



FINALISATION OF THE ENVIRONMENTAL MANAGEMENT PROGRAMME (EMPR)

**PROPOSED UMSOBOMVU WIND ENERGY FACILITY, EASTERN
CAPE AND NORTHERN CAPE PROVINCES.**

DFFE REFERENCE NUMBER: 14/12/16/3/3/2/730

FEBRUARY 2023

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EASTERN CAPE AND NORTHERN CAPE PROVINCES.**

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PROPOSED FINAL ENVIRONMENTAL MANAGEMENT PROGRAMME (EMPR)

PREPARED FOR:



UMSOBOMVU WIND POWER (PTY) LTD

A subsidiary of

EDF RENEWABLES (PTY) LTD

Waterfront Business Park, Building 4, First Floor, 1204 Humerail Road,
Humerail, 6001

Tel.: +27 (0)41 506 4900 | Website: edf-re.co.za

PREPARED BY:



COASTAL AND ENVIRONMENTAL SERVICES (PTY) LTD (TRADING AS "CES")

67 African Street, Makhanda (Grahamstown), 6140

Tel.: +27 (0)46 622 2364 | Website: www.cesnet.co.za

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DEFINITIONS

For the purposes of this Environmental Management Programme report (EMPr), the following terms, abbreviations and descriptions apply:

TERMS	DESCRIPTION
Alien Vegetation	Alien vegetation is defined as undesirable plant growth which shall include, but not be limited to all declared category 1 and 2 listed invader species as set out in the Conservation of Agricultural Resources Act (CARA) regulations. Other vegetation deemed to be alien shall be those plant species that show the potential to occupy in number, any area within the defined construction area and which are declared to be undesirable. This includes plant species identified as Alien and invasive species in the National Environmental Management Biodiversity Act of 2004, Alien and Invasive Species Regulations, 2014.
Cement-laden water	Cement laden water refers to water containing cement or concrete arising from the Contractor’s activities.
Contaminated water	Contaminate water refers to water that has been contaminated by the Contractor’s activities such as with hazardous substances, hydrocarbons, paints, solvents and runoff from plant, workshop or personnel wash areas but excludes water containing cement/ concrete or silt.
Construction Camp	Construction camp (site camps) refers to all storage and stockpile sites, site offices, container sites, workshops and testing facilities and other areas required to undertake construction activities.
Environment	Environment refers to the surroundings within which humans exist and that could be made up of:- <ul style="list-style-type: none"> (i) The land, water and atmosphere of the earth; (ii) Micro-organisms, plant and animal life; (iii) Any part or combination of (i) and (ii) and the interrelationships among and between them; and (iv) The physical, chemical, aesthetic and cultural properties and conditions of the foregoing that influence human health and well-being.
Environmental Aspect	An environmental aspect is any component of a Contractor’s construction activity that is likely to interact with the environment.
Environmental Authorisation (EA)	An Environmental Authorisation (EA) refers to a written statement from the relevant environmental authority, with or without conditions, that records the approval (partial approval or refusal) of a proposed project and the mitigating measures required to prevent or reduce the effects of environmental impacts during the lifespan of a contract.
Environmental Control Officer (ECO)	An Environmental Control Officer (ECO) refers to a suitably qualified and experienced person or entity appointed for the construction and/or operation of works, to perform the obligations specified in the EA.
Environmental Impact	An impact or environmental impact is the change to the environment, whether desirable or undesirable, that will result from the effect of a construction activity. An impact may be the direct or indirect consequence of a construction activity.
Environmental Management Plan/Programme (EMP/EMPr)	An Environmental Management Plan (EMP) or Programme (EMPr) is an environmental management tool used to ensure that undue or reasonably avoidable adverse impacts of the construction, operation and decommissioning specific to a project are prevented; and that the positive benefits of the project are enhanced.

TERMS	DESCRIPTION
Environmental Management System (EMS)	The internationally accepted and recognized environmental management system (EMS) which enables companies, organizations and operations to systematically manage, prevent and reduce environmental problems and associated costs. In terms of ISO 14001 an EMS is defined as, <i>“that part of the overall management system that includes organizational structure, planning activities, responsibilities, procedures, processes and resources for developing, implementing, reviewing and maintaining the environmental policy.”</i>
Environmental Policy	Environmental Policy is a statement (or statements) by the organisation of its intentions and principles in relation to its overall environmental performance which provides a framework for action and for the setting of its environmental objectives and targets.
Environmental Site Officer (ESO)	An Environmental Site Officer (ESO) refers to the site-based designated person responsible for implementing the environmental provisions of the construction contract and is appointed by the service provider that carries out construction activities.
External Auditor	An External Auditor is a suitably qualified and experienced independent expert as per the required auditor qualifications (ISO 14012).
Independent Environmental Consultant (IEC)	An Independent Environmental Consultant (IEC) is a suitably qualified and IEC appointed by the Engineer to perform the obligations specified in the Contract. The IEC must provide reports to the regulatory authority, the Engineer and any other parties as specified by the regulatory authority.
Interested and/or Affected Party (I&AP)	An Interested and/or Affected Party (I&AP) is contemplated in Section 24(4)(d) of the NEMA (1998, Act No. 107) and which, in terms of that section, includes – <i>(i) Any person, groups of persons, organisation interested in or affected by an activity, and;</i> <i>(ii) Any organ of state that may have jurisdiction over any aspect of the activity.</i>
ISO 14001 Environmental Management System (ISO 14001)	The internationally accepted and recognised Environmental Management System as reflected in the document SABS ISO 14001: 1996; the most recent being the ISO 14001:2015.
Method Statement (MS)	A Method Statement (MS) is a written submission by the Contractor to the ECO in response to the EMPr or to a request by the ECO, setting out the plant (construction equipment), materials, labour and method the Contractor proposes to carry out an activity, identified by the relevant specification or the ECO when requesting the Method Statement. The MS should be in such detail that the ECO is able to assess whether the Contractor's proposal is in accordance with the EMPr and/or will produce results in accordance with the EMPr.
Mitigate/Mitigation	Mitigate (or mitigation) refers to the implementation of practical measures to reduce the adverse impacts, or to enhance beneficial impacts of a particular action.
No-Go Area	A no-go area refers to an area in which construction activities are prohibited.
Pollution	According to the NEMA (Act No. 107 of 1998), pollution can be defined as, <i>“Any change in the environment caused by (i) substances; (ii) radioactive or other waves; or (iii) noise, odours, dust or heat emitted from any activity, including the storage or treatment of waste or substances, construction and the provision of services, whether engaged in by any person or an organ of state, where that change has an adverse effect on human health or well-being or on the composition, resilience and productivity of natural or managed ecosystems, or on materials useful to people, or will have such an effect in the future”.</i>
Potentially hazardous substance	A potentially hazardous substance refers to a substance, which, in the reasonable opinion of the ECO, can have a harmful effect on the environment. Hazardous Chemical Substances are defined in the Regulations for Hazardous Chemical Substances published in terms of the Occupational Health and Safety Act.
Reasonable	Reasonable means reasonable in the opinion of the ECO, after consultation with the ESO - unless the context indicates otherwise.
Rehabilitation	Rehabilitation refers to re-establishing or restoring something to its original state or to a healthy, sustainable capacity or state.

TERMS	DESCRIPTION
Site	A site, in this context, refers to the area in which construction is taking place.
Solid waste	Solid waste refers to all solid waste materials, including construction debris, chemical waste, excess cement/concrete, wrapping materials, timber, tins, cans, drums, wire, nails, food and domestic waste (e.g. plastic packets and wrappers).
Species of Conservation Concern (SCC)	Species of Conservation Concern (SCC) refers to species listed in the rare, indeterminate, or monitoring categories of the South African Red Data Books, and/or species listed in globally near-threatened, nationally threatened or nationally near threatened categories (Barnes, 1998).
Threatened species	Threatened species are defined as: a) species listed in the endangered or vulnerable categories in the revised South African Red Data Books or listed in the globally threatened category; b) species of special conservation concern (i.e. taxa described since the relevant South African Red Data Books, or whose conservation status has been highlighted subsequent to 1984); c) species which are included in other international lists; or d) species included in Appendix 1 or 2 of the Convention of International Trade in Endangered Species (CITES).
Topsoil	Topsoil refers to the top 100 mm of soil and may include top material, e.g. vegetation and leaf litter.

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1 INTRODUCTION

Umsobomvu Wind Power (Pty) Ltd, a subsidiary of EDF Renewables (Pty) Ltd, (the Applicant) is proposing the construction of a Wind Energy Facility (WEF), near Noupoot and Middelburg in the Pixley Ka Seme District Municipality (Northern Cape Province) and the Chris Hani District Municipality (Eastern Cape Province).

Table 1-1 below lists the proposed properties which will be affected by the proposed infrastructure.

Table 1-1: 21-Digit Surveyor General (SG) Codes of the affected properties.

FARM NAME	21 DIGIT SG NUMBER	PORTION AND FARM NUMBER
Uitzicht	C0480000000000300000	Remaining Extent of Farm 3
	C0480000000000300002	Portion 2 of Farm 3
	C0480000000000300003	Portion 3 of Farm 3
	C0480000000000300004	Portion 4 of Farm 3
	C0480000000000300008	Portion 8 of Farm 3
Leuwe Kop	C0300000000012000000	Remaining Extent of Farm 120
Elands Kloof	C0300000000013500000	Remaining Extent of Farm 135
	C0300000000013500001	Portion 1 of Farm 135
Winterhoek	C0300000000013600000	Remaining Extent of Farm 136

1.1 OBJECTIVES OF THE EMPr

This Environmental Management Programme report (EMPr) has been compiled to provide mitigation, monitoring and institutional measures to be taken during the various phases of the Umsobomvu Wind Energy Facility, situated within the Northern Cape and Eastern Cape Provinces. These measures aim to eliminate, offset and/or reduce adverse environmental and social impacts.

This EMPr informs all relevant parties, in this case, the Project Coordinator, the Contractor, the Environmental Control Officer (ECO) and all other staff employed by Umsobomvu Wind Power (Pty) Ltd at the site, of their duties in the fulfilment of the legal requirements for the construction and operation of the Umsobomvu WEF, with particular reference to the prevention and mitigation of anticipated potential environmental impacts.

All parties should note that obligations imposed by the EMPr are legally binding in terms of the Environmental Authorisation (EA) granted by the relevant environmental permitting authority, the national Department of Forestry, Fisheries and the Environment (DFFE).

The general objectives of the EMPr are to:

- Ensure compliance with the regulatory authority stipulations and guidelines which could be local, provincial, national and/or international;
- 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;
- Verify environmental performance through information on impacts as they occur;
- Respond to unforeseen events;
- Provide feedback for continual improvement in environmental performance;
- Identify a range of mitigation measures which could reduce and mitigate the potential impacts to minimal or insignificant levels;
- Detail specific actions deemed necessary to assist in mitigating the environmental impact of the project;
- Identify measures which could optimize beneficial impacts;

- Create management structures which address the concerns and complaints of I&APs with regards to the development;
- Establish a method of monitoring and auditing environmental management practices during all phases of the activity;
- Ensure that safety recommendations are complied with; and
- Specify time periods within which the measures contemplated in the final EMPr must be implemented, where appropriate.

1.2 STRUCTURE AND FUNCTION OF THE EMPr

An EMPr is focused on sound environmental management practices, which will be undertaken to minimise adverse impacts on the environment through the lifetime of a development. In addition, an EMPr identifies measures which should be in place or will be actioned to manage any incidents and emergencies that could occur during the operation of the project.

As such, the EMPr provides specifications which must be adhered to in order to minimise adverse environmental impacts associated with the various phases of the Umsobomvu Wind Energy Facility. The contents of the EMPr are consistent with the requirements as set out in Appendix 4 of the National Environmental Management Act (NEMA, Act No. 107 of 1998 and subsequent 2014 amendments) Environmental Impact Assessment (EIA) Regulations (2014, and subsequent 2017 amendments), as stipulated below.

REQUIREMENTS OF AN ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT IN TERMS OF GN R. 982 (GN R. 326, 2017) APPENDIX 4
<p>(1) An EMPr must comply with Section 24(N) of the Act and include -</p> <p>(a) Details of –</p> <ul style="list-style-type: none"> (i) The EAP who prepared the EMPr; and (ii) The expertise of the EAP to prepare an EMPr, including a curriculum vitae; <p>(b) A detailed description of the aspects of the activity that are covered by the EMPr as identified by the project description;</p> <p>(c) A map at an appropriate scale which superimposes the proposed activity, its associated structures, and infrastructure on the environmental sensitivities of the preferred site, indicating any areas that should be avoided, including buffers;</p> <p>(d) A description of the impact management outcomes, including management statements, identifying the impacts and risks that need to be avoided, managed and mitigated as identified through the environmental impact assessment process for all phases of the development including –</p> <ul style="list-style-type: none"> (i) Planning and design; (ii) Pre-construction activities; (iii) Construction activities; (iv) Rehabilitation of the environment after construction and where applicable post closure; and (v) Where relevant, operation activities; <p>(f) A description of proposed impact management actions, identifying the manner in which the impact management outcomes contemplated in paragraph (d) will be achieved, and must, where applicable include actions to –</p> <ul style="list-style-type: none"> (i) Avoid, modify, remedy, control or stop any action, activity or process which causes pollution or environmental degradation; (ii) Comply with any prescribed environmental management standards or practices; (iii) Comply with any applicable provisions of the Act regarding closure, where applicable; (iv) Comply with any provisions of the Act regarding financial provisions for rehabilitation, where applicable;

- (g) The method of monitoring the implementation of the impact management actions contemplated in paragraph (f);
 - (h) The frequency of monitoring the implementation of the impact management actions contemplated in (f);
 - (i) An indication of the persons who will be responsible for the implementation of the impact management actions;
 - (j) The time periods within which the impact management actions contemplated in paragraph (f) must be implemented;
 - (k) The mechanism for monitoring compliance with the impact management actions contemplated in paragraph (f);
 - (l) A program for reporting on compliance, taking into account the requirement as prescribed by the regulations;
 - (m) An environmental awareness plan describing the manner in which –
 - (i) The applicant intends to inform his or her employees of any environmental risk which may result from their work; and
 - (ii) Risks must be dealt with in order to avoid pollution or the degradation of the environment; and
 - (n) Any specific information that may be required by the competent authority.
- (2) Where a government notice *gazetted* by the Minister provides for a generic EMPr, such generic EMPr as indicated in such notice will apply.

1.3 LEGISLATIVE REQUIREMENTS

Construction must be according to the best industry practices, as identified in the project documents. This EMPr, which forms an integral part of the contract documents, informs the Contractor of their duties in the fulfilment of the project objectives, with particular reference to the prevention, mitigation and management of environmental impacts caused by the activities of the various phases associated with the Umsobomvu WEF. The Contractor should note that obligations imposed by the approved EMPr are legally binding in terms of environmental statutory legislation and in terms of the additional conditions to the general conditions of contract which pertain to this project. In the event that any rights and obligations contained in this document contradict those specified in the standard or project specifications, then the latter must prevail.

The Contractor must identify and comply with all South African national and provincial environmental legislation, including associated regulations and all local by-laws relevant to the project. Key legislation currently applicable to the construction and operational phases of the project must be complied with. The list of applicable legislation provided below is intended to serve as a guideline only and is not exhaustive:-

TITLE OF LEGISLATION, POLICY OR GUIDELINE:	DATE:
National Environmental Management Act (NEMA) (Act No. 107 of 1998) and its subsequent amendments	1998 and 2014 amendments
National Environmental Management Act (NEMA) (Act No. 107 of 1998, as amended) Environmental Impact Assessment (EIA) Regulations (2014, as amended)	2014
The Constitution Act (Act No. 108 of 1996)	1996
National Heritage Resources Act (NHRA) (Act No. 25 of 1999)	1999
National Water Act (NWA) (Act No. 36 of 1998, as amended)	1998
National Environmental Management: Waste Act (NEMWA) (Act No. 59 of 2008, as amended)	2008
National Environmental Management: Protected Areas Act (NEMPAA) (Act No. 57 of 2003)	2003
National Environmental Management: Protected Areas Amendment Act (Act No. 31 of 2004)	2004
National Environmental Management: Air Quality Act (NEMAQA) (Act No. 39 of 2004, as amended)	2004
Conservation of Agricultural Resources Act (CARA) (Act No. 43 of 1983)	1983
National Environmental Management: Biodiversity Act (NEMBA) (Act No. 10 of 2004)	2004
National Forest Act (NFA) (Act No. 84 of 1998, as amended)	1998
National Environmental Management: Biodiversity Act, Alien and Invasive Species Regulations (2014)	2014

TITLE OF LEGISLATION, POLICY OR GUIDELINE:	DATE:
Occupational Health and Safety Act (OHSA) (Act No. 85 of 1993, as amended)	1993
Hazardous Substances Act (HSA) (Act No. 15 of 1973)	1973
Spatial Planning and Land Use Management Act (SPLUMA) (Act No. 16 of 2013)	2013
Electricity Regulation Act (Act No. 4 of 2006, as amended)	2006
Aviation Act (Act No. 74 of 1962): 13 th Amendment of the Civil Aviation Regulations 1997, dated 2008	1962, 1997 and 2008
Minerals and Petroleum Resources Development Act (MPRDA) (Act No. 28 of 2002, as amended)	2002
Provincial Nature and Environmental Conservation Ordinance (No. 19 of 1974)	1974
Northern Cape Nature Conservation Act (Act No. 9 of 2009)	2009
National Road Traffic Act (NRTA) (Act No. 39 of 1996)	1996
National Veld and Forest Fire Act (Act No. 101 of 1998)	1998
South African Bureau of Standards (SABS)	
National Infrastructure Plan (NIP, 2012)	2012
Local Government: Municipal Systems Act (Act No. 32 of 2000)	2000
Pixley Ka Seme District Municipality (Northern Cape) Development Plans and Frameworks	Most recent
Umsobomvu Local Municipality (Northern Cape) Development Plans and Frameworks	
Chris Hani District Municipality (Eastern Cape) Development Plans and Frameworks	
Inxuba Yethemba Local Municipality (Eastern Cape) Development Plans and Frameworks	

1.4 ENVIRONMENTAL AUTHORISATION

In accordance with the requirements of the NEMA (Act No. 107 of 1998, as amended) EIA Regulations (2014, as amended), the proposed Umsobomvu WEF was subject to a Scoping and EIA Process.

The proposed Umsobomvu WEF received Environmental Authorisation (EA) on the 17th of February 2017 (DFFE Ref. No.: 14/12/16/3/3/2/790). The Umsobomvu WEF was then amended and the facility was split into three parts, namely Umsobomvu WEF (DFFE Ref No.: 14/12/16/3/3/2/790), Coleskop WEF (DFFE Ref No.: 14/12/16/3/3/2/790/1), and Eskom Infrastructure MTS (DFFE Ref No.: 14/12/16/3/3/2/790/2) on the 18th of November 2019.

This EMP_r interprets the findings of the EIR and prescribes project-specific specifications to be achieved. The EMP_r is a progressive working document which should be updated throughout the development phases, as required.

As per the SIPs letter attached to this EMP_r, the Umsobomvu Wind Power Project falls under the “STRATEGIC INTEGRATED PROJECT (SIP) 20c EMBEDDED GENERATION NATIONAL PROGRAM” for Anglo American.

2 DETAILS OF THE EAP & SPECIALIST TEAM

2.1 EXPERTISE OF THE EAP

EAP: Dr Alan Carter, *Pri.Sci.Nat*, Registered EAP

NEMA registered Company: Coastal and Environmental Services (Pty) Ltd. t/a CES

Physical Address: 39 Harewood Drive, Nahoon Mouth, East London, 5214

Telephone No.: +27 (0)43 726 7809

Website: www.cesnet.co.za

Email Address: a.carter@cesnet.co.za

Dr Alan Carter is an Executive and the East London Branch Manager at CES. He has extensive training and experience in both financial accounting and environmental science disciplines with international accounting firms in South Africa and the USA. He is a member of the American Institute of Certified Public Accountants (licensed in Texas) and holds a PhD in Plant Sciences. He is also a certified ISO14001 EMS auditor with the American National Standards Institute. Alan has been responsible for leading and managing numerous and varied consulting projects over the past 25 years. He is a registered professional with the South African Council for Natural Scientific Professionals (SACNASP) and a registered EAP through the Environmental Assessment Practitioners Association of South Africa (EAPASA).

2.2 DETAILS OF THE SPECIALIST TEAM

In addition to Section 2.1, the following specialists formed part of the Umsobomvu WEF original assessment (2017), amendment assessment (2019) and ground truthing assessment (2021).

Table 2-1: Specialist Team

SPECIALIST ASSESSMENT	SPECIALIST
PHASE 1: EIA PROCESS (2016)	
Agricultural and Soils Impact Assessment	Roy de Kock, CES
Avifaunal Monitoring and Impact Assessment	Jon Smallie, WildSkies Ecological Services
Bat Monitoring and Impact Assessment	Werner Marais, Animalia Zoological and Ecological Consultants
Ecological Impact Assessment	Tarryn Martin, CES
Heritage Impact Assessment	Gavin Anderson, Umlando Archaeological Consultancy
Noise Impact Assessment	Brett Williams, Safetech
Paleontological Impact Assessment	John Almond, Natura Viva
Social Impact Assessment	Marchelle Terblanche, INDEX
Visual Impact Assessment	Alan Carter, CES
PHASE 2: AMENDMENT PROCESS (2020)	
Agricultural Specialist Statement and Split Reports	Roy de Kock, CES
Avifaunal Specialist Statement and Split Reports	Jon Smallie, WildSkies Ecological Services
Bat Specialist Statement and Split Reports	Werner Marais, Animalia Zoological and Ecological Consultants
Ecological Specialist Statement and Split Reports	Greer Hawley, CES
Heritage Specialist Statement and Split Reports	Gavin Anderson, Umlando: Archaeological surveys & Heritage Resources Management
Noise Specialist Statement and Split Reports	Brett Williams, Safetech
Paleontological Specialist Statement and Split Reports	John Almond, Natura Viva
Social Specialist Statement and Split Reports	Marchelle Terblanche, INDEX

Visual Specialist Statement and Split Reports	Alan Carter, CES
PHASE 3: GROUND TRUTHING PROCESS AND OPINION LETTERS (2022)	
Avifaunal Letter	Jon Smallie, WildSkies Ecological Services
Bat Letter	Werner Marais, Animalia Zoological and Ecological Consultants
Ecological Ground Truthing	Nicole Wienand, CES
Heritage Ground Truthing	Gavin Anderson, Umlando Archaeological Consultancy

3 PROPOSED ACTIVITY

3.1 PROJECT DESCRIPTION

Umsobomvu Wind Power (Pty) Ltd is planning the development of the Umsobomvu Wind Energy Facility (WEF) and associated infrastructure near Middelburg and Noupoort in the Inxuba Yethemba Local Municipality (Eastern Cape Province) and the Umsobomvu Local Municipality (Northern Cape Province). The planned development will include:

- The construction and operation of twenty-six (26) turbines, with the following specifications :
 - Hub height between 110 m and 135 m,
 - Clearance from the Ground between 30 m and 50 m, and
 - Rotor Diameter of between 160 m and 180 m .
- Access road off the N10, using the access road which was authorised under EA DFFE Reference No.: 14/12/16/3/3/1/2487. A combination of new and upgraded existing roads with a construction width of 12 m, which will be rehabilitated to 6 m during operations.
- Underground cabling along the proposed roads.
- One (1) 132 kV/33 kV connecting substation.
- Multiple 33 kV overhead lines (\pm 1.5 km) and a 132 kV (up to 1 km) overhead line to connect the IPP Substation to the Koruson MTS Substation.
- Operations, Maintenance and Services (OMS) Area [site office] of 150 m x 50 m.
- Temporary infrastructure (construction phase only), including:
 - Construction Compound area of 50 m x 40 m,
 - Container storage area, and
 - Primary and secondary laydown area.

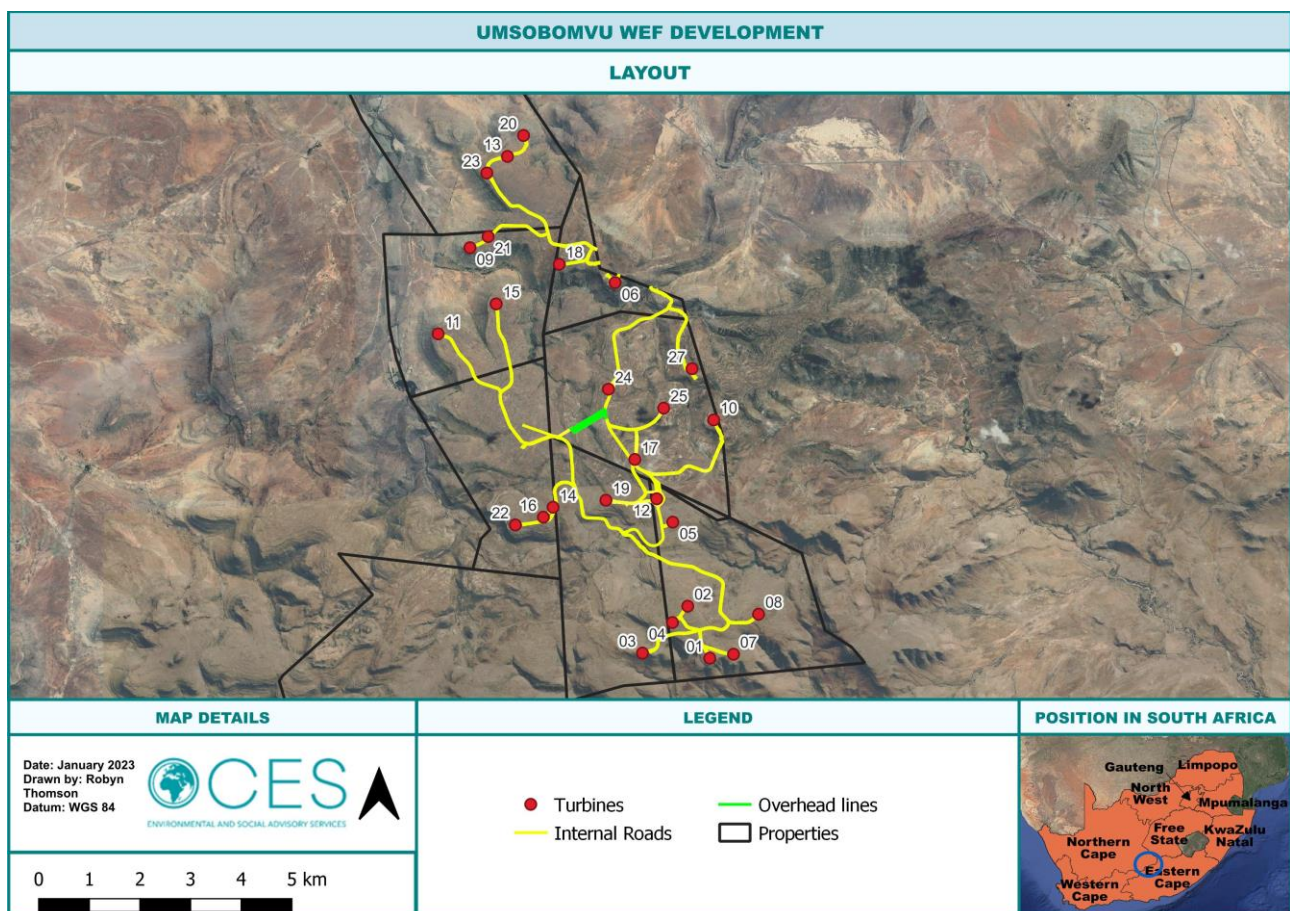


Figure 3-1: Layout Map of the Proposed Umsobomvu Wind Energy Facility Development site.

3.2 PROJECT LOCALITY

The proposed Umsobomvu WEF will be situated near Middelburg in the Eastern Cape and Northern Cape Provinces of South Africa. The proposed Umsobomvu WEF is located on the following farm portions:

- Farm 135 (Elands Kloof), Remaining Extent (RE) and Portion 1;
- Farm 3 (Uitzicht), Remaining Extent (RE) and Portions 2, 3, 4 and 8;
- Farm 120 (Leuwe Kop), Remaining Extent (RE); and
- Farm 136 (Winterhoek), Remaining Extent (RE).

These properties are situated within the Inxuba Yethemba Local Municipality in the Eastern Cape Province and the Umsobomvu Local Municipality in the Northern Cape Province.

Figure 3-2: Locality Map of the Proposed Umsobomvu WEF.

3.3 CONSTRUCTION SITE: HOURS OF OPERATION

Due to the rural nature and on-going agricultural activities within the area, the Ecological Specialist stipulated that no construction activities should occur between dusk and dawn. In certain cases, owing to the nature of the construction activity, it may be necessary to extend the working hours to allow for completion of tasks such as turbine erection or concrete pouring into foundation excavations. Table 3-1 summarises the construction activities anticipated to take place on the site. Those activities underlined in Table 3-1 may take place during working hours AND between dusk and dawn if necessary.

Table 3-1: Summary of construction activities on site. Underlined activities may take place outside of regular working hours (i.e. between dusk and dawn).

PHASE	DURATION	ACTIVITIES	TYPICAL PLANT & MACHINERY
Site Establishment (low impact)	Dependent on the number of turbines. Generally, 1 – 2 years.	<ol style="list-style-type: none"> 1. Setting out of construction area 2. Site camp establishment <ul style="list-style-type: none"> o Levelling of camp area o Import and placement of aggregates to form a free draining platform o Delivery of office and welfare containers o Electricity, sanitation, and internet connections 3. Erection of temporary stock-proof fencing across the site to separate stock from the construction area 	<ol style="list-style-type: none"> 1. LDV (i.e. bakkie) 2. Dump trucks, TLB, roller and possibly a grader or excavator 3. LDV
Civil and Electrical Works (high impact)		<ol style="list-style-type: none"> 1. Topsoil stripping and bulk earthworks (excavations and backfill) for roads, hardstandings and WTG foundations. <u>2. Concrete works</u> <u>3. Fixing reinforcement</u> 4. Cable ducting, trenching and laying 5. Road and hardstanding construction (placement of aggregate layers) 6. Blasting (if hard rock present) 7. Pylon erection and electrical cable stringing (where there is an overhead power line) <u>8. All of the above activities but within the substation and relevant to substation</u> 	<ol style="list-style-type: none"> 1. Dozer, excavator, dump trucks, water trucks, vibratory roller 2. Concrete pump and concrete delivery trucks 3. Flat-bed delivery trucks, telehandler/ excavator 4. Excavator/ TLB 5. As item 1 6. Specialist explosives sub-contractor with appropriate drilling equipment. Excavators and dump trucks. 7. Flat-bed delivery trucks, telehandler/ excavator, LDVs

PHASE	DURATION	ACTIVITIES	TYPICAL PLANT & MACHINERY
		<u>construction and including building construction works e.g. bricklaying, roofing, installation and testing of electrical equipment such as transformers and switchgear</u>	8. As above
Wind Turbine Erection (possible low impact)		<ol style="list-style-type: none"> 1. <u>Delivery of WTG components</u> 2. <u>Assembly/erection of WTG</u> 3. <u>Crane and assembling tools shifting</u> 4. <u>Crane disassembling, cranes, and site DEMOB</u> 	<ol style="list-style-type: none"> 1. Flat-bed or clamp style delivery trucks with components of up to 10m height and 120m length, mobile crane (250 tonne capacity), telehandler 2. Mobile crane, flat bed delivery trucks, telehandler 3. Main crane (750 tonne capacity), mobile crane, telehandler
Wind Turbine Testing and Commissioning (low impact)		<ol style="list-style-type: none"> 1. Internal fit-out of WTG 2. Testing and commissioning 	<ol style="list-style-type: none"> 1. LDV, generator on a trailer towed by the LDV. 2. As above.
Overall Wind Farm Testing (low impact)		<ol style="list-style-type: none"> 1. Testing 	<ol style="list-style-type: none"> 1. LDV for staff transport

By allowing selected construction activities to continue outside of the stipulated working hours the construction period will be reduced, thus minimising the environmental impacts of the construction period as a whole.

If it becomes necessary for additional activities to take place outside of daylight hours, this must be agreed to in writing by the ECO, and permission from the landowner must be obtained.

4 LAYOUT OF THE EMPR

In order to ensure a holistic approach to the management of environmental impacts during the planning and design, construction, operational and decommissioning phases of the proposed Umsobomvu WEF, this EMPr sets out the methods by which proper environmental controls are to be implemented by the Contractor and all other parties involved. These phases of development are discussed in more detail below and has specific issues unique to that phase.

4.1 PLANNING AND DESIGN PHASE

The Planning and Design Phase is an integral component of the project life cycle and requires interaction between the design engineers and environmental consultants to ensure that the engineers are aware of the environmental constraints that must be considered and incorporated into the final design of the project.

The format of the Planning and Design Phase section is to ensure that all specifications are included in the design phase. It requires ongoing and in-depth discussions between the final design team and the appointed Environmental Control Officer (ECO). The engineer will have to cost for and be available for, ongoing discussions with the ECO at all stages of final design.

4.2 CONSTRUCTION PHASE

The Construction Phase section details the environmental management system/framework within which construction activities will be governed, and it consists of various actions, initiatives, and systems which the Contractor will have to ensure are in place and are undertaken. It consists of both a management system and environmental specifications which contain detailed specifications that will need to be undertaken or adhered to by the Contractor.

The Construction Phase section will need to be developed parallel to the final design stages, and constructive input should be invited from the selected Contractor. Sound environmental management is orientated around a pragmatic, unambiguous but enforceable set of guidelines and specifications, and for this reason it is imperative that the Contractor, while being bound by the EMPr, fully understands it, and has had input into its final development. For this reason, the final construction EMPr will need to be signed off after input from the selected Contractor prior to the initiation of construction activities. It should, however, be noted that the Contractor must tender on the existing document and that in areas of uncertainty, a precautionary approach to the environmental guidelines and specifications must be adopted.

4.3 OPERATIONAL PHASE

The Operational Phase section provides specific guidance related to operational activities associated with a particular development. By taking proactive measures during the Construction Phase, potential environmental impacts emanating during the Operational Phase will be minimised. Monitoring of certain issues, such as the success of vegetation re-establishment and erosion control, will be required to continue during operation. The final Operational Phase section should be developed in conjunction with any other relevant stakeholders prior to the adoption thereof.

4.4 DECOMMISSIONING PHASE

This section includes principles for the Decommissioning Phase of the Umsobomvu WEF. This section will require revisiting and updates at the time of decommissioning.

5 IMPACT MANAGEMENT ACTIONS

5.1 GENERAL CONSTRUCTION PHASE MITIGATION AND MANAGEMENT MEASURES

In addition to the mitigation measures and impact management actions which were stipulated in the Umsobomvu WEF EIR, and included in Section 5.2 of this report, the following general Construction Phase mitigation and management measures will apply.

Table 5-1: General Construction Phase Mitigation Measures

GENERAL CONSTRUCTION PHASE		
ACTIVITY	MITIGATION AND MANAGEMENT MEASURES	
1.	SITE DEMARCATION	<p>The location, layout, and method of establishment of the construction camp, including the following, must be clearly indicated, and demarcated prior to the commencement of construction:</p> <ul style="list-style-type: none"> • All Contractors’ offices; • Lay down areas; • Vehicle wash areas (if any); • Workshops and drip trays; • Fuel storage areas (including filling and dispensing from storage tanks); • Cement/concrete mixing areas (including the methods employed for the mixing of concrete and particularly the containment of runoff water from such areas and the method of transportation of concrete); and • Other infrastructure required for the running of the project. <ul style="list-style-type: none"> • The Contractor must erect and maintain permanent and/or temporary fences in the locations directed by the ECO. Such fences should, if so specified, be erected before undertaking designated activities; • All no-go areas in proximity to the construction camp must be clearly demarcated on-site by the ECO or botanical specialist; and • The Contractor must ensure that, insofar as he/she has the authority, no person, machinery, equipment, or materials enter the “no-go” areas at any time.
2.	SITE ACCESS	<p>Details, including a drawing, showing where and how the access points and routes will be located and managed must be submitted to the ECO. These should be supported by the following management requirements:</p> <ul style="list-style-type: none"> • On the site and within such distance of the site as may be stated, the Contractor should control the movement of all vehicles, including vehicles of suppliers so that they remain on designated routes, are distributed so as not to cause an undue concentration of traffic and that all relevant laws are complied with. In addition, such vehicles should be routed and operated in a manner that minimises the disruption to regular users of the routes; • On gravel or earth roads onsite and within 500 m of the site, the Contractor’s vehicles as well as the suppliers’ must not exceed a speed of 40 km/h or as directed by the ECO; and • The Contractor must supply the ECO with a Method Statement detailing the location and management of all access points and roads.
3.	MATERIALS HANDLING, USE AND STORAGE	<ul style="list-style-type: none"> • The Contractor must ensure that any delivery drivers are informed of all procedures and restrictions (including identified “no-go” areas) required to comply with this EMP; and • The Contractor must ensure that these delivery drivers are supervised during offloading, by someone with an adequate understanding of the requirements of the EMP; and • Materials must be appropriately secured to ensure safe passage between destinations. Loads including, but not limited to, sand, stone chip, fine vegetation, refuse, paper and cement, should have appropriate cover to prevent them spilling from the vehicle during transit;

GENERAL CONSTRUCTION PHASE		
ACTIVITY		MITIGATION AND MANAGEMENT MEASURES
		<ul style="list-style-type: none"> The Contractor will be responsible for any clean up resulting from the failure of their employees or suppliers to properly secure transported materials; All manufactured and/or imported material should be stored within the Contractor's camp, and, if required by the EMP, out of the rain; All laydown areas outside of the construction camp will be subject to the ECO's approval; and Imported gravel, fill, soil, and sand materials should be free of weeds, alien invasive seed matter, plant material, litter and contaminants and must be obtained from sources approved by the ECO.
4.	STOCKPILING	<ul style="list-style-type: none"> Any stockpiling of gravel, cut, fill or any other material including spoil must only be in areas that have been approved by the ECO within the defined working area; The Contractor should ensure that the material does not blow or wash away. If the stockpiled material is in danger of being washed or blown away, the Contractor should spray it with Dustex or cover it with a suitable material, such as hessian or plastic. Stockpiles of topsoil must not be covered with plastic; and No stockpiling of any material will be allowed within 20 m of any "no-go" areas.
5.	SOLID WASTE MANAGEMENT	<ul style="list-style-type: none"> Onsite burning, burying, or dumping of any waste materials, litter or refuse must not occur; The Contractor should provide vermin and weatherproof bins with lids of sufficient number and capacity to store the solid waste produced on a daily basis. The lids must be kept firmly on the bins at all times; Bins must not be allowed to become overfull and should be emptied daily; The waste from bins may be temporarily stored onsite in a central waste area that is weatherproof and scavenger proof, and which the ECO has approved; Recyclable waste should be disposed of into separate skips/bins and removed offsite for recycling; All solid waste must be disposed of offsite at an approved registered landfill site. The Contractor must supply the ECO with the appropriate disposal certificates; and The Contractor must submit a solid waste management plan, as part of the Pollution Control Method Statement, to the ECO.
6.	WATER USE	<ul style="list-style-type: none"> All sources of water for construction purposes must be approved by the ECO in writing before any such sources can be used to obtain water; and All wash water should be recycled for use as wash water again or for dust suppression, where applicable.
7.	HAZARDOUS SUBSTANCES	<ul style="list-style-type: none"> The transportation and handling of hazardous substances must comply with the provisions of the Hazardous Substances Act (Act No.187 of 1993) and associated regulations as well as SABS 0228 and SABS 0229; The Contractor must also comply with all other applicable regional and local legislation and regulations with regard to the transport, use and disposal of hazardous substances. Hazardous chemical substances (as defined in the Regulations for Hazardous Chemical Substances) used during construction must be stored in secondary containers. The relevant Material Safety Data Sheets (MSDS) must be available onsite; Procedures detailed in the MSDSs must be followed in the event of an emergency situation; The Contractor will be responsible for the training and education of all personnel onsite who will be handling hazardous materials about their proper use, handling and disposal; and If potentially hazardous substances are to be stored or used onsite, the Contractor must submit a Method Statement to the ECO detailing the substances/materials to be used, together with the transport, storage, handling, and disposal procedures for the substances.

GENERAL CONSTRUCTION PHASE		
ACTIVITY	MITIGATION AND MANAGEMENT MEASURES	
8.	CEMENT AND MIXING OF CONCRETE	<ul style="list-style-type: none"> The proposed location of cement mixing areas (including the location of cement stores and sand and aggregate stockpiles) must be indicated on the site layout plan and approved by the ECO; All wastewater generated from the operation and cleaning of concrete mixing equipment and other sources of concrete should be passed through a concrete wastewater settlement system; The Contractor must ensure that minimal water is used for washing of concrete and cement mixing equipment; Used cement bags must be disposed of in weatherproof bins onsite to prevent the generation of wind-blown cement dust and the bags from blowing away; The Contractor must ensure that concrete is mixed on mortar boards, all visible remains of concrete are removed and disposed of as waste and that all surplus aggregate is removed; and As part of the Pollution Control and Concrete Mixing Method Statement, a plan detailing all actions to be taken to comply with the requirements must be submitted by the Contractor to the ECO.
9.	FUELS AND OIL	<p><u>Fuel Storage</u></p> <ul style="list-style-type: none"> All construction materials including fuels and oil should be stored in demarcated areas that are contained within berms/bunds. Washing and cleaning of equipment should also be done in berms or bunds, in order to trap any cement and prevent excessive soil erosion; All necessary approvals with respect to fuel storage and dispensing must be obtained from the appropriate authorities. Symbolic safety signs depicting “No Smoking” and “Danger”, conforming to the requirement of SABS 1186, must be prominently displayed in and around the fuel storage area. There must be adequate fire-fighting equipment at the fuel storage area; The Contractor must ensure that all liquid fuels and oils are stored in tanks with lids, which are kept firmly shut and under lock and key at all times. The capacity of the tank should be clearly displayed, and the product contained within the tank clearly identified using the emergency information system detailed in SABS 0232 part 1. Fuel storage tanks capacity must not exceed 9 000 litres and must be kept on-site only for as long as fuel is needed for construction activities, on completion of which they must be removed; Tanks onsite should not be linked or joined via any pipe work but should remain as separate entities. The tanks must be situated on a smooth impermeable base with a bund. The volume inside the bund should be 110% of the total capacity of the largest storage tank. The base may be constructed of concrete, or of plastic sheeting with impermeable joints with a layer of sand over to prevent perishing. The impermeable lining should extend to the crest of the bund. The floor of the bund should be sloped to enable any spilled fuel and/or fuel-contaminated water to be removed. Appropriate material, approved by the ECO that absorbs / breaks-down or encapsulates minor hydrocarbon spillage and which is effective in water should be installed in the sump; Adequate precautions should be provided to prevent spillage during the filling of any tank and during the dispensing of the contents. The dispensing mechanism for the fuel storage tanks should be stored in a waterproof container when not in use; and As part of the required site layout for the construction camp, a plan must be submitted to the ECO detailing the design, location and construction of the fuel storage area as well as for the filling and dispensing from storage tanks and for the type of absorbing / breaking-down or encapsulating material to be used. <p><u>Refuelling</u></p> <ul style="list-style-type: none"> Where reasonably practical, the plant should be refuelled at a designated re-fuelling area/depot or at a workshop as applicable. If this is not reasonably practical, then the

GENERAL CONSTRUCTION PHASE		
ACTIVITY	MITIGATION AND MANAGEMENT MEASURES	
	<p>surface under the refuelling area must be protected and appropriately bunded against pollution to the reasonable satisfaction of the ECO prior to any refuelling activities;</p> <ul style="list-style-type: none"> • If fuel is dispensed from 200-litre drums, the proper dispensing equipment must be used, and the drum should not be tipped in order to dispense fuel. The Contractor should ensure that the appropriate fire-fighting equipment is present during refuelling operations; • The Contractor must ensure that there is always a supply of absorbent material readily available to absorb / breakdown or where possible, be designed to encapsulate minor hydrocarbon spillages. The quantities of such materials should be able to handle a minimum of 200 ℓ of hydrocarbon liquid spill. Prior to any refuelling or maintenance activities, the ECO must approve this material; <p><u>Used oil and hydrocarbon contaminated materials</u></p> <ul style="list-style-type: none"> • Used oil should be stored at a central location onsite prior to removal offsite for disposal at an approved disposal or recycling site; and • Old oil filters and oil, petrol and diesel-soaked material must be treated as hazardous waste. The Contractor should remove all oil, petrol, and diesel-soaked sand immediately and should dispose of it as hazardous waste or treat it onsite with material that breaks down or encapsulates such spillages as approved by the ECO. 	
10.	WORKSHOP, EQUIPMENT MAINTENANCE AND STORAGE	<ul style="list-style-type: none"> • The Contractor should ensure that in his workshop and other plant maintenance facilities, including those areas where, after obtaining the ECO's approval, the Contractor carries out emergency plant maintenance, there is no contamination of the soil or vegetation. The workshop must have a smooth impermeable (concrete or thick plastic covered with sand) floor; • The floor should be bunded and sloped towards an oil trap or sump to contain any spillages. When servicing equipment, drip trays should be used to collect the waste oil and other lubricants. Drip trays should also be provided in construction areas for stationary plant (such as compressors) and for "parked" plant (such as scrapers, loaders, vehicles); • All vehicles and equipment must be kept in good working order and serviced regularly. Leaking equipment must be repaired immediately or removed from the site; • All vehicle and equipment washing must be undertaken in the workshop or maintenance areas, and these areas must be equipped with a suitable impermeable floor and sump/oil trap. The use of detergents for washing should be restricted to low phosphate and nitrate products and low sudsing-type detergents; and • As part of the site layouts, a plan must be submitted to the ECO detailing the design of the bunding of the workshop and how run-off from the workshop will be managed as well as how drip trays used under plant will be managed.
11.	ABLUTION FACILITIES	<ul style="list-style-type: none"> • Washing, whether of a person or of personal effects, and acts of excretion and urination are strictly prohibited other than at the facilities provided. The Contractor must provide the necessary ablution facilities for all their personnel prior to the commencement of work; • Ablution facilities must be supplied by the Contractor for the workers at a ratio of at least 1 toilet per 20 workers in areas approved by the ECO. Toilets should be situated within 200 m of any area where work is taking place in numbers sufficient to meet the ratio depicted above for the workers in the area; • The facilities should be maintained in a hygienic state and serviced regularly. Toilet paper must be provided. Temporary/portable toilets should be secured to the ground to prevent them toppling due to wind or any other cause, to the satisfaction of the ECO; and • Discharge into the environment and burial of waste is strictly prohibited. The Contractor must ensure that no spillage occurs when the toilets are cleaned or emptied

GENERAL CONSTRUCTION PHASE		
ACTIVITY	MITIGATION AND MANAGEMENT MEASURES	
		and that the contents are removed from the site. Toilets must be emptied before any temporary site closure.
12.	EATING AREAS	<ul style="list-style-type: none"> The Contractor should designate eating area(s), subject to the approval of the ECO. No cooking is allowed outside of the Contractor’s camp area onsite; At mealtimes, all workers must eat in designated eating areas. These areas should have shade for the workers; Sufficient bins must be present in these areas. All disposable food packaging must be disposed of in the bins after every meal; and The feeding- or leaving of food for animals is strictly prohibited.
13.	SITE STRUCTURES	<ul style="list-style-type: none"> All site establishment components (as well as equipment) should be positioned to limit visual intrusion on neighbouring areas and the size of the land area disturbed. The type and colour of roofing and cladding materials of the Contractor's temporary structures should be selected to reduce reflection; and The Contractor should supply and maintain adequate and suitable sheds for the storage of materials. Sheds for the storage of materials that may deteriorate or corrode if exposed to the weather should be weatherproof, adequately ventilated and provided with raised floors.
14.	LIGHTING	<ul style="list-style-type: none"> The Contractor should ensure that any lighting installed on the site for their activities does not cause a reasonably avoidable disturbance to neighbouring residents or the naturally occurring fauna; and The installation of low UV emitting lights, such as most LEDs is recommended, as these cause less disturbance to insects and fauna.
15.	NOISE	<ul style="list-style-type: none"> The Contractor should take precautions to minimise noise generated on-site (e.g. install and maintain silencers on machinery where necessary); The Contractor must comply with the Noise Induced Hearing Loss Regulations published under the Occupational Health and Safety Act; Appropriate directional and intensity settings are to be maintained on all hooters and sirens; <u>When possible and practical</u>, work should be limited to daylight hours – between 06:00 and 18:00 (see Table 3-1). Permission to work outside these times will require approval from the ECO; and No amplified music must be allowed on site. The Contractor must not use sound amplification equipment on-site unless in emergency situations.
16.	DUST CONTROL	<ul style="list-style-type: none"> The Contractor will be responsible for the continued control of dust arising from their operations. The Contractor must take all reasonable measures to minimize the generation of dust as a result of construction activities to the satisfaction of the ECO. Appropriate dust suppression measures include spraying or dampening with water, using a commercial dust binder (such as Hydropam or Dustex), rotovating straw bales, planting of open cleared space and the scheduling of dust-generating activities. If the conditions are such that the Contractor cannot satisfactorily dampen the dust, then the ECO may halt operations until such time as the conditions are more suitable for lower dust-generating construction activities; Areas that are to have the topsoil stripped for construction purposes must be limited and only stripped when work is about to take place; Other activities and situations that may result in a dust nuisance include site clearance and other earth moving operations, open cleared space, stockpiles of topsoil or sand and activities associated with concrete mixing; and The appropriate health and safety equipment (e.g. dust masks) should be worn by workers during the phases of dust-producing construction activity.
17.	ENVIRONMENTAL AWARENESS TRAINING	<ul style="list-style-type: none"> Environmental awareness training courses should be run for all personnel onsite (See Annexure A for a proposed Basic Environmental Education Course). Two courses should be run, one for the Contractor's and Subcontractor's management and one for all site staff and labourers. Courses should be run in the morning during normal

GENERAL CONSTRUCTION PHASE		
ACTIVITY	MITIGATION AND MANAGEMENT MEASURES	
		<p>working hours at a suitable venue provided by the Contractor. All attendees should remain for the duration of the course and sign an attendance register on completion, that clearly indicates participant’s names, a copy of which must be handed to the ECO;</p> <ul style="list-style-type: none"> • The size of each session should be limited to thirty (30) people. The Contractor should allow for sufficient sessions to train all personnel. Subsequent sessions should be run for any new personnel coming onto site. A Method Statement with respect to the organisation of these courses should be submitted; and • Notwithstanding the specific provisions of this clause it is incumbent upon the Contractor to convey the sentiments of the EMP to all personnel and Subcontractors involved with the Works.
18.	FIRE CONTROL	<ul style="list-style-type: none"> • The Contractor must take all the necessary precautions to ensure that fires are not started as a result of site activities; • No open fires must be permitted on the site; • Smoking must not be permitted in areas where there is a fire hazard. Such areas include the workshop and fuel storage areas and any areas where the vegetation or other material is such as to support the rapid spreading of an initial flame; • The Contractor should appoint a Fire Officer who will be responsible for ensuring immediate and appropriate actions in the event of a fire and will ensure that employees are aware of the procedures to be followed. The Contractor must forward the name of the Fire Officer to the ECO for approval within 7 days of being on-site; • The Contractor must ensure that there is basic firefighting equipment available onsite at all times. This should include at least rubber beaters when working in urban open spaces and natural areas, and at least one fire extinguisher of the appropriate type when welding or other “hot” activities are undertaken; and • The Contractor will be liable for any expenses incurred by any organisations called to assist with fighting fires that were started as a result of their activities or personnel, and for any cost relating to the rehabilitation of burnt areas, or consequential damages.
19.	EMERGENCY PROCEDURES	<ul style="list-style-type: none"> • Emergency procedures, including the names and contact details of responsible personnel and emergency services must be made available to all staff and should be clearly displayed at relevant locations at the site. The Contractor should advise the ECO of any emergencies onsite, together with a record of action taken, within 24 hours of the emergency occurring; and • The Contractor must submit a Method Statement covering the procedures for the following emergencies: <p><u>Fire</u></p> <ul style="list-style-type: none"> • The Contractor should advise the relevant authority of a fire as soon as one starts and must not wait until it is out of control; and • The Contractor must ensure that all employees are aware of the procedures to be followed in the event of a fire. <p><u>Accidental leaks and spillages</u></p> <ul style="list-style-type: none"> • The Contractor must ensure that all employees are aware of the procedures to be followed for dealing with spills and leaks, which must include notifying the ECO and the relevant authorities. The Contractor must ensure that all the necessary materials and equipment for dealing with spills and leaks are available onsite at all times. Treatment and remediation of the spill areas must be undertaken to the reasonable satisfaction of the ECO; • In the event of a hydrocarbon spill, the source of the spillage must be isolated, and the spillage contained. The area should be cordoned off and secured. The Contractor should ensure that there is always a supply of absorbent material readily available to absorb / breakdown or where possible, be designed to encapsulate minor hydrocarbon

GENERAL CONSTRUCTION PHASE		
ACTIVITY	MITIGATION AND MANAGEMENT MEASURES	
		<p>spillages. The quantities of such materials should be able to handle a minimum of 200 ℓ of hydrocarbon liquid spill; and</p> <ul style="list-style-type: none"> Any spills must be cleared, and the contaminated soil or sludge disposed of in an appropriate manner, approved by the ECO, or at a licensed hazardous waste disposal site.
20.	PROTECTION OF NATURAL FEATURES	<ul style="list-style-type: none"> The Contractor must not deface, paint, damage or mark any natural features (e.g. rock formations or trees) situated in or around the site for survey or other purposes unless agreed upon beforehand with the ECO. Any features affected by the Contractor in contravention of this clause must be restored/rehabilitated to the satisfaction of the ECO; and The Contractor and onsite staff must not at any stage enter dense, intact vegetation without written approval from the ECO.
21.	PROTECTION OF FAUNA AND FLORA	<ul style="list-style-type: none"> A Botanist has identified the need for plant search and rescue (done as part of the pre-submission process) to identify Species of Conservation Concern (SCC) to be relocated; Protected plant species must be removed from the designated construction footprint and relocated to adjacent areas of similar habitat that should not be affected by construction activities. The plants should be used in landscaping once construction is complete (if applicable); Except to the extent necessary for the carrying out of the works, flora should not be removed, damaged or disturbed; The removal and stockpiling of topsoil must also be carried out in accordance with this EMP; and Trapping, poisoning and/or shooting of animals is strictly forbidden. No domestic pets or livestock are permitted onsite; The use of chemicals of all forms should be carefully controlled and monitored to avoid contamination of surrounding areas; and Construction phases should allow for education of staff as to the significance of species of conservation concern.
22.	PROTECTION OF HERITAGE FEATURES	<ul style="list-style-type: none"> Construction managers and/or foremen must be informed before construction starts on the possible types of heritage sites and cultural material they may encounter and the procedures to follow when they find sites; If concentrations of palaeontological and/or archaeological heritage material and human remains are uncovered during construction, all work must cease immediately and be reported to the Eastern Cape Provincial Heritage Resources Authority (ECPHRA) and/or the South African Heritage Resources Agency (SAHRA) (021 642 4502) so that systematic and professional investigation/ excavation can be undertaken; and Any person who causes intentional damage to archaeological or historical sites and/or artefacts could be penalised or legally prosecuted in terms of the National Heritage Resources Act (Act No. 25 of 1999).
23.	VEGETATION CLEARANCE	<ul style="list-style-type: none"> Vegetation clearing and trampling must be avoided in areas demarcated as “no-go” areas (if any); Temporary infrastructure such as the site camp, lay down areas and storage areas must not be placed in any other area than the area approved by the ECO; The Contractor must work according to a plan, which demarcates areas to be cleared. The plan should be part of the Project Layout Plan developed in the Site Design Phase; The minimum amount of vegetation clearance must take place; and Collection of, or wilful damage to, any plants outside of the areas demarcated for clearing is not allowed.
24.	TOPSOIL	<ul style="list-style-type: none"> Topsoil should only be stripped from the areas as indicated below: <ul style="list-style-type: none"> Any area which is to be used for temporary storage of materials; Areas which could be polluted by any aspect of the construction activity; and Areas designated for the dumping of soil.

GENERAL CONSTRUCTION PHASE		
ACTIVITY	MITIGATION AND MANAGEMENT MEASURES	
		<ul style="list-style-type: none"> Stripping of topsoil should be undertaken in such a manner as to minimise erosion by wind or runoff; Outside of the development footprint, topsoil will be stripped to a depth not exceeding 150 mm from the original ground level; Areas from which the topsoil is to be removed must be cleared of any foreign material which could form part of the topsoil during removal including bricks, rubble, any waste material, litter, excess vegetation and any other material which could reduce the quality of the topsoil; The Contractor must ensure that subsoil and topsoil are not mixed during stripping, excavation, reinstatement and rehabilitation. If mixed with clay sub-soil, the usefulness of the topsoil for rehabilitation of the site will be lost; Soils should be exposed for the minimum time possible once cleared; Topsoil should be temporarily stockpiled, separately from (clay) subsoil and rocky materials; Topsoil should only be stockpiled in areas designated by the ECO; Stockpiles will either be vegetated with indigenous grasses or covered by a suitable fabric to prevent erosion and invasion of weeds; and Stockpiled topsoil must not be compacted.
25.	STORMWATER MANAGEMENT	<ul style="list-style-type: none"> Stormwater should be managed using suitable structures such as swales, gabions and rock rip-wrap so that any run-off from the development site is attenuated prior to discharge. Silt and sedimentation should be kept to a minimum, through the use of the above-mentioned structures by also ensuring that all structures don't create any form of erosion; and Natural run-off must be diverted to stormwater drains where these are available.
26.	EROSION AND SEDIMENTATION CONTROL	<ul style="list-style-type: none"> The Contractor must take all reasonable measures to limit erosion and sedimentation due to construction activities and must comply with such detailed measures as required by this EMP; and Revegetate areas that have been disturbed as soon as possible; Where erosion and/or sedimentation occur, whether on or off the site, despite the Contractor complying with the aforementioned, rectification should be carried out in accordance with details specified by the ECO. Where erosion and/or sedimentation occur due to the fault of the Contractor, rectification must be carried out to the reasonable requirements of the ECO and at the expense of the Contractor; and Actions must also be taken in the event of heavy rains and potential flooding, whereby diversion barriers must not cause excessive erosion.
27.	AESTHETICS	<ul style="list-style-type: none"> The Contractor must take reasonable measures to ensure that construction activities do not have an unreasonable impact on the aesthetics of the area.
28.	COMMUNITY RELATIONS	<ul style="list-style-type: none"> The Contractor must keep a "Complaints Register" onsite. The Register should contain all contact details of the person who made the complaint, and information regarding the complaint itself as well as the date and time that the complaint was resolved; The ESO will be responsible for responding to queries and/or complaints and may request assistance from the Contractor's Management Staff; The Complaints Register must be audited by the ECO; and Construction materials and other purchases relating to the project should be done, where possible, within the nearby community and at local shops.
29.	TEMPORARY SITE CLOSURE	<ul style="list-style-type: none"> If the Site is closed for a period exceeding 5 days, the Contractor's Safety, Health and Environment (SHE) Officer in consultation with the ECO should carry out the following checklist procedure and ensure that the following conditions pertain and report on compliance with this clause: <u>Fuels / flammables / hazardous materials stores</u> <ul style="list-style-type: none"> Fuel stores are as low in volume as practicable; There are no leaks;

GENERAL CONSTRUCTION PHASE	
ACTIVITY	MITIGATION AND MANAGEMENT MEASURES
	<ul style="list-style-type: none"> • The outlet is secure and locked; • The bund is empty; • Fire extinguishers are serviced and accessible; • The area is secure from accidental damage through vehicle collision and the like; • Emergency and contact numbers are available and displayed; and • There is adequate ventilation in enclosed spaces. <p><u>Safety</u></p> <ul style="list-style-type: none"> • Check that site safety checks have been carried out in accordance with the Occupational Health and Safety Act (No. 85 of 1993) prior to site closure; • An inspection schedule and log for use by security or contracts staff is developed; • All trenches and manholes are secured; • Applicable notice boards are in place and secured; • Emergency and Management contact details are prominently displayed; • Security personnel have been briefed and have the facilities to contact or be contacted by relevant management and emergency personnel; • Night hazards such as reflectors, lighting, traffic signage etc. have been checked; • Fire hazards identified and the local authority notified of any potential threats, e.g. large brush stockpiles, fuels etc.; • Pipe stockpiles are wedged / secured; • Scaffolds are secure; and • Structures vulnerable to high winds are secure. <p><u>Erosion</u></p> <ul style="list-style-type: none"> • Wind and dust mitigation measures such as straw, brush packs, irrigation etc. are in place; • Excavated and filled slopes and stockpiles are at a stable angle; • Re-vegetated areas have a watering schedule and the supply to such areas is secured; and • There are sufficient detention ponds or channels in place. <p><u>Water contamination and pollution</u></p> <ul style="list-style-type: none"> • Hazardous fuel stores are secure; • Cement and materials stores are secure; • Toilets are empty and secured; • Refuse bins are empty and secured; • Bunding is clean and treated with appropriate material that will absorb / breakdown and where possible be designed to encapsulate minor hydrocarbon spillage; and • Drip trays are empty and secure.

5.2 GENERAL AND SPECIALIST EIR GUIDELINES, MITIGATION AND MANAGEMENT MEASURES

The EAP and specialists have recommended the following additional mitigation and management measures which must be implemented during the relevant phases of development of the Umsobomvu WEF.

Comprehensive ECO audits should be undertaken during the development of the Umsobomvu WEF to verify compliance with the mitigation and management measures which are stipulated in the sections below. If compliance with any of these mitigation or management measures cannot be met, it will be the responsibility of the appointed Contractor to provide reasons/motivations for the non-compliance(s).

Table 5-2: Planning and Design Phase Mitigation Measures and Management Actions, General

ACTIVITY		MITIGATION AND/OR MANAGEMENT MEASURES
PLANNING AND DESIGN PHASE – GENERAL EIR		
1.	TRAFFIC & TRANSPORT	<ul style="list-style-type: none"> Project planning must include a transport management plan that will be implemented, especially during the construction phase of the development. The necessary road traffic permits must be obtained for transporting parts, containers, materials, and construction equipment to the site. Careful planning of the routes taken by heavy and extra-large vehicles must highlight areas of road that may need to be upgraded in order to accommodate these vehicles. Once identified these areas must be upgraded if necessary.
2.	STORAGE OF HAZARDOUS SUBSTANCES	<ul style="list-style-type: none"> All hazardous substances such as paints, diesel and cement must be stored in a bunded area with an impermeable surface beneath them. Cement mixing must ideally be done at a single location which should be suitably located. However, it might be required that grouting mix is prepared at each of the WTG locations for the jointing of concrete towers.
3.	ENVIRONMENTAL LEGISLATION AND POLICY	<ul style="list-style-type: none"> Ensure that all relevant legislation and policy is consulted and further ensure that the project is compliant with such legislation and policy. In addition, planning for the construction and operation of the proposed energy facility should consider available best practice guidelines. These should include (but are not restricted to): <ul style="list-style-type: none"> Local and District Spatial Development Frameworks Local Municipal bylaws
4.	STORMWATER MANAGEMENT PLAN AND EROSION	<ul style="list-style-type: none"> Structures must be located at least 32 m away from identified drainage lines. Water Use Licences will be required, where relevant, prior to construction. A Storm Water Management Plan must be designed and implemented to ensure maximum water seepage at the source of water flow. The plan must include management mitigation measures for water pollution, wastewater management and the management of surface erosion e.g. by considering the applicability of contouring, etc.
5.	WASTE MANAGEMENT PLAN	<ul style="list-style-type: none"> A waste management plan must be developed and implemented for handling on-site waste. An appropriate area where waste can be stored before disposal must be designated.
6.	ELECTROMAGNETIC INTERFERENCE	<ul style="list-style-type: none"> Accurate siting of wind turbines must take place in the planning and design phase to reduce these effects. If complaints are received from surrounding landowners regarding this issue, the developer must investigate and mitigate these issues to the best of their abilities.
7.	SHADOW FLICKER	<ul style="list-style-type: none"> The layout of wind turbines must be designed in order to minimize the effects of shadow flicker on surrounding landowners. Recommendations made by the visual impact assessor with regard to the identification of landowners who may be within range of the shadow flicker caused by the turbines, must be implemented. If surrounding landowners complain of shadow flicker-related issues, these must be investigated and mitigated to the best of the developers' ability.

Table 5-3: Construction Phase Mitigation Measures and Management Actions, General

ACTIVITY		MITIGATION AND/OR MANAGEMENT MEASURES
CONSTRUCTION PHASE – GENERAL EIR		
1.	SITE ESTABLISHMENT	<ul style="list-style-type: none"> The Contractor shall establish construction camps, offices, workshops and any other infrastructure as per the agreed site layout plan in a manner that does not adversely affect the environment. The Contractor shall submit a method statement for site clearance for approval by the Proponent in consultation with the ECO. 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. The Construction camp shall have the necessary ablution facilities with chemical toilets at commencement of construction activities to the satisfaction of the Project

ACTIVITY	MITIGATION AND/OR MANAGEMENT MEASURES	
CONSTRUCTION PHASE – GENERAL EIR		
		<p>Coordinator. The Contractor shall inform all site staff to make use of supplied ablution facilities and under no circumstances shall indiscriminate sanitary activities be allowed other than in supplied facilities.</p> <ul style="list-style-type: none"> • Safe drinking water for human consumption shall be available at the site offices and at other convenient locations on site. All water used on site must be taken from a legal source and comply with the recognised standards for potable and other uses. • The Contractor shall provide adequate facilities for his staff so that they are not encouraged to supplement their comforts on site by accessing what can be taken from the natural surroundings. • The Contractor shall ensure that energy sources are available at all times for construction and supervision personnel for heating and cooking purposes. • The Contractor shall supply waste collection bins where such is not available, and all solid waste collected shall be disposed of at a municipal registered landfill. These bins must be equipped with animal-proof lids to ensure the contents are not accessible to wild or domestic animals. • A certificate of disposal shall be obtained by the Contractor and kept on file. • Where a registered waste site is not available close to the construction site, the Contractor shall provide a method statement (i.e. how and where he intends to dispose of the waste) with regard to waste management. The disposal of waste shall be in accordance with all relevant legislation. • Under no circumstances may solid waste be burnt on site. • ESO to assist in siting of structures and supervise any bush clearing for the construction camp. This must be submitted to the ECO for approval. Construction camp should be fenced to avoid sprawl. • If there is a concrete batching site, it should be fenced. Shade cloth should be attached to the fence to stop sand blowing around.
2.	SITE CLEARING	<ul style="list-style-type: none"> • Site clearing must take place in a phased manner, as and when required. The area to be cleared must be clearly demarcated and this footprint strictly maintained. • Vegetation clearing must be restricted to the identified sites for the construction camp, cement mixing areas, ancillary infrastructure lay down areas, underground power cable route, control cabin and other activities on-site that have been identified as necessary for development of the project. • Where feasible, spoil must be used for rehabilitation on-site. Where this is not possible, spoil that is removed from the site must be removed to an approved spoil site or municipal licensed landfill site. • Silt fences and erosion control measures must be implemented in areas where these risks are more prevalent. These include steep areas. • Topsoil must be neatly stockpiled adjacent to the excavations ready for backfill when required. • The Contractor shall ensure that all work is undertaken in a manner that minimises the impact on vegetation outside the immediate area of the works. No tree or shrub outside the area of the works shall be felled, topped, cut, or pruned until it has been clearly marked for this purpose by the Contractor. The method of marking should be included in a Method Statement for the ECO’s approval, and no tree outside the area of the works shall be burned for any purpose.
3.	SOIL IMPACTS	<p><u>Topsoil</u></p> <ul style="list-style-type: none"> • The full depth of topsoil should be stripped from areas affected by construction and related activities prior to the commencement of major earthworks. This should include the building footprints, working areas and storage areas. Topsoil must be reused where possible to rehabilitate disturbed areas. • The upper 30 cm of topsoil must be stripped and stockpiled as topsoil. It should be retained for re-spreading over disturbed surfaces during rehabilitation. • Care must be taken not to mix topsoil and subsoil during stripping.

ACTIVITY	MITIGATION AND/OR MANAGEMENT MEASURES
CONSTRUCTION PHASE – GENERAL EIR	
	<ul style="list-style-type: none"> ● Polluted topsoil must be disposed of at a licensed landfill site. Waste manifests must be kept as proof that this has been disposed of legally. ● Topsoil stockpiles are to be handled only twice – once during clearing and stockpiling, and once during rehabilitation/backfilling. <p><u>Soil Stripping</u></p> <ul style="list-style-type: none"> ● No soil stripping must take place on areas within the site that the Contractor does not require for construction works, or on areas of retained vegetation. ● Subsoil and topsoil should, in all construction and lay down areas, be stockpiled separately to be returned for backfilling in the correct soil horizon order. ● Construction vehicles must only be allowed to utilise existing tracks or pre-planned access routes. <p><u>Stockpiles</u></p> <ul style="list-style-type: none"> ● Stockpiles should not be situated such that they obstruct natural water pathways and drainage channels. ● Stockpiles should not exceed 1.5 m in height, with the exception of the WTG foundation excavation stockpile height that shall be limited to the height of the excavation. ● If stockpiles are exposed to windy conditions or heavy rain, they should be covered either by vegetation or cloth. ● Stockpiles may further be protected by the construction of berms or low brick walls around their bases. ● Stockpiles should be kept clear of weeds and alien vegetation growth by regular weeding. <p><u>Fuel storage</u></p> <ul style="list-style-type: none"> ● Topsoil and subsoil to be protected from contamination. ● Fuel and material storage must be away from stockpiles. ● Cement, concrete and chemicals must be mixed on an impermeable surface and provisions should be made to contain spillages or overflows into the soil. ● Any storage tanks containing hazardous materials must be placed in bunded containment areas with sealed surfaces. The bund walls must be high enough to contain 110% of the total volume of the stored hazardous material. ● Contaminated soil must be contained and disposed of off-site at an approved landfill site. Waste manifests must be kept as proof that this has been disposed of legally. <p><u>Concrete mixing</u></p> <ul style="list-style-type: none"> ● No vehicles transporting concrete to the site may be washed on site. If this cannot be avoided, the Contractor must provide a disposal site for the washing and the cleaning of the trucks and should maintain this site and ensure that no residual concrete is spread out around the project site. ● If a batching plant is necessary, run-off should be managed effectively to avoid contamination of other areas of the site. Untreated run-off from the batching plant must not be allowed to get into the stormwater system or any rivers, streams, wetlands or existing erosion channels / dongas. ● If it is impractical to dispose of water at a WWTW then a Method Statement should be compiled to make provision for a system that will not allow wastewater to contaminate the surrounding area (e.g. settling ponds). ● Drip trays should be used when off-loading concrete trucks to collect any concrete that spills. <p><u>Earthworks</u></p> <ul style="list-style-type: none"> ● Soils compacted during construction should be deeply ripped to loosen compacted layers and re-graded to even running levels. Topsoil should be spread over landscaped areas.

ACTIVITY	MITIGATION AND/OR MANAGEMENT MEASURES
CONSTRUCTION PHASE – GENERAL EIR	
4.	<p>EROSION</p> <ul style="list-style-type: none"> • Wind screening and stormwater control should be undertaken to prevent soil loss from the site. • All erosion control mechanisms need to be maintained regularly. • Retain vegetation where possible to avoid soil erosion • Vegetation clearance should be phased to ensure that the minimum area of soil is exposed to potential erosion at any one time. • Re-vegetation of disturbed surfaces should occur immediately after the construction activities are completed. • No impediment to the natural water flow other than approved erosion control works is permitted.
5.	<p>AIR QUALITY</p> <p><u>Dust control</u></p> <ul style="list-style-type: none"> • Damping down of un-surfaced and un-vegetated areas during dusty periods is required. Potable water must not be used for this and only water abstracted from sources approved by DWS in agreement with the landowners is permitted. • Retention of vegetation where possible will reduce dust travel. • Excavations and other clearing activities must only be done during agreed working times and permitting weather conditions to avoid drifting of sand and dust into neighbouring areas. • The Contractor shall be responsible for dust control on site to ensure no nuisance is caused to the Landowner or neighbouring Communities. • A notice at the junction of the N10 and the access road must be installed with a phone number that public can use to lodge complaints about dust. • A speed limit of 40km/h must not be exceeded on dirt roads. • Any complaints or claims emanating from the lack of dust control shall be attended to immediately by the Contractor. <p><u>Emissions control</u></p> <ul style="list-style-type: none"> • Regular servicing of vehicles in order to limit gaseous emissions (to be done off-site). • Regular servicing of on-site toilets to avoid potential odours. • Allocated cooking areas must be provided. <p><u>Fire prevention</u></p> <ul style="list-style-type: none"> • All cooking shall be done in demarcated areas that are safe in terms of runaway or uncontrolled fires. It is recommended that a formal “braai area” is constructed at the site office for cooking. • The Contractor shall have operational firefighting equipment available on site at all times. The level of firefighting equipment must be assessed and evaluated through a typical risk assessment process. It may be necessary to increase the level of protection, especially during the winter months.
6.	<p>WATER QUALITY</p> <p><u>Sanitation</u></p> <ul style="list-style-type: none"> • Adequate sanitary and ablutions facilities must be provided for construction workers. Such an agreement must be conducted between the relevant municipality and the developer. In the case of Umsobomvu where two local municipalities are relevant, the municipalities have agreed to meet with the developer to discuss roles and responsibilities based on proximity to the WEF. • The facilities must be regularly serviced to reduce the risk of surface or groundwater pollution. <p><u>Hazardous materials</u></p> <ul style="list-style-type: none"> • Use and /or storage of materials, fuels and chemicals which could potentially leak into the ground must be controlled in a manner that prevents such occurrences. • All storage tanks containing hazardous materials must be placed in bunded containment areas with sealed surfaces. • 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 high runoff stormwater events.

ACTIVITY	MITIGATION AND/OR MANAGEMENT MEASURES	
CONSTRUCTION PHASE – GENERAL EIR		
		<ul style="list-style-type: none"> Any hazardous substances must be stored at least 100m from any of the water bodies on site. Contaminated wastewater (such as concrete wastewater) must be managed by the Contractor to ensure existing water resources on the site are not contaminated. All wastewater from general activities in the camp shall be collected and removed from the site for appropriate disposal at a licensed commercial facility. Waste manifests must be kept as proof of legal disposal at a hazardous landfill site <p><u>Water resources</u></p> <ul style="list-style-type: none"> Site staff shall not be permitted to use any other open water body or natural water source adjacent to or within the designated site for the purposes of bathing, washing of clothing or for any construction related activities. Municipal water (or another source approved by the ECO or secured through a WUL) should be used for all activities such as washing of equipment or disposal of any type of waste, dust suppression, concrete mixing, compacting, etc. Compaction of backfilled material must attain low soil permeability. Site design and operation must be such that surface/stormwater is diverted away from excavation trenches. Backfilling of trenches must be done in such a way that water ponding and erosion of the backfilled trench are avoided. <p><u>Stormwater</u></p> <ul style="list-style-type: none"> The site must be managed in a manner that prevents pollution of drains, downstream watercourses or groundwater, due to suspended solids, silt or chemical pollutants. Temporary cut-off drains and berms may be required to capture stormwater and promote infiltration. Hazardous substances must be stored at least 100 m away from any water bodies on-site to avoid pollution.
7.	NOISE	<ul style="list-style-type: none"> Construction site yards, workshops, and other noisy fixed facilities should be located well away from noise sensitive areas. Once the proposed final layouts are made available by the contractor(s), the sites must be evaluated in detail and specific mitigation measures designed into the system. Noise levels must be kept within acceptable limits. All noise and sounds generated must adhere to SABS 0103 specifications for maximum allowable noise levels for residential areas. No pure tone sirens or hooters may be utilised except where required in terms of SABS standards or in emergencies.
8.	BIODIVERSITY	<ul style="list-style-type: none"> Any animals rescued or recovered will be relocated in suitable habitat away from any infrastructure. An expert who holds a Competency Certificate to handle Dangerous and Venomous Reptiles should be contracted to remove any snakes. Cleared vegetation can be used to form wood piles, and logs and stumps can be placed in rehabilitated areas. Dead or decaying wood piles should be created as these also provide valuable refuge, especially due to the clearance of vegetation cover. Logs and stumps also provide important habitats for several reptile species as well as smaller mammals, amphibians, arachnids, and scorpions. With time they will eventually be reduced to valuable compost. Dead trees and stumps are also used for nesting purposes by barbets, hoopoes and owls, as well as perching or hunting platforms for birds like kingfishers. Any lizards, gecko's, monitors, or snakes encountered should be allowed to escape to suitable habitat away from the disturbance. No reptile should be intentionally killed, caught, or collected during any phase of the project. The local departments of environmental affairs (Eastern Cape & Northern Cape) are mandated to investigate the management of the site as per each provinces' mandated legislation. General avoidance of snakes is the best policy if encountered. Snakes should not be intentionally harmed or killed and allowed free movement away from the area. Appropriate footwear should be worn in the field.

ACTIVITY	MITIGATION AND/OR MANAGEMENT MEASURES
CONSTRUCTION PHASE – GENERAL EIR	
	<ul style="list-style-type: none"> When possible, construction work should be restricted to one area at a time. This will give smaller birds, mammals, reptiles, and amphibians an opportunity to move into undisturbed areas close to their natural habitat. The Contractor must ensure that no faunal species are trapped, hunted, or killed during the construction phase. No further vegetation clearance to that which is essential for establishing project infrastructure is permitted, except for the removal of alien invasive species. All remaining indigenous vegetation must be conserved wherever possible. No roads shall be cut through river- and stream banks (riparian vegetation) as this may lead to erosion. If this is essential then a method statement is required, and the ECO must approve the method statement. There must be no unnecessary disturbance of natural vegetation. Where unavoidable, such disturbed areas must be rehabilitated. Implement a worker environmental education program and implement best management practices.
9.	<p style="text-align: center;">WASTE MANAGEMENT</p> <p><u>Construction rubble</u></p> <ul style="list-style-type: none"> Construction rubble shall be disposed of in pre-agreed, demarcated spoil dumps that have been approved by the relevant Municipality. Waste manifests must be kept as proof that this has been disposed of legally. <p><u>Litter management</u></p> <ul style="list-style-type: none"> Sufficient waste bins (with animal proof lids) must be provided at the construction site for different types of waste disposal and for recycling purposes. Refuse bins must be placed at strategic positions to ensure that litter does not accumulate within the construction site. A housekeeping team should be appointed to regularly maintain the litter and rubble situation on the construction site. Littering by the employees of the Contractor shall not be allowed under any circumstances. The ECO shall monitor the neatness of the work sites as well as the Contractor's campsite. Sanitary bins must be provided for women. All waste must be removed from the site and transported to a landfill site as approved by the relevant Municipality. <p><u>Hazardous waste</u></p> <ul style="list-style-type: none"> All hazardous waste materials must be carefully stored as advised by the ECO, and then disposed of off-site at a licensed landfill site. Contaminants to be stored safely to avoid spillage Machinery must be properly maintained to keep oil leaks in check. <p><u>Sanitation</u></p> <ul style="list-style-type: none"> The Contractor shall install mobile chemical toilets on the site. 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. Ablution facilities shall be within 100m from workplaces but not closer than 100m from any natural water bodies or boreholes. There should be enough toilets available to accommodate the workforce. Males and females must be accommodated separately where possible. Alternatively, ablution facilities may be located in a place approved by the ECO. Toilets must be serviced regularly, and the ESO should inspect toilets regularly. Potable water must be provided for all construction staff. <p><u>Remedial actions</u></p> <ul style="list-style-type: none"> Depending on the nature and extent of the spill, contaminated soil must be either excavated or treated on-site. The ECO must approve the precise method of treatment of polluted soil.

ACTIVITY	MITIGATION AND/OR MANAGEMENT MEASURES
CONSTRUCTION PHASE – GENERAL EIR	
	<ul style="list-style-type: none"> • This could involve the application of soil absorbent materials or oil-digestive powders to the contaminated soil. • If a spill occurs on an impermeable surface such as cement or concrete, the surface spill must be contained using oil absorbent materials. • 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. • Spill kits must be provided at strategic points within the construction site.
10.	<p>HEALTH AND SAFETY</p> <p><u>Worker safety</u></p> <ul style="list-style-type: none"> • Safety measures, work procedures and first aid must be implemented on-site. • A health and safety plan in terms of the Occupational Health and Safety Act (Act No. 85 of 1993) must be drawn up to ensure worker safety. • Contractors must ensure that all equipment is maintained in a safe operating condition. • A record of health and safety incidents must be kept on-site. • Any health and safety incidents must be reported to the Project Coordinator immediately. • First aid facilities must be available on site at all times. • Workers have the right to refuse work in unsafe conditions. • Material stockpiles or stacks must be stable and well secured to avoid collapse and possible injury to site workers. <p><u>Worker facilities</u></p> <ul style="list-style-type: none"> • Eating areas should be regularly serviced and cleaned to ensure the highest possible standards of hygiene and cleanliness <p><u>Protective gear</u></p> <ul style="list-style-type: none"> • Personal Protective Equipment (PPE) must be made available to all construction staff and the wearing and use of PPE must be compulsory. Hard hats and safety shoes must be worn at all times and other PPE worn where necessary i.e. dust masks, earplugs, hard hats, safety boots and overalls etc. • No person is to enter the site without the necessary PPE. • The construction camp must remain fenced for the entire construction period. • Potentially hazardous areas such as trenches are to be demarcated and clearly marked with orange snow netting. In addition, the ESO must check the trenches before work commences to ensure that no animal species have fallen in. • Adequate warning signs of hazardous working areas must be erected in suitable locations. • Uncovered manholes and excavations must be clearly demarcated • Emergency numbers for local police, fire department, Eskom and the Municipality must be placed in a prominent area. • Firefighting equipment must be placed in prominent positions across the site where it is easily accessible. This includes fire extinguishers, a fire blanket as well as a water tank. • A speed limit of 40km/h must be adhered to by all vehicles and machinery. <p><u>Hazardous Material Storage</u></p> <ul style="list-style-type: none"> • Staff that will be handling hazardous materials must be trained to do so. • Any hazardous materials (apart from fuel) must be stored within a lockable store with a sealed floor. • All storage tanks containing hazardous materials must be placed in bunded containment areas with sealed surfaces. The bund walls must be high enough to contain 110% of the total volume of the stored hazardous material. • The provisions of the Hazardous Chemical Substances Regulations promulgated in terms of the Occupational Health and Safety Act 85 of 1993 and the SABS Code of

ACTIVITY	MITIGATION AND/OR MANAGEMENT MEASURES	
CONSTRUCTION PHASE – GENERAL EIR		
		<p>Practise must be adhered to. This applies to solvents and other chemicals possibly used in the construction time.</p> <p><u>Procedure in the event of a petrochemical spill</u></p> <ul style="list-style-type: none"> • The individual responsible for, or who discovers, the petrochemical spill must report the incident to the Project Coordinator, ECO and/or Contractor as soon as reasonably possible. • The problem must be assessed, and the necessary actions required will be undertaken. • The immediate response must be to contain the spill. <p><u>Fire management</u></p> <ul style="list-style-type: none"> • Firefighting equipment should be present on-site at all times as per Occupational Health and Safety Act. • All construction staff must be trained in fire hazard control and firefighting techniques. • All flammable substances must be stored in dry areas which do not pose an ignition risk to the said substances. • No open fires will be allowed on site unless in a demarcated area identified by the ECO (e.g. a “braai” area). This area must be equipped with fire extinguishers. • Smoking may only be conducted in demarcated areas as agreed upon by the ECO and Contractor.
11.	SECURITY	<ul style="list-style-type: none"> • Antisocial activities such as consumption or illegal selling of alcohol, drug utilisation or selling on-site are prohibited. • Any persons found to be engaged in such activities shall have disciplinary and / or criminal action taken against them. • No person shall enter the site unless authorised to do so by the Contractor, Project Coordinator or ECO. All visitors must report to the site office on arrival, undergo induction training, sign an indemnity form and be in possession of the correct PPE clothing to wear while on site. • If any fencing interferes with the construction process, such fencing shall be deviated until construction is completed. The deviation of fences shall be negotiated and agreed with the landowner in writing by the Developer, in consultation with the ECO. • Trespassing on private / commercial properties adjoining the site is forbidden. • The site must be secured in order to reduce the opportunity for criminal activity in the locality of the construction site.
12.	SOCIAL ENVIRONMENT	<ul style="list-style-type: none"> • All contact with affected parties shall be courteous at all times. The rights of the affected parties shall be respected at all times. • A complaints register should be kept on site. Details of complaints should be incorporated into the audits as part of the monitoring process. This register is to be tabled during monthly site meetings. • No interruptions, other than those negotiated, shall be allowed to any essential services. • Damage to infrastructure shall not be tolerated and any damage shall be rectified immediately by the Contractor. A record of all damage and remedial actions shall be kept on site. • Road rehabilitation should take place during and once construction is completed. • Construction traffic should only make use of approved routes. • Where possible unskilled job opportunities should be afforded to local community members. • Equal opportunities for employment should be created to ensure that the local female population also have access to these opportunities. Females should be encouraged to apply for positions. • Payment should comply with applicable Labour Law legislation in terms of minimum wages.

ACTIVITY	MITIGATION AND/OR MANAGEMENT MEASURES
CONSTRUCTION PHASE – GENERAL EIR	
13.	<p>CULTURAL AND HERITAGE ARTEFACTS</p> <ul style="list-style-type: none"> Local companies should be given the opportunity to tender for the provision of locally sourced materials, labour, plant, transport, etc. Local museums as well as the South African Heritage Resource Agency (SAHRA) and the Eastern Cape Provincial Heritage Resources Authority (ECPHRA), should be informed if any artefacts are uncovered in the affected area and mitigation measures recommended by SAHRA should be followed. The Contractor must ensure that their workforce is aware of the necessity of reporting any possible historical or archaeological finds to the ECO so that appropriate action can be taken. Any discovered artefacts shall not be removed under any circumstances. Any destruction of a site can only be allowed once a permit is obtained and the site has been mapped and noted. Permits shall be obtained from the ECPHRA and/or SAHRA, where relevant.
14.	<p>CONSTRUCTION SITE DECOMMISSIONING</p> <p><u>Removal of equipment</u></p> <ul style="list-style-type: none"> All structures comprising the construction camp are to be removed from site. The area that previously housed the construction camp is to be checked for spills of substances such as oil, paint, etc, and these shall be cleaned up and contaminants disposed of appropriately. All hardened surfaces within the construction camp area should be ripped, all imported materials removed, and the area shall be top soiled and rehabilitated using the guidelines as set out in the section on Flora and Fauna that forms part of this document. <p><u>Temporary services</u></p> <ul style="list-style-type: none"> The Contractor must arrange the cancellation of all temporary services. Temporary roads must be closed and access across these blocked. All areas where temporary services were installed are to be rehabilitated to the satisfaction of the ECO. <p><u>Associated infrastructure</u></p> <ul style="list-style-type: none"> Surfaces are to be checked for waste products from activities such as concrete batching and cleared in a manner approved by the ECO. All surfaces hardened due to construction activities are to be ripped and imported material thereon removed. All rubble is to be removed from the site to an approved disposal site as approved by the ECO. Burying of rubble on-site is prohibited. Waste manifests must be kept as proof that this has been disposed of legally. The site is to be cleared of all litter. Waste manifests must be kept as proof that this has been disposed of legally. The Contractor is to check that all watercourses are free from building rubble, spoil materials and waste materials. Fences, barriers and demarcations associated with the construction phase are to be removed from the site. All residual stockpiles must be removed or spread on site as directed by the ECO. All unused building materials must be removed from the site. The Contractor must repair any damage that the construction works has caused to neighbouring properties, specifically, but not limited to, damage caused by poor storm water management. <p><u>Rehabilitation</u></p> <ul style="list-style-type: none"> Disturbed areas of natural vegetation as well as cut and fills must be rehabilitated immediately after the installation of the new towers to prevent further soil erosion. Re-seeding shall be done on disturbed areas as directed by the ECO. Only seeds of indigenous plants must be used. Recommended rehabilitation is in the form of active and ongoing re-vegetation of affected areas, including areas where surface disturbances resulted from

ACTIVITY	MITIGATION AND/OR MANAGEMENT MEASURES
CONSTRUCTION PHASE – GENERAL EIR	
	<p>construction, as well as areas that were used for alternative or other functions, such as storage areas, parking bays, etc.</p> <ul style="list-style-type: none"> • Once construction activities at a tower site has been completed, rehabilitation must commence. • Existing access roads should be left ‘as is’ for future use during maintenance operations. • In accordance with the Conservation of Agricultural Resources Act, No. 43 of 1983, slopes in excess of 2% must be contoured and slopes in excess of 12% must be terraced. • Other methods of rehabilitation may also be used at the discretion of the ECO, e.g. stone pitching, logging, etc. Contour banks shall be spaced according to the slope on tower sites. The type of soil shall also be taken into consideration. • Final inspection in order to ensure adherence to EMP guidelines, completion of localised/ remaining areas of impact, monitoring of rehabilitation success, etc.

Table 5-4: Construction Phase Mitigation Measures and Management Actions, Specialists

ACTIVITY	MITIGATION AND/OR MANAGEMENT MEASURES
CONSTRUCTION PHASE – SPECIALISTS	
1.	<p>ECOLOGICAL</p> <ul style="list-style-type: none"> • Ensure that turbine platforms are placed in previously impacted areas if possible; • All Species of Conservation Concern (SCC), protected or vulnerable must be avoided or transplanted. A Search and Rescue Plan must be implemented. • Rehabilitate areas used during the construction phase but not required during the operational phase, e.g. laydown areas. • Permits to remove species found on the NEM:BA and PNCO list will be required prior to construction. • In the unlikely event that a protected tree species needs to be removed, a permit to do so must be attained from DAFF. • An independent ECO must inspect the immediate vegetation for evidence of snares. • Construction activities must be demarcated, and vegetation clearing and topsoil removal limited to these areas. • Construction through watercourses, only where necessary, must occur within the smallest possible construction footprint, preferably during the dry season, and must be immediately followed by erosion stabilisation and re-vegetation. • Where areas with SCC are required for the project, a Search and Rescue Plan must be implemented, and SCC removed prior to construction and either placed in an area that will not be developed and requires rehabilitation or placed in a holding nursery located on-site and used later for site rehabilitation. • Permits will be required to move all plants protected by legislation. • Areas which are already disturbed should be utilised, such as areas with a low number of SCC, have invasive species and those that are disturbed due to grazing and poor land management practices. • All recommendations contained in the CES report, “Botanical Micro-siting Report for the Proposed Umsobomvu Wind Energy Facility near Middelburg, Eastern Cape and Northern Cape Provinces”, are to be implemented [see Section 5.3]. Allowance needs to be made for plant relocation at all turbine locations. • An ECO, with an ecological background, must be appointed for the Umsobomvu WEF project and must have undertaken a snake wrangling course so that they can safely relocate any snakes found on site. • The ECO must walk the site immediately prior to construction i.e. in front of earthmoving equipment. All snakes and other slow-moving species must be recorded (photographs and GPS location) and relocated elsewhere within the same property, out of harms way. The location where the fauna is relocated to must be recorded (GPS and photograph) and placed on iNaturalist. • Traffic calming measures, such as speed restrictions, must be implemented.

		<ul style="list-style-type: none"> Staff induction must include information on speed limits and that vehicles must stop when they encounter snakes crossing the road. If encountered, vehicles must wait until the snake has moved off the road before continuing on. Any mortalities must be collected and donated to SANBI with GPS co-ordinates. The ESO must check trenches daily for faunal species (including snakes) that may have fallen inside. If faunal species are found, these must be recorded and removed to suitable habitat out of harms way. Limit the height of stockpiles to 2m and actively manage them for alien vegetation and erosion. Protect abiotic habitats, such as termite mounds which play an important ecological role such as providing shelter for reptiles.
2.	AGRICULTURE & SOILS	<ul style="list-style-type: none"> Develop and implement a Rehabilitation and Monitoring Plan (please see Section 10.6.) to monitor stockpiles. Implement measures such as windbreaks, swales and watering as required to ensure no wind or stormwater erosion occurs. The contractor shall ensure that all site personnel are aware of the procedure to be followed in the event of a fire. The appointed fire officer shall notify the Fire and Emergency Services in the event of a fire and shall not delay doing so until such time as the fire is beyond his / her control. The contractor shall ensure that there is basic fire-fighting equipment on site at all times. This equipment shall include fire extinguishers and beaters. Any work that requires the use of fire may only take place within designated areas. Fire-fighting equipment shall be available in these areas. The contractor shall ensure that the correct emergency call numbers for the nearest fire department and the local Farmers Association Fire Marshall are easily accessible at all times and that in the event that a fire becomes unmanageable, these people are notified as a matter of urgency.
3.	AVIFAUNA	<ul style="list-style-type: none"> If pre-construction monitoring discovers any breeding target species, the specialist will develop case specific recommendations for management of the situation. No infrastructure should be built in areas which have been identified as MEDIUM sensitivity by the Avifaunal Specialist. All powerlines linking the turbines and linking turbine strings to the on-site substation should be placed underground. Where this is not possible this should be discussed with the specialist and a compromise reached that provides acceptable protection for birds. 1.5 km of overhead connecting line was authorised as part of the process (up to 33 kV). This is acceptable in terms of avifauna provided that all pole structures are designed bird friendly and that anti-bird collision line marking devices are installed on the full length of line.
4.	PALAEONTOLOGICAL	<ul style="list-style-type: none"> During the construction phase, all deeper (> 1 m) bedrock excavations should be monitored for fossil remains by the responsible ESO. Should substantial fossil remains such as vertebrate bones and teeth, plant-rich fossil lenses or dense fossil burrow assemblages be exposed during construction, the responsible ECO should be notified and should safeguard these, preferably in situ, and alert the responsible heritage management authority (ECPHRA for the Eastern Cape, SAHRA for the Northern Cape) so that appropriate action can be taken by a professional palaeontologist, at the developer's expense (Contact details: ECPHRA: Mr Sello Mokhanya, 74 Alexander Road, King Williams Town 5600; Email: smokhanya@ecphra.org.za. SAHRA: 111 Harrington Street, Cape Town. PO Box 4637, Cape Town 8000, South Africa. Phone: +27 (0)21 462 4502. Fax: +27 (0)21 462 4509. Web: www.sahra.org.za).
5.	HERITAGE	<ul style="list-style-type: none"> All heritage sites and features within the site need to be demarcated if they fall within a 50m of and construction footprint. Demarcation can be in the form of temporary fencing with appropriate warning signs. There should be a 20m buffer between the feature/site and the development. A competent heritage practitioner should undertake demarcation. No construction activity should be allowed unless proof of demarcation is given to ECHPRA/SAHRA. (Please note that SAHRA guidelines stipulate a minimum of 15m as a buffer)

		<ul style="list-style-type: none"> All sites that are to be affected will require a destruction permit from ECPHRA. Permits may take some time to be issued, and thus the application needs to be done well in advance of the construction phase. Should concentrations of palaeontological and/or archaeological heritage material and/or human remains be uncovered during construction, all work at that location must cease immediately and be reported to ECPHRA and/or SAHRA (021 642 4502) so that systematic and professional investigation/excavation can be undertaken.
6.	NOISE	<ul style="list-style-type: none"> The noise impact should be remodelled when the micro-siting of the turbines take place. No construction piling should occur at night. Piling should only occur during the day to take advantage of unstable atmospheric conditions. An exception may be made, as per Table 3-1 when turbine bases are being poured. Construction staff should receive “noise sensitivity” training. An ambient noise survey should be conducted during the construction phase.
7.	SOCIAL	<ul style="list-style-type: none"> Co-operate with the district municipalities and their relevant structures to compile/update a database of an available labour force, skills requirements, etc. This process should start well in advance of the construction period commencing. Liaise with municipalities regarding their methods used to advertise for employment. Take care not to create unrealistic expectations and communicate the time frames, skills requirements and commencement of the activities clearly to the communities. Set up a central labour desk where workers register. Only workers registered in this database should be considered for employment. Recruitment of temporary workers at the access to the construction site should not be allowed. The Community Liaison Officer (CLO) should work in consultation with the Ward Councillors and community representatives to establish labour desks at the most suitable localities within the communities where workers are sourced. The area where workers are recruited should not be near schools or other sensitive receptors where a large influx of people could cause safety and security impacts for the residents and other parties. Provide sufficient sanitation and refuse facilities to curb littering and pollution. Identify a CLO for the various areas/regions well in advance of the construction period commencing. Set up criteria for the CLO’s to ensure that the correct people are appointed. The CLO should have knowledge of the local community members and area, be educated, committed to the cause, accessible for community members as well as for the developer, etc. Give preference to workers from the local and metropolitan municipal area, followed by people from the district municipality. Contractually oblige Sub-contractors to only employ workers through the labour desk and make this fact known to the communities. This would address and limit the uncoordinated influx of people to the site and to the surrounding towns, as they would be unable to secure work if not through the labour desk. Issues such as accommodation for workers, transport, catering and any other needs for employees, whether locals or outsiders, must be discussed with the local and Metropolitan Municipalities in good time. Once construction starts structures must already be in place to address SMME needs and requirements and implement management measures. A skills audit of the available workforce must be conducted in order to minimise the numbers of workers (skilled, semi- and unskilled) to be brought in from other areas. Enhance on a capacity building and skills development strategy to lessen any possible skills disparities between the local skills available and the requirements of the project. A policy regarding employment equity of minority groups (women, youth and the disabled) should be formulated and implemented wherever possible. Announce disruptions, road closures, etc. by using the local media, road sign boards and other Municipal structures. Erect signboards along surrounding routes indicating accesses to the construction site.

		<ul style="list-style-type: none"> ● Impose penalties for reckless drivers as a way to enforce compliance to traffic rules. ● Inspect trucks and other heavy vehicles on a regular basis to avoid oil spillages and unroadworthy vehicles that could lead to accidents. ● Vehicles carrying dusty or light materials should be securely covered with a tarpaulin before leaving the site. ● Display a contact number on the construction vehicles where motorists can report reckless driving. ● No informal traders to be allowed on or near the construction site. ● Set up the labour desk in a secure and suitable area, preferably in the communities where workers are being sourced, discouraging the gathering of temporary workers at the entrance and access roads to the construction site where it could affect road users and surrounding landowners. ● Keep a logbook at the entrance to the construction site where community members can lodge complaints, if necessary.
8.	VISUAL	<ul style="list-style-type: none"> ● Dust suppression is important as dust will raise the visibility of the development. ● New road construction should be minimised, and existing roads should be used where possible. ● The Contractor should maintain good housekeeping on-site to avoid litter and minimise waste. ● Clearance of indigenous vegetation should be minimised, and rehabilitation of cleared areas should start as soon as possible. ● Erosion risks should be assessed and minimised as erosion scarring can create areas of strong visual contrast with the surrounding vegetation, which can often be seen from long distances. ● Night lighting of the construction sites should be minimised within requirements of safety and efficiency.

Table 5-5: Operational Phase Mitigation Measures and Management Actions, General

ACTIVITY		MITIGATION AND/OR MANAGEMENT MEASURES
OPERATIONAL PHASE – GENERAL EIR		
1.	ECOLOGY	<ul style="list-style-type: none"> ● Ensure that maintenance staff and vehicles remain on designated roads and paths within the site. ● Avoid unnecessary disturbance of existing bush patches.
2.	SOCIO-ECONOMIC	<ul style="list-style-type: none"> ● Ensure that if the community trust business model is implemented, the board of trustees is representative of the surrounding communities, and that proper oversight procedures are established prior to operation of the WEF.
3.	LIGHTING	<ul style="list-style-type: none"> ● Reduce night lighting impacts by using shaded lighting, LED lighting and using lights at low levels.
4.	ARCHITECTURE OF ANCILLARY INFRASTRUCTURE	<ul style="list-style-type: none"> ● Ensure that the surfaces of all project structures and buildings visible to the public are maintained such that: <ul style="list-style-type: none"> ○ their colours minimize visual intrusion and contrast by blending with the existing colours of the surrounding landscape, ○ their colours and finishes do not create excessive glare, and ○ their colours and finishes are consistent with local policies and ordinances.
5.	STORAGE OF HAZARDOUS SUBSTANCES	<ul style="list-style-type: none"> ● Ensure that all hazardous substances are stored in appropriately bunded locations.
6.	OPERATING EQUIPMENT	<ul style="list-style-type: none"> ● Lower noise emission levels from inverters and transformers can be achieved by housing them in enclosed structures.
7.	STORMWATER MANAGEMENT	<ul style="list-style-type: none"> ● Maintain recommendations of the Stormwater Management Plan.
8.	WASTE MANAGEMENT	<ul style="list-style-type: none"> ● Develop and implement a waste management plan incorporating recycling and waste minimization and legal aspects into the plan. ● Develop and implement a worker education plan for waste management in the work environment.

Table 5-6: Operational Phase Mitigation Measures and Management Actions, Specialist

ACTIVITY		MITIGATION AND/OR MANAGEMENT MEASURES
OPERATIONAL PHASE – SPECIALISTS		
1.	ECOLOGICAL	<ul style="list-style-type: none"> • Eradication of the already established alien invasive species on site (This should be done during all phases of the project). • Active management of alien species throughout both the construction and operation phases to prevent their spread into areas where they have not already been established. • Ensure continued maintenance of rehabilitated areas until a specialist has conclude that the rehabilitated areas are self-sustaining and require no further management. • During the rehabilitation of the area, measures should be put in place to prevent accidental or unintended introduction of alien species from occurring. • An Alien Invasive Control Programme (please see Section 10.7) must be implemented.
2.	AGRICULTURE & SOILS	<ul style="list-style-type: none"> • All run-off water must be collected, channelled and disposed of in an appropriate manner. • Anti-erosion features must be installed where required. • Ensure that all cleared and impacted land is rehabilitated and re-vegetated. • Do not fence off any WEF infrastructure. This will allow maximum grazing within current camps and allow fauna to move freely about.
3.	AVIFAUNA	<ul style="list-style-type: none"> • A more detailed avifaunal management plan is presented in Table 5-7 below.
4.	BATS	<ul style="list-style-type: none"> • The following curtailment schedule applies to the Umsobomvu WEF • TIME PERIOD 1 <ul style="list-style-type: none"> ○ Late October to Mid January ○ 19:00-23:00 and 03:00-04:30 ○ Below 7m/s; Above 13.0°C (measured at 10m agl) ○ Below 9m/s; Above 13.0°C (measured at 50m agl) • TIME PERIOD 2 <ul style="list-style-type: none"> ○ February ○ 18:30-05:00 ○ Below 4.5 m/s; Above 16.0°C (measured at 10m agl) ○ Below 7.5 m/s; Above 17.0°C (measured at 50m agl) • TIME PERIOD 3 <ul style="list-style-type: none"> ○ Mid March to Early April ○ 18:30-05:00 ○ Below 3.5 m/s; Above 14.5°C (measured at 10m agl) ○ Below 5.5 m/s; Above 13.0°C (measured at 50m agl)
5.	SOCIAL	<ul style="list-style-type: none"> • Maximise the number of local permanent and temporary employees where possible. • Do training and capacity building wherever necessary. • Assist and guide the local community with regards to the needs of the WEF plant and the types of supporting industries and services required for its successful operation. Enterprise Development funding is available to assist the local SMMEs with skills training and capacity building, etc. • Formulate a strategy to achieve long-term sustainable goals that would include large economic development projects in the major “renewable energy development nodes” that would contribute to the region’s economic growth; and • In addition to this also identify some short-term food security and local community development projects.
6.	VISUAL	<ul style="list-style-type: none"> • Turbine maintenance should be conducted regularly. • Wind turbines shall be painted bright white to provide maximum daytime conspicuousness. Lighting should be designed to minimise light pollution without compromising safety. • Wind farms are required by law to be lit at night as they represent hazards to aircraft due to the height of the turbines. Marking of turbines depends on wind farm layout and not all turbines need to be lit.

ACTIVITY	MITIGATION AND/OR MANAGEMENT MEASURES
	<ul style="list-style-type: none"> • The aviation standards have to be followed and no mitigation measures are applicable in terms of marking the turbines. Lighting of ancillary buildings and structures should be designed to minimise light pollution without compromising safety. Motion sensitive lighting can be used for security purposes. • Signs near wind turbines should be avoided unless they serve to inform the public about wind turbines and their function. Advertising billboards should be avoided. • An information kiosk (provided that the kiosk and parking area is located in a low visibility area) and trails along the wind farm can enhance the project by educating the public about the need and benefits of wind power. ‘Instilling the concept of sustainability, and creating awareness of the need for wind farm developments is an important process that can engage the entire community’ (Johnston, 2001).

Table 5-7: Avifaunal Management Programme

ASPECT	GOAL	RESPONSIBLE PARTY	ACTION	TIMEFRAME TO IMPLEMENT	INDICATOR	REPORTING
CONSTRUCTION PHASE						
Verreaux's Eagle	Avoid turbine collision risk	Umsobomvu Wind Power	Design infrastructure to avoid eagle nest buffers	Final layout	Complete avoidance of buffers	EMPr
	Mitigate turbine collision risk	Umsobomvu Wind Power	A bird fatality threshold and adaptive management policy must be designed by an ornithologist for the site prior to COD. This policy should form an annexure of the operational EMP for the facility. This policy should identify most importantly the number of bird fatalities of priority species which will trigger a management response, appropriate responses, and timelines for such a response. Fatalities of priority bird species are usually rare events (but with very high consequence) and it is difficult to analyse trends or statistics related to these fatalities as they occur. It is therefore important to have a threshold policy in place to assist management.	By COD	Policy approved and in place	Policy document as annexure to operational EMP
	Avoid creation of new habitat for prey species close to turbines	Umsobomvu Wind Power	It is essential that the new wind farm does not create favourable conditions for eagle prey mammal species such as Rock Hyrax and Ground Squirrel in high-risk areas (close to turbines). This could be caused by insufficient compacting of road verges, and incorrect placement of spoil rock and plant material. We therefore recommend that within the first three months of operations a full assessment of this aspect be made by the ornithologist contracted for operational monitoring. If such conditions are found, case specific recommendations for solutions will need to be developed and implemented by the wind farm.	During construction	No creation of new prey habitat close to turbines - avifaunal specialist sign off	Operational bird monitoring report

ASPECT	GOAL	RESPONSIBLE PARTY	ACTION	TIMEFRAME TO IMPLEMENT	INDICATOR	REPORTING
	Avoid disturbance of breeding eagles	Umsobomvu Wind Power	The effects of construction of the wind farm on the eagles must be monitored during construction. This will require a minimum of 2-3 site visits by a specialist during each eagle breeding season during construction. These site visits must determine breeding success at each nest and document eagle behaviour and reaction to construction as far as possible.	During construction	Breeding status at nests	Construction phase bird monitoring report
Large terrestrial bird	Avoid collision with overhead power lines	Umsobomvu Wind Power	Minimise length of new overhead power line built above ground (1.5km of internal connector line maximum).	Final layout	Avifaunal specialist sign off	EMPr
			Any above ground power line must be fitted with a dynamic 'bird flapper' type device at 5m spacing on conductor or earth wire (if present) of all spans. Light and dark colour devices to be alternated to provide contrast against dark and light background. Devices to be maintained in working order for full lifespan. Phase-phase and phase-earth clearances to be 1 800mm minimum to ensure that large eagles perching on pylons cannot bridge these clearances, cause a short circuit and become electrocuted. Once the preferred design is available, it should be signed off by an avifaunal specialist.	During construction	Avifaunal specialist sign off	Operational phase bird monitoring report
All birds	Destruction of habitat	Umsobomvu Wind Power	Underground cables should be buried in trenches following roads (i.e. not on their own servitude through the veld), where technically feasible.	Final layout	Avifaunal specialist sign off	EMPr
OPERATIONAL PHASE						
Verreaux's Eagle	Mitigate turbine collision risk	Umsobomvu Wind Power	An observer led turbine Shutdown on Demand (SDOD) programme must be implemented at the facility from the start of operations (COD). This programme must consist of a suitably qualified, trained and resourced team of observers present on site for all daylight hours 365 days of the year. This team must be stationed at vantage points with full visible coverage of all turbine locations. The observers must detect incoming priority bird species (Verreaux's Eagle & others), track their flights, judge when they enter a turbine proximity threshold, and alert the control room to shut down the relevant turbine. A full detailed method statement or protocol must be designed by an ornithologist prior to COD. This	By COD	Programme operational just after COD	Operational phase bird monitoring report & Operational EMP

ASPECT	GOAL	RESPONSIBLE PARTY	ACTION	TIMEFRAME TO IMPLEMENT	INDICATOR	REPORTING
			protocol must be included in the operational EMP			
		Umsobomvu Wind Power	The facility must be monitored once operational in accordance with the most recent version of the best practice guidelines available at the time (Jenkins et al, 2015, 2021). A minimum of two years of monitoring must be completed, although if significant impacts are detected this will need to be extended. If significant impacts are identified, the projects' avifaunal specialist will have to identify suitable mitigation measures to be implemented by the wind farm operator. Fatality estimates should continue for the full life span of the facility. The results of this monitoring should feed into the adaptive management plan for the facility. Monitoring should include the grid connection line.	Operational phase	Monitoring programme under way just after COD	Operational phase bird monitoring report
		Umsobomvu Wind Power	The local population of Verreaux's Eagle (the four known nests close to site) must be monitored for the first two years of operations as part of the above required monitoring to ensure that any population level impacts are measured. This will require 2-3 visits to each of the known nests during breeding season each year by a suitably qualified independent ornithologist. This will measure breeding status and productivity and the overall health of this local population of eagles. Monitoring of the local population of breeding Verreaux's Eagles can be discontinued after two years if no fatalities have occurred at the site but should be continued if fatalities continue and exceed the identified thresholds.	Operational phase	Monitoring programme under way just after COD	Operational phase bird monitoring report
		Umsobomvu Wind Power	If the above mitigation measures do not adequately mitigate the risk and bird fatalities still exceed the identified thresholds these impacts will need to be mitigated in some other way. The wind farm should budget a suitable contingency amount annually for such an eventuality. If all mitigation measures prove inadequate the residual impacts will need to be offset. The facility will need to address other sources of mortality of priority species in a measurable way (according to best practice) so as to compensate for residual effects on the facility itself. This will	Operational phase	Monitoring programme under way just after COD	Operational phase bird monitoring report

ASPECT	GOAL	RESPONSIBLE PARTY	ACTION	TIMEFRAME TO IMPLEMENT	INDICATOR	REPORTING
			be detailed in the adaptive management plan.			

Table 5-8: Decommissioning Phase Mitigation Measures and Management Actions, General

ACTIVITY		MITIGATION AND/OR MANAGEMENT MEASURES
DECOMMISSIONING PHASE – GENERAL EIR		
1.	ECOLOGY	<ul style="list-style-type: none"> Construction vehicles and machinery should make use of existing infrastructure such as roads as far as possible to minimise disturbance on the receiving environment. Ensure that all bare land is rehabilitated after decommissioning.
2.	NOISE SENSITIVE RECEPTORS	<ul style="list-style-type: none"> Machinery that causes noise must only be operated at appropriate times (during the day and at normal working hours). See Table 3-1 for exceptions.
3.	POLLUTION	<ul style="list-style-type: none"> Littering must be avoided, and litter bins should be made available at various strategic points on site. Refuse from the construction site should be collected on a regular basis and deposited at an appropriate landfill. No storage of fuels and hazardous materials should be permitted near sensitive water resources. All hazardous substances (e.g. diesel, oil drums, etc.) to be stored in a bunded area. Ensure adequate storm water management by implementing recommendations of the Stormwater Management Plan during decommissioning.
4.	DUST	<ul style="list-style-type: none"> Reduce fugitive/nuisance dust by implementing the following: <ul style="list-style-type: none"> Damping down of un-surfaced and un-vegetated areas; Retention of vegetation where possible; Demolitions and other clearing activities must only be done during agreed working times and permitting weather conditions to avoid drifting of sand and dust into neighbouring areas; and A speed limit of 40km/h must not be exceeded on dirt roads. Any complaints or claims emanating from the lack of dust control should be attended to immediately by the Contractor.
5.	TRAFFIC & TRANSPORT	<ul style="list-style-type: none"> Deconstruction vehicles and machinery should make use of existing infrastructure such as roads as far as possible to minimise disturbance on the receiving environment. There must be no unnecessary disturbance of existing vegetation.
6.	SOIL EROSION	<ul style="list-style-type: none"> After the removal of all wind turbine-related structures, the disturbed soils should be re-vegetated to avoid unnecessary soil erosion.
7.	LAND USE	<ul style="list-style-type: none"> Ensure that an appropriate land use is adopted.

5.3 CUMULATIVE IMPACT AND OTHER INFRASTRUCTURE

Cumulative impacts are defined as those “that result from the incremental impact, on areas or resources used or directly impacted by the project, from other existing, planned or reasonably defined developments at the time the risks and impact identification process is conducted.” To assess the cumulative impacts that the proposed Umsobomvu WEF will have on the terrestrial ecology of the site, it is necessary to assess this at a broader level by looking at other developments in the area. The cumulative impacts associated with the project will include the loss of vegetation communities at a regional scale which will be exacerbated, the spread of invasive alien plant species which could be exacerbated, and habitat fragmentation and disruption of ecosystem function and process could be exacerbated. The cumulative impact associated with the construction and operation of the proposed Umsobomvu WEF, is likely to be of moderate significance due to the relatively large development footprint. However, to limit the impact, it is important that the recommended management plans (Chapter 10) are implemented, and that vegetation clearance is strictly limited to the development footprint of the Umsobomvu WEF. Rehabilitation, to restore ecological function, is also a key element of mitigating cumulative impacts, and it is therefore important to implement and monitor rehabilitation.

5.4 MICRO-SITING RECOMMENDATIONS

Micro-siting investigations were undertaken on the Final Umsobomvu WEF layout by the specialists. The recommendations made by the Avifaunal Specialist (WildSkies Ecological Services), Botanical and Faunal Specialist (CES), and Heritage Specialist (Umlando: Archaeological surveys & Heritage Resources Management) have been included in Table 5-9, Table 5-10 and Table 5-11 below.

Table 5-9 Avifaunal Micro-Siting Specialist Recommendations.

MICRO-SITING RECOMMENDATIONS – AVIFAUNAL		
COMPONENT		RECOMMENDATIONS
1.	WTG 1-26, Cabling and Access Roads	<ul style="list-style-type: none"> The infrastructure location is acceptable from an avifaunal perspective.

Table 5-10: Botanical Micro-Siting Specialist Recommendations.

MICRO-SITING RECOMMENDATIONS – BOTANICAL		
COMPONENT		RECOMMENDATIONS
1.	WTG 01, 02, 03, 04, 07 & 08	<p>WTG 01, 02, 03, 04, 07 and 08 fall within the Eastern Cape Province. Four (4) SCC were recorded within the overall footprint of the Umsobomvu WTG 01, 02, 03, 04, 07 and 08 in terms of the PNCO (Act No. 19 OF 1974), namely <i>Delosperma multiflorum</i>, <i>Ruschia sp.</i>, <i>Stomatium middelburgense</i>, and cf <i>Microloma armatum</i>, all of which are classified as Least Concern according to the SANBI Red List of South African Plants (Figure 1). Due to time constraints and accessibility, WTG 07 was not surveyed. However, the vegetation, slope, and position in the landscape was similar to the surrounding WTG's which allows for the extrapolation of potential SCC likely to occur within the footprint of WTG 07.</p> <ol style="list-style-type: none"> A permit must be obtained from the Eastern Cape DEDEAT prior to the damage, destruction or removal of any SCC identified at the site. To account for potential SCC which may have gone undetected during the micro-siting investigation, it is recommended that a Search and Rescue Operation is conducted during the peak survey period for the respective biomes in which the project occurs. Should additional SCC be identified during the Search and Rescue operation, which were not accounted for during this micro-siting investigation, separate permits must be obtained prior to the damage, destruction, removal or translocation of these species. SCC which are known to survive translocation must be translocated to the nearest similar habitat.
2.	WTG 05, 12 & 19	<p>WTG 05, 12 & 19 falls within the Eastern Cape Province. Four (4) SCC were recorded within the overall footprint of the Umsobomvu WTG 05, 12 and 19 in terms of the PNCO (Act No. 19 OF 1974), including <i>Delosperma sp.</i>, <i>Ruschia sp.</i>, <i>Stomatium middelburgense</i>, and cf <i>Microloma armatum</i>, all of which are classified as Least Concern according to the SANBI Red List of South African Plants (Figure 2). It should be noted that the position of WTG 05 has shifted since the micro-siting and therefore has not been directly assessed. However, only one (1) SCC was recorded within the original footprint of WTG 05, including <i>M. armatum</i> (LC) (Table 4).</p> <ol style="list-style-type: none"> A permit must be obtained from the Eastern Cape DEDEAT prior to the damage, destruction or removal of any of the other SCC identified at the site. To account for potential SCC which may have gone undetected during the micro-siting investigation, it is recommended that a Search and Rescue Operation is conducted during the peak survey period for the respective biomes in which the project occurs. Should additional SCC be

MICRO-SITING RECOMMENDATIONS – BOTANICAL		
	COMPONENT	RECOMMENDATIONS
		<p>identified during the Search and Rescue operation which were not accounted for during this micro-siting investigation, separate permits must be obtained prior to the damage, destruction, removal or translocation of these species.</p> <p>3. SCC which are known to survive translocation must be translocated to the nearest similar habitat.</p>
3.	WTG 10, 17 and 25	<p>WTG 10, 17 and 25 fall within the Northern Cape Province. Eleven (11) SCC were recorded within the overall footprint of the Umsobomvu WTG 10, 17 and 25 in terms of the Northern Cape Nature Conservation Act (NC NCA) (Act No. 9 of 2009), including <i>Euphorbia mauritanica</i>, <i>Ruschia indurata</i>, <i>Ruschia intricata</i>, <i>Ruschia sp.</i>, <i>Stomatium middelburgense</i>, <i>Crassula setulosa</i>, <i>Crassula sarcocaulis</i>, <i>Cotyledon sp.</i>, <i>Rabiea albinota</i>, <i>Chasmatophyllum musculinum</i>, and cf <i>Microloma armatum</i>, all of which are classified as Least Concern according to the SANBI Red List of South African Plants (Figure 3). It should be noted that the position of WTG 17 has shifted approximately 100 m to the south. However, it is unlikely that the species composition is different to the original turbine position assessed.</p> <p>1. A permit must be obtained from the Northern Cape DAEDARDL prior to the damage, destruction or removal of any of the other SCC identified at the site.</p> <p>2. To account for potential SCC which may have gone undetected during the micro-siting investigation, it is recommended that a Search and Rescue Operation is conducted during the peak survey period for the respective biomes in which the project occurs (see Figure 10 below). Should additional SCC be identified during the Search and Rescue operation which were not accounted for during this micro-siting investigation, separate permits must be obtained prior to the damage, destruction, removal or translocation of these species.</p> <p>3. SCC which are known to survive translocation must be translocated to the nearest similar habitat.</p>
4.	WTG 14, 16 and 22	<p>WTG 14, 16 and 22 all fall within the Eastern Cape Province. Only one (1) SCC was recorded within the overall footprint of the Umsobomvu WTG 14 and 16 in terms of the PNCO (Act No. 19 OF 1974), cf <i>Microloma armatum</i> which is classified as Least Concern according to the SANBI Red List of South African Plants. It should be noted that the position of WTG 22 has shifted since the micro-siting investigation and therefore has not been directly assessed. However, it is unlikely that the species composition would differ significantly to WTG 14 and 16.</p> <p>1. A permit must be obtained from the Eastern Cape DEDEAT prior to the damage, destruction or removal of any of the other SCC identified at the site.</p> <p>2. To account for potential SCC which may have gone undetected during the micro-siting investigation, it is recommended that a Search and Rescue Operation is conducted during the peak survey period for the respective biomes in which the project occurs (see Figure 10 below). Should additional SCC be identified during the Search and Rescue operation which were not accounted for during this micro-siting investigation, separate permits must be obtained prior to the damage, destruction, removal or translocation of these species.</p> <p>3. SCC which are known to survive translocation must be translocated to the nearest similar habitat.</p>
5.	WTG 24	<p>WTG 24 falls within the Northern Cape Province. Four (4) SCC were recorded within the overall footprint of the Umsobomvu WTG 24 in terms of the NC</p>

MICRO-SITING RECOMMENDATIONS – BOTANICAL		
	COMPONENT	RECOMMENDATIONS
		<p>NCA (Act No. 9 of 2009), including <i>Chasmatophyllum musculinum</i>, <i>Ruschia sp.</i>, <i>Stomatium middelburgense</i>, and <i>Cotyledon orbiculata</i>, all of which are classified as Least Concern according to the SANBI Red List of South African Plants.</p> <ol style="list-style-type: none"> 1. A permit must be obtained from the Northern Cape DAEARDL prior to the damage, destruction or removal of any of the other SCC identified at the site. 2. To account for potential SCC which may have gone undetected during the micro-siting investigation, it is recommended that a Search and Rescue Operation is conducted during the peak survey period for the respective biomes in which the project occurs. Should additional SCC be identified during the Search and Rescue operation which were not accounted for during this micro-siting investigation, separate permits must be obtained prior to the damage, destruction, removal or translocation of these species. 3. SCC which are known to survive translocation must be translocated to the nearest similar habitat.
6.	WTG 06 and 18	<p>WTG 06 and 18 fall within the Northern Cape Province. Four (4) SCC were recorded within the overall footprint of the Umsobomvu WTG 06 and 18 in terms of the NC NCA (Act No. 9 of 2009), including <i>Euphorbia mauritanica</i>, <i>Ruschia sp.</i>, <i>Stomatium middelburgense</i> and <i>Aloe broomii</i>, all of which are classified as Least Concern according to the SANBI Red List of South African Plants. It should be noted that the position of WTG 18 has shifted approximately 65 m to the north. However, it is unlikely that the species composition is different to the original turbine position assessed.</p> <ol style="list-style-type: none"> 1. A permit must be obtained from the Northern Cape DAEARDL prior to the damage, destruction or removal of any of the other SCC identified at the site. 2. To account for potential SCC which may have gone undetected during the micro-siting investigation, it is recommended that a Search and Rescue Operation is conducted during the peak survey period for the respective biomes in which the project occurs. Should additional SCC be identified during the Search and Rescue operation which were not accounted for during this micro-siting investigation, separate permits must be obtained prior to the damage, destruction, removal or translocation of these species. 3. SCC which are known to survive translocation must be translocated to the nearest similar habitat.
7.	WTG 09 and 21	<p>WTG 09 and 21 fall within the Northern Cape Province. Five (5) SCC were recorded within the overall footprint of the Umsobomvu WTG 09 and 21 in terms of the NC NCA (Act No. 9 of 2009), including <i>Microloma armatum</i>, <i>Ruschia intricata</i>, <i>Ruschia sp.</i>, <i>Stomatium middelburgense</i>, and <i>Crassula setulosa</i>, all of which are classified as Least Concern according to the SANBI Red List of South African Plants. It should be noted that the position of WTG 21 has shifted less than 60 m to the west. However, it is unlikely that the species composition is different to the original turbine position assessed.</p> <ol style="list-style-type: none"> 1. A permit must be obtained from the Northern Cape DAEARDL prior to the damage, destruction or removal of any of the other SCC identified at the site. 2. To account for potential SCC which may have gone undetected during the micro-siting investigation, it is recommended that a Search and Rescue Operation is conducted during the peak survey period for the

MICRO-SITING RECOMMENDATIONS – BOTANICAL		
	COMPONENT	RECOMMENDATIONS
		<p>respective biomes in which the project occurs. Should additional SCC be identified during the Search and Rescue operation which were not accounted for during this micro-siting investigation, separate permits must be obtained prior to the damage, destruction, removal or translocation of these species.</p> <p>3. SCC which are known to survive translocation must be translocated to the nearest similar habitat.</p>
8.	WTG 13, 20 and 23	<p>WTG 13, 20 and 23 fall within the Northern Cape Province. Nine (9) SCC were recorded within the overall footprint of the Umsobomvu WTG 13, 20 and 23 in terms of the NC NCA (Act No. 9 of 2009), including <i>Euphorbia mauritanica</i>, <i>Ruschia intricata</i>, <i>Ruschia sp.</i>, <i>Stomatium middelburgense</i>, <i>Delosperma sp.</i>, <i>Chasmatophyllum musculinum</i>, <i>Cotyledon orbiculata</i>, <i>Crassula setulosa</i>, and <i>Brunsvigia radulosa</i>, all of which are classified as Least Concern according to the SANBI Red List of South African Plants (Figure 8). It should be noted that the positions of WTG 13 and 20 have shifted slightly. However, it is unlikely that the species composition is different to the original turbine positions assessed.</p> <p>1. A permit must be obtained from the Northern Cape DAEDARDL prior to the damage, destruction or removal of any of the other SCC identified at the site.</p> <p>2. To account for potential SCC which may have gone undetected during the micro-siting investigation, it is recommended that a Search and Rescue Operation is conducted during the peak survey period for the respective biomes in which the project occurs. Should additional SCC be identified during the Search and Rescue operation which were not accounted for during this micro-siting investigation, separate permits must be obtained prior to the damage, destruction, removal or translocation of these species.</p> <p>3. SCC which are known to survive translocation must be translocated to the nearest similar habitat.</p>
9.	WTG 11 & 15	<p>WTG 11 and 15 fall within the Northern Cape Province and could not be accessed due to large troops of baboons on site. However, considerable effort was made to get as close to WTG 15 as possible, in order to draw conclusions regarding the potential SCC likely to occur on site. Six (6) SCC were recorded within and near to the 400 kV MTS in terms of the NC NCA (Act No. 9 of 2009), including <i>Brunsvigia radulosa</i>, <i>Stomatium middelburgense</i>, <i>Ruschia sp.</i>, <i>Ruschia intricata</i>, <i>Aloe broomii</i>, and <i>Crassula setulosa</i> classified as Least Concern (Figure 9). It is presumed that these species would occur within the footprints of WTG 11 and 15.</p> <p>1. A permit must be obtained from the Northern Cape DAEDARDL prior to the damage, destruction or removal of any of the other SCC identified at the site.</p> <p>2. To account for potential SCC which may have gone undetected during the micro-siting investigation, it is recommended that a Search and Rescue Operation is conducted during the peak survey period for the respective biomes in which the project occurs. Should additional SCC be identified during the Search and Rescue operation which were not accounted for during this micro-siting investigation, separate permits must be obtained prior to the damage, destruction, removal or translocation of these species.</p> <p>3. SCC which are known to survive translocation must be translocated to the nearest similar habitat.</p>

Table 5-11: Heritage Micro-Siting Specialist Recommendations.

MICRO-SITING RECOMMENDATIONS – Heritage		
	DESCRIPTION OF ARTIFACT FOUND	RECOMMENDED MITIGATION
1.	Stellae 10, Boundary Marker	● Remove and relocate
2.	Stellae 11, Boundary Marker	● Remove and relocate
3.	Stellae 12, Boundary Marker	● Remove and relocate
4.	UMZ006, Stone Tool Scatter	● Permit required
5.	UMZ014, Stone Tool Scatter	● Not affected by infrastructure
6.	UMZ015, Quarry and Knapping	● Not affected by infrastructure
7.	UMZ026, Stone Tool Scatter	● Sampling and Permit required
8.	UMZ029, Stone Tool Scatter	● Permit required
9.	Weltevreden, Labourers Houses	● Not affected by infrastructure
10.	Weltevreden, Historical Building	● Not affected by infrastructure
11.	Weltevreden, Historical Midden	● Sampling and Permit required
12.	Winterhoek, Historical Building	● Not affected by infrastructure

5.5 ENVIRONMENTAL AUTHORISATION CONDITIONS

The following conditions have been extracted from the Environmental Authorisation, verbatim. All conditions must be abided by as part of this EMP (Table 5-11).

Table 5-11: Umsobomvu WEF EA Conditions.

EA CONDITIONS AND EA NUMBERING	
EA DFFE REFERENCE NO.: 14/12/16/3/3/2/730	
Scope of Authorisation	
1.	The construction of the 140MW Umsobomvu Wind Energy Facility, access road alternative 1, and its associated infrastructure within the Inxuba Yethemba Local Municipality in the Eastern Cape Province and the Umsobomvu Local Municipality in the Northern Cape Province.
2.	Authorisation of the activity is subject to the conditions contained in this authorisation, which form part of the environmental authorisation and are binding on the holder of the authorisation.
3.	The holder of the authorisation is responsible for ensuring compliance with the conditions contained in this environmental authorisation. This includes any person acting on the holder’s behalf, including but not limited to, an agent, servant, contractor, sub-contractor, employee, consultant or person rendering a service to the holder of the authorisation.
4.	The activities authorised may only be carried out at the property as described above.
5.	Any changes to, or deviations from, the project description set out in this authorisation must be approved, in writing, by the Department before such changes or deviations may be affected. In assessing whether to grant such approval or not, the Department may request such information as it deems necessary to evaluate the significance and impacts of such changes or deviations and it may be necessary for the holder of the authorisation in terms of the regulations.
6.	This activity must commence within a period of five (5) years from the date of issue of this authorisation. If commencement of the activity does not occur within that period, the authorisation lapses and a new application for environmental authorisation must be made in order for the activity to be undertaken.
7.	Commencement with one activity listed in terms of this authorisation constitutes commencement of all authorised activities.
8.	This authorisation does not negate the holder of the authorisations responsibility to comply with any other statutory requirements that may be applicable to the undertaking of the activity.
9.	The holder of an environmental authorisation must notify the competent authority of any alienation transfer and change of ownership rights in the property on which the activity is to take place.
Notification of authorisation and right to appeal	
10.	The holder of the authorisation must notify every registered interested and affected party, in writing and within 12 (twelve) calendar days of the date of this environmental authorisation, of the decision to authorise the activity.
11.	The notification referred to must -
	11.1 specify the date on which the authorisation was issued;

	11.2. inform the interested and affected party of the appeal procedure provided for in Chapter 7 of the Environmental Impact Assessment Regulations, 2010;
	11.3. advise the interested and affected party that a copy of the authorisation will be furnished on request; and
	11.4. give the reasons of the competent authority for the decision.
12.	The holder of the authorisation must publish a notice;
	12.1 informing interested and affected parties of the decision;
	12.2. informing interested and affected parties where the decision can be assessed; and
	12.3. drawing the attention of interested and affected parties to the fact that an appeal may be lodged against this decision in the newspaper was used for the placing of advertisements as part of the public participation process.
Management of the activity	
13.	A copy of the final development layout map must be made available for comments by registered I&APS and the holder of the EA 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:
	13.1. Cable routes (where they are not along internal roads);
	13.2. Position of wind turbines and associated infrastructure.
	13.3. Internal roads indicating width;
	13.4. Wetlands, drainage lines, rivers, stream, and water crossing of roads and cables.
	13.5. All sensitive features: CBA, IBA, ESA, Heritage sites, wetlands, pans, drainage channels.
	13.6. Substation(s) inverters and/or transformer(s) sites including their entire footprint.
	13.7. Connection routes (including pylon positions) to the distribution/transmission network.
	13.8. All existing infrastructure on the site, such as roads.
	13.9. Soil heaps (temporary for top soil and subsoil and permanently for excess material);
	13.10. Buildings, including accommodation and
	13.11. All "no go" and buffer areas
14.	Furthermore, a shapefile of the approved development layout/footprint must be submitted to this Department within two months from the date of this decision. The shapefile must be created using the Hartebeesthoek94 Datum and the data should be in Decimal Degree Format using the WGS 84 Spheroid. The shapefile must include at a minimum the following extensions i.e. .shp; .shx; .dbf; .prj; and, .xml (Metadata file). If specific symbology was assigned to the file, then the .avlnd/or the .lyr file must also be included. Data must be mapped at a scale of 1:10 000 (please specify if an alternative scale was used). The metadata must include a description of base data used of digitizing. The shapefile must be submitted in a zip file using the EIA application reference number as the title.
EMPr	
15.	The EMPr 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 EA. The EMPr must be made available for comments by registered I&APS and the holder of the EA must consider such comments. Once amended, the final EMPr must be submitted to the Department for written approval prior to commencement of the activity. Once implemented the EMPr must be implemented and adhered to.
16.	The EMPr amendment must include the following:
	16.1. The requirements and conditions of this authorisation.
	16.2. All recommendations and mitigation measures recorded in the EIA's.
	16.3. All mitigation measures as listed in the specialist reports.
	16.4. The final site layout map.
	16.5. 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 species undertaken.
	16.6. 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 complied by a vegetation specialist familiar with the site in consultation with the ECO and be implemented prior to commencement of the construction phase.
	16.7. A re-vegetation and habitat rehabilitation plan to be implemented during the construction and operation of the facility. Restoration must be taken 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.
	16.8. A bird and bat monitoring programme to document the effect of the construction and operation of the WEF on avifauna and bats. This must be complied by an avifaunal and bat specialist and must be done in accordance with the latest BirdLife South Africa/Endangered Wildlife Trust. Best practice guidelines for avian monitoring and impact mitigation at proposed wind energy development sites in Southern Africa and the South African Bat Advisory Panel (SABAAP) best practise guidelines.
	16.9. 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 impacts. This plan must include measures to minimise impacts on local commuters, limiting construction vehicles traveling 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.
	16.10. A storm water management plan to be implemented during the construction and operation f 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.
	16.11. 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.
	16.12. A heritage and palaeontology management plan for monitoring and action should any resources be found. Appropriate mitigation must form part of this plan.
	16.13. 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.
	16.14. A fire management plan to be implemented during the construction and operational phases.
	16.15. 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.
	16.16. An environmental sensitivity map indicating environmental sensitive areas and features identified during the EIA process.
	16.17. A map combining the final layout map superimposed (overlain) on the environmental sensitivity map. This map must reflect the proposed location of the turbine as stated in the EIAR and this authorisation.
17.	The final EMPr (once approved) must be implemented and strictly enforced during all phases of the project. It shall be seen as a dynamic document and shall be included in all contract documentation for all phases of the development when approved.
18.	Changes to the EMPr must be submitted to this Department for approval before such changes could be effected.
Environmental Control Officer (ECO) and duties	
20.	The holder of the EA must appoint an independent and qualified ECO with experience or expertise in undertaking ECO functions. The ECO will have the responsibility to ensure that the conditions referred to in this EA are implemented and to ensure compliance with the provisions of the approved EMPr.
21.	The ECO must be appointed before commencement of any authorised activity.
22.	Once appointed, the name and contact details of the ECO must be submitted to the Director: Compliance Monitoring of this Department.
23.	The ECO must meet with the contractors to discuss the conditions of the EA and the contents of the EMPr prior to any site clearing occurring.
24.	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.
25.	Records relating to monitoring and auditing must be kept on site and made available for inspection to the competent authority in respect of this development.
26.	The duties of the ECO must include the following:
	26.1. Keeping record of all activities on site, problems identified, transgressions noted and a schedule of tasks undertaken by the ECO.

	26.2. Keeping and maintaining a detailed incident (including spillage of bitumen, fuels, chemicals, or any other material) and complaint register on site indicating how these issues were addressed, what rehabilitation measures were taken and what preventative measures were implemented to avoid re-occurrence of incidents/complaints.
	26.3. Keeping and maintaining a daily site diary.
	26.4. Keeping copies of all reports submitted to the Department.
	26.5. Keeping and maintaining a schedule of current site activities including the monitoring of such activities.
	26.6. Obtaining and keeping record of all documentation, permits, licences and authorisations such as waste disposal certificates, hazardous waste landfill site licences etc. required by this facility.
	26.7. Compiling a monthly monitoring report.
Recording and reporting to the Department	
27.	The holder of this authorisation must keep all records relating to monitoring and auditing on site and make it available for inspection to any relevant and competent authority in respect of this development.
28.	All documentation e.g. audit/monitoring/compliance reports and notifications, required to be submitted to the Director: Compliance Monitoring at this Department.
Environmental audit report	
29.	The holder of the authorisation must submit an environmental audit report to the Director: Compliance Monitoring of the Department within 30 days of completion of rehabilitation activities.
30.	The environmental audit must:
	30.1. Be compiled by an independent environmental auditor.
	30.2. Indicate the date of the audit, the name of the auditor and the outcome of the audit.
	30.3. Evaluate compliance with the requirements of the approved EMPr and this EA.
	30.4. Include measures to be implemented to attend to any non-compliances or degradation noted.
	30.5. Include copies of any approvals granted by other authorities relevant to the development reporting period.
	30.6. Highlight any outstanding environmental issues that must be addressed, along with recommendations for ensuring these issues are appropriately addressed.
	30.7. Include a copy of the EA and the approved EMPr.
	30.8. Include all documentation such as waste disposal certificates, hazardous waste landfill site licences etc. pertaining to this EA.
	30.9. Include evidence of adherence to the conditions of this authorisation and the EMPr where relevant such as training records and attendance records.
Commencement of the activity	
31.	The authorised activity shall not commence within twenty (20) days of the date of signature of the environmental authorisation.
Notification to authorities	
32.	A written notification of commencement must be given to the Department no later than 14 days prior to the commencement of the activity. Commencement for this purposes of this condition includes site preparation. The notice must include a date on which it is anticipated that the activity will commence. This notification period may coincide with the Notice of Intent to Appeal period.
Operation of the activity	
33.	A written notification of operation must be given to the Department no later than 14 days prior to the commencement of the activity operational phase.
Site closure and decommissioning	
34.	Should the activity ever cease or become redundant, the holder of this EA shall 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.
Specific Conditions	
Turbines position	
35.	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.
36.	All buffers and no-go areas stipulated in the EIAR must be adhered to for both the turbines and its associated infrastructure.
37.	Exclusion of sensitive ecological, heritage and paleontological areas from construction activities must inform the micro siting of all development activities.
38.	Turbines must be positioned in such a way that shadow flicker does not affect any farm buildings.

Avifauna and bats	
39.	All powerlines linking wind turbines to each other and to the internal substation must be buried.
40.	As an absolute minimum, bird monitoring must occur at least 6 months pre-construction, continue during the construction period and continue for at least two years during the construction phase, and continue for at least two years during the operation of the facility. The results of this monitoring must be made available to the DEA and Birdlife South Africa (BLSA) and must further advise the EMPr where necessary.
41.	The results of the pre-construction bird monitoring assessment including all recommendations proposed by the reports dated August 2016, must inform the final layout and the construction schedule of the energy facility.
42.	All bird monitoring must be conducted by an accredited monitor and/or specialist and must be done in accordance with the latest BirdLife South Africa/Endangered Wildlife Trust: Best practise guidelines for avian monitoring and impact mitigation at proposed wind energy development sites in South Africa.
43.	Reports regarding bird monitoring must be submitted to the relevant Provincial Environmental Department, BirdLife South Africa, the Endangered Wildlife Trust (EWT) and this Department on a quarterly basis. The report will assist all stakeholders in identifying potential and additional mitigation measures and to establish protocols for a bird monitoring programme for wind energy development in the country.
44.	The facility must be designed in a manner that, infrastructure components that could be used as perching or roosting substates by birds and bats, are avoided.
45.	During construction 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.
46.	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.
47.	A pre-construction walk through of the approved powerline 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 powerline 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 identifies.
Vegetation, wetlands and water resources	
48.	The 'no go' areas of the development property must be clearly demarcated and must be excluded from the final layout plan.
49.	Vegetation clearing must be limited to the authorised footprint.
50.	Relevant permits must be obtained from relevant authorities for any removal or destruction of Threatened or Protected Species (TOPs).
51.	Before the for the clearing of the site, the appropriate permits must be obtained from DAFF for the removal of plants listed in the National Forest Act and from the relevant provincial department for the destruction of species protected in terms of the specific provincial legislation. Copies of the permits must be kept by the ECO.
52.	Construction activities must be restricted to demarcated areas to restrict the impact on sensitive environmental features.
53.	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.
54.	Topsoil from all excavations and construction activities must be salvaged and reapplied during reclamation.
55.	No exotic plants may be used for rehabilitation purposes; only indigenous plants of the area may be utilised.
56.	No activities will be allowed to encroach into a water resource without a water use licence being in place from the DWS.
57.	Cleared alien vegetation must not be dumped on adjacent intact vegetation during clearing but must be temporarily stored in a demarcated area.
58.	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).
59.	The holder of this authorisation must ensure that all the "No-go" and buffer areas are clearly demarcated (using fencing and appropriate signage) before construction commences.
60.	Contractors and construction workers must be clearly informed of the no-go areas.

61.	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.
62.	Bridge design must be such that it minimise impact to riparian area with minimal alterations to water flow and must allow the movement of fauna and flora.
63.	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.
64.	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.
65.	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.
66.	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.
67.	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.
68.	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.
69.	No discharge of effluents or polluted water must be allowed into any rivers or wetland areas.
70.	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.
71.	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.
72.	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 advise on the most suitable remediation measures.
Roads and transportation	
73.	Existing road infrastructure must be used as far as possible for providing access to the proposed turbine positions. Where no road infrastructure exists, new roads should be placed within existing disturbed areas or environmental conditions must be taken into account to ensure the minimum amount of damage is caused to natural habitats.
74.	Signs must be placed along construction roads to identify speed limits, travel restrictions, and other standard traffic control information. To minimise impacts on local commuters, consideration should be given to limiting construction vehicles travelling on public roadways during the morning and late afternoon commute time.
75.	Internal access roads must be located to minimise stream crossings. All structures crossing streams must be located and constructed so that they do not decrease channel stability or increase water velocity.
76.	A designated access to the site must be created and clearly marked to ensure safe entry and exit.
77.	Signage must be erected at appropriate points warning of turning traffic and the construction site.
78.	Construction vehicles carrying materials to the site should avoid using roads through densely populated built-up so as not to disturb existing retail and commercial operations.
79.	Road borders should be regularly maintained to ensure that vegetation remains short and that they therefore serve as an effective firebreak.
80.	Roads must de designed so that changes to surface water runoff are avoided and erosion is not initiated.
81.	All construction vehicles should adhere to a low speed limit to avoid collisions with susceptible species such as snakes and tortoises.
Noise	
82.	A minimum 500m setback line applies to all occupied noise sensitive areas on the development properties.
83.	Routine noise measurements must be conducted during the operation of the facility and a complaints register must be opened and made available to affected parties and the Department on request.
84.	The holder of this authorisation must ensure that the National Noise Control Regulations and SANS10103:2008 are adhered to and measures to limit noise from the work site are implemented.

85.	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.
86.	The holder of this authorisation must ensure that all equipment and machinery are well maintained and equipped with silencers.
87.	The holder of this authorisation must provide a prior warning to the community when a noisy activity is to take place.
88.	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).
89.	Construction staff must be trained in actions to minimise noise impacts.
Visual resources	
90.	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.
91.	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.
92.	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.
93.	Signage on or near wind turbines must be avoided unless they serve to inform the public about wind turbines and their function.
94.	Commercial messages and graffiti on turbines are prohibited.
Human health and safety	
95.	A health safety programme must be developed to protect both workers and the general public during construction, operation and decommissioning of the WEF. 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 turbines.
96.	Potentials interference with public safety communication systems (e.g. radio traffic related to emergency activities) must be avoided.
97.	The holder of the EA must ensure that the operation of the WEF shall comply with the relevant communication regulations or guidelines relating to electromagnetic interference
98.	The holder of the EA must obtain approval from the SACAA that the WEF will not interfere with the performance of aerodrome radio communication, navigation and surveillance equipment especially radar, prior to commencement of the activity. A copy of the approval must be kept on site by the ECO.
99.	The holder of the EA must obtain approval from SAWS that the WEF 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.
100.	The holder of the EA 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.
101.	Liaison with land owners/farm managers must be done prior to construction in order to provide sufficient time for them to plan agricultural activities.
102.	No unsupervised open fires for cooking or heating must be allowed on site.
Hazardous materials and waste management	
103.	The batching plant must preferably be located within laydown areas outside sensitive ecological, heritage and paleontological areas.
104.	Areas around fuel tanks must be bunded or contained in an appropriate manner as per the requirements of SABS 089:1999 Part 1.
105.	Leakage of fuel must be avoided at all times and if spillage occurs, it must be remedied immediately.
106.	Hazardous waste such as bitumen, oils, oily rags, paint tins etc. must be disposed of at an approved waste landfill site licenced to accept such waste.
107.	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.
108.	Hazardous substances must not be stored where there could be accidental leakage into surface or subterranean water.
109.	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.
110.	Temporary bunds must be constructed around chemical storage to contain possible spills.
111.	Spill kits must be made available on-site for the clean-up of spills.
112.	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).
113.	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.
114.	The holder of the EA 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 EIA regulations, 2014.
Excavation and blasting activities	
115.	Underground cables and internal access roads must be aligned as much as possible along existing infrastructure to limit damage to vegetation and watercourses.
116.	Cabling routes outside internal access routes must be approved by this Department.
117.	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.
118.	Borrow materials must be obtained only from authorised and permitted sites. Permits must be kept on site by the ECO.
119.	Anti-erosion measures such as silt fences must be installed in disturbed areas.
Air emissions	
120.	Dust abatement techniques must be used before and during surface clearing, excavation, or blasting activities.
121.	Appropriate dust suppression techniques must be implemented on all exposed surfaces during periods of high wind. Such measures may only include wet suppression, chemical stabilisation, the use of a wind fence, covering surfaces with straw chipping and re-vegetation of open areas.
Historical/cultural/paleontological resources	
122.	Pre-construction archaeological monitoring is required. The appointed archaeologist must keep a list documenting all identified farm infrastructure.
123.	Archaeological monitoring at the time of vegetation clearing must be conducted at Turbine line WTG01. Further recommendations to be made based on monitoring results.
124.	If concentrations of archaeological heritage material, fossils and human remains are uncovered during construction, all work must cease immediately and be reported to SAHRA so that a systematic and professional investigation/excavation can be undertaken.
125.	Construction managers/foreman 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.
126.	All buffers and no-go areas stipulated in the EIAR must be adhered to for both the facilities, all roads and underground cables.
127.	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.
128.	All construction and maintenance crew and vehicles (except small vehicles which may use existing farm tracks) should be kept out of the buffer zones.
129.	The final layout should be shown to the appointed archaeologist before implementation to confirm that all significant heritage resources have been adequately protected
General	
130.	In terms of Section 43(7), an appeal under Section 43 of the National Environmental Management Act, 1998 will suspend the environmental authorisation or any provision or condition attached thereto. In the instance where an appeal is lodged you may not commence with the activity until such time that the appeal has been finalised.

131.	A copy of this authorisation and the approved EMPr must be kept at the property where the activity will be undertaken. The environmental authorisation and approved EMPr must be produced to any authorised official of the Department who requests to see it and must be made available for inspection by any employee or agent of the holder of the authorisation who undertakes work at the property.
132.	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 environmental authorisation as set out in this document or any other subsequent document emanating from these conditions of environmental authorisation.

6 ADMINISTRATION AND REGULATION OF ENVIRONMENTAL OBLIGATIONS

6.1 MANAGEMENT STRUCTURE

In line with this EMPr, the Contractor must prepare a document clearly outlining and demonstrating the environmental responsibilities, accountability, and liability of the Contractor's employees. The Contractor must assign responsibilities for the following:

- Reporting structures;
- Actions to be taken to ensure compliance;
- Overall design, development, and implementation of the EMPr;
- Documenting the environmental policy and strategy;
- Implementing the EMPr in all stages/phases of the project; and
- All the aspects which require action under the other core elements and sub-elements of the EMPr.

All official communication and reporting lines, including instructions, directives, and information, need to be channelled according to the organisation structure.

6.2 ROLES AND RESPONSIBILITIES

6.2.1 *The Applicant (Developer)*

Umsobomvu Wind Power (Pty) Ltd (hereafter referred to as the "Applicant" or "Developer") is a Special Purpose Vehicle (SPV) established by EDF Renewables (Pty) Ltd. for the sole purpose of developing, owning, and operating the proposed Umsobomvu WEF. The Applicant is the responsible entity for monitoring the implementation of the EMPr and compliance with the EA. However, if the company appoints a Contractor to implement the project, and hence implement the proposed mitigation measures documented in this EMPr on their behalf, then the successful contractor's responsibilities are outlined as per the section that follows. The Applicant will also be responsible for stipulating and enforcing fines and penalties to the Contractor for contravention of any non-compliances against the EMPr, the EA and other approved plans.

6.2.2 *The Contractor*

The successful Contractor will:

- Be responsible for the finalisation of the EMPr in terms of methodologies which are required to be implemented to achieve the environmental specifications contained herein and the relevant requirements contained in the EA;
- Be responsible for the overall implementation of the EMPr in accordance with the requirements of the developer and the EA;
- Ensure that all third parties, who carry out all or part of the Contractor's obligations under the contract, comply with the requirements of this EMPr; and
- Be responsible for obtaining any outstanding permits and licenses which are required for the construction of the Umsobomvu WEF.

6.2.3 *The Resident Engineer*

The Resident Engineer (RE) should be appointed by the Applicant and will be required to oversee the construction programme and construction activities performed by the Contractor. The RE is expected to liaise with the Contractor and ECO on environmental matters, as well as any pertinent engineering matters where these may have environmental consequences. The RE will oversee the general compliance of the Contractor with the EMPr and other pertinent site specifications. The RE should also be familiar with the EMPr specifications and further monitor the Contractor's compliance with the environmental specifications on a

daily basis, through a Site Diary, and enforce compliance.

6.2.4 The Environmental Site Officer (ESO)

The Contractor should appoint a nominated representative of the Contractor as the ESO for the contract. The ESO must be site-based and should be the responsible person for implementing the environmental provisions of the construction contract. The approved ESO must be onsite at all times.

The ESO's duties will include, *inter alia*, the following:

- Ensuring that all the environmental authorisations and permits, required in terms of the applicable legislation, have been obtained prior to construction commencing;
- Reviewing construction Method Statements (MS) with input from the ECO and RE, where necessary, in order to ensure that the environmental specifications contained within the construction contract are adhered to;
- Assisting the Contractor in finding environmentally responsible solutions to problems;
- Keeping accurate and detailed records of all activities on-site;
- Keeping a register of complaints onsite and recording community comments and issues, and the actions taken in response to these complaints;
- Ensuring that the required actions are undertaken to mitigate the impacts resulting from non-compliance;
- Reporting all incidences of non-compliance to the ECO and Contractor; and
- The ESO must submit regular written reports to the ECO, not less frequently than once a month, during the construction phase of the Umsobomvu WEF.

The ESO must have:

- The ability to manage public communication and complaints;
- The ability to think holistically about the structure, functioning and performance of environmental systems;
- The ESO must be fully conversant with the EIR, EMPr, relevant environmental legislation and any other relevant documents relating to the Umsobomvu WEF;
- The ESO must have received professional training, including training in the handling of dangerous snakes; amongst other suitable health and safety training; and
- The ESO must have received professional training, including training in the skills necessary to be able to amicably and diplomatically deal with the public as outlined in the first bullet point above.

The ECO should be in the position to determine whether or not the ESO has adequately demonstrated their capabilities to carry out the tasks at hand and in a professional manner. The ECO will therefore have the authority to instruct the Contractor to replace the ESO if, in the ECO's opinion, the appointed officer is not fulfilling their duties in terms of the requirements of the construction contract. Such instruction must be in writing and must clearly set out the reasons why a replacement is required and within what timeframe. The ECO must visit the development site and, in addition to the responsibilities listed in section 6.2.5 below, review the performance of the ESO and submit performance reviews to Umsobomvu Wind Power (Pty) Ltd.

6.2.5 Environmental Control Officer (ECO)

For the purpose of implementing the conditions contained herein, Umsobomvu Wind Power (Pty) Ltd must appoint an ECO for the contract. The ECO must be the responsible person for ensuring that the provisions of the EMPr, as well as the EA, are complied with during the construction phase. The ECO will be responsible for issuing instructions to the Contractor, where environmental considerations call for action to be taken. The ECO must submit regular written reports, at least once a month, to the Applicant and, when required

and/or requested, to the competent authority (DFFE). The ECO will be responsible for the monitoring, reviewing, and verifying of compliance with the EMPr and conditions of the EA by the Contractor.

The ECO's duties in this regard will include, *inter alia*, the following:

- Confirming that all the permits and EA(s) required in terms of the applicable legislation have been obtained prior to construction commencing;
- Monitoring and verifying that the EMPr, the EA and the Contract are adhered to at all times and acting if specifications are not followed;
- Monitoring and verifying that environmental impacts are kept to a minimum;
- Reviewing and approving construction Method Statements with input from the ESO and RE, where necessary, in order to ensure that the environmental specifications contained within this EMPr and the EA are adhered to;
- Inspecting the site and surrounding areas on a regular basis to monitor compliance with the EMPr, EA and Contract;
- Monitoring the undertaking by the Contractor of environmental awareness training for all new personnel on-site;
- Ensuring that activities onsite comply with all relevant environmental legislation;
- Undertaking a continual internal review of the EMPr and submitting any changes to the Applicant and authority for review and approval, as applicable;
- Checking the register of complaints kept on-site and maintained by the ESO and ensuring that the correct actions are/were taken in response to these complaints;
- Checking that the required actions are/were undertaken to mitigate the impacts resulting from non-compliance;
- Reporting all incidences of non-compliance to Umsobomvu Wind Power (Pty) Ltd;
- The ECO must also submit compliance audit reports to DFFE, in accordance with the requirements of the EA. Such reports must be reviewed by Umsobomvu Wind Power (Pty) Ltd prior to submission;
- Keeping a photographic record of progress on-site from an environmental perspective. This can be conducted in conjunction with the ESO, because the ESO will be the person that will be onsite at all times and can therefore take photographic records weekly. The ECO should ensure that the ESO understands the task at hand;
- Recommending additional environmental protection measures, where necessary; and
- Providing feedback on any environmental issues during the site meetings.

The ECO must have:

- A good working knowledge of all relevant environmental policies, legislation, guidelines, and standards;
- The ability to conduct inspections and audits and to produce thorough, readable, and informative reports;
- The ability to manage public communication and complaints;
- The ability to think holistically about the structure, functioning and performance of environmental systems; and
- Proven competence in the application of the following integrated environmental management tools:
 - Environmental Impact Assessment;
 - Environmental Management Plans/Programmes;
 - Environmental auditing;
 - Mitigation and optimisation of impacts;
 - Monitoring and evaluation of impacts; and
 - Environmental management systems.

The ECO must be fully conversant with the EIA Process, the Umsobomvu WEF Development EIR and associated reports, the EA, this EMPr, and other relevant ancillary BARs, EMPrs and EAs. The Applicant will have the authority to replace the ECO if, in their opinion, the appointed officer is not fulfilling their duties in

terms of the requirements of the EMPr or this specification. Such instruction will be in writing and must be clearly set out with reasons why a replacement is required and within what timeframe.

6.3 COMPLIANCE MONITORING AND CORRECTIVE ACTION

Non-compliance with the conditions of the EMPr must be viewed as a breach of appointment Contract for which the construction contractors will be held liable. The latter is deemed NOT to have complied with the EMPr if:

- There is evidence of contravention of the EMPr, its environmental specifications or the Method Statements developed by the Contractor within the boundaries of the construction site or areas of contractor responsibility;
- Construction-related activities take place outside the defined boundaries of the site;
- Environmental damage ensues due to negligence;
- The Contractor fails to comply with corrective or other instructions issued by the ECO within a specific time; or
- The Contractor fails to respond adequately to complaints from the public or authorities.

The Applicant and the construction contractors are liable for any construction rehabilitation costs associated with their non-compliance with this EMPr. This rehabilitation will be undertaken to the satisfaction of the ECO. The construction contractors will have the right to appeal any punitive action undertaken by the ECO or the Applicant.

6.4 REPORTING AND REVIEW

The EMPr reporting and documentation requirements must be based on best practice principles, e.g. ISO 14001, which must take the following requirements into account:

- Documents associated with the EMPr must be reviewed regularly and updated by all environmental management parties;
- Audits of the environmental performance of the construction phase of the project will be undertaken on a monthly basis by accredited auditors in fulfilment of likely conditions of EA in this regard;
- The findings of external, internal, and informal environmental reviews will be recorded and items requiring action will be identified from the recommendations made; and
- The construction contractors will be contractually obliged to fulfil any reasonable recommendations, and implementation of these actions will be assessed in the above audit.

Meetings, where required, should take place onsite. Internal auditing and reporting should be subject to external review by the ECO during the monthly compliance audits.

6.5 MONITORING

Construction activities have the potential to impact on a range of biophysical habitats as well as neighbouring communities. The monitoring programme which requires development by the Applicant, ECO and Contractor should, *inter alia*, allow for analysis of:

1. Air emissions (such as dust);
2. Hydrocarbon pollution;
3. Success of local labour employment;
4. Success of local procurement policies;
5. Ambient and workplace noise;
6. Health and safety incidents;

7. Success of traffic management measures; and
8. Contamination and soil erosion.

6.6 EMERGENCY PREPAREDNESS

The Contractor must develop environmental emergency response procedures to ensure that there are appropriate responses to unexpected or accidental actions or incidents that will cause environmental impacts during the construction phase. Such activities include, *inter alia*:

- Accidental discharges to water and land;
- Accidental exposure of employees to hazardous substances;
- Accidental fires;
- Accidental spillage of hazardous substances; and/or
- Specific environmental and ecosystem effects from accidental releases or incidents.

The Contractor and Subcontractors must comply with the emergency preparedness incident reporting requirements that must be developed and in place prior to the commencement of the construction phase.

6.7 ENVIRONMENTAL INCIDENT MANAGEMENT

The construction contractors must adhere to the hazard and incident reporting protocols to be developed by the Contractor. A report must be completed for all incidents, and appropriate action taken where necessary to minimise any potential impacts. DFFE must be informed of any environmental incidents, in accordance with legislative requirements, should this be necessitated by a major environmental incident.

6.8 MANAGEMENT REVIEW

A formal management review should be conducted in which the internal audit reports, written by the ESO, and based on frequent inspections and interactions with the ECO and review of the periodic reports, including audit reports by the independent external auditor - will be reviewed. The purpose of the review is to critically examine the effectiveness of the EMPr and its implementation and to decide on potential modifications to the EMPr as and when necessary. The process of management review will be to keep to the principle of continual improvement.

Management review should take place when the liaison committee, consisting of representatives from the Contractor, construction Subcontractors (as appropriate), ECO and other parties or I&APs deem them necessary or on a quarterly basis. The purpose of these quarterly meetings will be to review the progress of the Contractor in implementing and complying with their obligations in terms of this EMPr for the duration of the project. Where necessary, management review will take place more frequently than the required quarterly meetings.

7 REPORTING

7.1 METHOD STATEMENTS

Method Statements must be completed by the Contractor, an individual that is competent with the tasks to be undertaken, for each activity which requires a Method Statement as specified in the EMPr or as requested by the ECO. Each Method Statement must be submitted to the ECO and the Applicant for approval. For the purposes of the environmental specification, a Method Statement is defined as:

“A written submission by the Contractor to the ECO setting out the plant, materials, labour and method the Contractor proposes to carry out an activity, in such detail that the ECO is enabled to assess whether the Contractor’s proposal is in accordance with the EMPr and/or will produce results in accordance with EMPr.”

The Method Statement must include details of the:

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

Method Statements can be for once-off tasks or a series of tasks which are often repeated. The risks are identified during the various work stages when a Method Statement is prepared. Steps taken to reduce the potential risk associated with these stages can then be determined. The sequential steps and actions to be followed by the persons carrying out the works are written down. This sequence of steps should include all environmental and safety aspects relevant to the task being executed.

As a minimum, the Contractor should produce the following Method Statements:

- Site Dust Management;
- Solid Waste Management;
- Hazardous Material Management;
- Hydrocarbon Management;
- Site Clearing and Topsoil Management;
- Fire Management;
- Noise Management;
- Concrete Mixing;
- Pollution Control;
- Site Access and Traffic Management; and
- Incident and Emergency Response Management.

The Method Statements should be submitted to the ECO and the Applicant not less than twenty (20) days prior to the intended date of commencement of the activity, or as directed by the ECO. The Contractor must not commence with an activity until all required Method Statements have been approved by the ECO and the Applicant. The ECO should provide comment on the methodology and procedures proposed by the Contractor, but the ECO will not be responsible for the Contractor’s chosen measures of impact mitigation

and emergency/disaster management systems. Approval of the Method Statements should not be withheld unreasonably.

All control measures detailed in the Method Statement must be the subject of "toolbox" talks prior to the initiation of works. By introducing or reaffirming these measures during the "toolbox" talk, everyone involved should have a clear understanding of the work to be carried out, as well as the safe work method sequences and equipment required.

AN EXAMPLE OF A METHOD STATEMENT LAYOUT IS PROVIDED IN [APPENDIX C](#).

7.2 GOOD HOUSEKEEPING

The Contractor must undertake "good housekeeping" practices during the Construction Phase. This will help avoid disputes on responsibility and allow for the smooth running of the contract as a whole. Good housekeeping extends beyond the wise practice of construction methods to include the care for and preservation of the environment within which the construction is situated.

7.3 RECORD KEEPING

The ECO must continuously monitor the Contractor's adherence to the approved impact prevention procedures and the ECO must issue the Contractor with a notice of non-compliance whenever transgressions are observed. The ECO should document the nature and magnitude of the non-compliance in a designated register, the actions taken to discontinue the non-compliance, the actions taken to mitigate its effects and the results of the actions. The non-compliance should be documented and reported to the Applicant in the monthly reports. These reports must be made available to the DFFE when requested.

7.4 DOCUMENT CONTROL

The Contractor is responsible for establishing a procedure for electronic document control. The document control procedure should comply with the following requirements:

- Documents must be identifiable by organisation, division, function, activity, and contact person;
- Every document should identify the personnel and their position(s), who drafted and compiled the document(s), who reviewed and recommended approval, and who finally approved the document for distribution; and
- All documents should be dated, provided with a revision number and reference number, filed systematically, and retained for a five (5) year period.

The Contractor must ensure that documents are periodically reviewed and revised, where necessary, and that current versions are available at all locations where operations, essential to the functioning of the EMPr, are performed. All documents must be made available to the ECO and other independent external auditors.

8 ENVIRONMENTAL AWARENESS

8.1 ENVIRONMENTAL TRAINING

The Contractors must ensure that their employees and any third party, who carries out all or part of the Contractors' obligations, is adequately trained with regard to the implementation of the EMPr and the general environmental legal requirements and obligations.

Environment and health awareness training programmes should be targeted at three (3) distinct levels of employment, i.e. the executive, middle management, and labour. Environmental awareness training programmes should contain the following information:

- The names, positions, and responsibilities of personnel to be trained;
- The framework for appropriate training plans;
- The summarised content of each training course; and
- A schedule for the presentation of the training courses.

The ECO must ensure that records of all training interventions are kept in accordance with the record-keeping and documentation control requirements as set out in this EMPr. The training records must verify each of the targeted personnel's training experience. The Applicant must ensure that adequate environmental training takes place. All employees must be given an induction presentation on environmental awareness and the content of the EMPr. The presentation should be conducted in the language of the employees to ensure it is understood. The environmental training must, as a minimum, include the following:

- The importance of conformance with all environmental policies;
- The environmental impacts, actual or potential, of their work activities;
- The environmental benefits of improved personal performance;
- Their roles and responsibilities in achieving conformance with the environmental policy and procedures and with the requirement of the Agency's environmental management systems, including emergency preparedness and response requirements;
- The potential consequences of departure from specified operating procedures;
- The mitigation measures required to be implemented when carrying out their work activities;
- Environmental legal requirements and obligations;
- Details regarding floral and faunal species of special concern and protected species, and the procedures to be followed should these be encountered during the construction of construction camps;
- The importance of not littering;
- The importance of using supplied ablution facilities;
- The need to use water sparingly;
- Details of and encouragement to minimise the production of waste and re-use, recover and recycle waste where possible; and the
- Details regarding archaeological and/or historical sites which may be unearthed during construction and the procedures to be followed should these be encountered.

RECOMMENDED ENVIRONMENTAL EDUCATION MATERIAL IS PROVIDED IN APPENDIX A.

8.2 MONITORING OF ENVIRONMENTAL TRAINING

The Contractor must monitor the performance of construction workers to ensure that the points relayed during their induction 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.

9 ENVIRONMENTAL MONITORING

9.1 GENERAL ENVIRONMENTAL MONITORING

A monitoring programme will be implemented for the duration of the construction of the Umsobomvu WEF and associated infrastructure. This programme will include:

- Establishing a baseline through the taking of photographs of identified environmental aspects and potential impact sites along the routes prior to construction.
- Bi-weekly (fortnightly) monitoring during the first month of construction where after monthly audits will be conducted by the ECO for the remainder of the construction phase to ensure compliance to the EMPr conditions, and where necessary make recommendations for corrective action. These audits can be conducted randomly and do not require prior arrangement with the Project Coordinator. The ESO, who will report to the ECO, will be on-site daily to monitor the above.
- While construction is taking place at the Umsobomvu WEF, the ECO must be on-site at bi-weekly to ensure that protected plant and tree species are adequately demarcated. The ESO will be on site daily to ensure that these conditions are adhered to.
- Compilation of an audit report with a rating of compliance with the EMPr. The ECO must keep a photographic record of any damage to areas outside the demarcated site and construction area. The date, time of damage, type of damage and reason for the damage shall be recorded in full to ensure the responsible party is held liable. All claims for compensation emanating from damage should be directed to the ECO for appraisal. The Contractor will be held liable for all unnecessary damage to the environment. A register must be kept of all complaints from the landowners and/or the community. All complaints and/or claims should be handled immediately to ensure timeous rectification and/or payment by the responsible party.

9.2 AVIFAUNAL AND BAT MONITORING

Prior to construction, an avifaunal specialist and bat specialist should be consulted in order to determine the requirements for monitoring of the avifauna and bats present in the vicinity of the Umsobomvu WEF; pre- and post-construction. The monitoring programmes must be kept with the approved Final EMPr. A preliminary framework for bird monitoring is presented in Appendix E and can be updated based on the most recent version of the best practice guidelines once the facility is operational.

10 MANAGEMENT PLANS

The following management plans must be implemented during the relevant phases of the development of the Umsobomvu WEF and associated infrastructure:

1. Open Space Management Plan
2. Watercourse and Wetland Management Plan
3. Faunal Relocation Plan
4. Botanical Search and Rescue Plan
5. Site Clearing Plan
6. Rehabilitation and Landscape Management Plan
7. Alien Vegetation Management Plan
8. Fire Management Plan
9. Traffic, Transportation and Road Maintenance Management Plan
10. Stormwater Management Plan
11. Erosion Management Plan
12. Waste Management Plan
13. Emergency Response Plan

10.1 OPEN SPACE MANAGEMENT PLAN

All recommendations of the Alien Vegetation, Rehabilitation, Fire and Flora and Fauna Management Plans are applicable to open space areas. For the purposes of this Management Plan, Open Space areas should include all areas impacted by construction activities including all approved buffers.

The following issues should be addressed:

- Open space areas should be kept as contiguous blocks of vegetation as far as possible and no additional barriers (except for approved roads and fences) should be constructed that may impede faunal movement.
- All open space areas must be kept alien and weed free.
- Only indigenous species from a list approved by the ECO may be used for any rehabilitation work in open space areas.
- No waste should be disposed of in open space areas, including but not restricted to cigarette butts and uneaten foodstuffs (i.e. fruit cores and peels) that may attract scavengers. It is recommended that receptacles are placed strategically to minimise this, especially during the construction phase.
- A search and rescue operation must be undertaken by a qualified botanist/ horticulturalist prior to commencement of construction. All SCC identified within the development footprints must be transplanted to a refuge area.
- Cleared vegetation must not be piled onto adjacent intact vegetation outside of the designated footprint, even for temporary storage.
- No collection of indigenous plants may be allowed on the property, outside of those undertaken by the designated person(s).
- Employees should undergo environmental awareness training and be sensitized to the need to avoid disturbance to the indigenous vegetation outside the development footprints.
- Rehabilitation guidelines for the entire development must prioritise the use of indigenous grass, tree, and shrub species in the soil stabilisation landscaping of the development once construction is completed, if required.

10.2 WATERCOURSE AND WETLAND MANAGEMENT PLAN

The following is recommended for the conservation of drainage habitat on the site:

- Although no hardstands are currently located within 30 m of a channel edge, future deviations of the layout must take in consideration that no hardstanding surfaces must be constructed within 30 m from a channel edge, except for roads and cable crossings.
- Any stormwater management features must be suitably designed and constructed to maintain stormwater flow to acceptable levels and minimise risk of erosion and scouring.
- Stormwater runoff must not be discharged directly into any drainage lines or seeps, where it could lead to erosion.

10.3 FAUNAL RELOCATION PLAN

- No fauna present on the property may be wilfully harmed unless it threatens the life of an employee.
- Hunting, disturbance, and collection of animals by employees must be prohibited.
- Construction areas must be screened for slow moving fauna before any activities commence and removed, if necessary.
- Any animals injured by the construction activities should be taken to a veterinarian for treatment.
- Minimise impacts on faunal habitat by adhering to the botanical specialists' recommendations.
- Vehicle speeds should be kept to a minimum by using informative signage and traffic calming methods.
- If certain areas are found to involve unusually high mortality rates, then suitable mitigation (e.g. the erection of low fences alongside the problem area) may be required.
- Monitor excavations daily and rescue any trapped fauna. When filled with water, the excavations should be checked twice a day. Release the rescued fauna into a suitable habitat adjacent to the study area.
- Domestic waste should be placed in suitable covered containers and removed from the site on a regular basis to reduce the attraction of scavenging animals, e.g. Vervet Monkeys.
- External and internal fences must be monitored for traps.
- In terms of the conducted survey, the areas demarcated for clearing do not pose a risk/threat to mammals, for example: the presence of mammals was minimal.
- If a mammal or reptile is trapped within an area where construction is taking place, then a professional handler must be called upon to remove the mammal or reptile.
- Protective clothing, such as gloves, should be used when handling mammals.
- All staff tasked to capture and relocate mammals should be inoculated against Rabies and Tetanus.
- Immobilizers and/or tranquilizers must not be used on the mammals.

10.4 BOTANICAL SEARCH AND RESCUE

The floral SCC identified during the micro-siting investigation undertaken for the proposed Umsobomvu WEF are all classified as Least Concern but protected either in terms of the Northern Cape Nature Conservation Act (NC NCA) (Act No. 9 of 2009) or the Provincial Nature Conservation Ordinance (PNCO) (Act No. 19 OF 1974), or both. According to the South African National Biodiversity Institute (SANBI) Red List of South African Plants a species is classified as Least Concern when it has been evaluated against the IUCN criteria and does not qualify for any of the above categories. Species classified as Least Concern are considered at low risk of extinction. Widespread and abundant species are typically classified in this category.

- *Ruschia indurata*
- *Ruschia sp.*
- *Ruschia intricata*
- *Stomatium middelburgense*
- *cf Stomatium sp.*
- *cf Rabiea albinota*
- *cf Delosperma sp.*
- *cf Delosperma multiflorum*
- *Chasmatophyllum musculinum*

- *Brunsvigia sp.*
- *Anacampseros ustulata*
- *cf Microloma armatum*
- *Gomphocarpus fruticosus*
- *Aloe broomii*
- *Crassula corallina*
- *Crassula setulosa*
- *Cotyledon orbiculata*
- *Crassula sarcocaulis*
- *Euphorbia clavarioides*
- *Euphorbia mauritanica*
- *Pelargonium sp.*
- *Harveya pumila*
- *Jamesbrittenia filicaulis*

Permit applications, for the abovementioned species which were identified within the Umsobomvu WEF site, have been submitted to the Eastern Cape Department of Agriculture, Forestry and Fisheries (DAFF), the National Department of Forestry, Fisheries and the Environment (DFFE) and the Eastern Cape Department of Economic Development, Environmental Affairs and Tourism (DEDEAT) respectively.

In mountainous areas which were difficult to access, it is suggested that the Search and Rescue operation is undertaken during vegetation clearance, in order to increase accessibility and visibility of SCC. SCC which cannot be translocated should be conserved in an onsite nursery area for use during rehabilitation.

10.5 SITE CLEARING PLAN

VEGETATION CLEARING

- Before clearing of vegetation, the Contractor should ensure that all litter and non-organic material is removed from the area to be cleared.
- Vegetation clearing must take place in a phased manner in order to retain vegetation cover for as long as possible in order to reduce the size of areas where dust can be generated by wind.
- All seed-bearing invasive alien vegetation must be removed from site.
- Removed vegetation must not be dumped onto adjacent intact vegetation and topsoil must be removed separately.
- All indigenous plant material removed from cleared areas should be stockpiled for mulching or temporarily stockpiled in a demarcated area, which meets the satisfaction of the ESO and the ECO, before disposal at an approved landfill site.
- The use of herbicides is prohibited, unless approved by the ESO and the ECO.
- The Contractor should submit a site clearing Method Statement to the ESO and the ECO for approval. This Method Statement should include the details of the phasing of the clearing and how this will be done, where and how cleared material will be stored and/or disposed of, etc.

TOPSOIL CLEARING

- Topsoil (a layer of approximately 100 - 150 mm) should be removed from areas to be disturbed during construction and safely stockpiled for landscaping purposes.
- All plant material (grasses, herbs and larger bushclump species) removed from the site are to be mixed into the topsoil.
- Topsoil stockpiles should be convex and should not exceed a height of 1.5 m.
- Stockpiles must be located in areas agreed to by the ESO and the ECO.
- Topsoil stockpiles must not be subject to compaction greater than 1 500 kg/m² and should not be pushed by a bulldozer for more than 50 m.

- Topsoil stockpiles must be monitored regularly to identify any alien plants, which must be removed when they germinate to prevent contamination of the seed bank.
- Appropriate measures, as agreed to by the ESO and the ECO, should be taken to protect topsoil stockpiles from erosion by wind or water by providing suitable stormwater and cut off drains, containment using hessian or similar material and/or by establishing suitable temporary vegetation.
- Stockpiles should not be covered with materials such as plastic which could cause it to compost or which could kill the seed bank.
- The Contractor must be held responsible for the replacement, at their own cost, for any unnecessary loss of topsoil due to their failure to work according to the requirements of this EMP and the approved Method Statement.

10.6 REHABILITATION AND LANDSCAPE MANAGEMENT PLAN

SITE VEGETATION

Re-vegetating and rehabilitating the site, once constructed, through a comprehensive landscaping effort will benefit the faunal species which find refuge on the site. Linked to this, is the creation, preservation, and maintenance of tracts of natural and ornamental vegetation in all stages of ecological succession, interconnected by corridors or green belts for escape, foraging, breeding and exploratory movements. In terms of the scope of the construction activities, landscaping and rehabilitation will be minimal; many instances will require clean-up activities together with planting ground-stabilising vegetation.

Rehabilitation and landscaping efforts should focus on rehabilitating the following areas:

- Road verges after road construction is completed.
- Stormwater soaks away features and landscaped areas.
- The transformed portions of the site which have not been developed must be rehabilitated by planting indigenous plant species occurring in the area.
- Areas where pockets of alien invasive species have been removed.
- Areas not disturbed by the construction activities, but from previous land use, or those where invasive species have been removed, must be identified by a suitably qualified botanist as suitable sites for relocating plant SCC.

The ECO must approve a list of indigenous plants to be used during rehabilitation prior to the commencement of rehabilitation activities.

According to the South Africa, Lesotho and Swaziland Vegetation Map (South African National Biodiversity Institute, 2018), the proposed infrastructure is situated in an area classified as containing Besemkaree Koppies Shrubland and Eastern Upper Karoo.

Besemkaree Koppies Shrubland occurs in the Northern Cape, Free State and Eastern Cape Provinces along the slopes of koppies, butts and tafelbergs (Mucina and Rutherford, 2006). This vegetation type consists of two (2) layers; the lower layer is dominated by dwarf small-leaved shrubs, and in years with high rainfall, grasses. The upper layer is dominated by tall shrubs such as *Rhus erosa*, *Rhus burchelli*, *Rhus cilliata*, *Euclea crispa*, *Diospyros austro-africana* and *Olea europaea subsp. africana*. This vegetation type is classified as **Least Threatened** as it is largely excluded from agricultural practices. The conservation target is 28%, with 5% being conserved in the various reserves such as the Gariep Dam, Rolfontein, Tussen Die Riviere, Caledon and Kalkfontein Dam Nature Reserve.

The site investigations confirmed that this vegetation within the site is associated with high lying rocky outcrops, mountain summits, mountain slopes and in areas near drainage lines. The condition of this vegetation varied and ranged from being fairly intact in inaccessible areas, such as on steep slopes and on rocky outcrops, to showing signs of erosion in heavily impacted areas. Portions of this vegetation type have also been impacted to the extent that there is minimal vegetation cover and, in some cases, were devoid of vegetation altogether, most likely as a result of overgrazing. This vegetation type was characterised by a

mosaic of shrubs, dwarf trees and a grass layer. The dominant shrubs onsite included *Elytropappus rhinocerotis*, *Euryops anea* and *Chrysocoma ciliata*. Dwarf trees such as *Rhus erosa*, *Euclea crispa* and *Euclea undulata* were present, and grass species such as *Eragrostis chloromelas*, *Themeda triandra* and *Aristida sp.* were interspersed throughout the proposed site.

Eastern Upper Karoo occurs in the Northern Cape, Eastern Cape and Western Cape and is associated with a flat to gently sloping topography (Mucina and Rutherford, 2006). It is dominated by dwarf microphyllus shrubs and grasses belonging to the *Aristida* and *Eragrostis* genera. This vegetation type is classified as **Least Threatened** with a conservation target of 21%. A portion of this vegetation type has been conserved in Mountain Zebra and Karoo National Parks as well as in Oviston, Commando Drift, Rolfontein and Gariep Dam Nature Reserves. This vegetation type occurs in the low lying, flat areas of the affected properties.

PLANT SPECIES OF CONSERVATION CONCERN

The species list, containing plant species which are likely to occur within the proposed site, was assessed against the IUCN Red Data List, the South African Red Data List, the NEMBA (Act No. 10 of 2004) list of protected species, DAFF’s list of protected tree species as well as the PNCO (1974) list of species and the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) species lists.

Five (5) Plant SCC were found to occur within the proposed site and surroundings. However, it is likely that more plant SCC will be identified during the construction phase. Four (4) of these five (5) identified Plant SCC will require permits for the destruction and/or removal of the individuals. The Plant SCC include:

- ***Aloe broomii*** (Appendix II on CITES; Schedule 4 on the PNCO) which is widespread throughout in the central interior of South Africa and ranges from the Western Cape to the Northern Cape, Eastern Cape and Free State. This species has a stable population and is described as being common and not threatened on the South African Red Data List (von Staden, 2011). This species will require a permit for its destruction/removal.



- ***Euphorbia mauritanica*** (Appendix II on CITES) which is widespread occurring in the Eastern Cape, Free State, Kwa-Zulu Natal, Northern Cape and the Western Cape. This species ranges from Namibia to the Cape Peninsula and Eastward towards Kwa-Zulu Natal. This species is considered to have a stable population and is not in danger of extinction (von Staden, 2014). A permit to trade internationally, but no permit required for destruction/transplanting.



- Gomphocarpus fruticosus*** (Schedule 4 on the PNCO list) is widespread throughout South Africa, with a distribution that extends up into Angola, Zambia and Mozambique. It is associated with dry sandy soils in disturbed areas, often along riverbanks. The population of this species is considered to be stable and is listed with a status of Least Concern on the South African Red Data List (Goyder and Nicholas, 2001). A permit to destroy or transplant this species will be required.



- Harveya pumila*** (Schedule 4 on the PNCO list) has a wide distribution in South African and occurs in the Eastern Cape, Free State, Gauteng, Kwa-Zulu Natal and Mpumalanga. It is listed as Least Concern on the South African Red Data List (Victor, 2006). A permit to destroy or transplant this species will be required.



- Moraea huttonii*** (Schedule 4 on the PNCO list) has a wide distribution in South African and occurs in the Eastern Cape, Free State, Kwa-Zulu Natal and Mpumalanga. It is listed as Least Concern on the South African Red Data List (Cholo and Foyden, 2006). A permit to destroy or transplant this species will be required.



A suitably qualified Botanist must identify Plant SCC within the development footprints which require relocation prior to construction. Once Plant SCC have been identified within the construction areas, permits must be obtained for the destruction and/or for the removal for transplanting of the individuals. The removed Plant SCC must either be transplanted in areas adjacent with a similar habitat, in which construction activities will not take place, or be stored in a nursery until used for rehabilitating the disturbed areas within the site. The recommended out-planting procedure must be followed to ensure the success of the transplanted Plant SCC, as per Table 1 below.

Table 1: Recommended Out-Planting Procedure.

TASKS	METHOD
PLOT PREPARATION	<p>The plots should be prepared as follows:</p> <ul style="list-style-type: none"> <p>Prior to rehabilitation of the site, all remnants of foreign debris must be removed from the site.</p>

TASKS	METHOD
	<ul style="list-style-type: none"> All plots should first be covered with 1 m deep subsoil and then with topsoil (minimum depth of 10 cm). Soils should be manually spread evenly over the surface. Topsoil must be spread to the original depth (10 cm), and deeper where sufficient topsoil remains. As topsoil will contain all cleared vegetation, no additional treatment will be required. However, to avoid erosion and increase nitrogen content, it might be necessary to sow a cover crop of commercially available Rye Grass (<i>Lolium perenne</i>). Although not indigenous, it is recommended as it has been used successfully elsewhere, is annual so dies off, is able to bind soil, and increases nutrients and soil mycorrhiza in the sand. This all improves the success of indigenous seeding and planting. Seed at the rate of 50 kg per hectare.
<p>PLANT PREPARATION</p>	<p>Plants must undergo a period of ‘hardening-off’ during which they have been exposed to full, direct sunlight and been under a reduced watering regime.</p> <p>The individual plants destined for each plot should be grouped into plot-specific, marked baskets, before they leave the nursery. Each plant should be labelled with an aluminium label, giving species code, and a specific numeral identifying the plot.</p> <p>Before the out-planting commences, the equipment necessary for the proper handling and placing of all required materials should be on hand, in good condition and to acceptable approved standards.</p> <ul style="list-style-type: none"> Planting should preferably be done during the rainy season. Unless otherwise specified by the ESO or the ECO, excavate square holes of 800 mm x 800 mm x 800 mm on average for trees and 500 mm x 500 mm x 500 mm on average for shrubs. Backfill planting holes with topsoil. As much of the soil from container plants as possible must be retained around the roots of the plant during planting. The soil must cover all the roots and be well firmed down to a level equal to that of the surrounding <i>in situ</i> material After planting, each plant must be well watered, adding more soil upon settlement if necessary. Stake all trees and tall aloes using three (3) weather-resistant wooden or steel stakes anchored firmly into the ground. Two (2) of the three (3) stakes should be located on the windward side of the plant. Galvanised wire binding, 3 mm thick, covered with a 20 mm diameter plastic hosepipe must be tied tightly to the stakes, half to two thirds the height of the tree above the ground and looped around the trunk of the tree. Place stakes at least 500 mm apart and away from the stem and roots of the tree, so as not to damage the tree or its roots. Thoroughly water plants as required until the plants are able to survive independently (i.e. depending on the rainfall). A raised circular 200 mm high subsoil berm, placed 500 mm (shrubs) to 750 mm (trees) from the plant’s stem, must be provided for the watering. Do not simply leave the excavated plant hole partially backfilled for this purpose – the berm must be raised above the natural soil level. Water aloes and bulbs once directly after transplanting to settle the soil Remove stakes and wire binds over time as required, as plants become established. Herbs, shrubs, and trees should be planted at a density of at least 1 plant per 6,25 m² or 1600 plants per hectare.
<p>MAINTENANCE</p>	<ul style="list-style-type: none"> Water all transplanted plants, as specified. Watering must commence and continue immediately after transplanting. Apply the following watering regime: Early morning and evenings for the first week; Then once a day for the next week; then twice a week until there is evidence of new shoots, whereafter watering is stopped. Check all plants for pests and diseases on a regular basis and treat the plants using approved methods and products as per manufacturers specifications. Control weeds by means of extraction, cutting or other approved methods. For planted areas that have failed to establish, replace plants with the same species as originally specified. The same species must be used unless otherwise specified by the ESO and/or the ECO.

In order to rehabilitate transformed and invaded areas, the following landscaping techniques should be employed:

- Clearing of vegetation should take place in accordance with the construction programme, instead of exposing large tracts of land simultaneously.
- Clearing of invaded areas should be undertaken as per the Alien Vegetation Management Plan.
- No re-useable topsoil should be removed from the site.
- Grass sods should be removed from areas to be cleared and stored for later use during rehabilitation.
- Sods used in re-vegetation should be obtained directly from the veld, but not from the identified sensitive areas. Veld sods should contain at least a 50 mm topsoil layer, and the roots must be minimally disturbed. They should either be obtained from the near vicinity of the site from an area selected by the ESO or the ECO, or from areas of the proposed development site that are earmarked for development. The soil should be compatible with that removed from the area to be re-vegetated and must not have been compacted by heavy machinery.
- Indigenous seeds may be harvested for purposes of re-vegetation in areas that are free of alien invasive vegetation, either at the site prior to clearance or from suitable neighbouring sites.
- The stockpiled vegetation from the clearing operations should be reduced to mulch.
- Indigenous plant material must be kept separate from alien material. The indigenous vegetative material should either be reduced by mechanical means (chipper) or by hand-axing to sticks no longer than 100 mm. The chipped material should be mixed with the topsoil at a ratio not exceeding 1:1.
- Mulch is to be harvested from areas that are to be denuded of vegetation during construction activities, provided that they are free of seed-bearing alien invasive plants.
- No harvesting of vegetation may be done outside the area to be disturbed by construction activities.
- Mulches should be collected in such a manner as to restrict the loss of seed.
- Brush-cut mulch should be stored for as short a period as possible, and seed released from stockpiles should be collected for use in the rehabilitation process.
- Re-vegetated areas should be monitored every three (3) months for the first twelve (12) months and every six (6) months thereafter.
- Re-vegetated areas showing inadequate surface coverage (less than 30% within 9 months after re-vegetation) should either be re-vegetated from scratch, or addition infill planting might be required. The ECO should advise.
- The Contractor must be responsible for maintaining the desired level of moisture necessary to maintain vigorous and healthy growth in re-vegetated areas. The quantity of water applied at one time should be sufficient to penetrate the soil to a minimum depth of 800 mm, where appropriate, and at a rate that will prevent saturation of the soil.
- Water used for the irrigation of re-vegetated areas should be free of chlorine and other pollutants which could have a detrimental effect on the plants.
- All seeded, planted, or sodded grass areas and all shrubs or trees planted are to be irrigated at regular intervals.
- Where herbicides are used to clear vegetation, species-specific chemicals should be applied to individual plants only. General spraying should be strictly prohibited.

10.7 ALIEN VEGETATION MANAGEMENT PLAN

Henderson (2001) provides the invasive status classification, as outlined in the Conservation of Agricultural Resources Act (CARA) (Act No. 43 of 1983a). These plants can be classified as Category 1, 2 or 3 species, and as a 'Declared Weed' or 'Declared Invader' according to their level of invasiveness in South Africa. The description of the above-mentioned classifications are:

- **Category 1 Plants**
 - Are prohibited and must be controlled.
- **Category 2 Plants**

- (Commercially used plants) may be grown in demarcated areas providing that there is a permit and that steps are taken to prevent their spread.
- **Category 3 Plants**
 - (Ornamentally used plants) may no longer be planted; existing plants may remain, as long as all reasonable steps are taken to prevent the spreading thereof, except within the floodline of watercourses and wetlands.
- **Declared Weed (category 1)**
 - Prohibited on any land or water surface in South Africa.
 - Must be controlled or eradicated where possible (except in biological control reserves).
- **Declared Invader (category 2)**
 - Allowed only in demarcated areas under controlled conditions.
 - Import of propagative material and trading allowed only by permit holders.
 - Outside demarcated areas must be controlled or eradicated where possible (except in biological reserves).
 - Prohibited within 30 m of the 1:50 year floodline of watercourses or wetlands unless authorisation is obtained.
- **Declared Invader (category 3)**
 - No further plantings allowed (except with special permission).
 - No trade of propagative material.
 - Existing plants may remain but must be prevented from spreading.
 - Prohibited within 30 m or the 1:50 year floodline of watercourses or wetlands, or as directed by the executive officer.

It is essential that alien invasive species be removed from the infrastructure development site. Following the Working for Water guidelines for effective alien vegetation removal (DWAF, 2009), an alien removal programme should consist of the following three (3) phases:

- I. **Initial control:** Clearing and eradication of alien invasive stands so as to drastically reduce the existing population.
- II. **Follow-up control:** Control of re-growth (including seedlings, root suckers and coppice growth); which should be conducted annually for the first five (5) years.
- III. **Maintenance control:** Sustain alien plant numbers with ongoing annual monitoring for the life of the project, and if necessary, implement additional control methods to avoid re-establishment of alien invasive stands.

ALIEN PLANT SPECIES IDENTIFIED WITHIN THE INFRASTRUCTURE DEVELOPMENT SITE AND SURROUNDS

- **Opuntia stricta** (Category 1b: PROHIBITED/Exempted if in Possession or Under control).
A person in control of a Category 1 b Listed Invasive Species must control the listed invasive species in compliance with sections 75(1), (2) and (3) of the Act. A person contemplated in sub-regulation (2) must allow an authorised official from the Department to enter onto the land to monitor, assist with or implement the control of the listed invasive species, or compliance with the Invasive Species Management Programme contemplated in section 75(4) of the Act. - www.environment.co.za.



- **Populus spp.** (Category 2: PERMIT REQUIRED) Category 2 Listed Invasive Species are those species listed by notice in terms of section 70(1)(a) of the Act as species which require a permit to carry out a restricted activity within an area specified in the Notice or an area specified in the permit, as the case may be. A landowner on whose land a Category 2 Listed Invasive Species occurs or person in possession of a permit, must ensure that the specimens of the species do not spread outside of the land or the area specified in the Notice or permit. Unless otherwise specified in the Notice, any species listed as a Category 2 Listed Invasive Species that occur outside the specified area contemplated in sub-regulation (1), must, for purposes of these regulations, be considered to be a Category 1 b Listed Invasive Species and must be managed according to Regulation 3. Notwithstanding the specific exemptions relating to existing plantations in respect of Listed Invasive Plant Species published in Government Gazette No. 37886, Notice 599 of 1 August 2014 (as amended), any person or organ of state must ensure that the specimens of such Listed Invasive Plant Species do not spread outside of the land over which they have control. - www.environment.co.za.



Additional alien vegetation species could be present within the site. The ECO, advised by a suitably qualified Botanical Specialist, should assist in the identification of alien vegetation species and advise on suitable methods of removal and disposal.

WEED REMOVAL (INITIAL CONTROL PROGRAMME FOR ALL ALIEN VEGETATION ENCOUNTERED)

There are a number of possible methods which can be used to control alien invasive species; these include mechanical, chemical, biological, and mycoherbicide control. In addition, integrated control methods consist of the use of a combination of these methods to control alien vegetation. This section outlines possible techniques used in mechanical and chemical control methods only, as biological and mycoherbicide control is not recommended for this site and therefore not discussed further.

Mechanical Control Methods

The Agricultural Research Council (ARC)(2014) describes mechanical control as damaging or removing the plant by physical action. Various methods could be used, including uprooting/hand pulling, slashing, mowing, felling, ringbarking or bark stripping (ARC, 2014). This method of alien vegetation removal is best suited to small areas or sparse infestations. The following mechanical methods for removal are recommended:

- Hand pulling: Grip the seedlings or saplings low down and pull out by hand (using gloves). Make use of a hoe for plants that cannot be pulled out with ease.
- Ring barking: Bark is removed to from the bottom of the stem to a height of 0.75 – 1.0 m to below ground level. Bush knives or hatchets can be used for debarking.
- Frill or Ring-bark: Using an axe or bush knife, angled cuts are made downward into the cambium layer through the bark in a ring; herbicide is applied into the cuts.

- Cut stump treatment: Stems should be cut as low as practical, as stipulated on the herbicide label. Chemical herbicides are applied in diesel or water as recommended. Applications in diesel should be to the whole stump and exposed roots and in water to the cut area as recommended on the label.

Chemical Control Methods

Chemical control methods involve the use of registered herbicides to kill the target weed (ARC, 2014). Chemical control methods for alien plant removal include using a number of approved environmentally safe herbicides, which are applied to the leaves, stems or stumps of alien invader species.

- Foliar Spray:
 - Seedlings – Touchdown
 - Young trees – Garlon
- Cut Stumps (larger trees) and then apply:
 - Chopper;
 - Confront (2%); or
 - Timbrel 3A*.
- Frill (trees) and then apply:
 - Chopper; or
 - Timbrel 3A*.
- Stem Injection:
 - MSMA;
 - Mamba; or
 - Touchdown.

The *Working for Water Programme: Guide to Control Method and Herbicide Selection for Alien Vegetation* must be followed.

10.8 FIRE MANAGEMENT PLAN

It is imperative that the necessary precautions be implemented to minimise this risk of fire within the site and surrounds. The following measures must be implemented to reduce the risk of fires during the construction and operational phases.

CONSTRUCTION PHASE MANAGEMENT MEASURES

- The Contractor must ensure that all personnel are aware of the fire risk and the need to extinguish cigarettes before disposal, in appropriate waste disposal containers.
- The risk of fire is highest during the drier months and during high wind velocities. To avoid and manage fire risk the following steps should be implemented:
 - Firefighting equipment must be kept on-site and ensure that all personnel are educated on how to use it as well as the procedures to be followed in the event of a fire.
 - Identify the relevant authorities and structures responsible for fighting fires in the area and liaise with them regarding procedures should a fire commence.
 - Ensure that all the necessary emergency contact details are posted at conspicuous and relevant locations.
- Should a Contractor be found responsible for the outbreak of a fire, they must be liable for any associated costs.
- Open fires must not be allowed on-site for the purpose of cooking or warmth. Bona fide braai fires (such braai fires must be limited to the traditional “month end” braais and not individual daily cooking fires) may be lit within the construction camp or site.
- The Contractor must take all reasonable steps to prevent the accidental occurrence or spread of fire. The Contractor must appoint a fire officer who should be responsible for ensuring immediate and appropriate action in the event of a fire.

- The Contractor must ensure that all site personnel are aware of the procedure to be followed in the event of a fire. The appointed fire officer must notify the Fire and Emergency Services in the event of a fire and must not delay doing so until such time as the fire is beyond control.
- The Contractor must ensure that there is basic firefighting equipment on-site at all times. This equipment should, at a minimum, include fire extinguishers and beaters. The Contractor must pay the costs incurred by organisations called to put out fires started by the Contractor, their staff, or any sub-contractor. The Contractor must also pay the costs incurred to reinstate burnt areas as deemed necessary by the RE.
- Any work that requires the use of fire may only take place at that designated area and as approved by the RE. Firefighting equipment must be available in these areas.
- The Contractor should ensure that the telephone number of the local Fire and Emergency Service is displayed at the site offices.
- The Contractor is to ascertain the fire requirements and must submit a fire contingency Method Statement to the ESO and ECO for approval.

OPERATIONAL PHASE MANAGEMENT MEASURES

Any requirements of the local Fire Protection Association must be adhered to in consultation with the relevant landowners, as per the requirements of the National Veld and Forest Fire legislation, which may include:

- Formation of a Fire Protection Association (FPA).
- Duty to prepare and maintain firebreaks.
- Requirements for firebreaks.
- Readiness for firefighting.
- Actions to fight fires.
- In areas other than designated development footprints, a network of firebreaks must be maintained and overlap with any firebreaks managed by the landowners to ensure that fires are not able to spread over the development.
 - All road reserves will serve as firebreak; and
 - All firebreaks must be maintained as required by the local Fire Chief.
- Firebreaks are to be positioned and prepared in such a way as to cause the least disturbance to soil and biodiversity. Firebreaks should be free from combustible material, e.g. pruned material and leaf litter.
- Ensure that firefighting equipment is maintained and in good working order before the start of each fire season.
- Smoking outside of designated safe areas must not be permitted.
- Flicking of cigarette butts into adjacent vegetation must not be permitted.

Suitable signage must be provided on-site, including entrance warning of fire risk and warnings not to flick cigarette butts into vegetated areas.

10.9 TRAFFIC, TRANSPORTATION AND ROAD MAINTENANCE MANAGEMENT PLAN

High construction traffic volumes are expected to be generated during the construction period. Measures to manage the impact of these volumes have been identified and are listed below. The local community should be advised of these measures prior to construction commencing and, in particular, prior to the transport of wind turbine components through local media and ward councillors.

- Temporary road construction and traffic accommodation signage, in accordance with Volume 2 Chapter 13 of the SADC Road Traffic Signs Manual, should be displayed at the proposed site in order to create awareness of construction vehicles by other road users and are to ensure that construction vehicle speeds are restricted. Such signage, to be determined by the appointed Contractor as per the required Health and Safety Plan and approved by the Engineer, shall include speed restrictions, warning of construction workers and construction vehicles, and information signs advising motorists of the hours the route will be used by construction vehicles. Such signage should be placed at least:

- On the approaches to the access points;
- At the access points to the proposed development; and
- Be fixed so that it is not affected by wind and is immovable for the duration of construction (i.e. planted in the ground).
- While access to the site can occur from 07:00 to 17:30, every effort should be made to restrict the operation of heavy abnormal construction traffic to periods outside of peak commuter operating times – off-peak periods, between the hours of 08:00 and 17:00 so that impact on commuter traffic is kept to a minimum.

In addition, the Contractor should ensure the following:

- Access to the site must be managed to ensure that no unauthorised vehicles are permitted onto the construction site and to ensure safe entry to- and exit from the site.
- All construction vehicles shall be in possession of the necessary licenses and roadworthy certificates in terms of the National Road Traffic Act (Act No. 93 of 1996).
- Vehicles transporting hazardous substances shall comply with the requirements of the Hazardous Substances Act (Act No. 15 of 1973).
- All abnormal heavy vehicles shall be accompanied by escort vehicles and correctly marked to indicate the abnormal load. The specification of the escort vehicle shall depend on the length and width of the load.
- Vehicles loads shall be secured such that no loads or part thereof fall from the vehicle and damage other road users.
- All vehicles used during construction must be roadworthy, regularly maintained, and repaired when required.
- Drivers of construction vehicles shall be in possession of the necessary licenses in terms of the National Road Traffic Act (Act No. 93 of 1996).
- Construction and operational vehicles travelling on all public roads shall adhere to the posted speed limits.

10.10 STORMWATER MANAGEMENT PLAN

This Stormwater Management Plan must be implemented during the construction and operation phases of the project. During the implementation of the Stormwater Management Plan, the Contractor must also ensure compliance with applicable regulations and prevent off-site migration of contaminated stormwater and the increase soil erosion. This Stormwater Management Plan serves as a high-level guideline for designers and Contractors to follow 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 stormwater run-off.

Diligence in stormwater management is essential and a full-time task, even during dry periods, as the lack of it could lead to the degradation of the site over time, rendering it susceptible to serious damage in the event of unexpected flooding, and subsequent potential damage to equipment on-site due to gradual erosion after normal rainfall events, or by unexpected damage due to extreme flood events.

The site must conform to all engineering designs and measures to manage and control water run-off and erosion during or after rainstorms. This will include the following items:

- Run-off control and drains;
- Slope attenuation;
- Silt fences;
- Stormwater channels and catch pits;
- Shade or catch nets; and
- Soil bindings.

The civil design should describe and illustrate the proposed stormwater control measures as stipulated by the Civil Engineer, in compliance with this Stormwater Management Plan:

- Control measures to be implemented before and during the construction period, including the final stormwater control measures (post-construction). All roads and platforms should be designed and built according to SANS 1200 applicable sections to ensure all stormwater measures are properly implemented.
- The location, area/extent (m²/ha) and specifications of all temporary and permanent water management structures or stabilisation methods.
- Stone pitching or concrete-lined drains be placed adjacent to roads where required to transfer the water to existing watercourses.
- At the point where stormwater is discharged, energy dissipaters must be constructed to slow the flow of run-off water.
- Mitre drains should be cut in the site roads at appropriate places to ensure water run-off and control.
- All cut-and-fill banks should be covered with stone pitching or crusher stone to ensure bank stabilisation and the elimination of potential erosion.

The aim is to ensure that the stormwater run-off is guided off the construction area, and such that it does not create erosion problems that may require aftercare.

In addition, the following surface water control measures should be implemented:

- Surface water flow must be guided to ensure there is no flow directly to an erosion area.
- Prevent the concentration or flow of surface water or stormwater down cut-and-fill slopes or along pipeline routes or roads and ensure measures to prevent erosion are in place prior to construction.
- Stormwater and any run-off generated by hard surfaces should be discharged into retention swales or areas with rock riprap. These areas must be grassed with indigenous vegetation. These energy dissipation structures must be placed in a manner that flows are managed prior to being discharged back into the natural watercourses, thus not only preventing erosion, but also supporting the maintenance of natural base flows within these systems, i.e. hydrological regime (water quantity and quality) is maintained.
- Mitigate against siltation and sedimentation using the above-mentioned structures and ensure that the structures do not cause erosion.
- Ensure that all stormwater control features have soft engineered areas that attenuate flows, allowing for water to percolate into the local aquifers.
- Minimise and restrict site clearing to areas required for construction purposes only and restrict disturbance to adjacent undisturbed natural vegetation.
- Large tracts of bare soil will either cause dust pollution or quickly erode and then cause sedimentation in the lower portions of the catchment.
- Minimise the diversion of flows into different catchments.
- If implementing dust control measures, prevent over-wetting, saturation and run-off that may cause erosion and sedimentation.
- Watercourse (stream) crossings must not trap any run-off, thereby creating inundated areas, but allow for free-flowing watercourses.

10.11 EROSION MANAGEMENT PLAN

This Erosion Management Plan must be implemented prior to construction as well as during the construction and operation phases of the project, along with the Stormwater Management Plan. The Erosion Management Plan must ensure compliance with applicable regulations and prevent off-site migration of contaminated stormwater or increase in soil erosion. This Plan will serve as a high-level guideline for designers and Contractors to follow measures that allow surface and subsurface movement of water along drainage lines

that will not impede natural surface and subsurface flows. Drainage measures must promote the dissipation of stormwater run-off.

Diligence in stormwater management and erosion management is essential and a full-time task, even during dry periods, as the lack of management could lead to the degradation of the site over time, placing the site and surrounds at risk to serious damage in the event of unexpected flooding, and subsequent potential damage to equipment on-site due to gradual erosion after normal rainfall events, or by unexpected damage due to extreme flood events.

The site must conform to all engineering designs and measures to manage and control water run-off and erosion during or after rainstorms. This will include the following items:

- Run-off control and drains;
- Slope attenuation;
- Silt fences;
- Stormwater channels and catch pits;
- Shade or catch nets; and
- Soil bindings.

The civil design should describe and illustrate the proposed erosion control measures as stipulated by the Civil Engineer, in compliance with this Erosion Management Plan:

- Erosion control measures to be implemented before and during the construction period, including the final erosion control measures (post-construction). All roads and platforms should be designed and built according to SANS 1200 applicable sections to ensure all stormwater measures are properly implemented.
- The location, area/extent (m²/ha) and specifications of all temporary and permanent water management structures or stabilisation methods.
- Stone pitching or concrete-lined drains be placed adjacent to roads where required to transfer the water to existing watercourses.
- At the point where stormwater is discharged, energy dissipaters must be constructed to slow the flow of run-off water.
- Mitre drains should be cut in the site roads at appropriate places to ensure water run-off and control.
- All cut-and-fill banks should be covered with stone pitching or crusher stone to ensure bank stabilisation and the elimination of potential erosion.

The aim is to ensure that the stormwater run-off is guided off the construction area, and such that it does not create erosion problems within the site and the surrounds.

In addition, the following surface water control measures should be implemented to reduce the risk of erosion:

- Surface water flow must be guided to ensure there is no flow directly into an area which could increase erosion.
- Prevent the concentration or flow of surface water or stormwater down cut-and-fill slopes or along pipeline routes or roads and ensure measures to prevent erosion are in place prior to construction.
- Stormwater and any run-off generated by hard surfaces should be discharged into retention swales or areas with rock riprap. These areas must be grassed with indigenous vegetation. These energy dissipation structures must be placed in a manner that flows are managed prior to being discharged back into the natural watercourses, thus not only preventing erosion, but also supporting the maintenance of natural base flows within these systems, i.e. hydrological regime (water quantity and quality) is maintained.
- Mitigate against siltation and sedimentation using the above-mentioned structures and ensure that the structures do not cause erosion.

- Ensure that all stormwater control features have soft engineered areas that attenuate flows, allowing for water to percolate into the local aquifers.
- Minimise and restrict site clearing to areas required for construction purposes only and restrict disturbance to adjacent undisturbed natural vegetation.
- Large tracts of bare soil are likely to cause dust pollution and increase erosion.
- If implementing dust control measures, prevent over-wetting, saturation and run-off that may cause erosion and sedimentation.
- Watercourse (stream) crossings must not trap any run-off, thereby creating inundated areas, but allow for free-flowing watercourses.

10.12 WASTE MANAGEMENT PLAN

The Contractor's intended methods for waste management and waste minimisation must be implemented at the onset of the contract and approved by the ECO. Where required, Method Statements must be compiled and submitted to the ECO for approval. All personnel must be instructed to dispose of all waste in the proper manner.

No waste from construction or otherwise may be disposed of on-site. All waste generated on-site must be removed from the site and disposed of at a licensed waste disposal site. In this regard, adequate litter drums or other suitable containers must be located on-site to ensure that waste generated on-site is disposed of in a suitable and timeous manner. Where possible, some of the construction waste should be recycled and used in construction.

SOLID AND LIQUID WASTE

During the construction phase, solid waste must be stored in a designated area within the site, which has been approved by the ECO, is covered, tip-proof drums for collection and disposal. All refuse containers must be free of any holes and in good condition. A refuse control system should be established for the collection and removal of refuse to the satisfaction of the ESO and the ECO. As far as possible, general waste (including paper, glass, plastics, aluminium, etc.) should be sorted for recycling. Disposal of solid waste should be at a licensed landfill site, or at a site approved by the DFFE in the event that an existing operating landfill site is not within a reasonable distance from the site. Waste must not be burned.

Any water contaminated by cement must not be allowed to flow freely into the environment. Instead, it must be contained, and solids allowed to settle out. Thereafter, the solid material should be disposed of at a landfill site with other solid waste.

LITTER

During the construction phase, littering by construction workers must be prohibited on-site. The facilities should be maintained in a neat and tidy condition, and the site is to be kept free of litter throughout the construction phase. Fines should be implemented for persons found littering. All reasonable measures should be taken to reduce the potential for litter and negligent behaviour with regards to the disposal of all refuse. At all places of work, the Contractor must provide litter collection facilities for later safe disposal at a licensed landfill site or at a DFFE approved waste disposal site.

During the operation phase, the area of the development should be cleared of litter on a regular basis. Once collected, this litter must be disposed of at a licensed landfill site or at a DFFE approved waste disposal site.

HAZARDOUS WASTE

During the construction phase, hazardous waste such as bitumen, oils, oily rags, paint tins, etc., must be disposed of at a DFFE approved hazardous waste landfill site. Special care should be taken to avoid the spillage of hazardous waste and from this waste entering the ground or contaminating water. In the event of

the above occurring, the affected areas must be promptly reinstated to the satisfaction of the ECO. As far as possible, maintenance of machinery and vehicles on-site should be avoided. Used oil, lubricants and cleaning materials from the maintenance of vehicles and machinery should be collected in a holding tank and returned to the supplier. Water and oil should be separated in an oil trap. Oils collected in this manner, should be retained in a safe holding tank and removed from site by a specialist oil recycling company for disposal at an approved waste disposal sites for toxic/hazardous materials. Oil collected by a mobile servicing unit should be stored in the service unit's sludge tank and discharged into the safe holding tank for collection by the specialist oil recycling company. The Contractor must ensure that an emergency preparedness plan is in place for implementation in the case of a spill or substances which can be harmful to an individual or the receiving environment. All used filter materials should be stored in a secure bin for disposal off-site. Hazardous waste must not be stored or stockpiled in any area other than at a site approved by the ECO. Any contaminated soil should be removed and replaced. Soils contaminated by oils and lubricants should be collected and disposed of at a facility designated by the local authority to accept contaminated materials. Washing of vehicles on the construction site should not be permitted as this is likely to result in the release of hydrocarbon-contaminated wash water into the environment.

During the operational phase, hazardous materials on-site (if any) must be disposed of in a DFFE approved hazardous waste landfill site. The Contractor should ensure that an emergency preparedness plan is in place for implementation in the case of a spill or substances which can be harmful to an individual or the receiving environment.

10.13 EMERGENCY RESPONSE PLAN

This Emergency Response Plan should be implemented by the Contractor with guidance from the Health, Safety and Environment (HSE) Representative(s) during the Construction, Operational and Decommissioning Phases of the infrastructure development to reduce the likelihood of emergency incidents and to ensure that there will be appropriate responses to unexpected or accidental adverse incidents.

EMERGENCY INCIDENT AVOIDANCE

- Induction Training, which includes a suitable Environmental Education Course and the location of emergency evacuation assembly points, must be given to all employees involved in the Construction, Operational and Decommissioning Phases.
- All impact management actions specified in the EMP(s) and the Environmental Authorisation must be implemented throughout the phases of development.
- If faunal species are encountered within the site subsequent to the faunal search and rescue procedure, which must be undertaken directly prior to vegetation clearance, these species must only be handled and relocated by a suitably experienced individual.
- A suitably experienced snake wrangler, with the ability to accurately identify snakes, must be present on-site during construction and decommissioning activities.
- A list of snakes which are likely to occur within the site must form part of the Environmental Education Course. In addition, it is recommended that the African Snakebite Institute app is downloaded by the ECO and the HSE Representative.
- Spill kits must be readily available on-site. These spill kits should include absorbent pads, bags, etc. and each refuelling vehicle must have a spill kit.
- A general first aid kit should be kept on-site and managed by a suitably experienced individual, who has received suitable first aid training.
- All vehicles and plants operated on-site must be serviced regularly.
- Tyre puncture repair kits should be kept on-site and used by a suitably experienced individual.
- Firefighting equipment must be readily available on-site. This should include rubber beaters and at least one (1) fire extinguisher of a suitable size. The fire extinguisher(s) must be serviced as per the manufacturer's recommendations.

- Fire breaks should be established and maintained where necessary.
- Smoking must only occur in designated areas, as approved by the appointed ECO.
- Open fires must not be permitted unless approval is received from the appointed ECO and the HSE Representative.
- Emergency contact details should be clearly displayed on-site. These should include, but not be limited to, contact details for the nearest:
 - Fire Services/Fire Protection Agency (FPA);
 - South African Police Services;
 - Ambulance; and
 - National Crisis Line.
- Fuels, oils and other hazardous materials must be kept in a bunded area under lock and key.
- A suitable number of drip trays must be readily available on-site, and the use of these drip trays must be monitored by the appointed ECO.
- All hazardous chemicals that will be used on-site must have Material Safety Data Sheets (MSDS).
- All hazardous substances must be stored in suitable containers as defined in the Method Statement.
- Hazardous materials must only be handled by trained personnel. The handling of hazardous materials must only be in accordance with the MSDS.
- Employees handling hazardous substances and materials must be aware of the potential impacts and follow appropriate safety measures. Appropriate personal protective equipment must be made available.
- Containers must be clearly marked to indicate contents, quantities, and safety requirements.
- Vehicle speed limits must be indicated on-site and limited to 40 km/hr on gravel roads.
- Employees must not be housed on-site.
- Any incidence of social unrest must be reported to the South African Police Services.
- Any incidence of theft must be reported to the South African Police Services.
- Any incidence of poaching must be reported to the South African Police Services.
- Weather forecasts should be observed, at least on a weekly basis, to plan for any potentially risky weather events.
- Additional safety measures must be implemented during periods of heavy rainfall, high wind speeds, snowfall, etc. During such periods, the recommended speed limit of 40 km/hr should be reduced to 30 km/hr.

EMERGENCY RESPONSES

Hazardous Substance Spills

In the event that an accidental spill of fuel, oil or other hazardous substances occurs, these actions must be taken immediately to isolate, control and manage the spill:

- Appropriate actions, in accordance with the approved (prior to construction) Method Statement(s), must be taken to isolate and contain the spill.
- The spill must be contained using spill kits; by applying suitable absorbent material to the spill and removing the contaminated soil (ground spills), or by using booms (watercourse spills).
- All spills must be treated with a matter of urgency.
- Used spill kit material and contaminated soil must be temporarily stored in a designated area on-site prior to disposal at a registered hazardous waste disposal site by a suitable service provider.
- The ECO and the HSE Representative must be informed of the incident as soon as possible, and an incident report must be completed which includes photographs of the spill, the measures taken to contain the spill and remediate the location of the spill as well as the success of the measures taken.

Fires

In the event of a fire, these actions must be taken immediately to control and extinguish the fire:

- Contact the Fire Services as soon as possible.

- Make use of the rubber beaters and fire extinguisher, the minimum firefighting equipment which should be available on-site, to control the fire until the Fire Services arrive.
- Should any employees have minor burns resulting from the fire, these burns should be treated with a burn dressing from the available first aid kit followed by an appointment with a suitably qualified healthcare professional.
- Should any employees have major burns resulting from the fire, an ambulance must be called immediately, and the burns must be treated by a suitably qualified healthcare professional.
- The ECO and the HSE Representative must be informed of the incident as soon as possible, and an incident report must be completed which includes photographs, the measures taken to contain the fire and remediate the affected area.

Emergency Evacuation

An Emergency Evacuation Method Statement must be compiled for approval from the appointed ECO and the HSE Representative prior to the commencement of the construction phase. Should emergency evacuation of the site be required, the following should be done as a matter of urgency:

- All employees must gather at the predetermined emergency evacuation assembly points and await the Contractor's instructions as per the approved Emergency Evacuation Method Statement.
- The ECO and the HSE Representative must compile an incident report must be completed which includes the identification of the snake, the location where the incident occurred, the location in which the snake was relocated to and the measures are taken to ensure the safety of the snake bite victim.

Severe Weather Conditions

A Method Statement must be compiled for approval from the appointed ECO and the HSE Representative prior to the commencement of the construction phase for the protocols relating to severe weather conditions. Should severe weather conditions be forecast, which could increase the risk of employees travelling to site or undertaking the necessary activities on-site, temporary site closure should be considered, and all necessary site closure measures must be put in place.

Snake Bites

In the event of a snake bite, these actions must be taken immediately:

- An ambulance must be contacted immediately.
- All efforts must be taken to obtain a description of the snake or a photograph in order to correctly identify the snake for treatment purposes.
- The snake must be captured by a suitably qualified snake wrangler and safely relocated away from the site.
- The ECO and the HSE Representative must be informed of the incident as soon as possible, and an incident report must be completed which includes the identification of the snake, the location where the incident occurred, the location in which the snake was relocated to and the measures are taken to ensure the safety of the snake bite victim.

Injury, Illness or Death Onsite

Should an employee obtain a minor injury or illness on-site, a suitably trained individual should provide treatment from the first aid kit, followed by an appointment with a suitably qualified healthcare professional (if deemed necessary) and allowed to rest until fully recovered (if necessary).

Should an employee obtain a major injury or show signs of severe illness on-site, an ambulance must be contacted immediately so that the employee can be treated by a doctor.

Should an employee die on-site, an ambulance, as well as the South African Police Services, must be contacted immediately. Those present at the time of the death should engage with the South African Police Services and they should receive the necessary counselling and support.

The ECO and the HSE Representative must be informed of all injuries, illnesses and/or deaths which occur on-site. An incident report must be completed for every incident as well as the steps taken to ensure the safety of the employees.

COMPLIANCE

The ECO and HSE Representative must monitor and keep records of all emergency incidents on-site. These incidents must be included in the Audits Reports during the relevant phases of the development and the Contractor and Developer must be made aware of all incidents. In addition, the landowners must be notified of all incidents which occur within their properties.

11 CLOSURE PLANNING

The Contractor must clear and clean the site and ensure that all equipment and residual materials, not forming part of the permanent works, are removed from site before issuing the completion certificate or as otherwise agreed.

11.1 POST-CONSTRUCTION AUDIT

A post-construction audit must be carried out and submitted to DFFE at the expense of the Applicant. Objectives should be to audit compliances with the key components of the EMPr, to identify main areas requiring attention and recommend priority actions. The post-construction audit must be submitted to DFFE within three (3) months of completion of the development and prior to the operational phase. Results of the audits should inform changes required to the specifications of the EMPr or additional specifications to deal with any environmental issues which arise on-site and have not been dealt with in the current document.

11.2 GENERAL REVIEW OF THE EMPr

The EMPr must be reviewed by the ECO on an ongoing basis. Based on observations during site inspections and issues raised at site meetings, the ECO should determine whether any procedures require modification to improve the efficiency and applicability of the EMPr on site. Any such changes or updates must be registered in the ECO's record, as well as being included as an annexure to this document. Annexures of this nature must be distributed to all relevant parties.

12 CONCLUSIONS

12.1 IMPACT MANAGEMENT OUTCOMES

The successful implementation of the impact management actions, stipulated in Chapter 5 of this EMP, for each phase of the Umsobomvu WEF Development will result in the avoidance, management and/or mitigation of the identified impacts and risks associated with the development. In addition, the implementation of the recommended management plans, in Chapter 10 of this EMP, should further contribute to the avoidance, reduction and/or management of potential impacts resulting from the various stages of the Umsobomvu WEF. The general impact management outcomes of this EMP are to:

- To reduce the adverse impacts and enhance the benefits of the development.
- Preserve faunal and floral species and their associated habitats within identified sensitive areas and outside of the development footprint.
- To reduce the adverse impacts on avifaunal species due to the construction of the overhead line.
- To reduce the adverse impacts on avifaunal species due to the construction of the wind turbines.
- Preserve SCC within the development footprint.
- Maintain soil and vegetation cover, through the implementation of erosion control, stormwater management, and alien vegetation management measures.
- Undertake activities in a manner which does not place workers or the public at risk in terms of health and safety.
- Prevent, and where not possible, control fires to protect public health, the environment and any properties in the vicinity of the development.
- Reduce the potential for pollution, in terms of air pollution, land pollution, water pollution, and noise pollution.
- Preserve cultural heritage and palaeontological resources of significance.
- Rehabilitate disturbed areas to their natural state or a near-natural state.
- Manage and maintain the operational development to reduce adverse impacts associated with the operation of the development and to ensure sustainable development.

12.2 CONCLUDING STATEMENTS

Although all foreseeable actions and potential mitigations or management actions are contained in this document, the EMP should be seen as a day-to-day management document. The EMP thus sets out the environmental and social standards, which would be required to minimise the negative impacts and maximise the positive benefits of the Umsobomvu WEF as detailed in the EIR and associated specialist reports. The EMP could thus change daily, and if managed correctly lead to successful planning and design, construction, operational, and decommissioning phases.

All attempts should be made to have this EMP available, as part of any tender documentation, so that the engineers and contractors are made aware of the potential cost and timing implications needed to fulfil the implementation of the EMP, thus adequately costing for these.






13 APPENDIX A | ENVIRONMENTAL EDUCATION COURSE

EXAMPLE OF AN ENVIRONMENTAL EDUCATION COURSE OUTLINE







www.webweaver.nu/clipart/environmental.shtml
















Reasons why should we look after the environment

-  We have a right to a clean environment
-  A clean environment is essential to healthy living
-  All our basic needs come from the environment
-  A contract has been signed – development vs the environment
-  Penalties / fines could be issued

How to look after the environment

-  Report issues
-  Teamwork
-  Follow the set rules and guidelines (EA, EMPr, Method statements etc.)
-  Conserve, reuse and recycle

Tips and Guidelines

-  Workers and equipment should not be allowed outside demarcated areas
-  No swimming or polluting of water bodies allowed
-  No damage / disturbance to vegetation or water bodies without consent / permits
-  No disturbance allowed in no-go areas
-  No hunting of animals
-  Report all fires
-  No burning or burying of waste
-  No smoking near hazardous materials
-  Training on fire fighting equipment
-  Hazardous materials to be stored in designated and bunded areas
-  Spill kits and drip trays a must
-  Report all spills
-  Control dust and Noise
-  Maintain construction vehicles
-  Availability and maintenance of sanitation facilities



Tips and Guidelines

- Only eat in designated areas
- Do not litter
- Vehicles to remain on approved tracks and adhere to speed limit
- Ensure emergency phone numbers are available
- Ensure PPE is worn
- Report fires, leaks and injuries
- Ask if unsure



14 APPENDIX B | COPY OF ENVIRONMENTAL AUTHORISATION

COPY OF ENVIRONMENTAL AUTHORISATION

15 APPENDIX C | EXAMPLE OF A METHOD STATEMENT

EXAMPLE OF A METHOD STATEMENT

METHOD STATEMENT

CONTRACT: **DATE:**

PROPOSED ACTIVITY (give title of Method Statement and reference number from the EMPr):

WHAT WORK IS TO BE UNDERTAKEN (give a brief description of the works):

WHERE ARE THE WORKS TO BE UNDERTAKEN (where possible, provide an annotated plan and a full description of the extent of the works):

START AND END DATE OF THE WORKS FOR WHICH THE METHOD STATEMENT IS REQUIRED:

Start Date:

End Date:

HOW ARE THE WORKS TO BE UNDERTAKEN (provide as much detail as possible, including annotated sketches and plans where possible):

*** Note: Please attach additional pages should you require more space.**

DECLARATIONS

1) ENVIRONMENTAL CONTROL OFFICER (ECO)

The work described in this Method Statement, if carried out according to the methodology described, is satisfactorily mitigated to prevent avoidable environmental harm:

(Signature)

(Print name)

Date: _____

2) PERSON UNDERTAKING THE WORKS

I understand the contents of this Method Statement and the scope of the works required of me. I further understand that this Method Statement may be amended on application to other signatories and that the ECO will audit my compliance with the contents of this Method Statement

(Signature)

(Print name)

Date: _____

16 APPENDIX D | CHANCE FOSSIL FINDS PRODECURE

APPENDIX 1 - CHANCE FOSSIL FINDS PROCEDURE: Ancillary infrastructure for the Umsobomvu 1 WEF near Middelburg	
Province & region:	NORTHERN CAPE: Pixley Ka Seme District Municipality EASTERN CAPE: Chris Hani District Municipality
Responsible Heritage Resources Agency	N. Cape: SAHRA (Contact details: SAHRA, 111 Harrington Street, Cape Town. PO Box 4637, Cape Town 8000, South Africa. Phone: +27 (0)21 462 4502. Fax: +27 (0)21 462 4509. Web: www.sahra.org.za). E. Cape: ECPHRA (Contact details: Mr Sello Mokhanya, 74 Alexander Road, King Williams Town 5600; Email: smokhanya@ecphra.org.za)
Rock unit(s)	Adelaide Subgroup and Katberg Formation (Tarkastad Subgroup) of Beaufort Group. Late Caenozoic superficial deposits (e.g. colluvium, alluvium, soils, surface gravels, pedocretes).
Potential fossils	Vertebrate skeletal remains and burrows, trace fossils, plant fossil (e.g. petrified wood, plant compressions) within the Beaufort Group. Mammalian and other vertebrate bones, teeth and horncores, freshwater molluscs, calcretised trace fossils (e.g. termitaria), subfossil plant material within superficial sediments.
ECO protocol	1. Once alerted to fossil occurrence(s): alert site foreman, stop work in area immediately (<i>N.B.</i> safety first!), safeguard site with security tape / fence / sand bags if necessary.
	2. Record key data while fossil remains are still <i>in situ</i> : <ul style="list-style-type: none"> • Accurate geographic location – describe and mark on site map / 1: 50 000 map / satellite image / aerial photo • Context – describe position of fossils within stratigraphy (rock layering), depth below surface • Photograph fossil(s) <i>in situ</i> with scale, from different angles, including images showing context (e.g. rock layering)
	3. If feasible to leave fossils <i>in situ</i> : <ul style="list-style-type: none"> • Alert Heritage Resources Agency and project palaeontologist (if any) who will advise on any necessary mitigation • Ensure fossil site remains safeguarded until clearance is given by the Heritage Resources Agency for work to resume
	3. If <i>not</i> feasible to leave fossils <i>in situ</i> (emergency procedure only): <ul style="list-style-type: none"> • <i>Carefully</i> remove fossils, as far as possible still enclosed within the original sedimentary matrix (e.g. entire block of fossiliferous rock) • Photograph fossils against a plain, level background, with scale • Carefully wrap fossils in several layers of newspaper / tissue paper / plastic bags • Safeguard fossils together with locality and collection data (including collector and date) in a box in a safe place for examination by a palaeontologist • Alert Heritage Resources Agency and project palaeontologist (if any) who will advise on any necessary mitigation
	4. If required by Heritage Resources Agency, ensure that a suitably-qualified specialist palaeontologist is appointed as soon as possible by the developer.
	5. Implement any further mitigation measures proposed by the palaeontologist and Heritage Resources Agency
Specialist palaeontologist	Record, describe and judiciously sample fossil remains together with relevant contextual data (stratigraphy / sedimentology / taphonomy). Ensure that fossils are curated in an approved repository (e.g. museum / university / Council for Geoscience collection) together with full collection data. Submit Palaeontological Mitigation report to Heritage Resources Agency. Adhere to best international practice for palaeontological fieldwork and Heritage Resources Agency minimum standards.

17 APPENDIX E | OPERATIONAL BIRD MONITORING FRAMEWORK

The bird monitoring work done to date on the Umsobomvu WEF site has established a baseline understanding of the distribution, abundance and movement of key bird species on and near the site. If the project is authorized and constructed, the baseline information will need to be compared to data collected once the facility is operational. There will also be a need to measure the impacts of the facility on avifauna, particularly through collision mortality. The following programme has therefore been developed to meet these needs. It is recommended that this programme be implemented by the developer. It is recommended that the live bird monitoring and mortality estimates be continued for at least 2 years, and that mortality estimates be repeated in years 5, 10, 15 etc. The latest available version of the best practice guidelines (Jenkins *et al*, 2015) should be adhered to in this regard.

DURING CONSTRUCTION BIRD MONITORING

Due to the presence of multiple pairs of breeding eagles on and near site, there will be a need to monitor the effect of construction itself on these birds. It is recommended that a minimum of three short site visits be conducted by an ornithologist during any breeding season during which construction takes place. These site visits should include time spent observing the relevant breeding pairs of eagles and establishing breeding success and eagles reaction to construction.

POST CONSTRUCTION MONITORING

The intention with post construction bird monitoring is to repeat as closely as possible the methods and activities used to collect data pre-construction. One very important additional component needs to be added, namely mortality estimates through carcass searches. The following programme has therefore been developed to meet these needs, and should start as soon as possible after the construction of the first phase of turbines (not later than 3 months):

The 14 walked transects of approximately one kilometre each that have been conducted during pre-construction monitoring should be continued, as should the five vehicle based road count routes. The focal sites already established as well as any new focal sites identified by the 'during construction monitoring' should be monitored. It is particularly important that the breeding success at the relevant Verreaux's Eagle nests be monitored in the long term. All other incidental sightings of priority species (and particularly those suggestive of breeding or important feeding or roosting sites or flight paths) within the broader study area will be carefully plotted and documented. The six Vantage Points already established should be used to continue data collection post construction. There may be a need to move VP1 onto the site itself rather than viewing the eagle nest as the current position does. The exact positioning of these VP's may need to be refined based on the presence of new turbines and roads. A total of at least 12 hours of observation will be conducted at each vantage point on each site visit, resulting in a total of 72 hours direct observation on site

per site visit. The activities at the control site should be continued, i.e. six walked transects, two Vantage Points and a single vehicle transect.

MORTALITY ESTIMATES

This is a new component of the methodology. The area surrounding the base of turbines should be searched for collision victims. As an absolute minimum, the search area should be defined by a radius equal to 75% of the turbine height (ground to blade-tip). The area around each turbine should be searched using transects no greater than 10 meters apart, this width should be reduced where groundcover reduces visibility. Transects should be walked at a slow pace and carefully and methodically searched for any sign of a bird collision incident (carcasses, dismembered body parts, scattered feathers, injured birds). The period between searching individual turbines, the search interval, should be informed by assessments of scavenge and decomposition rates conducted in the initial stages of the monitoring period. Ideally the search interval should be shorter than the average carcass removal time. As a rule of thumb, a search interval of one to two weeks could be expected. It may be necessary to have two different approaches to sampling, and two different search intervals: 1) intensive, regular sampling of a subset of turbines and 2) extensive, less frequent sampling for large bodied bird carcasses. While this approach is not ideal for determining average fatality rates (Smallwood 2013), it does represent a compromise where significant mortalities of large birds at a particular turbine, or group of turbines, can be identified with limited resources.

Any suspected collision casualties should be comprehensively documented (for more detail see Jenkins *et al*, 2012). The number of turbines sampled should be informed by the objectives of the monitoring, as well as the spatial variation in fatality rates. It is therefore recommended that all turbines at each wind farm are surveyed, if necessary using the two different survey methods (intervals) as described above. No less than 30% or 20 turbines (whichever is greater) should be surveyed using the more rigorous (intensive) sampling methods. It is also important that associated infrastructure such as power lines and wind masts be searched for collision victims according to similar methods. It is important that in addition to searching for carcasses under turbines, an estimate of the detection (the success rate that monitors achieve in finding carcasses) and scavenging rates (the rate at which carcasses are removed and hence not available for detection) is also obtained (Jenkins *et al*, 2014).

Both of these aspects can be measured using a sample of carcasses of birds placed out in the field randomly. The rate at which these carcasses are detected as well as the rate at which they decay or are removed by scavengers should be measured. It is important that at least 20 carcasses are used, and that this is done twice in a 12 month period, in summer and in winter. Although it is important to try to use carcasses similar in size and other factors to the target species for the site, this is unlikely to be achievable in practice. It is more likely that a readily obtainable species will be used, such as ducks or geese.

Since the mortality searches need to be done more frequently than the other monitoring, this will require a separate team with different skills and hopefully based closer to the site. This should be discussed with the specialist as soon as the project is confirmed as going ahead.

At this stage the time required for this component of monitoring is difficult to determine since it will also be dependent on the exact methods. This should be discussed more with the developer as the time approaches.

This component of the monitoring should continue for at least 2 years post construction, and be repeated in year 5, 10, 15 etc.

The latest available version of the best practice guidelines should be adhered to at the relevant time.