walk down has been completed.	Holder of the EA	Decommissioning Monitoring and audit reports.	Impacts avoided or managed as per specialist recommendations. Ensure the conditions of the EA are adhered to.	Continuous
Damage or loss of riparian and or drainage line systems i.e. disturbance of the waterbodies in the construction phase:	2. All alien plant re-growth, which is currently low within the greater region must be monitored and should it occur, these plants must be eradicated within the project footprints and especially in areas near the proposed crossings. *Prosopis* (alien invasive riparian tree) is prevalent in areas to the north of the site, thus care in transporting any material, while ensuring that such materials is free of alien seed, coupled with pre and post alien clearing must be stipulated in the EMPr.	Holder of the EA	Decommissioning Monitoring and audit reports.	Impacts avoided or managed as per specialist recommendations. Ensure the conditions of the EA are adhered to.	Continuous

SPECT / IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
	Where roads and crossings are upgraded, the following applies: • Existing pipe culverts must be removed and replaced with suitable sized box culverts, especially where road levels are raised to accommodate any large vehicles. • River levels, regardless of the current state of the river / water course must be reinstated thus preventing any impoundments from being formed. The related designs must be assessed by an aquatic specialist during a pre-decommissioning walkdown. • Where large cut and fill areas are required these must be stabilised and rehabilitated during the decommissioning process, to minimise erosion and sedimentation. • Suitable stormwater management systems must be installed along roads and other areas and monitored during the first few months of use. Any erosion / sedimentation must be resolved through whatever additional interventions maybe necessary (i.e., extension, energy dissipaters, spreaders, etc).				

SPECT / IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
Potential impact on localised surface water quality (decommissioning materials and fuel storage facilities) during the decommissioning phases. During decommissioning earthworks will expose and mobilise earth materials, and a number of materials as well as chemicals will be imported and used on site and may end up in the surface water, including soaps, oils, grease and fuels, human wastes, cementitious wastes, paints and solvents, etc. Any spills during transport or while works area conducted in proximity to a watercourse has the potential to affect the surrounding biota. Leaks or spills from storage facilities also pose a risk and due consideration to the safe design and management of the 30 000l fuel storage facility must be given. Although unlikely, consideration must also be provided for the proposed Battery Energy Storage System (BESS), with regard safe handling	3. All liquid chemicals including fuels and oil, including the BESS must be stored in with secondary containment (bunds or containers or berms) that can contain a leak or spill. Such facilities must be inspected routinely and must have the suitable PPE and spill kits needed to contain likely worst-case scenario leak or spill in that facility, safely. 4. Washing and cleaning of equipment must be done in designated wash bays, where rinse water is contained in evaporation/sedimentation ponds (to capture oils, grease cement and sediment). 5. Mechanical plant and bowsers must not be refuelled or serviced within 100m of a river channel. 6. All construction camps, lay down areas, wash bays, batching plants or areas and any stores must be more than 50 m from any demarcated water courses. Note comment regards Camp A that requires micro-siting. 7. Littering and contamination associated with decommissioning activity must be avoided through effective construction camp management. 8. No stockpiling must take place within or near a water course. 9. All stockpiles must be protected and located in flat areas where run-	Holder of the EA	Construction Monitoring and audit reports.	Impacts avoided or managed as per specialist recommendations. Ensure the conditions of the EA are adhered to.	Continuous

SPECT / IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
during the decommissioning phase. This to avoid any spills or leaks from this system.	off will be minimised and sediment recoverable.				
Heritage					
Palaeontology	1. During the construction phase the Chance Fossil Finds Protocol summarized in Annexure D must be fully implemented. 2. The Environmental Control Officer (ECO) / Environmental Site Officer (ESO) responsible for the development must be made aware of the possibility of important fossil remains (vertebrate bones, teeth, petrified wood, plant-rich horizons etc.) being found or unearthed during the construction phase of the development. Monitoring for fossil material of all major surface clearance and deeper (>1m) excavations by the Environmental Site Officer on an on-going basis during the construction phase is therefore recommended. Significant fossil finds must be safeguarded and reported at the earliest opportunity to Heritage Western Cape for recording and sampling by a professional palaeontologist (Contact details: Heritage Western Cape. 3rd Floor Protea Assurance Building, 142 Longmarket Street, Green Market Square, Cape Town 8000. Private Bag X9067, Cape Town 8001. Tel:	Palaeontologist ECO	n/a	Ensure the EMPr is adhered to.	Continuous

SPECT / IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
	021 483 5959 Email: ceoheritage@westerncape.gov.za).				
Cultural landscape: Ecological	3. Critical Biodiversity Areas, and Ecological Support Areas (along drainage lines), must be protected from development of the wind turbines or any associated development during all phases. 4. No wind turbines should be placed within the 1:100-year flood line of the watercourses. In the context of the sensitivity to soil erosion in the area, as well as potential archaeological resources, it would be a risk to include any structures close to these drainage lines 5. Remaining areas of endemic and endangered natural vegetation must be conserved. 6. Areas of critical biodiversity must be protected from any damage during all phases; where indigenous and endemic vegetation must be preserved at all cost. 7. Areas of habitat are found among the rocky outcrops and contribute to the character, as well as biodiversity of the area. Care must be taken that habitats are not needlessly destroyed. 8. Identified medicinal plants used for healing or ritual purposes must be conserved during all phases if threatened for use. 9. Careful planning must incorporate areas for storm water runoff where the base of the structure disturbed	Holder of the EA Contractor	n/a	Ensure the EMPr is adhered to.	Continuous

SPECT / IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
	the natural soil. Local rocks found on the site could be used to slow storm water (instead of concrete, or standard edge treatments), and prevent erosion that would be an unfortunate consequence that would alter the character of the site. By using rocks from site it helps to sensitively keep to the character.				
Cultural landscape: Aesthetic	10. Encourage mitigation measures (for instance use of vegetation) to 'embed' or disguise the proposed structures within the surrounding tourism and agricultural landscape at ground level, road edges etc. 11. The continuation of the traditional use of material could be enhanced with the use of the rocks on the site as building material. This would also help to embed structures into the landscape and must not consist of shipping containers or highly reflective untreated corrugated sheeting that clutters the landscape and is exacerbates the foreign intrusion on the natural matte landscape. 12. Using material found on the site adds to the sense of place and reduces transportation costs of bringing materials to site. 13. The local material such as the rocks found within the area could be applied to address storm water runoff from the road to prevent erosion.	Holder of the EA Contractor	n/a	Ensure the EMPr is adhered to.	Continuous

SPECT / IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
	14. Duration and magnitude of construction/ decommissioning activity must be minimized as far possible to reduce the impact of heavy vehicles on the roads as well as the associated dust from the activity. Lightest vehicles possible should be used to reduce degradation to the farm roads and the need to upgrade roads to scale and extent that negatively impacts on the integrity of the historic farm roads. Construction/ decommissioning traffic must operate at speeds that reduce dust and noise as far possible. 15. Any new road network or widening must be returned to its original state at end of the operational time of the WEF, with full environmental and aesthetic rehabilitation to the approval of a qualified cultural landscapes assessment specialist. 16. Turbine sites, substation and laydown areas should be returned to their original state at the end of the operational time of the WEF, with full environmental and aesthetic rehabilitation to the approval of a qualified cultural landscapes assessment specialist.				
Cultural landscape: Historic	17. Historic farmsteads must be protected from the impacts of heavy construction vehicles and increased numbers of people. No construction traffic should pass through or closer than 50m to the outer boundaries of a farm werf, or	Holder of the EA Contractor	n/a	Ensure the EMPr is adhered to.	Continuous

SPECT / IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
	200m from graded structures, which includes the associated historically cultivated lands, cemeteries, unmarked burials. The most appropriate use of existing farm roads must be found to avoid farm werfs and reduce construction impact on these heritage features. 18. A preconstruction micro-survey for turbines, access roads, substations, laydown areas and gridlines should be completed with CLA specialist to ensure appropriate buffers are maintained. 19. Duration and magnitude of construction/ decommissioning activity must be minimized to reduce the impact of heavy vehicles on the roads as well as the associated dust from the activity. Light vehicles should be used to reduce degradation to the farm roads and the need to upgrade roads to scale and extent that negatively impacts on the integrity of the historic farm roads. Construction decommissioning traffic must operate at speeds that reduce dust and noise. 20. No infrastructure or operational upgrades, such as boreholes, should impact negatively or reduce natural, on-site water quality, quantity or access for the residents within or around the development site. Preferably any borehole or other water resource upgrade should also be made freely				

SPECT / IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
	accessible to the residents living on site. 21. Accommodation of construction staff must not negatively impact on existing farm residents or degrade the integrity of the farmstead complexes and should, without negative impact to ecological or aesthetic resources, be located outside of the farmstead complexes or site. Farm residents should be consulted on the preferable location for construction staff accommodation. 22. Traditional planting patterns should be protected by ensuring that existing trees are not needlessly destroyed, as these signify traces of cultural intervention in a harsh environment. These planting patterns include the trees planted around the werfs and along travel routes. Interpretation of these landscape features as historic remnants should occur. A buffer of 50m around such planting patters should be maintained. 23. Burial grounds and places of worship are automatically regarded as Grade IIIa or higher. Any development that threatens the inherent character of family burial grounds must be assessed and should be discouraged. No turbines have been proposed for placement near known unmarked burials or family cemeteries. A preconstruction micro-survey of				

SPECT / IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
	each turbine footprint and any new access roads should be conducted to ensure no further unmarked graves are threatened. A preconstruction micro-survey for access roads, substations, laydown areas and gridlines should be completed with CLA specialist to ensure appropriate buffers are maintained. 24. Mountain slopes have been used for traditional practices for many years, and care should be taken that any significant cultural sites, such as burials and veldkos/medicinal plant resources, are not disturbed. 25. Farms in the area followed a system of stone markers to demarcate the farm boundaries in the area. Where these structures are found on the site, care should be taken that they are not needlessly destroyed, as they add to the layering of the area. 26. Roads running through the area may have historic stone way markers. Where these are found care should be taken that they are left intact and in place. Road upgrades must not move or threaten their position and they should be visible from the road they are related to by passing travellers. A preconstruction micro-survey for access roads, substations, laydown areas and gridlines should be completed with				

SPECT / IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
	CLA specialist to ensure appropriate buffers are maintained. 27. Where the historic function of a building/site is still intact, the function has heritage value and should be protected. 28. Surviving examples (wagon routes, outspans, and commonage), where they are owned in some public or communal way (or by a body responsible for acting in the public interest) and where they are found to be actively operating in a communal way, will have cultural and heritage value and should be enhanced and retained. The historic route running through Koup 1 should be maintained and integrity as a communal road for farm residents must be retained.				
Cultural landscape: Socio- economic	29. An updated cultural landscapes impact assessment report must be completed should the WEF continue to be used after the term granted in this application. This report should include a detailed assessment of the impacts to the cultural landscape and its outcomes and recommendations need to be considered in the decision for recommissioning and be implemented if recommissioning is approved. 30. The continued use of the landscape for human habitation and cultivation by historic residents of the area, should be retained and encouraged as far possible to	Holder of the EA Contractor	n/a	Ensure the EMPr is adhered to.	Continuous

SPECT / IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
	sustain the continual use pattern and human-environment relationship which is the ultimate significance of this cultural landscape element. The WEF development must allow and support this, including financially, and not degrade this continued relationship. 31. No infrastructure or operational upgrades, such as boreholes, should impact negatively or reduce natural, on-site water quality, quantity or access for the residents within or around the development site. Preferably any borehole or other water resource upgrade should also be made freely accessible to the residents living on site. 32. The local community on and around the development should benefit from job opportunities created by the proposed development and the development should not cause reduction in economic viability of surrounding properties in excess of those offered by the development. Short-term job opportunities at the expense of long-term economic benefit and local employment opportunities must be prevented. 33. Local residents must be offered employment on the construction/ decommissioning and operational phases before 'importing' staff from elsewhere.				

SPECT / IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
	34. Local residents must be offered employment-training opportunities associated with WEF developments at all phases. 35. Sheep, cattle or game farming should be allowed to continue below the wind turbines, or be rehabilitated to increase biodiversity in the area.				
Visual					
Potential visual intrusion resulting from vehicles and equipment involved in the decommissioning process. Potential visual impacts of increased dust emissions from decommissioning activities and related traffic. Potential visual intrusion of any remaining infrastructure on the site.	1. All infrastructure that is not required for post-decommissioning use should be removed. 2. Carefully plan to minimize the decommissioning period and avoid delays. 3. Maintain a neat decommissioning site by removing rubble and waste materials regularly. 4. Ensure that dust suppression procedures are maintained on all gravel access roads throughout the decommissioning phase. 5. All cleared areas should be rehabilitated as soon as possible. 6. Rehabilitated areas should be monitored post-decommissioning and remedial actions implemented as required.	Holder of the EA	n/a	Noise and lighting managed according to approved Method Statement. All waste managed according to approved Method Statement. Plant Rehabilitation Implemented.	During decommissioning
Transportation					
Additional Traffic Generation: Increase in Traffic.	1. Ensure staff transport is done in the ‘off peak’ periods and by bus. 2. Stagger material, component and abnormal loads.	Holder of the EA Contractor	n/a	All staff members are aware of the EMPr requirements relevant to them.	Continuous

SPECT / IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
	3. Construction of an on-site concrete batching plant to reduce trips.			Ensure the EMPr is adhered to.	
Additional Traffic Generation: Increase of Incidents with pedestrians and livestock.	4. Reduction in speed of vehicles. 5. Adequate enforcement of the law. 6. Implementation of pedestrian safety initiatives. 7. Regular maintenance of farm fences & access cattle grids. 8. Construction of an on-site concrete batching plant to reduce trips.	Holder of the EA Contractor	n/a	All staff members are aware of the EMPr requirements relevant to them. Ensure the EMPr is adhered to.	Continuous
Additional Traffic Generation: Increase in Dust from gravel roads.	9. Reduction in speed of the vehicles. 10. Use of dust suppressant techniques. 11. Implement a road maintenance program under the auspices of the respective transport department. 12. Construction of an on-site concrete batching plant to reduce trips.	Holder of the EA Contractor	n/a	All staff members are aware of the EMPr requirements relevant to them. Ensure the EMPr is adhered to.	Continuous
Additional Traffic Generation: Increase in Road Maintenance.	13. Implement a road maintenance program under the auspices of the respective transport department. 14. Construction of an on-site batching plant to reduce trips.	Holder of the EA Contractor	n/a	All staff members are aware of the EMPr requirements relevant to them. Ensure the EMPr is adhered to.	Continuous
Additional Abnormal Loads.	15. Ensure abnormal vehicles travel to and from the proposed development in the 'off peak' periods or stagger delivery. 16. Adequate enforcement of the law.	Holder of the EA Contractor	n/a	All staff members are aware of the EMPr requirements relevant to them. Ensure the EMPr is adhered to.	Continuous
Internal Access Roads: Increase in Dust from gravel roads.	17. Enforce a maximum speed limit on the development.	Holder of the EA Contractor	n/a	All staff members are aware of the EMPr	Continuous

SPECT / IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
	18. Use of dust suppressant techniques. 19. Adequate watering by means of water bowser.			requirements relevant to them. Ensure the EMPr is adhered to.	
Internal Access Roads: New / Larger Access points.	20. Adequate road signage according to the SARTSM. 21. Approval from the respective roads department.	Holder of the EA Contractor	n/a	All staff members are aware of the EMPr requirements relevant to them. Ensure the EMPr is adhered to.	Continuous

10. MANAGEMENT PLAN FOR CUMULATIVE PHASE

The proposed WEF is located adjacent to several other WEFs within 35 km of Koup 1 WEF. The information that could be obtained for the surrounding planned renewable energy developments (SiVEST, 2022) was taken into account as part of the cumulative impact assessment.

Table 10.1 below presents a summary of the potential impacts as assessed by specialists for the construction phase of the WEF.

Table 10-1: Summary of the Cumulative Phase Impacts and Significance Ratings

Impact	Pre- mitigation	Post- mitigation
Impacts on Biophysical Systems / Components during the Cumulative Phase		
Avifaunal		
• Mortality due to collisions with the wind turbines • Displacement due to disturbance during construction and operation of the wind farm • Displacement due to habitat change and loss at the wind farm • Mortality due to electrocution on the electrical infrastructure	Negative Medium	Negative Low
Ecological		
Wind energy development in the wider area around the Koup 1 site will generate cumulative impacts on habitat loss and fragmentation for fauna and flora.	Negative Medium	Negative Low
Bat		
Cumulative bat mortality due to direct collision with the blades or barotrauma during foraging of resident bats at several WEF sites.	Negative High	Negative High
Cumulative bat mortality of migrating bats due to direct blade impact or barotrauma during foraging of migrating bats on several wind farms	Negative High	Negative Medium
Habitat loss over several wind farms	Negative High	Negative Medium
Cumulative reduction in the size, genetic diversity, resilience and persistence of bat populations	Negative High	Negative High
Geotechnical – none identified		
Surface Water		
The cumulative assessment considers the various proposed renewable projects that occur within a 35km radius of this site, where the author has either been involved in the assessment of these projects (Enertrag SA) and or review of the past assessments as part of any required Water Use Licenses (Atlantic Energy Partners & Mainstream projects).	Negative Low	Negative Low
Impacts to Socio-Economic Component during the Cumulative Phase		
Heritage		

The extent that the addition of this project will have on the overall impact of developments in the region on heritage resources.	Negative Medium	Negative Low
Disturbance, damage or destruction of fossils at or beneath the ground surface due to surface clearance and bedrock excavations	Negative Medium	Negative Low
Archaeological		
The extent that the addition of this project will have on the overall impact of developments in the region on heritage resources.	Negative Medium	Negative Low
Cultural Landscape		
Inappropriate cumulative development degrade the significant ecological elements of the cultural landscape	Negative Very high	Negative Medium
Inappropriate cumulative development degrades the significant aesthetic elements of the cultural landscape altering the character and sense of place	Negative Very high	Negative Medium
Inappropriate cumulative development degrades the significant historic elements of the cultural landscape altering the character and sense of place	Negative Very high	Negative Medium
Inappropriate cumulative development degrade the significant socio-economic opportunities of the cultural landscape	Negative Very high	Positive Medium
Noise		
Cumulative noises due to operating wind turbines from other wind energy facilities in the area	Negative Low	Negative Low
Paleontological – none identified		
Social		
Noise	Negative Low	Negative Low
Shadow flicker	Negative Low	Negative Low
Blade glint	Negative Low	Negative Low
Risk of HIV and AIDS	Negative High	Negative Medium
Sense of place	Negative High	Negative High
Service supplies and infrastructure	Negative Low	Negative Low

Job creation and skills development	Positive Very high	Positive Very high
Socio-economic stimulation	Positive Medium	Positive Medium
Transportation		
Increase in Traffic	Negative Low	Negative Low
Increase of Incidents with pedestrians and livestock	Negative High	Negative Medium
Increase in Dust from gravel roads	Negative Medium	Negative Low
Increase in Road Maintenance	Negative Low	Negative Low
Additional Abnormal Loads	Negative Medium	Negative Low
Increase in Dust from gravel roads	Negative Medium	Negative Low
New / Larger Access points	Negative Low	Negative Low
Visual		
• Additional renewable energy developments in the broader area will alter the natural character of the study area towards a more industrial landscape and expose a greater number of receptors to visual impacts. • Visual intrusion of multiple renewable energy developments may be exacerbated, particularly in more natural undisturbed settings. • Additional renewable energy facilities in the area would generate additional traffic on gravel roads thus resulting in increased impacts from dust emissions and dust plumes. • The night time visual environment could be altered as a result of operational and security lighting at multiple renewable energy facilities in the broader area.	Negative Medium	Negative Medium

11. BESS RISK ASSESSMENT AND MANAGEMENT PLAN

11.1 High-level BESS Risk Assessment

The risks associated with Solid-State, Lithium Ion (Li-Ion) batteries, are typically well researched and documented. The main concerns relating to a BESS are fire hazards (from toxic and flammable gasses) and the potential for a condition known as 'thermal runaway'. Thermal runaway occurs in situations where an increase in temperature changes the conditions in a way that causes a further increase in temperature, often leading to a destructive result. As far as general environmental risks, the main concerns are surrounding the disposal of the batteries at end of their life.

This section will attempt to address the risks associated with the on-site use of a BESS for the Loxton WEF 1, and the resultant Risk Assessment is presented in Table 11-1 below. To do this, the EAP looked at several potential situations which could result in a possible detrimental environmental hazard. These are:

1. The actual risks associated with the delivery, connection, operation, maintenance, disconnection and disposal of the batteries.

2. The likelihood of these actual risks occurring.

3. The significance of the impacts should these risks take place.

4. Appropriate and practical mitigation measures and/or management actions to reduce likelihood of the risk occurring and/or the impact.

A comprehensive operations and maintenance programme is necessary to ensure that all management and mitigation measured are included in the EMPr and adopted and implemented as well as to ensure that all monitoring and protective devices are in good working order.

Regular inspections should be undertaken to ensure the battery systems are not overheating or showing signs of malfunction. Annual thermographic scanning can help ensure the BESS is operating within normal parameters.

Where a BESS does not meet its performance requirements, and where repairs do not solve a problem which exists, and where change in the BESS does not lead to a profitable alternative business solution, the BESS is said to have reached its End-of-Life (EoL). Following an EoL shutdown procedure a BESS would be de-installed, disassembled, removed from the site and transported. Further, its components would be reused and/or recycled.

For decommissioning the energy storage system, the appropriate technical guidelines from the manufacturer should be consulted. Before the actual decommissioning, the BESS system needs to be checked for hazardous substances and a risk assessment should be performed considering safety and/or environmental risks which might occur during the decommissioning activities (e.g., fire hazards, electric shocks and poisonous effects on the environment). Depending on the safety and/or environmental risks identified and on the type of BESS equipment, local authorities should be consulted or informed about the decommissioning activities.

For recycling, it is advised to consult a specialized organization in waste treatment to the extent that all materials, also non-hazardous are disposed of correctly and preferably recycled. Several materials which commonly are found in modern batteries or redox flow batteries are environmentally hazardous and regulated and thus should be disposed of according to regional government requirements, such as directive 2006/66/EC of the European parliament and of the council, also known as the Batteries Directive.

This high-level risk assessment must be replaced with a detailed technology specific risk assessment once the final equipment suppliers have been identified during the detailed design and procurement

stage. The technology specific risk assessment should be undertaken or provided by the battery supplier once identified.

Table 11-1 High-level BESS Risk Assessment

Possible Risk	Likelihood of occurrence	Resultant Impact	Management / Mitigation
General leakage: - Leakage of Coolant - Leakage of Electrolyte	**Low**	- On site fires. - Electrical failure. - Potential spillage of electrolytes or refrigerant - Soil contamination - Groundwater contamination	- Latest BESS technologies to be used as far as possible. - BESS installation is to adhere to the appropriate international standards and South African National Standard (SANS) requirements. - Training of all staff and employees on how to handle spillages, fires and electrocutions. - Records kept for well managed operations and maintenance.
Mishandling: - Batteries incorrectly connected - Batteries left disconnected - Short circuits - Forced discharged - Venting of Electrolyte - Punctured/Crushed or damaged modules and battery casing	**Low**	- On site fires. - Electrical failure - Electrocution - Potential spillage of electrolytes or refrigerant - Vented gasses - Staff and personal injury - Contaminated Runoff - Soil and microbe contamination - Groundwater seepage - Downstream effects on the current terrestrial ecosystem.	- Bunding of containers and batteries to be placed on an impermeable barrier/layer (e.g., concrete surface with acid lining). - In case of a spillage of hazardous chemicals where contamination of soil occurs, depending on the degree of contamination, excavation and removal to a hazardous waste disposal site might be necessary. If the spillage is widespread, a specialist will need to be immediately appointed to deal with the issue, the DFFE must be notified, and the notification process stipulated in the National Norms and Standards for the Remediation of Contaminated Land and Soil Quality (GN 331, 2 May 2014) should be followed. - Implementation of spill handling and management in line with the EMPr. - Demarcate all no-go and sensitive areas. - Avoid the placement of batteries near watercourses and sensitive features. - Material Safety Data Sheets (MSDS) Records to be kept, as well as incidents reporting register. - Source batteries from reputable suppliers, and batteries to arrive on site pre-assembled in suitable containers. - Battery inspection prior to installation.

Thermal Runaway: - Thermal and/or Mechanical failure in one or more battery cells - Overheating - Short circuiting	**Low**	- On site fires. - Electrical failure - Potential spillage of electrolytes or refrigerant - Downstream effects on the current terrestrial ecosystem.	- Maintenance. - Latest BESS technologies to be used as far as possible. - Appropriate battery design and venting control. - Source from reputable manufacturers. - Safe and appropriate storage in line with the above and the EMPr. Safe handling which must include battery inspection prior to installation. - Should electrolyte solutions be stored on site, these should be stored away from incompatible materials such as all peroxides, such as hydrogen peroxide; chemicals that react with acid to generate a gaseous product, such as carbonate and bicarbonates, sulfites and bisulfites; strong reducing agents, such as alkaline metals (Li, Na, K) and alkaline earth metals (Be Mg Ca, Sr, Ba); reactive metals such as aluminum and zinc, all hydrides (such as LiAlH4, $NaBH_4$), and some carbides (such as CaC_2). - Development and implementation of Thermal Management Plan prior to installation/construction.
Limited Employee Training and Experience: - Device Monitoring Failure (SCADA) - Poor incidents reporting - Poor first responders training - Distance to nearest fire station and response time.	**Low**	- Time lag for first respondent - Inability to contain spillage - Fire - Electrocution - Damage to exiting/surrounding infrastructure	- During the construction phase the proposed project, first responders from the nearest major center (such as fire fighters and paramedics) must be given appropriate training on dealing with any emergency situation that may occur as a result of the operation of BESS. Such training must be provided by the technology suppliers or an appointed service provider.
Inappropriate Storage - Hydrocarbon Spill - Leaked battery pack coolant - Leaked refrigerant - Leaked cell electrolyte - Rapid heating of individual cells - Fires	**Low**	- On site fires. - Electrical failure - Electrocution - Potential spillage of electrolytes or refrigerant - Vented gasses - Staff and personal injury - Contaminated Runoff - Soil and microbe contamination	- Solid State Li-Ion technologies to be preferred where possible. - Training of all staff and employees on how to handle spillages, fires and electrocutions. - In terms of appropriate design measures, the holder of the EA must identify a secondary containment facility, which is to be constructed with a capacity of at least 110% of the largest storage tank's capacity and the off-loading point must be located in the bunded area to ensure that any potential spill during the off-loading of the electrolyte solutions is contained. - Records kept for well managed operations and maintenance.

		- Groundwater seepage - Downstream effects on the current terrestrial ecosystem.	- Bunding of containers. - Implementation of spill handling and management in line with the EMPr which ensures that run-off and dirty water does not mix with electrolyte spill. - Containment areas to be sloped towards a sump. - All drains to be covered. - Demarcate all no-go and sensitive areas. - Avoid the placement of batteries near watercourses and sensitive features. - MSDS Records to be kept, as well as incidents reporting register. - The batteries should be placed in a well-ventilated area, include vents and appropriate PPE (appropriate gloves, safety glasses/face shield, appropriate clothing) should be worn when handling the electrolyte solutions. - Source batteries from reputable suppliers. - The transport vehicle should be identified with symbols. - Transport schedule and map must be implemented and kept on each drivers person, with a copy kept in the admin offices on site. - Battery inspection prior to installation.
Inappropriate disposal at the end of life - Landfill Disposal - Heavy Metal Pollution	**Medium**	- Potential scenario of fluids from the batteries leaking into environment. The release of such chemicals through leaching, spills or air emissions can harm communities, ecosystems and food production. - The potentially toxic materials contained in batteries means that they are classified as hazardous materials in terms of NEM:WA. There are only a few licensed hazardous waste sites in South Africa and recycling of batteries and e-waste has been identified as	- The recycling of batteries and their potential use as e-waste. - Disposal at a licensed hazardous waste site. - Prior to construction of the WEF, and BESS, the holder of the EA is to develop a dedicated Battery Recycling Programme to be adopted on-site. - Records of disposal at a licensed facility must be kept.

		a sure way of improving the lifespans of such sites.	

12. ALIEN INVASIVE MANAGEMENT PLAN

12.1 Purpose of the Alien Invasive Management Plan

The purpose of the Alien Invasive Management Plan is to provide a framework for the management of alien and invasive plant species during the construction and operation of the Koup 1 WEF. The broad objectives of the plan include the following:

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

12.2 Problem Outline

Alien plants replace indigenous vegetation leading to severe loss of biodiversity and change in landscape function. Potential consequences include loss of biodiversity, loss of grazing resources, increased fire risk, increased erosion, loss of wetland function, impacts on drainage lines, increased water use etc.

In addition, the Conservation of Agricultural Resources Act (Act 43 of 1983), as amended in 2001, requires that land users clear Declared Weeds from their properties and prevent the spread of Declared Invader Plants on their properties.

Table 3 of CARA (the Conservation of Agricultural Resources Act) lists all declared weeds and invader plants. Alien plants are divided into 3 categories based on their risk as an invader.

- Category 1 - These plants must be removed and controlled by all land users. They may no longer be planted or propagated and all trade in these species is prohibited.
- Category 2 – These plants pose a threat to the environment but nevertheless have commercial value. These species are only allowed to occur in demarcated areas and a land user must obtain a water use licence as these plants consume large quantities of water.
- Category 3 – These plants have the potential of becoming invasive but are considered to have ornamental value. Existing plants do not have to be removed but no new plantings may occur and the plants may not be sold.

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

12.3 Vulnerable Ecosystems and Habitats

Certain habitats and environments are more vulnerable to alien plant invasion and are likely to bear the brunt of alien plant invasion problems at the site. In addition, construction activities and changes in water distribution at the site following construction are also likely to increase and alter the vulnerability of the site to alien plant invasion.

Areas at the site which are likely to require specific attention include the following:

- Wetlands, drainage lines and other mesic areas.
- Cleared and disturbed areas such as road verges, crane pads and construction footprints etc.
- Construction camps and lay-down areas which are cleared or are active for an extended period.

12.3.1 Wetlands, drainage lines and other mesic areas

There are a relatively large number of drainage lines at the site as well as a number of artificial wetlands. Disturbance within these areas often results in alien plant invasion on account of the greater water and nutrient availability in this habitat. Although there are no turbines within such areas, numerous road crossings will be required. The disturbance footprint within such areas must be minimized and these areas must be checked for alien species more than the surrounding landscape.

12.3.2 Cleared and disturbed areas

Cleared and disturbed areas are clearly vulnerable to invasion on account of the lack of existing plant cover to resist invasion as well as the disturbance created during construction which promoted the germination and establishment of alien plant species.

12.3.3 Construction camps and laydown areas

Construction camps and lay down areas are either cleared of vegetation or prolonged activities in these areas result in negative impact on indigenous vegetation. In addition, repeated vehicle and human activity in these areas usually results in the import of alien plant seed on clothes, dirty vehicles or with construction machinery and materials.

12.4 General Clearing and Guidance Principles

Alien control programs are long-term management projects and must include a clearing plan which includes follow up actions for rehabilitation of the cleared area. Alien problems at the site must be identified during pre-construction surveys of the development footprint. This may occur simultaneously to other required reaches and surveys. The clearing plan must then form part of the pre-construction reporting requirements for the site.

The plan must include a map showing the alien density & indicating dominant alien species in each area.

- Lighter infested areas must be cleared first to prevent the build-up of seed banks.
- Pre-existing dense mature stands ideally must be left for last, as they probably won't increase in density or pose a greater threat than they are currently.
- Collective management and planning with neighbours may be required in the case of large woody invaders as seeds of aliens are easily dispersed across boundaries by wind or water courses.
- All clearing actions must be monitored and documented to keep track of which areas are due for follow-up clearing.

12.5 Clearing Methods

- Different species require different clearing methods such as manual, chemical or biological methods or a combination of both.
- However care must be taken that the clearing methods used do not encourage further invasion. As such, regardless of the methods used, disturbance to the soil must be kept to a minimum. Fire is not a natural phenomenon in the area and fire must not be used for alien control or vegetation management at the site.
- The best-practice clearing method for each species identified must be used. The preferred clearing methods for most alien species can be obtained from the DWAF Working for Water Website http://www.dwaf.gov.za/wfw/Control/ .

12.6 Use of Herbicide for Alien Control

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

- Area contamination must be minimised by careful, accurate application with a minimum amount of herbicide to achieve good control.
- All care must be taken to prevent contamination of any water bodies. This includes due care in storage, application, cleaning equipment and disposal of containers, product and spray mixtures.
- Equipment must be washed where there is no danger of contaminating water sources and washings carefully disposed of in a suitable site.
- To avoid damage to indigenous or other desirable vegetation, products must be selected that will have the least effect on non-target vegetation.
- Coarse droplet nozzles must be fitted to avoid drift onto neighbouring vegetation.
- The appropriate health and safety procedures must also be followed regarding the storage, handling and disposal of herbicides.

For all herbicide applications, the following guidelines must be followed:

Working for Water: Policy on the Use of Herbicides for the Control of Alien Vegetation.

12.7 Construction Phase Activities

The following management actions are aimed at reducing soil disturbance during the construction phase of the development, as well as reducing the likelihood that alien species will be brought onto site or otherwise encouraged.

Construction Phase Action	Frequency
The ECO is to provide permission prior to any vegetation being cleared for development.	Daily
Clearing of vegetation must be undertaken as the work front progresses – mass clearing must not occur unless the cleared areas are to be surfaced or prepared immediately afterwards.	Weekly
Where cleared areas will be exposed for some time, these areas must be protected with packed brush, or appropriately battered with fascine work. Alternatively, jute (Soil Saver) may be pegged over the soil to stabilise it.	Weekly
Cleared areas that have become invaded can be sprayed with appropriate herbicides provided that these are such that break down on contact with the soil. Residual herbicides must not be used.	Weekly
Although organic matter is frequently used to encourage regrowth of vegetation on cleared areas, no foreign material for this purpose must be brought onto site. Brush from cleared areas must be used as much as possible. The use of manure or other soil amendments is likely to encourage invasion.	Weekly
Clearing of vegetation is not allowed within 32 m of any wetland, 80 m of any wooded area, within 1:100 year floodlines, in conservation servitude areas or on slopes steeper than 1:3, unless permission is granted by the ECO for specifically allowed construction activities in these areas	Weekly

Care must be taken to avoid the introduction of alien plant species to the site and surrounding areas. (Particular attention must be paid to imported material such as building sand or dirty earth-moving equipment.) Stockpiles must be checked regularly and any weeds emerging from material stockpiles must be removed.	Weekly
Alien vegetation regrowth on areas disturbed by construction must be controlled throughout the entire site during the construction period.	Monthly
The alien plant removal and control method guidelines must adhere to best-practice for the species involved. Such information can be obtained from the DWAF Working for Water website.	Monthly
Clearing activities must be contained within the affected zones and may not spill over into demarcated No Go areas.	Daily
Pesticides may not be used. Herbicides may be used to control listed alien weeds and invaders only.	Monthly
Wetlands and other sensitive areas must remain demarcated with appropriate fencing or hazard tape. These areas are no-go areas (this must be explained to all workers) that must be excluded from all development activities.	Daily

12.7.1 Monitoring Actions – Construction Phase

The following monitoring actions must be implemented during the construction phase of the development.

Monitoring Action	Indicator	Timeframe
Document alien species present at the site	List of alien species	Pre-construction
Document alien plant distribution	Alien plant distribution map within priority areas	3 Monthly
Document & record alien control measures implemented	Record of clearing activities	3 Monthly
Review & evaluation of control success rate	Decline in documented alien abundance over time	Biannually

12.8 Operational Phase Activities

The following management actions are aimed at reducing the abundance of alien species within the site and maintaining non-invaded areas clear of aliens.

Operational Phase Action	Frequency
Surveys for alien species must be conducted regularly. Every 6 months for the first two years after construction and annually thereafter. All aliens identified must be cleared.	Every 6 months for 2 years and annually thereafter
Where areas of natural vegetation have been disturbed by construction activities, revegetation with indigenous, locally occurring species must take place where the natural vegetation is slow to recover or where repeated invasion has taken place following disturbance.	Biannually, but revegetation must take place at the start of the rainy season
Areas of natural vegetation that need to be maintained or managed to reduce plant height or biomass, must be controlled	When necessary

using methods that leave the soil protected, such as using a weed-eater to mow above the soil level.	
No alien species must be cultivated on-site. If vegetation is required for esthetic purposes, then non-invasive, water-wise locally-occurring species must be used.	When necessary

12.8.1 Monitoring Actions – Operational Phase

The following monitoring actions must be implemented during the operation phase of the development.

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

12.9 Decommissioning Phase Activities

The following management actions are aimed at preventing the invasion, by alien plant species, of the re-vegetated areas created during the decommissioning phase. Re-vegetation of the disturbed site is aimed at approximating as near as possible the natural vegetative conditions prevailing prior to operation.

Decommissioning Phase Action	Frequency
All damaged areas shall be rehabilitated if the infrastructure is removed and the facility is decommissioned.	Once off
All natural areas must be rehabilitated with species indigenous to the area. Re-seed with locally-sourced seed of indigenous grass species that were recorded on site pre-construction.	Once off, with annual follow up re-vegetation where required
Maintain alien plant monitoring and removal programme for 3 years after rehabilitation.	Biannually

12.9.1 Monitoring Actions – Decommissioning Phase

The following monitoring and evaluation actions must take place during the decommissioning phase of the development.

Monitoring Action	Indicator	Timeframe
Monitor newly disturbed areas where infrastructure has been removed to detect and quantify any aliens that may become established for 3 years after decommissioning and rehabilitation	Alien plant surveys and distribution map	Biannually until such time as the natural vegetation has recovered sufficiently to resist invasion.

Monitor re-vegetated areas to detect and quantify any aliens that may become established for 3 years after decommissioning and rehabilitation	Alien plant surveys and distribution map	Biannually for 3 years
Document alien plant control measures implemented & success rate achieved	Records of control measures and their success rate. A decline in alien distribution and cover over time at the site	Annually for 3 years

13. PLANT RESCUE AND PROTECTION PLAN

The purpose of the plant rescue and protection plan is to implement avoidance and mitigation measures to reduce the impact of the development on listed and protected plant species and their habitats.

The objective of reusing plants on the project area is to prevent the loss of species either directly or through future extinction and minimising impacts of development on population dynamics of species of conservation concern.

Preserving the natural configuration of habitats as part of ecosystems, thus ensuring a diverse but stable hydrology, substrate and general environment for species to be able to become established and persist.

13.1 Effect of removing individual species of conservation concern

Species of conservation concern are declining either due to overexploitation or because their range of occupancy is limited and further infringed on by development. Most plant populations require a certain minimum number of individuals within a population or metapopulation to allow for sufficient genetic transfer between individuals. This prevents genetic erosion and hence weakening of the ability of individuals to persist in their environments. Similarly, where the distance between metapopulations is significantly increased due to fragmentation and the resultant loss of some populations, populations may suffer genetic decline due to restricted movement of pollen. Pollinators or other species that depend on a particular plant species for a specific microhabitat or food source may be equally affected because of the reduction of available resources. Therefore, the aim of plant rescue actions are always to maintain as many individuals of a plant population in as close proximity to the original habitat as possible to minimise loss of individuals and fragmentation of populations to prevent the creation of future extinction debts of the development.

13.2 Plant Rescue and Protection

Successful plant rescue can only be achieved if:

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

13.3 Time of Planting

- All planting shall be carried out as far as is practicable during the period most likely to produce beneficial results (i.e. during the peak growing season), but as soon as possible after completion of a section of earthworks.

- Drainage line rehabilitation preparation must be done during autumn, and planting of appropriate species in these areas must commence during early spring after the first rains.

13.4 Plant Search and Rescue

Prior to construction, once all the areas where topsoil will be removed or areas will be transformed have been demarcated, the ECO with experience in flora and contractor will be responsible to remove all bulbous species from the topsoil, as well as succulents and small indigenous shrubs that can be transplanted. These are to be kept in a raised, protected position in a designated area until they can be replanted again as part of the rehabilitation process. Further details are listed in the Re-vegetation and Habitat rehabilitation Plan.

14. RE-VEGETATION AND HABITAT REHABILITATION PLAN

The Revegetation and Habitat Rehabilitation Plan addresses the need to mitigate all impacts leading to disturbed vegetation, loss of species and/or agricultural potential, disturbed soil surfaces, and generally bare soils prone to erosion and further degradation on the proposed development site. The plan overlaps to some degree with the Erosion Management Plan, and for successful rehabilitation, it is imperative that this plan is at all times used in conjunction with other EMPrs mentioned.

The objective of the plan is therefore to provide:

- Protocols for the removal, temporary storage and replanting of plant species of conservation concern Protocols for the rehabilitation of vegetative cover across the project area;
- Tools for planning the rehabilitation work and responding to unforeseen events Guidelines on implementation and post-implementation tasks Criteria for evaluating rehabilitation success; and
- A summary of items to be included in the rehabilitation budget to ensure that there is sufficient allocation of resources on the project budget so that the scale of EMPr-related activities is consistent with the significance of project impacts.

The objective of rehabilitation and revegetation of the development area is:

- Preventing the loss of species either directly or through future extinction and minimising impacts of development on population dynamics of species of conservation concern.
- Preserving the natural configuration of habitats as part of ecosystems, thus ensuring a diverse but stable hydrology, substrate and general environment for species to be able to become established and persist.
- Preserving or re-creating the structural integrity of natural plant communities. Actively aid the improvement of indigenous biodiversity according to a desirable end state according to a previously recorded reference state. This reference state, if healthy, will be dynamic and able to recover after occasional disturbances without returning to a degraded state.
- Improving the ecosystem function of natural landscapes and their associated vegetation.
- Successful rehabilitation can only be achieved with:

  » A long-term commitment;

  »Practical, adaptive management; and

»Viable goals of desired outcomes.

Prior to vegetation rehabilitation, all stakeholders involved must be consulted to determine:

- What the rehabilitation is ultimately aiming for– rehabilitation of cropping/grazing lands or rehabilitation of indigenous vegetation, after soil erosion and storm water management is in place and IAPs have been cleared?

- A clear definition of incompatible and compatible vegetation on and in the immediate surroundings of the development must be defined and maintained as such. No tree or shrubs shall be allowed to grow to a height in excess of the horizontal distance of that tree or shrub from the nearest newly developed structure or to grow in such a manner as to endanger the development or its operation
- Who will take long-term ownership and hence responsibility for the rehabilitation and its subsequent monitoring and management? Continued monitoring of vegetation establishment and composition, as well as erosion detection will have to be coupled with continued follow-up maintenance of rehabilitation and erosion control from commencement of activity up to the decommissioning phase.
- The ultimate objective for rehabilitation must focus on the stabilisation of soil erosion, retaining agricultural potential of transformed areas and /or the establishment of a dense and protective plant cover and the maintenance of habitats to enable vegetation to persist and flourish on rehabilitated areas indefinitely, ultimately relying only on environmental resources.

14.1 Map and Create Management Areas

The entire project area must be mapped and divided into management areas indicating:

- Current land cover
- Roads and residential
- Areas with IAPs, subdivided further in sparse or dense infestations where applicable
- Transformed areas
- Untransformed indigenous vegetation

For every one of the management areas, the project proponent, in consultation with the land users, will have to decide what intervention will be necessary, desirable, and feasible to enable the development of the project and long-term sustainable maintenance of infrastructure. Thus for every management area there must be an operational outline on:

- what will happen there
- what needs to be mitigated – including storm water- and erosion management
- which management units need priority intervention/mitigation
- how will this mitigation / intervention be done (method statements) including schedule of work
- realistic and desirable end states including list of species that must be established to initiate rehabilitation after initial revegetation
- approximate timeframes
- monitoring protocol to evaluate success or failures of interventions
- establish permanently marked transects and monitor with fixed-point photography who will be responsible for doing what how will different actions be integrated to achieve and maintain or improve the desirable end state of the environment of that management unit

Special attention will have to be given to drainage zones, as these not only have very active morphodynamics, but are also distributers of seeds – both indigenous and of IAPs. Thus clearing a downstream invasion of aliens to enable maintenance of the development will be futile if the upstream IAPs are not cleared or at least aggressively controlled.

14.2 Setting Realistic Rehabilitation Goals

Rehabilitation efforts typically aim at improving ecosystem function that consists of a series of processes, which can in the end be evaluated against a desired outcome or reference state of the vegetation and environment.

Attainable goals of rehabilitation on the project area must be possible and viable for at least the following:

- Stabilisation of soils
- Stabilisation of riparian areas
- Storm water reduction through management and wetland integrity
- Clearing of IAPs
- The degree to which IAPs can be cleared from the project area needs to be determined according to desirability, available project funding, personnel and project requirements
- Restoring and/or rehabilitating vegetative cover on non-transformed areas to obtain an acceptable vegetation cover that can be maintained or persists on its own indefinitely.

14.3 Remove or Ameliorate the Cause of Degradation

This will include:

- Physical rehabilitation of topsoil where it has been removed.
- Topsoil on areas that have not been cultivated are considered as the upper 20 - 30 cm only. These contain the most important nutrients, micro flora and –fauna essential for nutrient cycling processes. Topsoils are also an important source of seeds.
- Subsoils and overburden substrata lack the above elements and will first have to be used for physical rehabilitation of landscapes as and where necessary, and then overlain with topsoils.
- Stabilisation of topsoils and prevention of erosion – refer to the Erosion management plan.
- Removal of all invasive vegetation – refer to the Alien Invasive Management Plan

Where it is desirable to use brush or logs of the cleared vegetation for soil stabilisation, such material must be free of regenerative material – e.g. seeds or root suckers.

14.4 Initial Revegetation

Immediately after clearing of vegetation, the soil surface must be inspected for signs of erosion and stabilised as soon as possible. After completion of construction, such erosion stabilisation must preferably be with a cover of vegetation. A dense initial grass or other perennial cover will be desirable. The appropriate seed mix must be determined in consultation with an ecologist familiar with the area. The aim of the first vegetation cover is to form a protective, relatively dense indigenous layer to slow runoff, increase moisture infiltration into the soil, and gradually change the soil nutrient status in order for it to be more favourable for other desirable indigenous vegetation to become established.

14.5 Natural seed banks and improvement of plant structural and compositional diversity

It is expected that soil seed banks of indigenous vegetation will be present to initiate initial vegetation cover, but may not be sufficient to establish an acceptable cover of desirable species. After deciding which indigenous species must be re-introduced, seed must be ideally collected from site or an environmentally-matched site nearby.

Seed collection may be done throughout the year as seed ripens, but can also be restricted to summer, when a large amount of the perennial seed should have ripened. Seeds must be stored in paper or canvas bags dusted with insecticide, and sown at the onset of the rainy season.

Alternatively, slower-growing perennials may be raised from seed or cuttings in a nursery and then transplanted once established. It will be beneficial to investigate if community members would be able to create and maintain such a nursery, or if there are nurseries in the area, that raise indigenous flora from the area.

The final vegetation cover must resemble the original (non-encroached) vegetation composition and structure as far as practicable possible or permissible within each management unit.

For drainage areas:

- First restore drainage line morphology following the guidelines of the Erosion Management Plan – without that ecological recovery cannot be initiated;
- Determine if natural seed sources may be present further upstream;
- If such upstream seed sources are still present, rehabilitation of riparian vegetation after soil erosion management will most likely occur naturally, PROVIDED that follow-up monitoring of the establishment of vegetation is carried out, and all invasive species eradicated as they emerge. This can only be achieved with a long-term commitment (> 5 years minimum); and
- Should no upstream seed resources be available, suitable species (as determined in consultation with an ecologist) must be sown or planted.

14.6 Monitoring and Follow-Up Action

Throughout the lifecycle of the development, regular monitoring and adaptive management must be in place to detect any new degradation of ecosystems affected by the development, and remedy these as soon as detected.

During the construction phase, the ECO and contractor will be responsible for initiating and maintaining a suitable monitoring system. Once the development is operational, the project proponent will have to identify a suitable entity that will be able to take over and maintain the monitoring cycle and initiate adaptive management as soon as it is required. Monitoring personnel must be adequately trained.

The following are the minimum criteria that must be monitored:

- Composition and density of replanted vegetation, distinguishing between species introduced for initial revegetation only and species that are part of the pre-determined desirable end state;
- Associated nature and stability of surface soils
  - It is recommended that permanent transects are marked and surveyed annually according to the LFA technique (Tongway and Hindley 2004), adapted to integrate both surface soil characteristics and the vegetation to be monitored
- Re-emergence of IAPs
  - If noted, remedial action must be taken immediately according to Working for Water specifications
- Nature and dynamics of riparian zones
  - Stability of riparian vegetation,
  - Any form of bank erosion, slumping or undercutting, and
  - Stability of channel form and width of streams – if this increases, it shows that vegetation on plains and/or riparian areas and upper drainage lines are not yet in a stable enough state to be fully functional in reducing excess runoff and the ecosystem overall is losing valuable resources.

14.7 Timeframes and Duration

- Rehabilitation will occur during construction, as areas for the re-application of topsoil and revegetation become available or where revegetation can be initiated after clearing of invasives or to stabilise erosion.
- The initial revegetation period post construction is estimated to be over a period of 6 (minimum) to 12 months (maximum), or a time period specified by the Horticultural Landscape Contractor, particularly if planting of trees and shrubs occurs.

- The rehabilitation phase (including post seeding maintenance) must be at least 12 months (depending on time of seeding and rainfall) to ensure establishment of an acceptable plant cover is achieved (excluding invasive plant species or weeds).
- If the plants have not established and the acceptable plant cover is not achieved within the specified maintenance period, maintenance of these areas shall continue until at acceptable plant cover is achieved (excluding alien plant species or weeds).
- Additional seeding or planting may be necessary to achieve acceptable plant cover. Hydroseeding may have to be considered as an option in this case.
- Any plants that die, during the maintenance period, shall be replaced by the Horticultural Landscape Contractor (at the Horticultural Landscape Contractor's cost if it was due to insufficient maintenance).
- Succession of natural plant species must be encouraged
- Monitoring of rehabilitation success and follow-up adaptive management, together with clearing of emerging invasives shall be carried on until the decommissioning phase has been completed.

15. EROSION MANAGEMENT PLAN

15.1 Purpose

The purpose of the erosion management plan is to implement avoidance and mitigation measures to reduce the erosion potential and the likely impact of erosion associated with the construction and operational phases of the proposed facility. As part of the management plan, measures to protect hydrological features from erosion damage are included.

15.2 Scope and Limitations

This plan is intended at introducing measures aimed at reducing the negative impacts of erosion on biodiversity as well as reducing the vulnerability of the site to erosion problems during the construction and operational phases of the development. The focus is on managing runoff and reducing the construction phase impact on ecologically sensitive areas. The plan does not cover engineering-side issues which are of relevance to soil management and erosion. Therefore issues such as the potential presence of heaving clays, compressible soils, perched water tables, dispersive soils and corrosive groundwater at the site are beyond the general scope of this study and are not directly dealt with. These issues would need to be addressed and their relevance assessed during detailed geotechnical investigation of the site.

15.3 Background

15.3.1 Types of Erosion

Erosion comes in several forms, some of which are not immediately obvious. The major types of erosion are briefly described below:

Raindrop impact

This is the erosion that occurs due to the "bomb blast" effect of raindrop impact. Soil particles can be blasted more than a meter into the air. Apart from loosening soil particles, the effect can also break soil aggregates apart and form a clay seal on the surface which resists infiltration and results in increased levels of runoff. This effect is most important when large areas of exposed soils are present. If the site is cleared, then this effect will play an important role as it results in the soil surface becoming sealed which reduces infiltration and increases runoff, leading to erosion.

Sheet Erosion

This is the removal of a shallow and uniform layer of soil from the surface. It is caused initially by raindrop splash and then by runoff. Sheet erosion is often difficult to see as no perceptible channels are formed. Accumulated sediment at the bottom of the slope is often the only indicator. This is likely to be an important erosion type at the site given the gently sloping nature of the site and the susceptible soils.

Rill Erosion

This is the removal of soil from the surface whereby small channels or rills up to 300 mm are formed. It is caused by runoff concentrating into depressions, wheel tracks etc.

Gully Erosion

This is the removal of soil from the surface and sub-surface caused by concentrated runoff eroding channels greater than 300mm deep. Gully erosion often begins as rill erosion.

Wind Erosion

Wind erosion results from soil particles being picked up, bounced or moved by the wind. Wind erosion is primarily a problem in arid areas and may affect sands soils as well as fine-textured soils. Vegetation cover is usually an effective barrier to wind erosion, but large soils losses or degradation can occur in disturbed areas or on croplands.

15.3.2Promoting Factors

Rainfall characteristics

High-intensity, short-duration storm events have much greater erosion potential than low intensity, longer duration storm events with the same runoff volume. Intense storms produce larger raindrops, and are more likely to break up the soil and dislodge particles.

Soil erodibility

Soil erodibility is determined by the soils ability to resist detachment and transport due to rainfall, runoff and infiltration capacity. Well-structured soils with a high clay content are generally least erodible. Some clays are dispersible meaning that they break down when wet and become highly erodible. Silts and fine sands are highly erodible.

Length and Steepness of Slope

Steeper slopes cause runoff velocities to increase, resulting in increased erosion. As the slope length increases the opportunity for runoff to concentrate and achieve an erosive velocity increases.

Soil Surface Cover

Soil surface cover such as vegetation and mulch protect the soil surface from raindrop impact, reduce flow velocity, disperse flow, and promote infiltration and the deposition of sediment. This is a basic principle underlying many erosion control approaches which aim to modify the surface characteristics in order to reduce the flow velocity and reduce the potential for erosion. In this regard it is important to note that many of the practices which are used to enhance rehabilitation potential are also useful in reducing erosion potential.

15.3.3 Erosion and Sediment Control Principles

The goals of erosion and sediment control during and after construction at the site must be to:

- Protect the land surface from erosion;
- Intercept and safely direct run-on water from undisturbed upslope areas through the site without allowing it to cause erosion within the site or become contaminated with sediment.
- Progressively revegetate or stabilise disturbed areas.

- Prevent damage to hydrological features such as drainage lines or wetlands, either within or adjacent to the site.

These goals can be achieved by applying the following principles:

- Integrate project design with site constraints.
- Plan and integrate erosion and sediment control with construction activities.
- Minimise the extent and duration of disturbance.
- Control stormwater flows onto, through and from the site in stable drainage structures.
- Use erosion controls to prevent on-site damage.
- Use sediment controls to prevent off-site damage.
- Control erosion and sediment at the source.
- Stabilise disturbed areas promptly.
- Inspect and maintain control measures.

15.3.4 On-Site Erosion Management

Exposed and unprotected soils are the main cause of erosion in most situations. Therefore, the erosion management plan and the revegetation and rehabilitation plan should be closely linked to one another and must not operate independently, but must rather be seen as complementary activities within the broader environmental management of the site and must therefore be managed together.

General factors to consider regarding erosion risk at the site includes the following:

- Soil loss will be greater during wet periods than dry periods. Intense rainfall events outside of the wet season, such as occasional unseasonal showers can also however cause significant soil loss. Therefore, precautions to prevent erosion must be present throughout the year.
- Soil loss is related to the length of time that soils are exposed prior to rehabilitation or stabilization. Therefore, the gap between construction activities and rehabilitation must be minimized. Allied to this the fact that topsoil does not store well and must preferably be used within a month or at most within 3 months to aid in the revegetation and rehabilitation of disturbed areas.
- Phased construction and progressive rehabilitation are important elements of the erosion control strategy.
- The extent of disturbance will influence the risk and consequences of erosion. Therefore, large areas must not be cleared at a time, especially in areas such as slopes where the risk of erosion is higher.

15.4 Concentration of flows into downstream areas

Road crossings over drainage lines, streams and wetlands can impact downstream wetland ecosystems. Crossings that result in narrowing of the downstream system can result in concentration of flows and channelisation downstream. This may result in a loss of wetland function, and result in the drying out and shrinkage of the wetland area. Erosion and increased vulnerability to invasion of drier banks by alien vegetation may occur.

- Culverts must be adequately spaced such that they do not result in shrinkage of downstream wetlands. Where roads cross minor drainage channels, a single culvert may be adequate, aligned with the downstream drainage line. Where more substantial wetland systems are intercepted by a road, sufficient culverts must be provided such that downstream shrinkage of wetland width does not occur. Moreover, culverts must be aligned, as far impossible, with existing, natural channels.

- All crossings of drainage systems must ensure that both surface and shallow subsurface flows can be accommodated where appropriate and that unnatural channelisation does not occur downstream.

15.5 Runoff Concentration

The increase in hardened surfaces associated with roads, and other infrastructure will lead to a significant increase in volume and velocity of flow generated from these areas during large rainfall events.

Runoff from road surfaces is usually channelled off of the road surface towards the downslope side of the road. On steep slopes, the volumes and velocity of runoff generated may result in erosion of the surrounding areas. Therefore, specific measures to curb the speed of runoff water is usually required in such areas, such as rock beds or even gabions. In addition, these areas must be monitored for at least a year after construction to ensure that erosion is not being initiated in the receiving areas. Once erosion on steep slopes has been initiated, it can be very difficult to arrest.

15.5.1Diversion of Flows

Diversion of flows from natural drainage channels may occur when roads interrupt natural drainage lines, and water is forced to run in channels along the manipulated road edge to formalized crossing points. Even slight diversion from the natural drainage line can result in excessive downstream erosion, as the new channel cuts across the slope to reach the valley bottom. Should the access road to the site traverse any major drainage lines, the following principles must apply.

- Adequate culverts must be provided along the length of all roads to prevent diversion of flow from natural drainage lines.
- Culverts must be carefully located, such that outlet areas do in fact align with drainage lines.
- The downstream velocity of runoff must be managed, such that it does not result in downstream erosion – on steep slopes, where roads have been constructed on cut areas, allowance must be made for culverts to daylight sufficiently far down the slope that their velocities are managed and erosion does not occur.
- Where necessary, anti-erosion structures must be installed downstream of road drains – these may comprise appropriate planting, simple riprap or more formal gabion or other structures.
- Roads and their drainage system must be subject to regular monitoring and inspection, particularly during the wet season, so that areas where head cut erosion is observed can be addressed at an early stage.

15.6 Monitoring Requirements

15.6.1Construction Phase

The following monitoring actions must be implemented during the construction phase of the development:

Monitoring Action	Indicator	Timeframe
Identify all river and drainage line crossings affected by the development	Map of sites of potential concern	Preconstruction
Monitor cleared areas for erosion problems	Record of monitoring site, problems encountered and remedial actions implemented	Monthly during the rainy season and following significant rainfall events otherwise
Monitor vegetation clearing activities near sensitive areas	Activity log of monitoring actions and any mitigation and	Monthly during the rainy season and following significant rainfall events otherwise

such as wetlands or drainage lines	avoidance measures implemented	
Monitor revegetated and stabilised areas	Record of monitoring site, problems encountered and remedial actions implemented	Monthly during the rainy season and following significant rainfall events otherwise

15.6.2Operational Phase

The following monitoring actions must be implemented during the operational phase of the development:

Monitoring Action	Indicator	Timeframe
Monitor for the development of new erosion problems across the site, with a focus on areas where water has been diverted or collected from upslope onto downslope areas	Map of erosion problem areas	Quarterly
Document erosion control measures implemented	Records of control measures and their success rate.	Quarterly
Document the extent of erosion at the site and the remedial actions implemented	Decline in erosion and vulnerable bare areas over time	Biannually

16. OPEN SPACE MANAGEMENT PLAN

The objective of open space management is to restore, enhance and rehabilitate open spaces, improve climate change adaptations through the minimisation of biodiversity loss, and mitigate against environmental degradation. Management actions consider open spaces and natural areas as well as community perceptions of these.

In the context of the proposed grid connections and substations the primary purpose of the open plan management plan is therefore to:

- Minimise visual impact on the character of the area; and
- Maintain biodiversity within the area to ensure that no long-term negative impacts occur on the local environment.

In order to maintain biodiversity, the Alien Invasive, Plant Rescue and Protection and Re-vegetation and Habitat Management Plans must be adhered to.

In addition, the following actions must be implemented by the Contractor and Project Company:

- Promote environmental awareness in all employees and sub-contractors and create an understanding of the environmental sensitivities of the project site;
- No waste, including organic matter may be disposed of anywhere on site, except in provided bins placed at convenient locations, especially during the construction period. Disciplinary actions must be taken against littering;
- Open spaces are to be kept free of alien plants and weeds;
- Indigenous plants may not be collected or removed from the site;
- Access to the facility must be strictly controlled;
- All visitors and contractors must be required to sign-in;

- Signage at the entrance must indicate that disturbance to fauna and flora is strictly prohibited.

The following activities must not be permitted by anyone except the landowner or his representatives:

- No fires within the site;
- No hunting, collecting or disturbance of fauna and flora, except where required for the safe operation of the facility and only by the Environmental Officer on duty and with the appropriate permits and landowner permission;
- No driving off of demarcated road; and
- No interfering with livestock.

16.1 Grazing Management

The development of the wind energy facility will not prevent the site from being used for its current landuse, however it may reduce the grazing on site as the development footprint will be rezoned from agriculture to mixed-use development land. Parts of the farm are used for cultivation of planted pasture and small grain grazing – all used only for grazing. There is no small grain harvested on the farm. Grazing is compatible with biodiversity maintenance provided that it is implemented according to the basic principles of sustainable grazing management. While the majority of these are beyond the scope of the current plan, the following basic principles are recommended for implementation to:

- A grazing management plan for the development footprint should be developed in cooperation with Agricultural Extension services.
- The stocking rate applied should be within the recommended limits as identified by the Department of Agriculture.
- Livestock should be rotated through the different paddocks at the site in a manner which allows for the growth and recovery of the vegetation between grazing events.
- Precautions must be taken to ensure that the development of the site does not increase the risk of stock theft within the facility. These include access control as previously described, as well as security patrols.

17. WASTE MANAGEMENT PLAN

A waste management plan (WMP) is important to ensure a safe and healthy environment and that sustainable waste management and procedures are followed throughout the lifecycle of the project. The DFFE promulgated the National Environmental Management: Waste Act 59 of 2008 (Waste Act) and in 2010 developed the National Waste Management Strategy (NWMS). The WMP provides recommended measures for the collection, temporary storage and safe disposal of the various waste streams associated with the project and includes recommendations for the recovery, re-use and recycling of waste. The purpose of this plan is therefore to ensure that effective procedures are implemented for the handling, storage, transportation and disposal of waste generated from the project activities on site.

The introduction of an internationally best known practise in waste management, the Waste hierarchy (Figure 17-1 below) is one of the best mechanisms that came into effect with the promulgation of the waste act. The waste act promotes the exercising of the duty of care and the implementation of the waste hierarchy while protecting the environment.

17.1 Construction Phase Waste Management

A method statement to detail the specific (hazardous) waste management practices should be prepared by the Contractor prior to the commencement of activities.

General Waste Management

- Construction methods and materials should be carefully considered and implemented in view of waste reduction, re-use, and recycling opportunities.
- The ESO / ECO must conduct waste classification and rating in terms of SANS 10288 and Government Notice 634 published under the NEM: WA.
- The ESO / ECO must develop, implement and maintain a waste inventory reflecting all waste generated during construction for both general and hazardous waste.
- A dedicated waste area must be established on site for the storage of all waste streams before removal from site. The storage period must not trigger listed waste activities as per the NEMWA, GN 921 of November 2013.
- Waste collection bins and hazardous waste containers must be provided by the contractor and placed at strategic locations around the site for the storage of organic, recyclable and hazardous waste.
- Hazardous waste must be stored separate from other forms of waste to avoid contamination. The following items are hazardous: Batteries, Light bulbs (fluorescent, LED, Halide), Electronic waste, used oils, chemicals and chemical containers.
- The location of all temporary waste storage areas must aim to minimise the potential for impact on the surrounding environment, including prevention of contaminated runoff, seepage, and vermin control, while being reasonably placed in terms of centrality and accessibility on site. Where required, an additional temporary waste storage area may be designated, provided identical controls are exercised for these locations.
- Waste storage shall be in accordance with all Regulations and best-practice guidelines and under no circumstances may waste be burnt on site.
- All waste removed from site must be done by a registered / licensed subcontractor, who must

Figure 17-1 Waste Hierarchy- National Waste Management Strategy 2010 (Source: https://www.dffe.gov.za/projectsprogrammes/workingonwaste)

supply information regarding how waste recycling / disposal will be achieved. The registered subcontractor must provide waste manifests for all removals at least once a month or for every disposal made, records of which must be kept on file at the site camp for the duration of the construction period.

- If any waste is transported to the nearest general waste disposal facility (Vaalkoppies waste disposal facility), the applicant must communicate with Beaufort West Municipality to ensure that the facility has the capability to accept the waste volumes.

- Waste must be stored in designated containers and not on the ground.
- Hazardous waste must be stored in a lockable container on an impermeable surface and bunded, should the need arise.
- Waste generated on site must be removed on a regular basis. This frequency may change during construction depending on waste volumes generated at different stages of the construction process, however removal must occur prior to the storage capacity being reached to avoid overflow of containers and poor waste storage.
- Waste should not be dumped, buried or burned on site.
- Reduce waste transportation and disposal costs by ensuring full loads of waste are transported instead of half loads.
- Setting up a reverse logistics system (products move from supplier to customer and vice-versa) would minimise waste and reduce disposal costs, i.e, suppliers deliver batteries and collect used batteries.

Waste Management Practices

- To achieve sustainable waste management, it is recommended a procurement policy be implemented that takes into account the waste that will be generated at the end of the construction phase. Sourcing local goods would reduce costs of transportation and carbon emissions. Purchasing and using environmentally safe cleaning and building materials as well as considering reusable/recyclable goods will help to achieve reduced waste.
- Once a waste inventory has been established, targets for the recovery of waste (minimisation, re-use, recycling) should be set.
- Recyclable materials must be identified as part of the site's waste management monitoring records.
- Waste manifests and waste acceptance approvals (i.e. receipts) from designated waste facilities must be kept on file at the site office, in order to record and prove continual compliance for future auditing.
- It is the responsibility of the ESO / ECO to ensure that each subcontractor implements their own waste recycling system, i.e. separate bins for food waste, plastics, paper, wood, glass cardboard, metals, etc. Such practises must be made contractually binding upon appointment of the subcontractors. Signage / colour coding must be used to differentiate disposal areas for the various waste streams (i.e. paper, cardboard, metals, food waste, glass etc.).
- Septic tanks and portable toilets must be maintained regularly and monitored by the ESO / ECO. Below ground storage of septic tanks must withstand the external forces of the surrounding environment. The area above the tank must be demarcated to prevent any vehicles or heavy machinery from moving around in the surrounding area.
- Hazardous waste must be stored within a bunded area constructed according to SABS requirements, and must ensure complete containment of the spilled material in the event of a breach. As such, appropriate bunding material, design, capacity and type must be utilised to ensure that no contamination of the surrounding environment will occur despite a containment breach. The net capacity of a bunded compound in a storage facility should be at least 120% of the net capacity of the largest tank and should also take into consideration the capacity displaced by other tanks within the same bunded area and any foundations.
- Interconnected tanks should be treated as a single tank of equivalent total volume for the purposes of the bund design criteria.

- Inspections and maintenance of bunds must be undertaken regularly. Bunds must be inspected for leaks or cracks in the foundation and walls. If any leaks occur in the bund, these must be removed immediately.
- The position of all waste storage areas must be located so as to ensure minimal degradation to the environment. The main waste storage area must have a suitable stormwater system separating clean and contaminated stormwater.
- Bund systems must be designed to avoid dewatering of contaminated water, but to rather separate oil and hydrocarbons from water prior to dewatering.
- It is assumed that any rainwater collected inside the bund is contaminated and must be treated by oil / water separation (or similar method) prior to dewatering, or removed and stored as hazardous waste, and not released into the environment.
- Following rainfall event bunds must always be dewatered in order to maintain a sufficient storage capacity in the event of a breach.
- Waste streams will always be stored separately. No mixing of hazardous and general waste will be allowed.

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

- Documentation (waste manifest, certificate of issue or safe disposal) must be kept detailing the quantity, nature, and fate of any regulated waste for audit purposes.
- Waste management must form part of the monthly reporting requirements in terms of volumes generated, types, storage and final disposal.
- Training and awareness regarding waste management shall be provided to all employees and contractors.

17.2 Operation Phase Waste Management

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

Waste Management Practices

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

- Waste must be removed by a suitably qualified contractor and disposed at an appropriately licensed landfill site. Proof of appropriate disposal must be provided by the contractor and kept on site.

Waste Management Practices

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

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

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

18. STORMWATER MANAGEMENT PLAN

The objective of the storm water management plan (SWMP) is to prevent increased soil erosion, to contain any contaminated run-off and to avoid water logging and pollution.

The Erosion Management Plan (see below) must therefore be seen in conjunction with the SWMP. Actions are listed that will ensure that storm water is channelled in a controlled manner from roads and substations towards natural drainage lines, without impeded natural surface flows.

- Develop and implement a site-specific storm water management plan during the detailed design phase of the projects and prior to construction;
- In the detailed design phase of the project minimise any water crossings and utilise existing roads wherever possible;
- Enforce 32 m construction buffers of all rivers, streams and waterbodies;
- Should new roads be required to cross any banks or channels these must be secured with erosion protection (i.e. gabions etc);
- Monitor for erosion during the clearing of vegetation;
- Avoid hard-engineered surfaces (i.e. construct gravel roads and not asphalt roads wherever possible);
- Roads in steep areas must be equipped with side drainages and culverts that channel the run-off to natural drainage lines without gaining velocity and causing erosion;
- Construction camps and temporary ablution facilities must be located beyond the 1:100 year floodline;
- Stockpiles must be located on flat areas and protected from erosion;
- The substation site design must include side water outlets and an adequate slope to allow storm water run-off from the paved areas;
- Any run-off from the BESS area must be controlled and managed before entering any stormwater channel; and
- Prevent surface run-off from areas of potential contamination.

Guidelines and Stormwater Management:

Where buildings/ infrastructure occur on-site, the developer should ensure that all stormwater flow paths are protected against erosion. All inlets to piped systems must be fitted with a screen/grating to prevent debris and refuse from entering the stormwater system. Screens/ grating must be installed immediately after the installation of piped infrastructure. Buildings, earthworks, or any other infrastructure may obstruct or encroach on a watercourse inside or outside the site without approved plans. The approved plans must not compromise the SWMP or any other required Authority approvals.

Designs must ensure that rainfall run-off from roofing, not subjected to increases in pollution, can be captured for re-use for on-site irrigation and non-potable water uses. Where storage for re-use and ground conditions permit, rainwater run-off should connect to detention areas to maximise groundwater recharge. Detention areas must be designed to attenuate run-off.

Parking or paved areas should be structured to reduce stormwater runoff by allowing ponding or infiltration. Stormwater from these areas should be discharged and controlled as overland sheet flow or attenuation facilities.

Designed roads must avoid concentration of flow along and off the road. Where flow concentration is unavoidable, incorporating the road into the major stormwater system must be considered.

Subsurface disposal must be designed to ensure that slope instability, concentrated saturation or inundation does not occur.

Channels may be constructed to convey stormwater directly to a natural watercourse where deemed necessary and unavoidable. The channels must be suitably lined to prevent erosion and provide maximum possible energy dissipation of the flow.

Open trenches should not be unprotected for extended periods and should be progressively backfilled as construction proceeds. Excavated material to be used as a backfill must be placed close to the trench on the upstream side to avoid loose material from washing away.

Materials to be stockpiled away from drainage paths and loose material such as stone, sand or gravel must be covered or kept damp to minimise dust. The stormwater systems should be free from materials that could harm the water systems' fauna, flora, and aquatic life.

19. TRAFFIC MANAGEMENT PLAN

The objective of the traffic management plan is the prevention of incidents from the use of vehicles and disturbance of local traffic on public roads during the construction, operation and decommissioning phases of the development. Traffic volumes are most likely to increase during the construction phase. Operations, maintenance and decommissioning phase traffic is expected to be insignificant, except where a major WEF component (i.e. replace damaged turbine blade) could be required.

The development must be accessible to passenger cars, buses, trucks and abnormal multi-vehicle combinations which will be delivering WT components. Access to the site needs to be safe and practical to minimise the risk of pedestrian and vehicle accidents through:

- The provision of adequate traffic control; and
- Clear visibility by ensuring sufficient stopping sight distances and sufficient markings and warnings signs.

The traffic management plan to be implemented during construction and decommissioning should consist of the following recommended mitigation measures:

- The arrival and departure of construction vehicles should be staggered during off- peak periods to have a distributed effect over low volume traffic periods.

- All vehicles with abnormal loads should have exemption permits as required by the National Road Traffic Act 93 of 1996.
- The Contractor and Site Safety Officer / ESO, during construction and decommissioning should ensure correct signage and safety precautions are in place for vehicles and pedestrians on-site and at the site access. These may include warning signs, construction vehicle signage and flagmen.
- Unpaved roads must be watered to lesson dust generation and routine maintenance on road surface to maintain condition.
- Vehicles transporting materials that can be blown away and cause dust must be securely covered and adhere to speed limits.
- Community participation/stakeholder involvement at every stage of the project is recommended to allow the community to be informed before the start of site activities.
- A comprehensive assessment of the entire route is recommended on award of the project.
- Prohibit WEF equipment and materials transportation at night, during the school December holiday period, on public holidays, during festivals or other special events.

Actions to be implemented by the Contractor and the Developer:

- Limit use of private cars by arranging mini bus transport service for workers;
- Monitor for overloading of vehicles;
- Use only well trained, suitably qualified and experienced drivers in possession of an appropriate and valid driver's license;
- All vehicles must be roadworthy and serviced regularly;
- Clear and visible signage must be placed on and around site, clearly demarcating safe entry and exit points;
- Require all drivers to abide by standard road and safety procedures on site;
- When travelling on public roads all speed limits and rules of the road must be adhered to; and
- Limit dust generation by applying dust suppressants and postponing dust generating activities during period of strong winds and enforcing a strict speed limit of 40 km/h on unpaved roads.

Monitoring actions to be conducted by the ECO / ESO:

- Maintain incidents/complaints register for community complaints;
- Monitor dust generation and implementation of management actions detailed above.

20. TRANSPORTATION MANAGEMENT PLAN

The Transportation Management Plan aims to ensure the safe transportation of all components required for the construction of the development to the construction site. This includes the turbines, substation transformers, BESS, electrical cables and pylon structures.

The following actions must be implemented by the developer and Contractor:

- Apply for all relevant permits for abnormal loads and route clearances with the relevant authorities prior to construction;
- Appoint a qualified specialist to conduct a detailed site-specific Transport Risk Assessment during the detailed design phase and prior to construction;

- Determine the pre-construction condition of the road immediately prior to construction by carrying out a condition assessment or from recent pavement management system condition assessments if available from the Provincial Authorities;
- Public notices regarding any planned abnormal load transports must be placed at the construction site to inform affected parties;
- Abnormal loads must conform with legal maximum dimensions, and vehicles carrying abnormal loads must display sufficient signage;
- Any roads damaged during the transportation of components, or from other construction vehicles must be rehabilitated and returned to pre-construction conditions.

The following monitoring activities must be carried out by the ECO / ESO:

- Conduct site audits and report non-compliance with the above-mentioned conditions

21. FIRE MANAGEMENT PLAN

The National Veld and Forest Fires Act (Act 101 of 1998) states that it is the landowner' and / or relevant contractors in the context of the WEFs' responsibility to ensure that the appropriate equipment as well as trained personnel are available to combat fires.

Although fires are not a regular occurrence at the site, fires may occasionally occur under the right circumstances. Ignition risk sources in the area include the following:

- Lightning strikes.
- Personnel within the facility.
- Infrastructure such as transmission lines.

A fire management plan in compliance with Veld Fire Management Act should be compiled by the main contractor prior to the commencement of construction.

Firebreaks

Extensive firebreaks are not recommended as a fire risk management strategy at the site. The site is very large compared to the extent of the infrastructure and the maintenance of firebreaks would impose a large management burden on the operation of the facility. In addition, the risk of fires is not distributed equally across the site and within many of the lowlands of the site, there is not sufficient biomass to carry fires and the risk of fires within these areas is very low. Rather targeted risk management must be implemented around vulnerable or sensitive elements of the facility such as substations or other high risk components. Within such areas, the extent over which management action needs to be applied is relatively limited and it is recommended that firebreaks are created by mowing and that burning to create firebreaks is not used as this in itself poses a risk of runaway fires. Where such firebreaks need to be built such as around substations, a strip of vegetation 5 - 10 m wide can be cleared manually and maintained relatively free of vegetation through manual clearing on an annual basis. However, if alien species colonise these areas, more regular clearing must be implemented.

22. FUEL STORAGE MEASURES STORAGE TANKS

The storage tanks will be within contained areas to prevent spills contaminating soil and water, and with a design to capture and contain a volume of spill of at least 110% of the volume of stored fuel. These containers can be built in concrete and painted with anti-corrosive paint. The floor of the container must be inclined to permit the collection of the spilled liquids.

The storage tanks must also have a cover protection on top, prepared for drainage and collection of runoff.

22.1 General Procedures

- Transport routes for the transport of fuel will be clearly indicated;
- Pollution control equipment (spill and leak cleaning kits) must be readily available;
- Ensure personnel training, including: measures to prevent fuel spills, to treat/clean fuel spills, how to react on spill of flammable liquids on clothing and in the inhalation of vapours, leaks simulations; fuel vapour recovery processes, etc. Keep records of all training;
- Maintain the premises and equipment in a clean and tidy state;
- Regularly clean outdoor areas with a broom;
- Wastewater from outside areas must be directed to the contaminated water drainage system, and not enter the storm water system;
- Used oils (waste oil) will be collected, re-used, stored and disposed of in line with disposal procedures for hazardous wastes;
- Ensure the proper management of other hazardous wastes (contaminated soils, used spilling kits, waste lube, etc.); and
- All hazardous waste should be collected by a licensed service provider and transported to a licensed disposal facility.
- *Filling Operations*
- Isolate the area by cones and a rope;
- Prohibit refuelling operations during tank filling operations;
- Avoiding having people who are not involved in the operation within a 10 metre radius;
- Prohibit smoking and the use of mobile telephones or any other ignition sources during tank filling operations or vehicle refuelling, within a 3 metre radius;
- Use a tight-fill cap to completely seal off the connections between the tubing and the truck’s and station’s tanks;
- Engines must be turned off during refuelling;
- Prevent overflowing and spilling situations when the storage tanks are being filled (verify filling sensors and be aware of overflow alarms).
- *Preventing Accidents with fuel mixtures*
- Establish a procedure to deal with the potential occurrence of these situations, such as:
- The chemicals and reaction mechanisms associated with the substances mixed or blended must be well understood and documented
- Chemical and process hazards must be understood and addressed and the facilities must ensure that process equipment, controls, and procedures are designed, installed and maintained to safely operate the process

- All employees must understand the chemical and process hazards
- Facilities must establish a system for Standard Operating Procedures and ensure that they are understood and followed
- Display clear and informative messages for users of the station, as to how to deal with this situation;
- Prepare a procedure to suitably dispose of wastes recovered from the batches of fuel mixture.
- *Spill Kits*
- Emergency spill kits of absorbent material (e.g. sand) must be provided and stored next to the higher risk sites, and must be easily-accessible, ideally outside, in order to allow an immediate response when a spill occurs. This will be clearly labelled and ready for use.
- Drums for the storage of contaminated material must be provided.
- An accurate drawing of the local drainage system shall be posted next to the spill kit.
- *Closure Phase*
- During the closure phase, there may be loss of product into the soil, as a result of a deliberate or accidental release during closure and removal of tanks and tubing. In addition, this risk may arise outside of the facility site, if the tanks and/or tubing are not properly disposed of.
- In the closure phase, it is important to remove all tanks and pipes. A risk may arise if the tanks are left on site with residual products. As the integrity of the equipment will no longer be ensured or monitored.
- During closure, it must be ensured that facilities do not present a risk to the environment, health or safety. Measures must be taken to ensure that the closure does not result in an unacceptable risk, including:

  - Any and all waste products will be removed from the tanks. Care will be taken to ensure that no product is lost into the soil. Tank closure must be carried out safely, with the removal of explosive vapours, for example by filling the tanks with water or inert gases. All tanks will be safe prior to their removal from the ground. Similar methods will be employed prior to the removal of the pipes.

  - Water used in this process will be contaminated with residual product, and thus a water contamination risk may arise if the contaminated water is not disposed of in a way which is appropriate for hydrocarbon contamination. This would normally imply the removal to a suitable waste handling facility.

  - According to best environmental practices, the tanks, tubing and distributors will be disposed of. However, if the tanks remain in situ, it will be ensured that the procedure is safe. After making the tanks inert and safe, they will be filled in with sand, concrete, inert mud or hydrophobic foam.

  - The tanks and associated tubing which are no longer considered appropriate or safe for fuel storage will not be used for storage of other hydrocarbons, without first ensuring their integrity.

  - The oil/water separators will be removed for disposal, off the facility site. Otherwise they will be filled in a similar way to the tanks. Regardless of the fate of the oil/water separator, all liquid and mud waste will be removed (off the facility site) and all the inlets and outlets will be sealed.

  - Whatever drainage system left behind will be modified to ensure that it does not serve as a path for pollutants to reach groundwater or other waters.

  - If the deactivation is temporary, product can be left in the tanks. In this case, all monitoring procedures will be carried out as if the facility were in operation. If for any reason the monitoring cannot carry on, the tanks will be emptied and made inert.

- Personnel involved in the closure of a filling and fuel station will be aware and respect obligations with regards to waste disposal, in line with the best practices described above.

Environmental Aspect	Action or Measure
Prevent accidental spills from entering the stormwater drainage system	Provide cleaning equipment conceived specifically to deal with minor spills as may occur at the station. Place a clearly-identified spill kit in a visible location for each fuelling line.
	Develop a step-by-step guide to use of the spill kit.
	Develop an evacuation plan and/or response procedures for emergencies involving large fuel spills.
	Train the whole team in the emergency response procedures. Make sure that all staff knows where the emergency equipment is to be found and is acquainted with its maintenance.
	Label all of the stormwater drains on site in the proximity of the facilities as "Clean Water Only".
	Inspect the fuel distribution area in order to confirm that rainwater drained or emptied from the roof doesn't enter the areas marked out.
	Check whether the embankment around the fuel distribution area is in good condition and has the capacity to contain a fuel leak in the event of an emergency.
Minimise the risks of environmental contamination and from issues of workers' health and safety	Provide training to the staff regarding the disposal of material contaminated with fuel, such as absorbent material from the spill kit, soaked in fuel.
	Ensure that the product safety cards for all fuels and oils are up-to-date and accessible at all times.
	Should any contamination be found on-site during the decommissioning phase of the existing / proposed facility, the Western Cape Province Pollution and Chemicals Management Directorate must be informed of such contamination, as required in terms of Part 8 of the National Environmental Management Waste Act, 2008 (Act No. 59 of 2008) ("NEM: WA").
	Should more than 100m^3 of general waste and/or or more than 80m^3 of hazardous waste be stored at the proposed WEF for a period exceeding 90 days, the applicant will need to register in terms of, and adhere to, the NEM: WA National Norms and Standards for the Storage of Waste promulgated in GN No. 926 of 29 November 2013.

Minimise the risks of fuel leaks as may result in pollution of the sub-soil and groundwater	Check if there is fuel, from a possible leak, in the spill containment sumps installed at the tank's discharge nozzle.
	Check if there is fuel, from a possible leak, in the all tanks containment sumps, installed on the manhole to the storage tanks. In the event of suspected leakage, report it immediately.
	Check if there is fuel or lube, from a possible leak in the containment sumps installed under the tanks.
Minimise the risks of fuel leaks as this may result in pollution of the sub-soil and groundwater	Check if there is fuel, from a possible leak, in the chambers of the containment sumps installed under the pumps
Minimise the risks of harmful emissions to the atmosphere and the loss of fuel	Check that lids, flanges and connections are closed.
	Confirm that the ventilation conduits are not blocked.
	Supervise the fuel deliveries.
Minimise the risks of water pollution	Carry out an Oil-Water Separator inspection to ensure effective treatment.
Integrity control	Adequate maintenance and calibration of the monitoring equipment

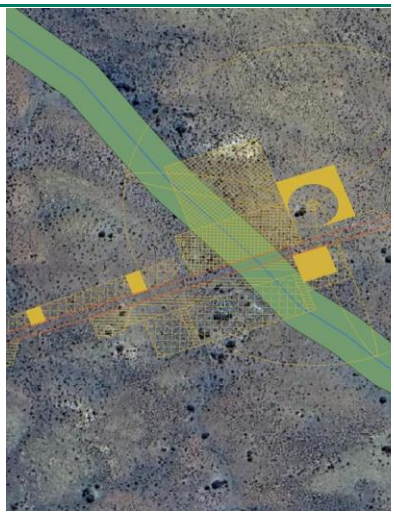
23. FRESHWATER AND WETLANDS (AQUATIC) MANAGEMENT AND MONITORING PLAN

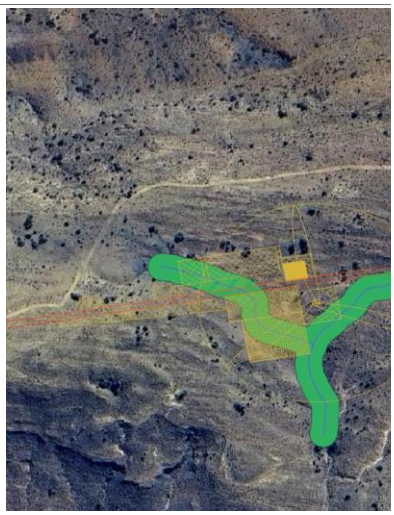
Based on the results of the walkdown, several sensitive areas are present within the region, but based on the field assessments, the final layouts and alignments were found to be located outside the majority of the high sensitive area identified during the EIA. All that remains are the recommendations made in above, that will then see the avoidance of any additional impacts on the minor drainage lines shown.

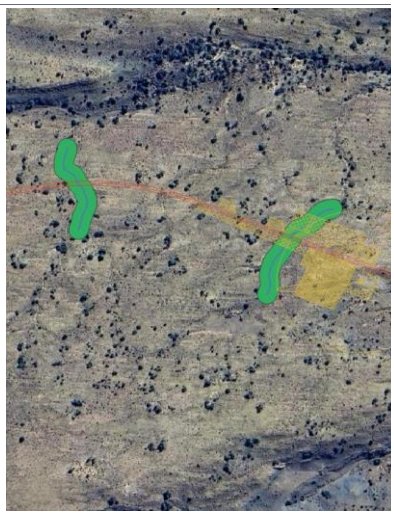
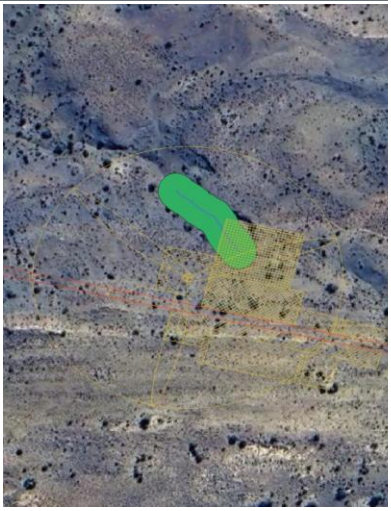
The further the following recommendations are reiterated:

- Vegetation clearing should occur in a phased manner in accordance with the construction programme to minimise erosion and/or run-off.
- All construction materials including fuels and oil should be stored in demarcated areas that are contained within berms / bunds to avoid spread of any contamination. Washing and cleaning of equipment should also be done in berms or bunds, in order to trap any cement and prevent excessive soil erosion. Mechanical plant and bowsers must not be refuelled or serviced within or directly adjacent to any channel. It is therefore suggested that all construction camps, lay down areas, batching plants or areas and any stores should be outside of any demarcated water courses.
- All cleared areas must be re-vegetated after construction has been completed.
- All alien plant re-growth must be monitored, and should it occur, these plants should be eradicated. The scale of the operation does however not warrant the use of a Landscape Architect and / or Landscape Contractor.

Table 23-1 Findings of the walkdown surveys for the structures shown with specific reference to habitats observed within the development layout only

Construction Features #	HGM Units	Description	Current state comment & potential impacts	Map
1	Minor watercourse with no riparian vegetation and or aquatic vegetation	WTG K58	This small drainage feature (drainage line) will be avoided by the WTG, however the associated infrastructure spans this system. It is advised that the hardstand / blade laydown is rotated to avoid this area	

2	Minor watercourse with no riparian vegetation and or aquatic vegetation	WTG K05	These small drainage features (drainage line) will be avoided by the WTG, however the associated infrastructure spans this system. It is advised that the hardstand / blade laydown is rotated to avoid this area	
3	Minor watercourse with no riparian vegetation and or aquatic vegetation	WTG K01	The WTG and associated areas has avoided all aquatic features, but is located in and areas with past erosion, thus due care must be undertaken to improve drainage via appropriate stormwater management to prevent additional scour/erosion of the area. The remaining areas should then also be rehabilitated during the works period were located within the project footprint	
4	Minor watercourse with no riparian vegetation and or aquatic vegetation	WTG K016	These small drainage features (drainage line) will be avoided by the WTG, however the associated infrastructure spans this system. It is advised that the hardstand / blade laydown is rotated to avoid this area	

5	Minor watercourse with no riparian vegetation and or aquatic vegetation	WTG K17	These small drainage features (drainage line) will be avoided by the WTG, however the associated infrastructure spans this system. It is advised that the hardstand / blade laydown is rotated to avoid this area	
6	Minor watercourse with no riparian vegetation and or aquatic vegetation	WTG K22	These small drainage features (drainage line) will be avoided by the WTG, however the associated infrastructure spans this system. It is advised that the hardstand / blade laydown is rotated to avoid this area	
7	Minor watercourse with no riparian vegetation and or aquatic vegetation – found within lower valley areas – dominated by alluvial features	New internal roads for the development footprint	It is recommended that were a new road or existing road will be upgraded, that were several drainage features will be crossed, that low level causeways are used. This especially where no river banks or bank incision occurs, in the lower valley areas.	

24. AVIFAUNA MANAGEMENT AND MONITORING PLAN

The avifaunal post-construction monitoring at the proposed WEF must be conducted in accordance with the latest version (2015) of the Best practice guidelines for avian monitoring and impact mitigation at proposed wind energy development sites in southern Africa (Jenkins et al. 2015).

24.1 Aim of Post-Construction Monitoring

The avifaunal post construction monitoring aims to assess the impact of the WEF by comparing pre- and post- construction monitoring data and to measure the extent of bird fatalities caused by the WEF. Post-construction monitoring is therefore necessary to:

- Confirm as far as possible what the actual impacts of the WEF are on avifauna; and
- Determine what mitigation is required if need be (adaptive management).

The proposed post-construction monitoring can be divided into three categories:

- Habitat classification
- Quantifying bird numbers and movements (replicating baseline pre-construction monitoring)
- Quantifying bird mortalities.

Post-construction monitoring will aim to answer the following questions:

- How has the habitat available to birds in and around the WEF changed?
- How has the number of birds and species composition changed?
- How have the movements of priority species changed?
- How has the WEF affected priority species' breeding success?
- How many birds collide with the turbines? And are there any patterns to this?
- What mitigation is necessary to reduce the impacts on avifauna?

24.2 Timing

Post-construction monitoring should commence as soon as possible after the first turbines become operational to ensure that the immediate effects of the facility on resident and passing birds are recorded, before they have time to adjust or habituate to the development. However, it should be borne in mind that it is also important to obtain an understanding of the impacts of the facility as they would be over the lifespan of the facility. Over time the habitat within the WEF may change, birds may become habituated to, or learn to avoid the facility. It is therefore necessary to monitor over a longer period than just an initial one year.

24.3 Duration

Monitoring should take place in Year 1 and 2 of the operational phase, and then repeated in Year 5 and every five years after that. After the first year of monitoring, the programme should be reviewed in order to incorporate significant findings that have emerged. This may entail the revision of the number of turbines to be searched, and the size of the search plots, depending on the outcome of the first year of monitoring. If significant impacts are observed, i.e. exceeding predetermined thresholds, and mitigation is required, the matter should be taken up with the operator to discuss potential mitigation. In such instances the scope of monitoring could be reduced to focus only on the impacts of concern.

24.4 Habitat Classification

Any observed changes in bird numbers and movements at a WEF may be linked to changes in the available habitat. The avian habitats available must be mapped at least once a year (at the same time every year), using the same methods which were used during pre-construction.

24.5 Bird Numbers and Movements

In order to determine if there are any impacts relating to displacement and/or disturbance, all methods used to estimate bird numbers and movements during baseline monitoring must be applied as far as is practically possible in the same way to post-construction work in order to ensure maximum comparability of these two data sets. This includes sample counts of small terrestrial species, counts of

large terrestrial species and raptors, focal site surveys and vantage point surveys according to the current best practice.

24.6 MORTALITIES

The mortality monitoring must have four components:

- Experimental assessment of search efficiency and scavenging rates of bird carcasses on the site at least twice a year.
- Weekly searches in the immediate vicinity of the wind farm turbines for collision casualties.
- Estimation of collision rates at the end of each year of post construction monitoring. Observed mortality rates need to be adjusted to account for searcher efficiency and scavenger removal. There have been many different formulas proposed to estimate mortality rates. The available methodologies must be investigated, and an appropriate method will be applied. The current method which is used widely is the GenEst method.
- Monthly inspections of the overhead powerlines to look for potential collision and electrocution mortalities.

24.7 Searcher Efficiency and Scavenger Removal

The value of surveying the area for collision victims is only valid if some measure of the accuracy of the survey method is developed. The probability of a carcass being detected and the rate of removal/decay of the carcass must be accounted for when estimating collision rates and when designing the monitoring protocol. This must be done in the form of searcher and scavenger trails at least twice a year.

24.8 Carcass Surveys

24.8.1 Aligning search protocols

The search protocol must be agreed upon between the bat and bird specialists to constitute an acceptable compromise between the current best practice guidelines for bird and bat monitoring.

24.8.2 Methodology

- The search plots must be defined by the avifaunal specialist.
- A team of searchers and one supervisor must be trained to implement the carcass searches.
- Searches must begin as early in the mornings as possible to reduce carcass removal by scavengers.
- Carcass searchers must walk in straight line transects, 6 m apart, covering 3 m on each side.
- The searchers must have a vehicle available for transport per site.
- The supervisor must assist with the collation of the data and to provide the data to the avifaunal specialist in electronic format on a weekly basis.
- The avifaunal specialist must ensure that the supervisor is completely familiar with all the procedures concerning the management of the data.
- The following must be loaded on a cloud server on a weekly basis for the avifaunal specialist to access:
    - Carcass fatality data (hardcopy and scans as well as data entered into Excel spreadsheets);
    - Pictures of any carcasses, properly labelled
    - GPS tracks of the search plots walked; and
    - Spreadsheet indicating the turbines searched on a weekly basis.

When a carcass is found, it must be bagged, labelled, and kept refrigerated for species confirmation when the specialist visits the site.

24.9 DELIVERABLES

24.9.1 Annual report

A post-construction monitoring report must be completed by the avifaunal specialist at the end of each year of operational monitoring. As a minimum, the report must attempt to answer the following questions:

- How has the habitat available to birds in and around the WEF changed?
- How has the number birds and species composition changed?
- How have the movements of priority species changed?
- How has the WEF affected priority species' breeding success?
- What are the likely drivers of any changes observed?
- What is the significance of any impacts observed?
- What mitigation measures are required to reduce the impacts?

24.9.2 Quarterly reports

Concise quarterly reports must be provided by the avifaunal specialist with basic statistics and any issues that need to be addressed

25. BAT MANAGEMENT AND MONITORING PLAN

The observations made on site confirm that the buffers previously defined during the preconstruction monitoring and impact assessment phase are sufficient and adequately represent the sensitivities expected to occur on site today. No further sensitive features were identified to be included into the existing sensitivity layout. As such, it is compulsory for the recommendations made in the original bat specialist monitoring and impact assessment report (EkoVler 2021) to be strictly adhered to, and for the original bat sensitivity buffers to be considered when finalising the wind turbine layout. No wind turbines (including the full blade length) are to be located within high sensitivity (i.e. no-go) buffers. Turbines may be sited in high-medium sensitivity buffers, provided that strict mitigation measures (as outlined in EkoVler 2021) are adhered to from the onset of project development. Turbines may also be sited within medium sensitivity areas, provided that operational monitoring results inform the need for potential future mitigation/curtailment measures. Associated infrastructures, including laydown areas, O&M buildings, an on-site substation, internal roads and the BESS are deemed permissible in sensitive areas due to the small extent and type of impacts associated with such infrastructures. However, such infrastructures should avoid high sensitivity (i.e. no-go) areas as far as possible. As recommended in the final bat monitoring and impact assessment report (EkoVler 2021), roost searches should be conducted before the construction of these components commence.

Presently, five wind turbines (including the maximum blade length of 100m) encroach into areas of high sensitivity (Appendix A). These turbines include T1, T3, T4, T13, andT17. It will be mandatory for all five of these wind turbines to be micro-sited out of these sensitivity zones prior to the construction of the facility taking place. All further recommendations made in the final bat pre-construction monitoring and impact assessment report (EkoVler 2021) for turbines encroaching into high-medium and medium sensitivity buffers apply. No further inclusions, other than those already identified in EkoVler 2021, are required for consideration into the final EMPr.

All mitigation measures and findings proposed by EkoVler (2021) remain valid and the overall impact of turbines on bats remains low after mitigation, assuming all recommendations are adhered to. Based on the above, it is the specialists opinion that the final layout and EMPr can be approved.

26. NOISE MANAGEMENT PLAN

Active noise monitoring is recommended because the projected noise levels are more than 38.7 dBA (the level defined by the WHO where noise levels from WTG may become annoying) for the layout and WTG as assessed in this report. Noise levels is projected to be higher than 45 dBA at NSR for a WTG with an SPL of 107.5 dBA (re 1 pW).

From an acoustic perspective the WTG layout is considered acceptable should the applicant select to use a WTG with a SPL less than 107.5 dBA (re 1 pW). Should the applicant select to use a WTG with an SPL exceeding 107.5 dBA (re 1 pW), additional mitigation measures must be implemented to ensure that total noise levels are less than 45 dBA at verified NSR (locations where residential activities would be taking place during the operational phase), with the potential mitigation measures highlighted in this review assessment.

Subject to the condition that the applicant limit total noise levels to less than 45 dBA at the NSR, it is recommended that the Koup 1 WEF be authorized (from an acoustic perspective).

It is also highlighted that the applicant re-evaluates the noise impact:

1. Should the layout be revised where:
    a. any WTG, located within 1,500 m from any NSR are moved closer;
    b. the number of WTG within 2,500 m from any NSR are increased; and
2. Should the applicant make use of a wind turbine with a maximum SPL exceeding 112.2 dBA re 1 pW.

If the project is to be developed in the future, the final layout and sound power emission levels of the selected WTG must be re-accessed to ensure the noise levels are less than 45 dBA at verified NSR (if the applicant changed the layout or the WTG as assessed in this report).

To ensure that noise does not become an issue for future residents, landowners or the local communities, it is recommended that the applicant get written agreement from current landowners/community leaders that no new residential dwellings will be developed within areas enveloped by the 42dBA noise level contour (of the Koup 1 WEF). Dwellings and structures located within the 45dBA noise rating level contour should not be used for permanent residential activities.

27. ARCHAEOLOGICAL / HERITAGE MANAGEMENT PLAN

Although no archaeological mitigation was recommended by PGS Heritage in the 2022 HIA, most of the archaeological occurrences identified are nonetheless avoided by the final layout of the WEF. The exceptions are KO-14 which is next to an access road and WTG26, and KO-16 which also lies very close to an access road. However, both occurrences are described by Fourie (2022) as low-density scatters of low significance and not conservation worthy.

The fieldwork undertaken during the January 2023 walkdown survey confirmed the occurrence of mainly MSA with some LSA archaeological material in relatively low quantities and of relatively low significance within the WEF.

Only two of the six lithic scatters recorded were graded (JG014 and G003). The remainder are considered not conservation worthy.

G003 is located more than 70 m from one of the turbine access roads and is thus unlikely to be impacted by WEF-related activities. JG014, however, is within 10 m of the proposed road alignment and is likely to suffer impacts.

It is recommended that a buffer of 20 m is implemented around JG014, and that is marked off during construction to ensure that the site is safeguarded.

There is always a chance that buried archaeological material will be exposed during earthworks for the WEF. All archaeological material over 100 years of age is protected and may only be altered or removed from its place of origin under a permit issued by HWC.

In the event of anything unusual being encountered, the project archaeologist and HWC must be notified and consulted immediately so that mitigatory action can be determined and be implemented, if necessary. Mitigation is at the cost of the developer, while time delays and diversion of machinery/plant may be necessary until mitigation in the form of conservation or archaeological/palaeontological sampling is completed.

Overall impacts to archaeological material arising from activities related to the construction, operation and decommissioning of the WEF will be low.

27.1 Built Environment

Of the five built structures identified in the HIA (Fourie 2022), PGS Heritage recommended the implementation of 30 m buffer zones around the outer limits of the medium significance KO-03 (Kareerivier) and KO-05 (Platdorings) farmsteads.

In the final layout of the Koup 1 WEF the nearest project elements - the access road and OHPL - are both more than 30 m from these farmsteads and they will thus be subject to no direct project-related impacts.

The final WEF layout also meets the requirements of guidelines published by the Western Cape Provincial Government (2006) which recommend a minimum distance of at least 500 m between WTGs and buildings/structures older than 60 years. There are no WTGs located less than 800 m of KO03 or KO-05.

With respect to the other three structures identified in the HIA, only the modern labourers' cottage KO-04 may be affected by the OHPL which on its current alignment passes almost directly over the building. While this is not a heritage issue, given the building's current age, it may be health / living environment issue if the cottage is still used.

It should also be noted that none of these three structures (KO-01, KO-02 and KO-04) are less than 750 m form the nearest WTG position.

None of the historical structures identified in the 2023 walkdown survey on Arbeid on Portion 10 of Farm 380 (JG008 and JG009) will be directly affected by the construction or operation of the WEF and all are at least 820 m from the nearest WEF infrastructure elements. No mitigation measures are required in respect of these structures.

Impacts to the bult environment from activities related to the construction, operation and decommissioning of the WEF will be low.

27.2 Graves and Burials

Because of their sensitivity, the 2022 HIA gave the formal graveyard (KO-07) adjacent to the Kareerivier farm complex, the informal burial ground (KO-06) between the labourers' cottage KO-04 and the Platdorings farm complex and the two possible isolated graves (KO-08 and KO-09) a high heritage significance rating and graded them 3A. The HIA recommended that all the graves and burial grounds should be subject to a 50 m buffer and should be avoided and left in situ.

This review of the final WEF layout of the Koup 1 WEF can confirm that the proposed access road and OHPL are more than 200 m from the formal graveyard (KO-07) and possible grave (KO-08) associated with the Kareerivier farm complex and from the informal graveyard (KO-06) possibly associated with the Platdoring complex.

However, the informal graveyard (KO-06) is approximately 45 m from the roadway and while this is likely to be sufficient to ensure that it is not impacted by the access road, it means that the imposition of a 50 m buffer is not practical, and it is thus recommended that this buffer is reduced to 40 m.

Regarding the OHPL and KO-06, the proposed final cable alignment shown on Figure 5 does not have pylons indicated at the points marked by the red stars on the figure. This suggests that the alignment of the cable may instead follow the most direct line between the two marked pylon locations. If this is the case, the OHPL will pass almost directly over the graves and the potential for impacts is high. It is recommended that the alignment of the OHPL in the vicinity of KO-06 follows that indicated in the final WEF layout to ensure that there are no impacts to this informal burial ground.

Lastly, the single isolated grave, KO-09, is directly adjacent to the access road and is more likely than not to be impacted by its upgrade for the WEF unless the road alignment is amended. It is recommended that the proposed access road alignment is amended in the vicinity of KO-09 to ensure that the grave is not impacted. It is suggested that the 50 m buffer may be reduced to 20 m, but that should this occur, it must be a requirement that KO-09 is physically marked off during construction to ensure that grave is not damaged or disturbed.

If any of the identified graves need to be relocated because of the development of the WEF, a Grave Management Plan must be drafted and approved HWC, before graves are moved.

Unmarked, pre-colonial graves may occur within the WEF, particularly along river courses and within valleys where there is soft soil suitable for interment. In the event that any human remains be disturbed, exposed or uncovered during excavations and earthworks for the WEF, work in the vicinity must cease immediately, the remains made secure and left in situ, and the project archaeologist and HWC notified so that a decision can be made about how to mitigate the find.

Provided the mitigation measures above are implemented, impacts to graves and burials from activities related to the construction, operation and decommissioning of the WEF will be low.

28. PALAEONTOLOGICAL FOSSIL FIND PROTOCOLS

Should any archaeological sites, artefacts, paleontological fossils or graves be exposed during construction work, work in the immediate vicinity of the find must be stopped, SAHRA must be informed and the services of an accredited heritage professional obtained for an assessment of the heritage resources to be made.

29. CONCLUSION

In terms of the National Environmental Management Act 107 of 1998, as amended, everyone is required to take reasonable measures to ensure that they do not pollute the environment. Reasonable measures include informing and educating employees about the environmental risks of their work and training them to operate in an environmentally acceptable manner.

Although all foreseeable actions and potential mitigation measures and management actions are contained in this document, the EMPr should be seen as a day-to-day management document. The EMPr thus sets out the environmental and social standards, which would be required to minimise the negative impacts and maximise the positive benefits of the Koup WEF 1. The EMPr could thus change daily, and if managed correctly lead to successful construction and operational phases of the development.

Furthermore, in terms of the 'Act', the cost to repair any environmental damage shall be borne by the person responsible for the damage. It is therefore imperative that the management plan is successfully implemented, as a failure to comply could have legal implications. The environmental impacts on the site will not be significant if the construction management is well implemented, and a set of operational guidelines are developed by the long term site management body.

APPENDIX A GENERIC EMPR FOR SUBSTATION INFRASTRUCTURE AND GENERIC EMPR FOR POWERLINE INFRASTRUCTURE

APPENDIX B EMPR FIGURES

Figure 2.1: Final Site Layout Map

APPENDIX C ENVIRONMENTAL AUTHORIZATION

APPENDIX D SPECIALIST WALKDOWN REPORTS

Aquatic Walkdown Report

Avifaunal Walkdown Report

Archaeological Walkdown Report

Noise Impact Assessment

Terrestrial Biodiversity Walkdown Report

Bat Site Walkdown Report

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