
ACCESS ROADS AND WATERCOURSE CROSSINGS WITHIN THE AUTHORISED IZIDULI EMOYENI WIND ENERGY FACILITY, EASTERN CAPE

ENVIRONMENTAL MANAGEMENT PROGRAMME

EC02/C/LN1&3/M/02-2018

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PROJECT DETAILS

Title	:	Environmental Management Programme for the Proposed Access Roads and Watercourse Crossings within the authorised Iziduli Emoyeni Wind Energy Facility, Eastern Cape Province
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DEFINITIONS AND TERMINOLOGY

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

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

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

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

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

Construction: Construction means the building, erection or establishment of a facility, structure or infrastructure that is necessary for the undertaking of a listed or specified activity as per Regulations GNR 324, 325 and 327 of December 2014, as amended. Construction begins with any activity which requires Environmental Authorisation.

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

Decommissioning: To take out of active service permanently or dismantle partly or wholly, or closure of a facility to the extent that it cannot be readily re-commissioned. This usually occurs at the end of the life of a facility.

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

'Do nothing' alternative: The 'do nothing' alternative is the option of not undertaking the proposed activity or any of its alternatives. The 'do nothing' alternative also provides the baseline against which the impacts of other alternatives should be compared.

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

Endangered species: Taxa in danger of extinction and whose survival is unlikely if the causal factors continue operating. Included here are taxa whose numbers of individuals have been reduced to a critical

level or whose habitats have been so drastically reduced that they are deemed to be in immediate danger of extinction.

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

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

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

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

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

Environmental impact assessment: Environmental Impact Assessment, as defined in the NEMA EIA Regulations, is a systematic process of identifying, assessing and reporting environmental impacts associated with an activity.

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

Environmental management programme: A plan that organises and co-ordinates mitigation, rehabilitation and monitoring measures in order to guide the implementation of a project or facility and its ongoing maintenance after implementation.

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

Hazardous waste: Any waste that contains organic or inorganic elements or compounds that may, owing to the inherent physical, chemical or toxicological characteristics of that waste, have a detrimental impact on health and the environment.

Indigenous: All biological organisms that occurred naturally within the study area prior to 1800.

Incident: An unplanned occurrence that has caused, or has the potential to cause, environmental damage.

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

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

Perennial and non-perennial: Perennial systems contain flowing or standing water for all or a large proportion of any given year, while non-perennial systems are episodic or ephemeral and thus contain flows for short periods, such as a few hours or days in the case of drainage lines

Pre-construction: The period prior to the commencement of construction, which may include activities which do not require Environmental Authorisation (e.g. geotechnical surveys).

Pollution: A change in the environment caused by substances (radio-active or other waves, noise, odours, dust or heat emitted from any activity, including the storage or treatment or waste or substances.

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

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

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

Waste: Any substance, material or object, that is unwanted, rejected, abandoned, discarded or disposed of, or that is intended or required to be discarded or disposed of, by the holder of that substance, material or object, whether or not such substance, material or object can be re-used, recycled or recovered and includes all wastes as defined in Schedule 3 to the Waste Amendment Act (as amended on June 2014); or any other substance, material or object that is not included in Schedule 3 that may be defined as a waste by the Minister.

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

Watercourse: as per the National Water Act means -

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

TABLE OF CONTENTS

	PAGE
CHAPTER 1 INTRODUCTION AND PROJECT DETAILS	1
CHAPTER 2 PURPOSE AND OBJECTIVES OF THE EMPR	5
CHAPTER 3 STRUCTURE OF THIS EMPR	7
CHAPTER 4 PLANNING AND DESIGN MANAGEMENT PROGRAMME	9
4.1 Objectives	9
OBJECTIVE 1: Ensure the facility design responds to environmental constraints and opportunities	9
OBJECTIVE 2: To ensure effective communication mechanisms	10
CHAPTER 5 Construction Management programme	11
5.1 Institutional Arrangements: Roles and Responsibilities for the Construction Phase	11
5.2. Objectives	15
OBJECTIVE 1: Minimise impacts related to site establishment and construction workers	15
OBJECTIVE 2: Management of dust and emissions to air	16
OBJECTIVE 3: Soil erosion control, water quality management	17
OBJECTIVE 4: Limit damage to watercourse	19
OBJECTIVE 5: Protection of Indigenous Vegetation, Fauna and Control of Alien Invasive Plants	20
OBJECTIVE 6: Appropriate handling and management of waste	21
OBJECTIVE 7: Protection of heritage resources	23
5.3. Detailing Method Statements	24
OBJECTIVE: Ensure all construction activities are undertaken with the appropriate level of environmental awareness to minimise environmental risk	24
5.4. Awareness and Competence: Construction Phase	26
5.4.1 Environmental Awareness Training	27
5.4.3 Toolbox Talks	27
5.5. Monitoring Programme: Construction Phase	27
5.5.1. Non-Conformance Reports	28
5.5.2. Monitoring Reports	28
5.5.3. Final Audit Report	28
CHAPTER 6 REHABILITATION MANAGEMENT PROGRAMME	29
6.1. Objectives	29
OBJECTIVE 1: To ensure rehabilitation of disturbed areas such that residual environmental impacts are remediated or curtailed	29
CHAPTER 7 OPERATION MANAGEMENT PROGRAMME	31
7.1. Objectives	31
OBJECTIVE 1: Minimise soil degradation and erosion	31
OBJECTIVE 2: Limit Damage to the watercourse	32
OBJECTIVE 3: Protection of vegetation and fauna	32
CHAPTER 8 DECOMMISSIONING MANAGEMENT PROGRAMME	34
CHAPTER 9 FINALISATION OF THE ENVIRONMENTAL MANAGEMENT PROGRAMME	35

APPENDICES:

Appendix A: A3 Maps

Appendix B: Grievance Mechanism for Public Complaints and Issues

Appendix C: Project Team CVs

INTRODUCTION AND PROJECT DETAILS

CHAPTER 1

Windlab Developments South Africa (Pty) Ltd (Windlab)¹ received an environmental authorisation for the proposed Iziduli Emoyeni Wind Energy Facility (previously known as Amakhala Emoyeni Phase 4) on 28 August 2012 from the National Department of Environmental Affairs (DEA Ref: 12/12/20/1754/4) in accordance with the EIA Regulations of 2006. The Wind Energy Facility (WEF) was previously part of the greater project concept known as the Amakhala Emoyeni Wind Energy Facility. The project was split into four phases (in order to align with the Renewable Energy Independent Power Producer Procurement Programme requirements restricting a project size to 140MW).

Emoyeni Wind Farm Renewable Energy (Pty) Ltd is now applying for authorisation for identified Listed Activities in terms of the EIA Regulations, 2014 (as amended in April 2017). The activities entails the infilling and deposition of material within a watercourse (the widening and upgrading of existing watercourse crossings²), the construction of access roads and widening of the existing on-site access roads within the authorised Iziduli Emoyeni Wind Energy Facility project site from the width of 6m to 9m in width. A previous basic assessment application was submitted by Savannah Environmental Consultants in May 2015. The application was issued an environmental authorisation in July 2015 (Eastern Cape DEDEAT ref: EC02/C/LN1&3/M/75-2014), however the construction did not commence within the 24 months from the date of issue and the EA subsequently lapsed. As such, Savannah Environmental (Pty) Ltd has been appointed by Emoyeni Wind Farm Renewable Energy (Pty) Ltd to obtain an environmental authorisation in terms of the EIA Regulations, 2014 (as amended in April 2017).

The project will entail:

- » the construction of a new access roads ~18km in length and ~9m wide;
- » the widening of existing roads from 6m to 9m, ~7,5km in length; and
- » the widening and upgrading four (4) existing watercourse crossings.

The proposed Iziduli Emoyeni Wind Energy Facility is located ~26km south of Bedford and ~36km south east of Cookhouse within the Blue Crane Route Local Municipality which falls within the jurisdiction of the Sarah Baartman District Municipality, Eastern Cape Province (refer to **Figure 1.1** and **Table 1.1**). The following farms were authorised for the siting of the wind farm:

- » Remainder of the Farm Brakke Fonteyn No 218;
- » Remainder of Portion 1 of the Farm Brakke Fonteyn No 218;
- » Portion 2 (a Portion of Portion 1) of the Farm Brakke Fonteyn No 218;
- » The Farm Vogel Fonteyn No 219; and
- » Remainder of the Farm Brakfontein No 220.

The proposed access roads and watercourse crossings are located within the authorised Iziduli Emoyeni Wind Energy Facility development footprint, located approximately 26km south of Bedford within the Blue Crane Route Local Municipality in the Eastern Cape. The following properties will be affected:

¹ The holder of the EA was amended from Windlab Developments South Africa (Pty) Ltd to Emoyeni Wind Farm Renewable Energy (Pty) Ltd on 2 July 2015.

² Listed Activity 19 of GN R326 of the 2014 EIA Regulations as amended on 07 April 2017, is applied for to allow for excavation and/or infill of material exceeding 10m³ for the construction of watercourse crossings.

- » Remainder of Portion 1, Portion 2 (a Portion of Portion 1) and the Remainder of the Farm Brakke Fonteyn No 218;
- » The Farm Vogel Fonteyn No 219; and
- » Remainder of the Farm Brakfontein No 220.

No site alternatives were assessed as the construction of the new access roads, the widening of the existing roads and the widening and upgrading of the watercourse crossings are required in the project site in order to accommodate the authorised wind farm.

Table 1: Location of the affected properties

Province	Eastern Cape Province
Local Municipality	Blue Crane Route Local Municipality
District Municipality	Sarah Baartman District Municipality
Ward number(s)	1
Nearest town(s)	The project site is located ~26km south of Bedford and ~36km south east of Cookhouse.
Farm name(s) and number(s)	<ul style="list-style-type: none"> » Remainder of the Farm Brakke Fonteyn No 218 » Remainder of Portion 1 of the Farm Brakke Fonteyn No 218 » Portion 2 (a Portion of Portion 1) of the Farm Brakke Fonteyn No 218 » The Farm Vogel Fonteyn No 219 » Remainder of the Farm Brakfontein No 220
SG 21 Digit Code	<ul style="list-style-type: none"> » Remainder of the Farm Brakke Fonteyn No 218 – C01000000000021800000 » Remainder of Portion 1 of the Farm Brakke Fonteyn No 218 - C01000000000021800010 » Portion 2 (a Portion of Portion 1) of the Farm Brakke Fonteyn No 218 - C01000000000021800020 » The Farm Vogel Fonteyn No 219 - C01000000000021900000 » Remainder of the Farm Brakfontein No 220 -C01000000000022000000
Current Land Use	The project site is currently being utilised for game farming and hunting.

A layout map overlain with the environmental sensitivities within the project site has been included as **Appendix A** and as **Figure 1.2**.

The EMPr has been developed on the basis of the findings of the Basic Assessment (BA), and must be implemented to protect sensitive on-site and off-site features through controlling construction, operation and decommissioning activities that could have a detrimental effect on the environment, and through avoiding or minimising potential impacts. This EMPr is applicable to all employees and contractors working on the pre-construction, construction and maintenance phases of the Project. The document will be adhered to, updated as relevant throughout the project life cycle. This document fulfils the requirement of the EIA Regulations and forms part of the BA Report for the project.

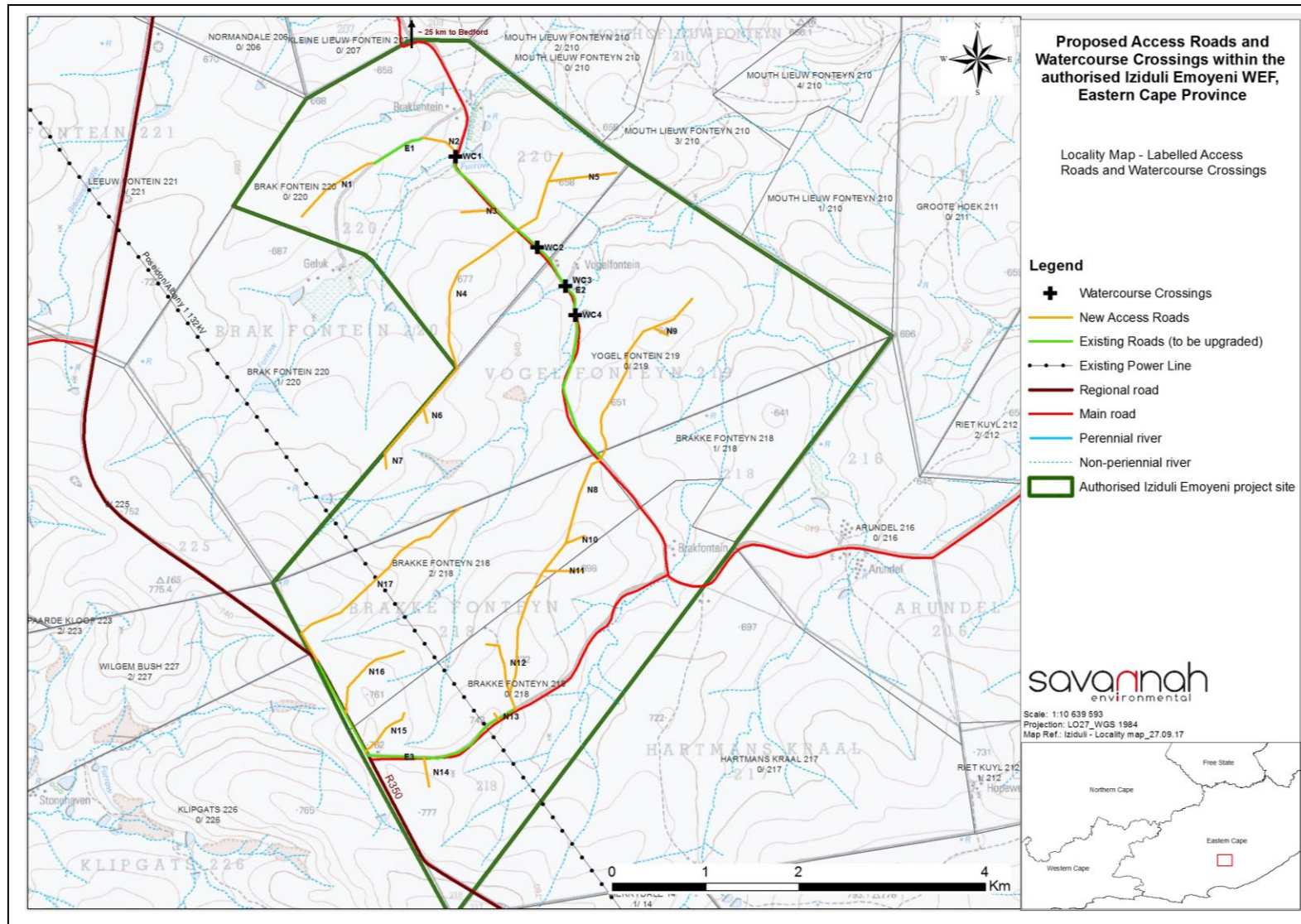


Figure 1.1: Layout map indicating the proposed access roads and watercourse crossings within the authorised Iziduli Wind Energy Facility site

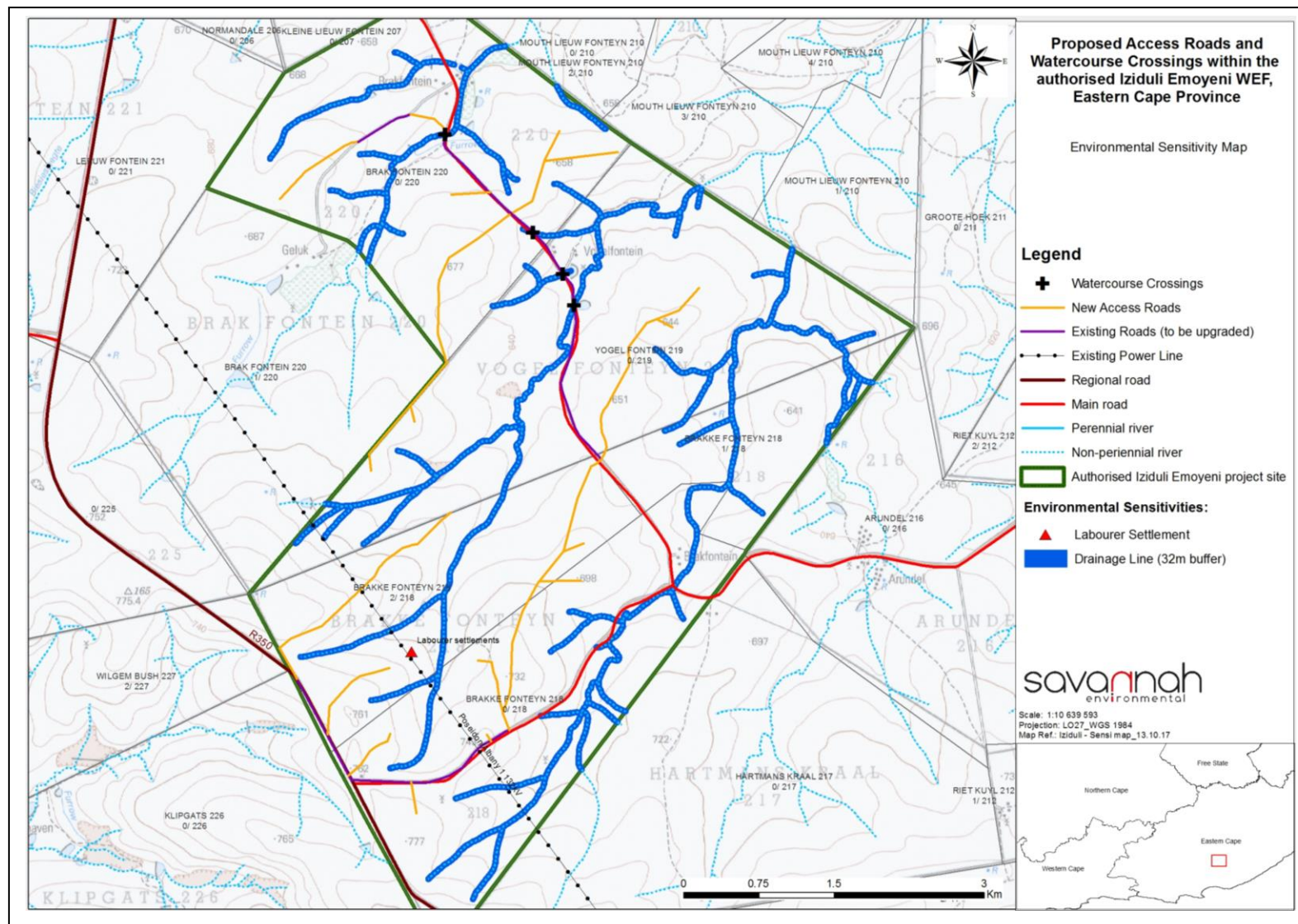


Figure 1.2: Map illustrating the sensitivity of the project site overlain with the layout of the access roads and watercourse crossings.

PURPOSE AND OBJECTIVES OF THE EMPR

CHAPTER 2

An Environmental Management Programme (EMPr) is defined as “an environmental management tool used to ensure that undue or reasonably avoidable adverse impacts associated with the planning, construction, operation and decommissioning of a project are avoided or mitigated, and that the positive benefits of the projects are enhanced”. The objective of this EMPr is to provide consistent information and guidance for implementing the management and monitoring measures established in the permitting process and to help achieve environmental policy goals. The purpose of an EMPr is to ensure continuous improvement of environmental performance, reducing negative impacts and enhancing positive effects during the construction and operation of the project. An effective EMPr is concerned with both the immediate outcome as well as the long-term impacts of the project.

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

This construction and operation Environmental Management Programme has been compiled for the construction of access roads and the widening of access roads and watercourse crossings. This EMPr is applicable to all employees and contractors working on the pre-construction, construction, and operation and maintenance phases of the project. The document will be adhered to, updated as relevant throughout the project life cycle.

This EMPr has been compiled in accordance with Appendix 4 of the 2014 EIA Regulations, as amended and will be further developed in terms of specific requirements as the project develops. This document is a dynamic document and will be further developed in terms of specific requirements listed in any authorisations issued for the project (if required) and/or as the project develops. The EMPr has been developed as a set of environmental specifications (i.e. principles of environmental management), which are appropriately contextualised to provide clear guidance in terms of the on-site implementation of these specifications (i.e. on-site contextualisation is provided through the inclusion of various monitoring and implementation tools).

This EMPr has the following objectives:

- » Outline mitigation measures and environmental specifications which are required to be implemented for the planning, construction, rehabilitation and operation phases of the project in order to manage and minimise the extent of potential environmental impacts associated with the watercourse crossings and access roads.
- » Ensure that all the phases of the project do not result in undue or reasonably avoidable adverse environmental impacts, and ensure that any potential environmental benefits are enhanced.
- » Identify entities responsible for the implementation of the measures and outline functions and responsibilities.
- » Propose mechanisms and frequency for monitoring compliance, and preventing long-term or permanent environmental degradation.

- » Facilitate appropriate and proactive responses to unforeseen events or changes in project implementation that was not considered in the Basic Assessment process.

The management and mitigation measures identified within the Basic Assessment (BA) process are systematically addressed in this EMPr, and ensure the minimisation of adverse environmental impacts to an acceptable level.

Emoyeni Wind Farm Renewable Energy (Pty) Ltd must ensure that the implementation of the project complies with the requirements of all environmental authorisations, permits, and obligations emanating from relevant environmental legislation. This obligation is partly met through the development and the implementation of this EMPr and through its integration into the contract documentation. Since this EMPr is part of the BA process for the watercourse crossings and access roads, it is important that this document be read in conjunction with the BA report compiled for this project. **Furthermore, this EMPr must be read together with the EMPr for the Iziduli Emoyeni Wind Farm (DEA Ref: 12/12/20/1754/4)** and generic specifications in the wind energy facility EMPr should also be considered relevant to this activity. This will contextualise the EMPr and enable a thorough understanding of its role and purpose in the integrated environmental management process. Should there be a conflict of interpretation between this EMPr and the environmental authorisation (once issued), the stipulations in the environmental authorisation shall prevail over that of the EMPr, unless otherwise agreed by the authorities in writing. Similarly, any provisions in legislation overrule any provisions or interpretations within this EMPr.

This EMPr for construction and operation activities shall be binding on all the parties involved in the planning, construction and operation of the project, and shall be enforceable at all levels of contract and operational management within the project. The document must be adhered to and updated as relevant throughout the project life cycle.

STRUCTURE OF THIS EMPr

CHAPTER 3

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

- » Planning and design (pre-construction) activities;
- » Construction activities;
- » Operation activities; and
- » Decommissioning activities.

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

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

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

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

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

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

- » Planned activities change (i.e. in terms of the components and/or layout of the project);
- » Modification to or addition to environmental objectives and targets;

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

3.1. Project Team

This EMPr was compiled by:

	Name	Company
EMPr Compilers:	Thalita Botha Jo-Anne Thomas	Savannah Environmental
Specialists:		
Ecology and Aquatic	Brian Colloty	Scherman Colloty & Associates supplemented by studies conducted for the Amakhala Emoyeni Wind Energy Facility

The Savannah Environmental team have extensive knowledge and experience in EIAs and environmental management, having been involved in EIA processes over the past years. They have managed and drafted EMPrs for a variety of projects throughout South Africa. Refer to **Appendix C** for CVs of project team. The expertise of the Savannah Environmental team is included below:

- » *Thalita Botha* - the principle author of this report holds a BSc degree with Honours in Environmental Management and has two years of experience in environmental consulting. Her key focus is on environmental impact assessments, public participation, mapping (using ArcGIS), environmental management plans and programmes.
- » *Jo-Anne Thomas* – the principle Environmental Assessment Practitioner (EAP) for this project. She is a registered Professional Natural Scientist (in the practice of environmental science) with the South African Council for Natural Scientific Professions. She has gained extensive knowledge and experience on potential environmental impacts associated with electricity generation and transmission projects through her involvement in related EIA processes over the past nineteen (19) years. She has successfully managed and undertaken EIA processes for infrastructure development projects throughout South Africa.

PLANNING AND DESIGN MANAGEMENT PROGRAMME

CHAPTER 4

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

- » Ensures that the design of the access roads and watercourse crossing respond to identified environmental constraints and opportunities.
- » Ensures that pre-construction activities are undertaken in accordance with all relevant legislative requirements.

In order to meet this goal, the following objectives have been identified, together with necessary actions and monitoring requirements. As previously stated, this EMPr should be read together with the EMPr prepared for the Iziduli Emoyeni Wind farm. Specifications not specific to the watercourse crossings structures are not repeated within this document.

4.1 Objectives

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

Project component/s	» Design and planning of the watercourse crossings (including culverts) and access roads
Potential Impact	» Design fails to respond optimally to the environmental consideration
Activity/risk source	» Construction of watercourse crossings
Mitigation: Target/Objective	<ul style="list-style-type: none"> » To ensure that the design of the watercourse crossings responds to the identified environmental constraints and opportunities. » To ensure selection of best environmental option for design of infrastructure. » To undertake pre-construction activities in accordance with all relevant legislative requirements.

Mitigation: Action/control	Responsibility	Timeframe
Plan and conduct pre-construction activities in an environmentally acceptable manner	Developer/Owner EPC Contractor	Pre-construction
The watercourse crossings should be designed such that they do not trap any run-off, thereby creating inundated areas, but allow for free flowing systems	EPC Contractor	Pre-construction
A detailed geotechnical investigation is required for the design phase.	EPC Contractor	Pre-construction
Fourteen (14) days written notice must be given to the Department that the activity will commence. The notification must include a date on which the activity will commence as well as the reference number.	Developer/Owner	Pre-construction
A permit must be obtained for removal or cutting of any protected plants found on site prior to the commencement of construction.	Developer/Owner	Pre-construction

Mitigation: Action/control	Responsibility	Timeframe
The terms of this EMPr and the Environmental Authorisation to be included in all tender documentation and Contractors contracts	Developer/Owner EPC Contractor	Tender process

Performance Indicator	<ul style="list-style-type: none"> » No complaints from surrounding landowners » The design meets the objectives and does not degrade the surrounding environment » Design and layouts respond to the mitigation measures and recommendations in the BA Report
Monitoring	<ul style="list-style-type: none"> » Ensure that the design implemented meets the objectives and mitigation measures in the BA Report through review of the design by the Project Manager, and the ECO prior to the commencement of activity

OBJECTIVE 2: To ensure effective communication mechanisms

On-going communication with affected and surrounding landowners is important to maintain during the construction and operational phases of the activity. Any issues and concerns raised should be addressed as far as possible in as short a timeframe as possible.

Project component/s	» Watercourse crossings and access roads
Potential Impact	» Impacts on affected and surrounding landowners and land uses
Activity/risk source	» Activities associated with construction of watercourse crossings
Mitigation: Target/Objective	<ul style="list-style-type: none"> » Effective communication with affected and surrounding landowners » Addressing of any issues and concerns raised as far as possible in as short a timeframe as possible

Mitigation: Action/control	Responsibility	Timeframe
Compile and implement a grievance mechanism procedure for the public (as outlined in Appendix A) to be implemented during both the construction and operational phases of the facility. This procedure should include details of the contact person who will be receiving issues raised by interested and affected parties, and the process that will be followed to address issues. This procedure should be in line with the South African Labour Law.	Developer/Owner EPC Contractor O&M Contractor	Pre-construction (construction procedure) Pre-operation (operation procedure)
Liaison with landowners is to be undertaken prior to the commencement of construction in order to provide sufficient time for them to plan land use activities accordingly.	Developer/Owner EPC Contractor	Pre-construction

Performance Indicator	» Effective communication procedures in place.
Monitoring	<ul style="list-style-type: none"> » An incident reporting system should be used to record non-conformances to the EMPr » Public complaints register must be developed and maintained

Overall Goal: To ensure that the construction of the access roads and the widening of the existing roads and watercourse crossings does not have unforeseen impacts on the environment and to ensure that all impacts are monitored and the necessary corrective action taken in all cases. In order to address this goal, it is necessary to construct to road in a way that:

- » Ensures that construction activities are properly managed in respect of environmental aspects and impacts.
- » Enables construction activities to be undertaken without significant disruption to other land uses and activities in the area.
- » Minimises the impact on any remaining indigenous natural vegetation, and habitats of ecological value.
- » Minimises impacts on fauna using the site.
- » Minimises the impact on heritage sites should they be uncovered.

5.1 Institutional Arrangements: Roles and Responsibilities for the Construction Phase

As the Proponent, Emoyeni Wind Farm Renewable Energy (Pty) Ltd must ensure that the implementation of the Iziduli Emoyeni Wind Farm complies with the requirements of any and all environmental authorisations and permits, and obligations emanating from other relevant environmental legislation. While the proponent has a duty of care in this regard, the Contractor will be held directly responsible for all of these permits. This obligation is partly met through the development of the EMPr, and the implementation of the EMPr through its integration into the contract documentation. Emoyeni Wind Farm Renewable Energy (Pty) Ltd will retain various key roles and responsibilities during construction. These are outlined within the EMPr compiled for the Iziduli Emoyeni Wind Farm and are also applicable for the watercourse crossing.

OBJECTIVE 1: Establish clear reporting, communication, and responsibilities in relation to overall implementation of environmental management programme during construction

Formal responsibilities are necessary to ensure that key procedures are executed. Specific responsibilities of the Technical Director/Manager; Site Manager; Safety, Health and Environment Representative; Environmental Control Officer (ECO) and Contractor for the construction phase of this project are as detailed below. Formal responsibilities are necessary to ensure that key procedures are executed. **Figure 5.1** provides an organogram indicating the organisational structure for the implementation of the EMPr.

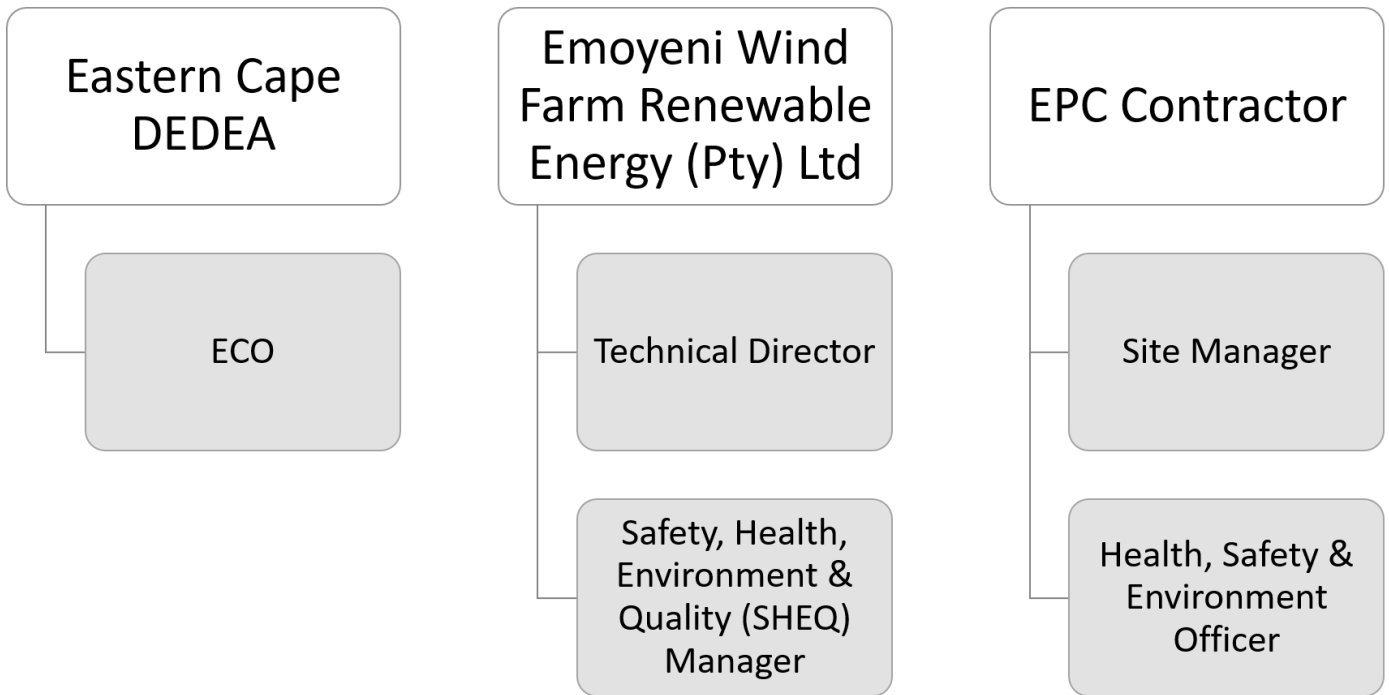


Figure 5.1: Organisational structure for the implementation of the EMPr.

Technical Director will:

- » Ensure all specifications and legal constraints specifically with regards to the environment are highlighted to the Contractor(s) so that they are aware of these.
- » Ensure that Emojeni Wind Farm Renewable Energy (Pty) Ltd and its Contractor(s) are made aware of all stipulations within the EMPr.
- » Ensure that the EMPr is correctly implemented throughout the project by means of site inspections and meetings. This will be documented as part of the site meeting minutes.
- » Be fully conversant with the BA for the project, the EMPr, the conditions of the Environmental Authorisation (once issued), and all relevant environmental legislation.
- » Be fully knowledgeable with the contents of all relevant licences and permits.

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

- » Be fully knowledgeable with the contents of the BA and risk management
- » Be fully knowledgeable with the contents and conditions of the Environmental Authorisation (once issued)
- » Be fully knowledgeable with the contents of the EMPr
- » Have overall responsibility of the EMPr and its implementation
- » Ensure that no actions are taken which will harm or may cause harm to the environment, and take steps to prevent pollution on the site
- » Confine activities to the demarcated construction site

An independent **Environmental Control Officer (ECO)** must be appointed by the project proponent prior to the commencement of any authorised activities and will be responsible for monitoring, reviewing and

verifying compliance by the EPC Contractor with the environmental specifications of the EMPr and the conditions of the Environmental Authorisation. Accordingly, the ECO will:

- » Be fully knowledgeable with the contents of the BA.
- » Be fully knowledgeable with the contents of the conditions of the Environmental Authorisation (once issued).
- » Be fully knowledgeable with the contents of the EMPr.
- » Be fully knowledgeable of all the licences and permits issued to the site.
- » Be fully knowledgeable with the contents of all relevant environmental legislation, and ensure compliance with them.
- » Ensure that the contents of this document are communicated to the Contractor site staff and that the Site Manager and Contractor are constantly made aware of the contents through discussion.
- » Ensure that the compliance of the EMPr, EA and the legislation is monitored through regular and comprehensive inspection of the site and surrounding areas.
- » Ensure that if the EMPr, EA and/or the legislation conditions, regulations or specifications are not followed then appropriate measures are undertaken to address any non-compliances (for example an ECO may cease construction or an activity to prevent a non-compliance from continuing).
- » Monitoring and verification must be implemented to ensure that environmental impacts are kept to a minimum, as far as possible.
- » Ensure that the Site Manager has input into the review and acceptance of construction methods and method statements.
- » Ensure that activities on site comply with all relevant environmental legislation.
- » Ensure that a removal is ordered of any person(s) and/or equipment responsible for any contravention of the specifications of the EMPr, provided they have been notified and not remedied in a reasonable time frame.
- » Keep record of all activities on site, problems identified, transgressions noted and a task schedule of tasks undertaken by the ECO.
- » Ensure that the compilation of progress reports for submission to the Technical Director, with input from the Site Manager, takes place on a regular basis, including a final post-construction audit.
- » Ensure that there is communication with the Site Manager regarding the monitoring of the site.
- » Ensure that any non-compliance or remedial measures that need to be applied are reported.
- » Keep record of all activities on site, problems identified, transgressions noted and a task schedule of tasks undertaken by the ECO.
- » Submit independent reports to the Eastern Cape DEDEA and other regulating authorities regarding compliance with the requirements of the EMPr, EA and other environmental permits.

The ECO shall remain employed and undertake audits until all rehabilitation measures, as may be required, are completed and the site handed over for operation.

Contractors and Service Providers: It is important that contractors are aware of the responsibilities in terms of the relevant environmental legislation and the contents of this EMPr. The contractor is responsible for informing employees and sub-contractors of their environmental obligations in terms of the environmental specifications, and for ensuring that employees are adequately experienced and properly trained in order to execute the works in a manner that will minimise environmental impacts. The contractor's obligations in this regard include the following:

- » Employees must have a basic understanding of the key environmental features of the construction site and the surrounding environment.
- » A copy of the EMPr must be easily accessible to all on-site staff members.
- » Employees must be familiar with the requirements of this EMPr and the environmental specifications as they apply to the construction of the facility.
- » Prior to commencing of any site works, all employees and sub-contractors must have attended an environmental awareness training course to provide staff with an appreciation of the project's environmental requirements, and how they are to be implemented.
- » Staff will be informed of environmental issues as deemed necessary by the ECO.

All contractors (including sub-contractors and staff) and service providers are ultimately responsible for:

- » Ensuring adherence to the environmental management specifications
- » Ensuring that Method Statements are submitted to the Site Manager for approval before any work is undertaken
- » Any lack of adherence to the above will be considered as non-compliance to the specifications of the EMPr
- » Ensuring that any instructions issued by the Site Manager on the advice of the ECO are adhered to
- » Ensuring that a report is tabled at each site meeting, which will document all incidents that have occurred during the period before the site meeting
- » Ensuring that a register is kept in the site office, which lists all transgressions issued by the ECO
- » Ensuring that a register of all public complaints is maintained
- » Ensuring that all employees, including those of sub-contractors receive training before the commencement of construction in order that they can constructively contribute towards the successful implementation of the EMPr (i.e. ensure their staff are appropriately trained as to the environmental obligations)

Contractor's Safety, Health and Environment Representative: The Contractor's Safety, Health and Environment (SHE) Representative, employed by the Contractor, is responsible for managing the day-to-day on-site implementation of this EMPr, and for the compilation of regular (usually weekly) Monitoring Reports. In addition, the SHE must act as liaison and advisor on all environmental and related issues and ensure that any complaints received from the public are duly recorded and forwarded to the Site Manager and Contractor. In some instances, a separate EO may be appointed to support this function.

The Contractor's Safety, Health and Environment Representative and/or Environmental Officer should:

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

5.2. Objectives

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

OBJECTIVE 1: Minimise impacts related to site establishment and construction workers

The contractor must take all reasonable measures to ensure the safety of the public in the surrounding area. Where the public could be exposed to danger by any of the works or site activities, the contractor must, as appropriate, provide suitable flagmen, barriers and/or warning signs in English, Afrikaans and any other relevant languages, all to the approval of the Site Manager.

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

Project component/s	» Access roads and watercourse crossings
Potential Impact	» Pollution of the surrounding environment due to inadequate or inappropriate facilities or procedures » Hazards to landowners and public
Activity/risk source	» Open excavations » Types of materials or equipment and the manner in which they are stored or handled » Movement of construction vehicles in the area and on-site » Contractors not aware of the requirements of the EMPr, leading to unnecessary impacts on the surrounding environment
Mitigation: Target/Objective	» Educate all workers of the dangers associated with a construction site » Secure the site against unauthorised entry » Ensure appropriate management of actions by on-site personnel in order to minimise impacts to the surrounding environment.

Mitigation: Action/control	Responsibility	Timeframe
Put up adequate warning signage, as required.	EPC Contractor	Construction phase
Secure site, working areas and excavations in an appropriate manner, as agreed with the Site Manager and EO.	EPC Contractor	Site establishment, and duration of construction
Where necessary control access, fence, and secure area.	EPC Contractor	Site establishment, and duration of construction
Fence, clearly demarcated and secure contractor's equipment camp/ laydown area.	EPC Contractor	Site establishment, and duration of construction

Establish SABS 089: 1999 Part 1 approved bunded areas for storage of hazardous materials and hazardous waste.	EPC Contractor	Site establishment
Conduct training and safety induction amongst workers	EPC Contractor	Construction phase
The contractor must take all reasonable measures to ensure the safety of the public in the surrounding area. Where the public could be exposed to danger by any of the works or site activities, the contractor must, as appropriate, provide suitable flagmen, barriers and/or warning signs in English, Afrikaans and any other relevant local languages, all to the approval of the Site Manager.	EPC Contractor	Duration of contract
Identify and demarcate construction areas, servitudes, and access for general construction work and restrict construction activity to these areas.	EPC Contractor / ECO	Pre-construction and construction
Supply adequate (closable, tamper proof) waste collection bins at site where construction is being undertaken. Separate bins should be provided for general and hazardous waste.	EPC Contractor	Site establishment, and duration of construction
Ensure waste containers are maintained and emptied as and when required.	EPC Contractor	Site establishment, and duration of construction

Performance Indicator	<ul style="list-style-type: none"> » No injuries or incidents on the construction site » Site is secure and there is no unauthorised entry » Appropriate and adequate waste management and sanitation facilities provided at construction site » Appropriate training of all staff is undertaken prior to them commencing work on the construction site » Code of Conduct drafted before commencement of construction phase
Monitoring	<ul style="list-style-type: none"> » An incident reporting system to record non-conformances to the EMPr » Observation and supervision of Contractor practices throughout construction phase by the ECO » Complaints must be investigated and, if appropriate, acted upon » ECO and EO to monitor all construction areas on a continuous basis until all construction is completed. Non-conformances must be immediately reported to the site manager.

OBJECTIVE 2: Management of dust and emissions to air

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

Project component/s	<ul style="list-style-type: none"> » Access roads and watercourse crossings
Potential Impact	<ul style="list-style-type: none"> » Dust consists of particles that are large enough to settle down and not remain suspended indefinitely in the atmosphere. Dust negatively affects quality of life by causing soiling, contamination, structural corrosion and damage to precision equipment, machinery and computers. » Release of minor amounts of air pollutants (for example NO₂, CO₂ and SO₂) from vehicles and construction equipment.

Activity/risk source	<ul style="list-style-type: none"> » Clearing of vegetation and topsoil. » Excavation, grading, scraping, levelling, digging, drilling. » Transport of materials, equipment, and components on internal access roads/ tracks. » Re-entrainment of deposited dust by vehicle movements. » Wind erosion from topsoil and spoil stockpiles and unsealed roads and surfaces. » Fuel burning from construction vehicles with combustion engines. PM10 emissions from construction activities.
Mitigation: Target/Objective	<ul style="list-style-type: none"> » To minimise nuisance to the community from dust emissions and to comply with workplace health and safety requirements for the duration of the construction phase » Suppression of dust, pollution control and minimise dust generation

Mitigation: Action/control	Responsibility	Timeframe
Appropriate dust suppressant measures must be applied as required to minimise/control airborne dust.	EPC Contractor	Duration of contract
A speed limit of 40km/h should be implemented for vehicles travelling on site in order to minimise dust generation and ensure safety of personnel and the environment.	EPC Contractor	Duration of contract
A comprehensive employee induction programme to be developed and utilised to cover land access protocols, fire management and road safety.	EPC Contractor	Construction Phase
Road must be maintained in a manner that will ensure that nuisance from dust emissions from road or vehicle sources are not visibly excessive.	EPC Contractor	Construction Phase
Cover loads on vehicles carrying dusty construction materials	EPC Contractor	Construction Phase

Performance Indicator	<ul style="list-style-type: none"> » No complaints from adjacent landowners regarding dust » Dust suppression measures implemented » Road worthy certificates in place for all heavy vehicles at outset of construction phase
Monitoring	<ul style="list-style-type: none"> » Monitoring must be undertaken to ensure emissions are not exceeding the prescribed levels. » Immediate reporting by personnel of any potential or actual issues with nuisance dust or emissions to the Site Manager. » An incident register and non-conformance must be used to record incidents and non-conformances to the EMPr.

OBJECTIVE 3: Soil erosion control, water quality management

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

Project component/s	» Access roads and watercourse crossings
Potential Impact	<ul style="list-style-type: none"> » Erosion and soil loss into watercourse » Disturbance of watercourse » Sedimentation of watercourse area » A loss of indigenous vegetation cover, particularly in watercourse area
Activity/risk source	<ul style="list-style-type: none"> » Water and wind erosion of disturbed areas » Excavation, stockpiling and compaction of soil » Concentrated discharge of water from construction activity » Storm water run-off from sealed surfaces » Mobile construction equipment movement on site » Drainage line road crossings » Roadside drainage ditches
Mitigation: Target/Objective	<ul style="list-style-type: none"> » To minimise erosion of soil from site during construction » To minimise deposition of soil into drainage lines » To minimise damage to aquatic system by erosion or deposition » To minimise damage to soil and aquatic system by construction activity » No accelerated overland flow related surface erosion as a result of a loss of vegetation cover » No reduction in the surface area of drainage lines as a result of the establishment of infrastructure » Minimal loss of vegetation cover due to construction related activities

Mitigation: Action/control	Responsibility	Timeframe
Identify and demarcate construction areas for general construction work and restrict construction activity to these areas. Prevent unnecessary destructive activity within construction areas (prevent over-excavations and double handling)	EPC Contractor	Pre-construction and construction
Stockpile topsoil for re-use in rehabilitation phase. Maintain stockpile shape and protect from erosion. All stockpiles must be positioned at least 50m away from wetlands and drainage lines. Limit the height of stockpiles as far as possible in order to reduce compaction.	EPC Contractor	Pre-construction and construction
Disturbance of vegetation and topsoil must be kept to a practical minimum.	EPC Contractor	Construction
Rehabilitate disturbance areas as soon as construction in an area is completed.	EPC Contractor	Pre-construction and post construction
Control depth of excavations and stability of cut faces/sidewalls.	EPC Contractor	Pre-construction and post construction
Compile a comprehensive storm water management plan as part of the final design of the project and implement during construction and operation.	EPC Contractor	Construction and operation

Performance Indicator	<ul style="list-style-type: none"> » Limited soil erosion around site » Limited increased siltation in drainage lines » Limited soil degradation
Monitoring	<ul style="list-style-type: none"> » Regular inspections of the site by ECO » inspections of sediment control devices by ECO » Regular inspections of surroundings, including drainage lines by ECO » Immediate reporting of ineffective sediment control systems by ECO

- » An incident reporting system must record non-conformances.
- » Public complaints register must be developed and maintained on site.

OBJECTIVE 4: Limit damage to watercourse

Construction of the proposed infrastructure will impact upon non-perennial drainage lines only; these crossings are high in the catchment areas and are not located within in any major watercourses or riverine channels. Where impacts are unavoidable, mitigation measures are required to minimise impacts on these systems.

Project component/s	» Access roads and watercourse crossings
Potential Impact	» Damage to watercourse area by any means that will result in hydrological changes (includes erosion, siltation, dust, direct removal of soil of vegetation, dumping of material)
Activity/risk source	» Construction and widening of access roads and watercourse crossings
Mitigation: Target/Objective	» Minimise damage to watercourse areas where crossing will be built.

Mitigation: Action/control	Responsibility	Timeframe
Where watercourse crossings are required, the engineering team must provide an effective means to minimise the potential upstream and downstream effects of sedimentation and erosion (erosion protection) as well as minimise the loss of riparian vegetation (small footprint). This has been proposed by the design team in the prepared design crossings and includes energy dissipation structures such as gabions and reno mattresses. » No vehicles to refuel within drainage lines/ riparian vegetation. » During the operational phase, monitor culverts to see if erosion issues arise and if any erosion control if required.	EPC Contractor, ECO	Construction and operation
No vehicles to refuel within drainage lines/ riparian vegetation.	EPC Contractor, ECO	Construction and operation
Where possible culvert bases must be placed as close as possible with natural levels in mind so that these don't form additional steps / barriers.	EPC Contractor, ECO	Construction and operation
Control storm water and runoff water through the implementation of a storm water management plan for the site.	EPC Contractor, ECO	Construction and operation
Disturbed areas should be rehabilitated and re-vegetated as soon as possible.	EPC Contractor	Construction
Installed culvert bases must be placed as close as possible with natural levels so that these do not form additional steps / barriers.	EPC Contractor	Construction

Performance Indicator	» No impacts on water quality, water quantity, natural status of watercourse.
Monitoring	<ul style="list-style-type: none"> » Habitat loss in watercourse should be monitored before and after construction. » The presence and development of erosion features downstream of any construction must be monitored. » The ECO should be responsible for driving this process with the contractor as needed.

- » An incident reporting system must be used to record non-conformances to the EMP/IWWMP.
- » Public complaints register must be developed and maintained on site.

OBJECTIVE 5: Protection of Indigenous Vegetation, Fauna and Control of Alien Invasive Plants

The authorised Iziduli Emoyeni Wind Farm site falls within two vegetation types namely the Bedford Dry Grassland which is considered to be Least Threatened, with 1% conserved of a target of 23% and 3% transformed (Mucina et al., 2006) and the Great Fish Thicket which is considered to be Least Threatened, with 11% conserved of a target of 19% and 4% transformed (Hoare et al. 2006).

No alien invasive plant species have been identified within the project site. The majority of faunal species listed as well as observed within the project site with a conservation status were found in association with rivers, rocky outcrops and the thicket / grassland vegetation types.

Project component/s	» Access roads and watercourse crossings
Potential Impact	<ul style="list-style-type: none"> » Loss of vegetation and sensitive vegetation » Spread of alien species » Interference with fauna » Possible exposure of fauna and flora to contaminants
Activity/risk source	<ul style="list-style-type: none"> » Site preparation and earthworks » Construction-related traffic » Dumping or damage by construction equipment outside of demarcated construction areas
Mitigation: Target/Objective	<ul style="list-style-type: none"> » To retain natural vegetation as far as possible » To minimise footprints of disturbance of vegetation/habitats on-site » Limit alien plants within project development footprint (Wind energy facility, Water crossings, new access roads and road upgrades) » Limit loss of species of conservation concern

Mitigation: Action/control	Responsibility	Timeframe
Due to the nature of the activities, the vegetation must be cleared prior to construction. The following is this recommended: <ul style="list-style-type: none"> • Clearing of the vegetation must be kept to a minimum; • The final development footprint/alignments must be surveyed as part of a search and rescue programme (plants, small mammals and reptiles) before commencement. These species should be translocated to available habitat adjacent to the site. 	EPC Contractor Specialist	Construction
Species of concern to be relocated and conserved in situ should be marked. Identification of suitable relocation sites for each species should be identified.	EPC Contractor	Construction
Areas to be cleared must be clearly marked in the field to eliminate unnecessary clearing. In this regard, staff/ employees must be educated to keep construction activities within the demarcated areas.	EPC Contractor	Construction

Mitigation: Action/control	Responsibility	Timeframe
Enforce speed limits of 40km/h within the construction site	EPC Contractor	Construction
ECO and EO must inspect the immediate vegetation for evidence of snares.	EPC Contractor ECO EO	Construction
A plant rescue and protection plan must be compiled and implemented.	EPC Contractor	Construction

Performance Indicator	<ul style="list-style-type: none"> » No disturbance outside of designated work areas. » Rescue of species of conservation concern. » Minimised clearing of existing/natural vegetation. » Limited impacts on areas of identified and demarcated sensitive habitats/vegetation.
Monitoring	<ul style="list-style-type: none"> » Observation of vegetation clearing activities by ECO or the Contractor's EO throughout construction phase. » Supervision of all clearing and earthworks by ECO or the Contractor's EO. » Number of trees to be conserved in situ to be checked, cross checked against the trees marked for in situ conservation after ground clearing is completed. » An incident reporting system must be used to record non-conformances to the EMPr.

OBJECTIVE 6: Appropriate handling and management of waste

Activities resulting from the construction phase could lead to impacts resulting from waste management and materials handling. Good supervision of the waste management programme on site is critical for the minimisation of impacts.

Project component/s	» Construction activities
Potential Impact	» Risk to environment due to poor waste management practices
Activity/risk source	<ul style="list-style-type: none"> » Spoil material from excavation, earthworks and site preparation » Other construction wastes
Mitigation: Target/Objective	<ul style="list-style-type: none"> » To comply with waste management guidelines developed by the contractor » To minimise production of waste » To ensure appropriate waste handling, storage and disposal » To avoid environmental harm from waste disposal

Mitigation: Action/control	Responsibility	Timeframe
Dispose of all solid waste collected at an appropriately registered waste disposal site. The disposal of waste shall be in accordance with all relevant legislation.	EPC Contractor	Duration of Contract
All chemicals, fuels and other hazardous materials are to be stored in designated and bunded areas, where the bunded area is impermeable and is impervious to the stored substance as per the requirements of SABS 089:1999 Part 1. The bunded area will contain 110% volume of the largest container stored.	EPC Contractor	Duration of Contract

Mitigation: Action/control	Responsibility	Timeframe
Construction contractors must provide specific detailed waste management plans to deal with all waste streams.	EPC Contractor	Pre-construction
Specific areas must be designated on-site for the temporary management of various waste streams, i.e. general refuse, construction waste (wood and metal scrap) and contaminated waste. Location of such areas must seek to minimise the potential for impact on the surrounding environment, including prevention of contaminated runoff, seepage and vermin control.	EPC Contractor	Duration of contract
Disposal of waste must be in accordance with relevant legislative requirements, including the use of licensed contractors.	EPC Contractor	Duration of contract
Where possible, construction and general wastes on-site must be reused or recycled. Bins and skips must be available on-site for collection, separation and storage of waste streams (such as wood, metals, general refuse etc.)	EPC Contractor	Duration of contract
Hydrocarbon waste must be contained and stored in sealed containers within an appropriately bunded area.	EPC Contractor	Duration of contract
Construction equipment must be refuelled within designated refuelling locations, or where remote refuelling is required, appropriate drip trays must be utilised.	EPC Contractor	Duration of contract
Waste and surplus dangerous goods must be kept to a minimum and must be transported by approved waste transporters to sites designated for their disposal.	EPC Contractor	Duration of contract
Documentation (waste manifest) must be maintained detailing the quantity, nature and fate of any regulated waste. Waste disposal records must be available for review at any time.	EPC Contractor	Duration of contract
Corrective action must be undertaken immediately if a complaint is made, or potential/actual leak or spill of polluting substance identified. This includes stopping the contaminant from further escaping, cleaning up the affected environment as much as practically possible and implementing preventive measures.	EPC Contractor	Duration of contract
SABS approved spill kits to be available and easily accessible.	EPC Contractor	Duration of contract

Performance Indicator	<ul style="list-style-type: none"> » No complaints received regarding waste on site or indiscriminate dumping » Internal site audits ensuring that waste segregation, recycling and reuse is occurring appropriately » Provision of all appropriate waste manifests for all waste streams
Monitoring	<ul style="list-style-type: none"> » Observation and supervision of waste management practices throughout construction phase » Waste collection to be monitored on a regular basis » Waste documentation completed » An incident reporting system will be used to record non-conformances to the EMP

OBJECTIVE 7: Protection of heritage resources

The main cause of impacts to archaeological sites is physical disturbance of the material itself and its context. The heritage and scientific potential of an archaeological site is highly dependent on its geological and spatial context. This means that even though, for example a deep excavation may expose archaeological artefacts, the artefacts are relatively meaningless once removed from the area in which they were found. Large-scale excavations for foundations will damage archaeological sites, as will road construction activities.

No significant sites/materials were observed within the development footprint. A farm labourer settlement that consists of three small houses was observed some 40 metres east of the existing power line within the authorised Iziduli Wind Farm. The settlement must be regarded as a no-go area and fenced-off before construction starts.

Project component/s	» <u>Access roads and watercourse crossings</u>
Potential Impact	» <u>Heritage objects or artefacts found on site are inappropriately managed or destroyed.</u>
Activity/risk source	» <u>Site preparation and earthworks.</u> » <u>Mobile construction equipment movement on site.</u>
Mitigation: Target/Objective	» <u>To ensure that any heritage objects found on site are treated appropriately and in accordance with the relevant legislation.</u>

Mitigation: Action/control	Responsibility	Timeframe
<u>Areas required to be cleared during construction must be clearly marked in the field to avoid unnecessary disturbance.</u>	<u>EPC Contractor</u>	<u>Pre-construction</u>
<u>Contractors 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. All staff should also be familiarised with procedures for dealing with heritage objects/sites.</u>	<u>EPC Contractor</u> <u>ECO</u>	<u>Duration of contract, particularly during excavations</u>
<u>Project employees and any contract staff must maintain, at all times, a high level of awareness of the possibility of discovering heritage sites.</u>	<u>EPC Contractor</u>	<u>Duration of contract</u>
<u>If any evidence of archaeological sites or remains, fossils or other categories of heritage resources are found during the proposed development, SAHRA must be alerted. If unmarked human burials are uncovered, the SAHRA must be alerted immediately. A professional archaeologist or palaeontologist, depending on the nature of the finds, must be contracted as soon as possible to inspect the findings.</u>	<u>EPC Contractor in consultation with Heritage Specialist</u>	<u>Duration of contract</u>
<u>In the event that fossils resources are discovered during excavations, immediately stop excavation in the vicinity of the potential material. Mark (flag) the position and also spoil that may contain fossils. Inform the site foreman and the ECO. ECO to inform the developer.</u>	<u>EPC Contractor</u> <u>ECO</u>	<u>Construction</u>
Chance find procedure: <u>The aim of this procedure is to establish monitoring and reporting procedures to ensure compliance with this policy and its associated</u>	<u>EPC Contractor/ Developer/ ECO/ Heritage specialist</u>	<u>Construction</u>

procedures. Construction personnel must be properly inducted to ensure they are fully aware of the procedures regarding chance finds as discussed below.

- » If during the pre-construction, construction, operations or closure phases of this project, any person employed by the developer, one of its subsidiaries, contractors and subcontractors, or service provider, finds any artefact of cultural significance or rock engraving, this person must cease work at the site of the find and report this find to their immediate supervisor, and through their supervisor to the senior on-site manager.
- » It is the responsibility of the senior on-site Manager to make an initial assessment of the extent of the find, and confirm the extent of the work stoppage in that area.
- » The senior on-site Manager will inform the ECO of the chance find and its immediate impact on operations. The ECO will then contact a professional archaeologist for an assessment of the finds who will notify the SAHRA.

Performance Indicator

- » No disturbance outside of designated work areas.
- » All heritage items located are dealt with as per the legislative guidelines.
- » Immediate reporting to the relevant heritage authorities of any heritage feature discovered during any phase of development.

Monitoring

- » Observation of excavation activities by SHE throughout construction phase.
- » Supervision of all clearing and earthworks.
- » Due care taken during earthworks and disturbance of land by all staff and any heritage objects found reported.
- » Appropriate permits obtained from SAHRA prior to the disturbance or destruction of heritage sites (if required).
- » An incident reporting system will be used to record non-conformances to the EMPr.

5.3. Detailing Method Statements

OBJECTIVE: Ensure all construction activities are undertaken with the appropriate level of environmental awareness to minimise environmental risk

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

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

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

Method Statements must be compiled for all activities which affect any aspect of the environment and should be applied consistently to all activities. Specific areas to be addressed through method statements (pre, during and post construction) may include:

- » Site establishment (which explains all activities from induction training to offloading, construction sequence for site establishment and the different amenities to be established etc., including a site camp plan indicating all of these).
- » Excavations and backfilling procedure.
- » Stipulate norms and standards for water supply and usage.
- » Stormwater management method statement.
- » Ablution facilities (placement, maintenance, management and servicing).
- » Solid Waste Management:
 - * Description of the waste storage facilities (on site and accumulative).
 - * Placement of waste stored (on site and accumulative).
 - * Management and collection of waste process.
 - * Recycle, re-use and removal process and procedure.
- » Dust and noise pollution:
 - * Describe necessary measures to ensure that noise from construction activities is maintained within lawfully acceptable levels.
 - * Procedure to control dust at all times on the site.
- » Hazardous substance storage (ensure compliance with all national, regional and local legislation with regard to the storage of oils, fuels, lubricants, solvents, wood treatments, bitumen, cement, and any other harmful and hazardous substances and materials. South African National Standards apply).
 - * Lists of all potentially hazardous substances to be used.
 - * Appropriate handling, storage and disposal procedures.
 - * Prevention protocol of accidental contamination of soil at storage and handling areas.
 - * All storage areas, (i.e. for harmful substances appropriately bundled with a suitable collection point for accidental spills must be implemented and drip trays underneath dispensing mechanisms including leaking engines/machinery).
- » Fire prevention and management measures on site.
- » Incident and accident reporting protocol.
- » Designate access road and the protocol on roads in use.

The Site Manager and/or ECO may request additional Method Statements or dispense with the requirement for a Method Statement pertaining to one or more of the above activities, as appropriate.

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

Failure to submit a required method statement may result in suspension of the activity concerned until such time as a method statement has been submitted and approved.

5.4. Awareness and Competence: Construction Phase

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

- » All Employees must have a basic understanding of the key environmental features of the construction site and the surrounding environment. This includes the discussion/explanation of site environmental matters during toolbox talks.
- » The content and requirements of Method Statements are to be clearly explained to all plant operators and general workers. All staff acting in a supervisory capacity is to have copies of the relevant Method Statements and be aware of the content thereof.
- » Ensuring that a copy of the EMPr is readily available on-site, and that all senior site staff is aware of the location and have access to the document. Senior site staff will be familiar with the requirements of the EMPr and the environmental specifications as they apply to the construction phase of the project.
- » Ensuring that, prior to commencing any site works, all employees and sub-contractors have attended an Environmental Awareness Training session. The training session must provide the site staff with an appreciation of the project's environmental requirements, and how they are to be implemented.
 - * Records must be kept of those that have completed the relevant training.
 - * Training should be done either in a written or verbal format but must be appropriate for the receiving audience.
 - * Refresher sessions must be held to ensure the contractor staff are aware of their environmental obligations as practically possible.
- » All sub-contractors must have a copy of the EMPr and sign a declaration/ acknowledgement that they are aware and familiar with the contents and requirements of the EMPr and that they will conduct work in such a manner as to ensure compliance with the requirements of the EMPr.

Therefore, prior to the commencement of construction activities on site and before any person commences with work on site thereafter, adequate environmental awareness and responsibility are to be appropriately presented to all staff present onsite, clearly describing their obligations towards environmental controls and methodologies in terms of this EMPr. This training and awareness will be achieved in the following ways:

5.4.1 Environmental Awareness Training

Environmental induction training must be presented to all persons who are to work on the site; Contractor's or Engineer's staff; administrative or site staff; sub-contractors or visitors to the site. Environmental Awareness Training must take the form of an on-site talk and demonstration by the ECO and Contractor's EO before the commencement of site establishment and construction on site.

5.4.2 Induction Training

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

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

5.4.3 Toolbox Talks

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

5.5. Monitoring Programme: Construction Phase

OBJECTIVE 1: To monitor the performance of the control strategies employed against environmental objectives and standards

A monitoring programme must be in place not only to ensure conformance with the EMPr, but also to monitor any environmental issues and impacts which have not been accounted for in the EMPr that are, or could result in significant environmental impacts for which corrective action is required. The period and frequency of monitoring will be stipulated by the Environmental Authorisation. Where this is not clearly dictated, E moyeni Wind Farm Renewable Energy (Pty) Ltd will determine and stipulate the period and frequency of monitoring required in consultation with relevant stakeholders and authorities. The Technical Director/Manager will ensure that the monitoring is conducted and reported on. The aim of the monitoring and auditing process would be to routinely monitor the implementation of the specified environmental specifications, in order to:

- » Monitor and audit compliance with the prescriptive and procedural terms of the environmental specifications
- » Ensure adequate and appropriate interventions to address non-compliance
- » Ensure adequate and appropriate interventions to address environmental degradation
- » Provide a mechanism for the lodging and resolution of public complaints
- » Ensure appropriate and adequate record keeping related to environmental compliance
- » Determine the effectiveness of the environmental specifications and recommend the requisite changes and updates based on audit outcomes, in order to enhance the efficacy of environmental management on site
- » Aid communication and feedback to authorities and stakeholders

5.5.1. Non-Conformance Reports

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

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

5.5.2. Monitoring Reports

A monitoring report will be compiled by the ECO on a monthly basis and must be submitted to Eastern Cape Economic Development, Environmental Affairs and Tourism (DEDEA) for their records as deemed practical or with the Final Audit Report. This report should include details of the activities undertaken in the reporting period, any non-conformances or incidents recorded, corrective action required, and details of those non-conformances or incidents which have been closed out.

5.5.3. Final Audit Report

A final environmental audit report must be compiled by an independent auditor and be submitted to the Eastern Cape DEDEA upon completion of the construction and rehabilitation activities (within 30 days of completion of the construction phase (i.e. within 30 days of site handover) and within 30 days of completion of rehabilitation activities). This report must indicate the date of the audit, the name of the auditor and the outcome of the audit in terms of compliance with the environmental authorisation conditions (once issued) and the requirements of the EMPr.

REHABILITATION MANAGEMENT PROGRAMME

CHAPTER 6

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

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

6.1. Objectives

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

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

Areas requiring rehabilitation will include all areas disturbed during the construction phase and that are not required for regular maintenance operations.

Project component/s	» Watercourse crossing, i.e. access roads and culverts
Potential Impact	» Environmental integrity of site undermined resulting in erosion, compromised land capability and the requirement for on-going management intervention
Activity/risk source	» Disturbed areas/footprints
Mitigation: Target/Objective	» To ensure and encourage site rehabilitation of disturbed areas » To ensure that the site is appropriately rehabilitated following the execution of the works, such that residual environmental impacts (including erosion) are remediated or curtailed

Mitigation: Action/control	Responsibility	Timeframe
All temporary facilities, equipment and waste materials must be removed from site and appropriately disposed of.	EPC Contractor	Post-construction
Necessary drainage works and anti-erosion measures must be installed, where required, to minimise loss of topsoil and control erosion.	EPC Contractor	Post-construction
All areas that require rehabilitation after construction has been completed must be done using indigenous vegetation.	EPC Contractor in consultation with rehabilitation specialist	Following completion of construction activities in an area
Disturbed areas must be rehabilitated/re-vegetated with appropriate natural vegetation and/or local seed mix.	EPC Contractor in consultation with rehabilitation specialist	Following completion of construction activities in an area
Re-vegetated areas may have to be protected from wind erosion and maintained until an acceptable plant cover has been achieved.	EPC Contractor and Project Company in consultation with rehabilitation specialist	Post-rehabilitation
On-going alien plant monitoring and removal should be undertaken on all areas of natural vegetation on an annual basis.	EPC Contractor and Project Company in consultation with rehabilitation specialist	Post-rehabilitation

Performance Indicator	<ul style="list-style-type: none">» All areas of the site cleared of equipment and temporary facilities» Topsoil replaced on all areas and stabilised» Disturbed areas rehabilitated and acceptable plant cover achieved on rehabilitated sites» Closed site free of erosion and alien invasive plants
Monitoring	<ul style="list-style-type: none">» On-going inspection of rehabilitated areas in order to determine effectiveness of rehabilitation measures implemented» On-going alien plant monitoring and removal should be undertaken on an annual basis» An incident reporting system must be used to record non-conformances to the EMPr.

OPERATION MANAGEMENT PROGRAMME

CHAPTER 7

Overall Goal: To ensure that the operation of the proposed project does not have unforeseen impacts on the environment and to ensure that all impacts are monitored and the necessary corrective action taken in all cases.

An environmental manager must be appointed during operation whose duty it will be to ensure the implementation of the operational EMPr.

7.1. Objectives

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

OBJECTIVE 1: Minimise soil degradation and erosion

Project component/s	» Watercourse crossing, i.e. access roads and culverts
Potential Impact	» Soil degradation and erosion. » Increased deposition of soil into drainage systems. » Increased run-off over the site.
Activity/risk source	» Poor rehabilitation and/or revegetation of cleared areas. » Rainfall - water erosion of disturbed areas. » Wind erosion of disturbed areas. » Concentrated discharge of water from construction activity.
Mitigation: Target/Objective	» Ensure rehabilitation of disturbed areas is maintained. » Minimise soil degradation (i.e. wetting). » Minimise soil erosion and deposition of soil into drainage lines. » Ensure continued stability of embankments/excavations.

Mitigation: Action/control	Responsibility	Timeframe
Implement stormwater management and erosion control plan.	Developer/Owner EPC Contractor	Operation
The watercourse crossings should not trap any run-off, thereby creating inundated areas, but allow for free flowing systems.	Developer/Owner EPC Contractor	Operation
Monitor culverts to determine if erosion issues arise and if any erosion control is required.	ECO	Operation

Performance Indicator	» Minimal levels of soil erosion around site. » Minimal levels of increased siltation in drainage lines.
Monitoring	» Inspections of site on a bi-annual basis.

OBJECTIVE 2: Limit Damage to the watercourse

Project component/s	» Watercourse crossing, i.e. access roads and culverts
Potential Impact	» Damage to water course areas by any means that will result in hydrological changes (includes erosion, siltation, dust, direct removal of soil of vegetation, dumping of material).
Activity/risk source	» Operation of facility and maintenance of watercourse crossings
Mitigation: Target/Objective	» Minimise damage to watercourse areas where crossings are built or upgraded.

Mitigation: Action/control	Responsibility	Timeframe
Rehabilitate any disturbed areas as soon as possible once construction is completed in an area.	EPC Contractor	Operation
Control storm water and runoff water through the implementation of a storm water management plan for the site. Any stormwater within the site must be handled in a suitable manner, i.e. trap sediments, and reduce flow velocities.	EPC Contractor	Operation
Monitor and maintain culvert areas to minimise blockages and erosion potential.	EPC Contractor	Operation

Performance Indicator	» Minimal impacts on water quality, water quantity, natural status of watercourses.
Monitoring	<ul style="list-style-type: none"> » Habitat loss in watercourses should be monitored before and after construction. » The presence and development of erosion features downstream of any construction must be monitored. » An incident reporting system must be used to record non-conformances to the EMPr/WUL. » Public complaints register must be developed and maintained on site

OBJECTIVE 3: Protection of vegetation and fauna

Indirect impacts on vegetation during operation could result from maintenance activities and the movement of people and vehicles on site. No direct impacts are anticipated on wetland habitat as there are no direct impacts associated with the development within the wetlands observed. However any infrastructure within the wetland catchments should have effective stormwater management in place and no discharges directly into these systems will be allowed.

Project component/s	» Watercourse crossing, i.e. access roads and culverts
Potential Impact	» Disturbance to or loss of vegetation and/or habitat
Activity/risk source	<ul style="list-style-type: none"> » Movement of employee vehicles within and around site » Disturbed areas
Mitigation: Target/Objective	<ul style="list-style-type: none"> » To maintain minimised footprints of disturbance of vegetation/habitats on-site » To ensure and encourage plant regrowth in areas of post-construction rehabilitation

Mitigation: Action/control	Responsibility	Timeframe
Vehicle movements must be restricted to designated roadways	Developer/Owner EPC Contractor	Operation
An on-going alien plant monitoring and eradication programme must be implemented, where necessary	Developer/Owner EPC Contractor	Operation
An independent environmental manager should be appointed during operation whose duty it will be to minimise impacts on surrounding sensitive habitats	Developer/Owner EPC Contractor	Operation

Performance Indicator	<ul style="list-style-type: none"> » No further disturbance to vegetation » Continued improvement of rehabilitation efforts » No colonisation of the site by alien vegetation
Monitoring	<ul style="list-style-type: none"> » Observation of vegetation on-site by environmental manager » Regular inspections by the environmental manager to monitor plant regrowth/performance of rehabilitation efforts and weed infestation compared to natural/undisturbed areas

DECOMMISSIONING MANAGEMENT PROGRAMME

CHAPTER 8

It is considered unlikely that the proposed activities (roads and culverts) would be decommissioned after the economic life of the wind farm, as the existing farming activities will continue and these may be utilised. However, should the activity ever cease or become redundant, the applicant shall be required to undertake the required actions as prescribed by legislation at the time and comply with all relevant legal requirements administered at any relevant and competent authority at that time.

FINALISATION OF THE ENVIRONMENTAL MANAGEMENT PROGRAMME

CHAPTER 9

The EMPr is a dynamic document, which must be updated when required. It is considered critical that this draft EMPr be updated to include site-specific information. This will ensure that the construction and operation activities are planned and implemented taking sensitive environmental features into account as far as possible.