**APPENDIX B: ENVIRONMENTAL MANAGEMENT PROGRAMME**

ARCUS
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# VOLUME I: APPENDIX B
# ENVIRONMENTAL MANAGEMENT PROGRAMME

# PROPOSED RE-ALIGNMENT OF THE MN50182 DISTRICT ROAD, EASTERN CAPE PROVINCE

**On behalf of**

## BANNA BA PIFHU WIND FARM (RF) (PTY) LTD

**OCTOBER 2022**

**DRAFT FOR PUBLIC COMMENT**

Prepared by:

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## Glossary of Terms

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

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

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

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

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

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

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

Therefore, the EMPr will be a working document, which will be reviewed when necessary, or if required by the authorities.

**Operational Phase (Post Construction**): The period following the Construction Phase, during which the proposed development site area will be rehabilitated.

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

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

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

**Project Area**: This refers to the authorised area for the proposed development to take place.

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

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

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

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

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

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

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

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

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

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

**Palaeontological objects:** Any fossilised remains of animals or plants.

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

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

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

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

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

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

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

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# 1 INTRODUCTION

Banna ba Pifhu Wind Farm (RF) (Pty) Ltd (the Applicant) is proposing the re-alignment of the MN50182 District Road which connects the DR1763 Oyster Bay Road to the R330 St Francis Bay Road, Eastern Cape Province. Hereafter the proposed re-alignment of the District Road will be referred to as 'the proposed development / the road'.

The Banna ba Pifhu Wind Farm (BWF) (DFFE Reference: 12/12/20/2289/AM3 and 12/12/20/2289/1/AM3) is proposed to be developed on a site near Humansdorp in the Eastern Cape Province. The re-alignment of the MN50182 District Road is required for the development of the proposed BWF. The re-aligned route will provide direct access to the BWF from the south during construction and post-construction thereby minimising potential disturbance caused by vehicle movements to neighbouring landowners of the BWF development site through the use of the MN50182. The existing MN50182 District Road currently traverses the neighbouring properties of the BWF and is located approximately 3 km south of the town of Humansdorp in the Kouga Local Municipality and Sarah Baartman District Municipality in the Eastern Cape Province.

This Environmental Management Programme (EMPr) is prepared as part of the requirements of the EIA Regulations promulgated under the National Environmental Management Act, 1998 (Act 107 of 1998), as amended, and is to be submitted to the National Department of Forestry, Fisheries and the Environment (DFFE) as part of the Basic Assessment process for the Proposed Re-alignment of the MN50182 District Road.

Arcus Consultancy Services South Africa (Pty) Ltd ('Arcus') has been appointed by the Applicant to compile and submit the Environmental Management Programme (EMPr).

The document is intended as a "living" document and must be seen as dynamic, and updated when and if required, throughout the lifecycle of the project.

A detailed description of the proposed development is contained in the BA Report, Volume I.

## 1.1 Details of the Project Company

*Table 1-1: Details of the Project Company*

| **Details of the Developer (Applicant)** | |
|---|---|
| **Project Developer** | Banna ba Pifhu Wind Farm (RF) (Pty) Ltd |
| **Company Registration** | 2011/009072/07 |
| **Contact Person** | Mr Mike Mangnall |
| **Postal Address** | PO Box 762, Wilderness, Western Cape |
| **Telephone** | +27 (0) 83 785 1492 |
| **Email** | Mangnall@wkn-windcurrent.com |

## 1.2 Author of the EMPr

*Table 1-2: Details of the EAP*

| **Environmental Assessment Practitioner** | |
|---|---|
| **EAP** | Ashlin Bodasing |
| **Organisation** | Arcus Consultancy Services South Africa (Pty) Ltd |

| Environmental Assessment Practitioner | |
|---|---|
| **Consultant** | Aneesah Alwie |
| **Qualifications** | Bachelor of Social Science - Geography and Environmental Management<br>Registered EAP (EAPASA 2020/780) |
| **Postal Address** | 240 Main Road, 1st Floor Great Westerford, Rondebosch, 7700 |
| **Telephone** | +27 21 412 1529 |
| **Fax** | None |
| **Email** | Ashlin.Bodasing@arcusconsulting.co.za / banna@arcusconsulting.co.za |

*Refer to Appendix A for the EAP's Curriculum Vitae.*

The co-authors of the EMPr were the specialists involved in the assessment of potential impacts identified during the BA process. The name and role of all authors and co-authors are presented Table 1.3 below.

*Table 1-3: Details of the Project Team*

| Name | Organisation | Role |
|---|---|---|
| Aneesah Alwie | Arcus | Consultant |
| Johann Lanz | Independent Consultant | Geology, Soils and Agriculture Specialist |
| Dr Brian Colloty | Enviro Sci. (Pty) Ltd | Freshwater and Wetlands (Aquatics) Specialist |
| Jamie Pote | Independent Consultant | Terrestrial Biodiversity Specialist |
| Chris van Rooyen | Chris van Rooyen Consulting | Avifauna Specialist |
| Morné de Jager | Enviro Acoustic Research cc | Noise Specialist |
| Quinton Lawson and Bernard Oberholzer | Qarc and BOLA | Visual and Landscape Specialist |
| Dr Jayson Orton | ACO Associates | Cultural Heritage, Archaeology and Palaeontological Specialist |
| Dr Hugo van Zyl | Independent Economic Researchers | Socio-Economic Specialist |
| Stephen Fautley | Techso (Pty) Ltd | Traffic and Transport Specialist |

## 1.3 Purpose and Aim of the EMPr

An Environmental Management Programme (EMPr) is required in terms of Appendix 4 of the National Environmental Management Act, 1998 (NEMA, Act 107 of 1998), EIA Regulations of 2014 (GNR 326), as amended.

According to the Western Cape's Department of Environmental Affairs and Development Planning, Guideline for Environmental Management Plan (2005), and Environmental Management Programme (EMPr) is defined as "an *environmental management tool used to ensure that undue or reasonably avoidable adverse impact of the construction, operation and decommissioning of a project are prevented or mitigated, and that the positive benefits of the project are enhanced."*

The aim of the EMPr is to outline measures to be implemented in order to minimise adverse environmental degradation and enhance positive impacts associated with the development. It serves as a guide for the contractor and the workforce on their roles and responsibilities

concerning environmental management on site, and it provides a framework for environmental monitoring throughout the construction and post-construction periods.

The purpose of the EMPr is to:

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

It should be considered critical that the EMPr be updated to include site-specific information and specifications as required - this will ensure that project activities are planned and implemented taking into account a changing environment and sensitive environmental features.

## 1.4 Content of the EMPr

The EMPr is based largely on the findings and recommendations of the BA process. However, the EMPr is considered a "live" document and must be updated with additional information or actions during the design, construction and post-construction phases.

The overall goal for environmental management for the re-alignment of the MN50182 District Road is to construct it in a manner that:

- Minimises the ecological footprint of the project on the local environment;
- Minimises impacts on fauna and flora, and aquatic systems on site;
- Minimises visual impacts;
- Facilitates harmonious co-existence between the project and other land uses in the area; and
- Minimises any traffic and transport disturbances.

### *1.4.1 Compliance with Appendix 4 of the EIA Regulations, as amended*

*Table 1-4: Content of the EMPr as per Appendix 4 of the EIA Regulations (as amended)*

| Appendix 4 Requirements NEMA, 1998 (Act No. 107 of 1998) | | Location in EMPr |
|---|---|---|
| *1* | **Content of environmental management programme (EMPr)**<br>*(1) An EMPr must comply with section 24N of the Act and include-* | |
| *(a)* | *details of-*<br>*(i) the EAP who prepared the EMPr; and* | Section 1.2<br>Appendix D |

| Appendix 4 Requirements NEMA, 1998 (Act No. 107 of 1998) | | Location in EMPr |
|---|---|---|
| | *(ii) the expertise of the EAP to prepare an EMPr, including a curriculum vitae;* | |
| *(b)* | *A detailed description of the aspects of the activity that are covered by the EMPr as identified by the project description;* | Section 3 |
| *(c)* | *a map at an appropriate scale which superimposes the proposed activity, its associated structures, and infrastructure on the environmental sensitives of the preferred site, indicating any areas that should be avoided, including buffers;* | Figure 1 |
| *(d)* | *a description of the impact management outcomes, including management statements, identifying the impacts and risks that need to be avoided, managed and mitigated as identified through the environmental impact assessment processed for all phased of the development including-*<br>*(i) planning and design;*<br>*(ii) pre-construction activities;*<br>*(iii) construction activities;*<br>*(iv) rehabilitation of the environment after construction and where applicable post closure; and*<br>*(v) where relevant, operation activities;* | Section 6 - 9 |
| *(f)* | *a description of proposed impact management actions, identifying the manner in which the impact management outcomes and contemplated in paragraph (d) will be achieved, and must, where applicable, include actions to-*<br>*(i) avoid, modify, remedy, control or stop any action, activity or process which causes pollution or environmental degradation;* | Section 6 - 9 |
| | *(ii) comply with any prescribed environmental management standards or practices;* | |
| | *(iii) comply with any applicable provisions of the Act regarding closure, where applicable; and* | |
| | *(iv) comply with any provisions of the Act regarding financial provision for rehabilitation, where applicable;* | |
| *(g)* | *the method of monitoring the implementation of the impact management actions contemplated in paragraph (f);* | Section 6 - 9 |
| *(h)* | *the frequency of monitoring the implementation of the impact management actions contemplated in paragraph (f);* | Section 6 - 9 |
| *(i)* | *an indication of the persons who will be responsible for the implementation of the impact management actions;* | Section 6 - 9 |
| *(j)* | *the time periods within which the impact management actions contemplated in paragraph (f) must be implemented;* | Section 6 - 9 |
| *(k)* | *the mechanism for monitoring compliance with the impact management actions contemplated in paragraph (f);* | Section 6 - 9 |
| *(l)* | *a program for reporting on compliance, taking into account the requirements as prescribed by the Regulations;* | Section 2 |
| *(m)* | *an environmental awareness plan describing the manner in which-*<br>*(i) the applicant intends to inform his or her employees of any environmental risk which may result from their work; and*<br>*(ii) risks must be dealt with in order to avoid pollution or the degradation of the environment; and* | Section 2 |
| *(n)* | *any specific information that be required by the competent authority.* | n/a |

## 2 DETAILS OF THE PROPOSED DEVELOPMENT

The Applicant requires environmental authorisation to re-align the MN50182 District Road which connects the DR1763 Oyster Bay Road to the R330 St Francis Bay Road in the Eastern Cape Province. Two alternatives were assessed and the Applicant requires EA for the **Preferred Alternative**. The proposed road will be re-aligned to run between the BWF development site (Portion 1 of Farm 868, Portion 2 of Farm 689, and Remainder of Farm 688) and the adjacent Farms (Portion 4 of Farm 912, Portion 3 of Farm 912, Portion 2 of Farm 912, Portion 1 of Farm 912 and Portion 25 of Farm 688).

MN50182 District Road is a low volume gravel road with poor geometry in sections, this was evidenced by the gravel roads serving the farms and low traffic volumes observed during the traffic specialist site visit on 31 November 2021 and 1 December 2021.

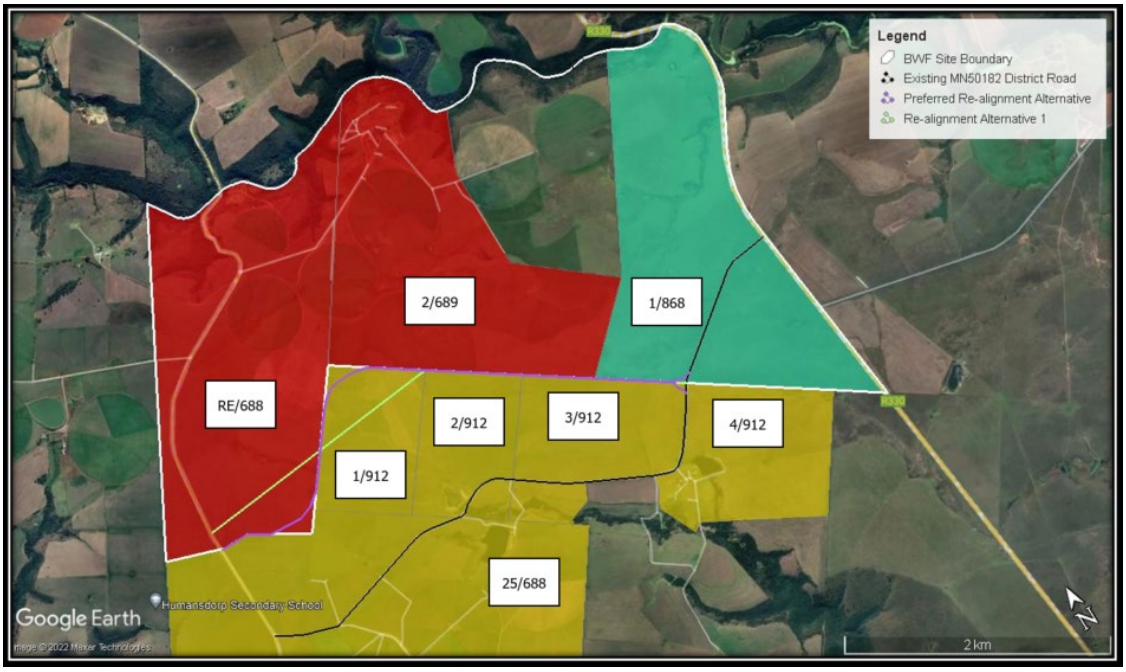



*Plate 2-1: Proposed and Existing MN50182 District Road, Eastern Cape Province (Plate 2-1 Key: Existing Road – black line; Preferred Alternative – purple line; Alternative 1 – green line)*

The technical specifications of the proposed road alternatives are presented in Table 2.1 and the Geographical Co-ordinates are presented in Table 2.2 below. Figure 1 presents the Site Development Plan overlain by the environmental sensitivity.

*Table 2-1: Technical Details of the Proposed Road Alternatives*

| Aspect | Proposed Specifications |
|---|---|
| **Length of the proposed re-aligned alternatives** | Preferred Alternative: Approximately 4.46 km |
| | Alternative 1: Approximately 4.05 km |
| **Width of the proposed re-aligned alternatives** | 5.5 m wide |
| **Development footprint** | 2.45 hectares |
| **Single or dual carriageway** | Single |
| **Road call type / service level** | Class 5 Provincial Gravel Road |
| **Speed limit** | 60 km/h |
| **Road reserve width** | 12 m |

| Aspect | Proposed Specifications |
|---|---|
| **Road surface type** | Gravel |
| **Storm water drainage design** | 1:10 year Recurrence Interval (RI) |
| **Laydown area** | Approximately 50 x 50 m Required |
| **Construction camp area** | Approximately 50 x 50 m Required |
| **Construction period** | Approximately 3 – 6 Months |
| **Affected land portions** | Road will run parallel between the site boundary of the affected land parcels presented in Plate 2.1 in this EMPr. |

*Table 2-2: Geographical Co-ordinates of the Proposed Road Alternatives*

| Aspect | Proposed Road Geographical Co-ordinates | |
|---|---|---|
| | **Latitude** | **Longitude** |
| **Preferred Alternative** | | |
| Start (at DR1763 Oyster Bay Road) | 34° 4'38.91"S | 24°44'47.60"E |
| Bend Point | 34° 4'38.97"S | 24°44'56.07"E |
| Bend Point | 34° 4'41.91"S | 24°45'2.33"E |
| Bend Point | 34° 4'42.42"S | 24°45'12.32"E |
| Bend Point | 34° 4'41.23"S | 24°45'16.23"E |
| Bend Point | 34° 4'38.68"S | 24°45'20.16"E |
| Bend Point | 34° 4'19.45"S | 24°45'39.29"E |
| Bend Point | 34° 4'19.49"S | 24°45'51.82"E |
| Middle | 34° 4'23.51"S | 24°45'58.80"E |
| End (at R330 St Francis Bay Road) | 34° 5'3.65"S | 24° 47'9.75"E |
| **Alternative 1** | | |
| Start (at DR1763 Oyster Bay Road) | 34° 4'34.11"S | 24°44'47.54"E |
| Middle | 34° 4'27.56"S | 24°46'5.08"E |
| Bend Point | 34° 4'27.50"S | 24°46'6.02"E |
| Start (at DR1763 Oyster Bay Road) | 34° 5'3.65"S | 24° 47'9.75"E |
| **Construction Camp** | | |
| Centre Point | 34° 05'03.25"S | 24°47'13.34"E |

## 2.1 Description of the Design Phase

During the design phase a contractor will be appointed by the developer to produce the final method statements and obtain necessary permits for the proposed development.

Measures as indicted in this EMPr must be implemented during this phase of the development.

## 2.2 Construction Period and Trip Generation

The road construction period is expected to last approximately 3 - 6 months, subject to the final design, weather and ground conditions, including time for testing and commissioning. The construction would require approximately 20 workers over a short period. A temporary construction camp would be placed in a strategic position agreed with the BWF site landowner. The camp will have a site office, ablution facility and sufficient storage space for construction plant and materials, and will be temporarily fenced. The location will be on transformed land or the same camp of the BWF will be used.

Typical vehicles to be used on the road construction and average trips to site, are shown below. These vehicles will drive to or be transported to site (i.e., grader on lowbed truck) and should remain on site for the duration of the construction.

- Bulldozer
- Excavator / Loader
- Grader
- Compactor
- Dump Truck
- Water Tanker
- Low Bed Truck

The process for the construction is described below:

- Contractor site establishment
  - Compliance to health and safety regulations
  - Compliance to EMPr
- Earthworks
  - Site Survey and Setting Out
  - Clear and grub and topsoil removal. Topsoil to be stored according to EMPr
  - Excavation – Cut to Fill and Testing of in-situ material and fill layers
- Stormwater
  - Construction of stormwater culverts and headwall
- Layerworks
  - Construction of Wearing Coarse layer and testing of layers
- Construction Side Drains
- Reinstatement of topsoil
- Construction of road signage
- Reinstatement and construction of farm fencing and gates as required

The road base will be locally sourced (balancing cut and fill materials) and the wearing course will be will sourced from existing borrow pits in the area. The 200 mm thick wearing course requires approximately 5 000 $m^3$ which equates to some 300 x 20$m^3$ truck deliveries. The 600 trips (300 in / 300 out) over 2 months equates to an average of 14 truck trips per working day (7 in / 7 out), assuming that the wearing course is constructed in 2 months.

The trip generation for equipment, machinery and materials for the road build are negligible, with the bulk of work being carried out on-site and not on public roads.

# 3 LEGAL FRAMEWORK

The EIA Regulations 2014, published under Government Notice (GN) No. 982, and as amended by GNR 326 of 2017, provide for the control of certain Listed Activities. These activities are listed in Government Notice No. R327 (Listing Notice 1 – Basic Assessment),

R325 (Listing Notice 2 – Scoping & EIA Process) and R324 (Listing Notice 3 – Basic Assessment) of 7 April 2017, and are prohibited to commence until environmental authorisation has been obtained from the competent authority, in this case, the DFFE.

Environmental authorisation, which may be granted subject to conditions, will only be considered upon compliance with GN982, as amended by GNR326 of 7 April 2017.

Any Environmental Authorisation obtained from the competent authority applies only to those specific listed activities for which the application was made. To ensure that all Listed Activities that could potentially be applicable to this proposed development are covered by the Environmental Authorisation, a precautionary approach is followed when identifying listed activities, that is, if an activity could potentially be part of the proposed development, it is listed.

The Listed Activities applicable to this proposed development are presented in Table 3.1 below.

*Table 3-1: NEMA Listed Activities in Relation to the Proposed Development*

| **Listing Notices 1, 2 and 3**<br>**07 April 2017** | **Listed Activity** | **Description of project activity that triggers listed activity** |
|---|---|---|
| **Listing Notice 1**<br>**GN R 327**<br>**Activity 12** | *The development of-*<br>*(ii) infrastructure or structures with a physical footprint of 100 square metres or more; where such development occurs*<br>*(a) within a watercourse;*<br>*(c) if no development setback exists within 32 m of a watercourse, measured from the edge of a watercourse.* | The proposed road re-alignment is proposed to be within 32 m of a watercourse. The cumulative footprint of the proposed development within 32 m of a watercourse will exceed 100 square metres.<br>The specific width and length can only be determined during planning and design phase of the facility. |
| **Listing Notice 1**<br>**GN R 327**<br>**Activity 19** | *The infilling or depositing of any material of more than 10 cubic metres into or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 10 cubic meters from a watercourse.* | The proposed road re-alignment will traverse watercourses. The construction will require the infilling or depositing of more than 10 cubic meters or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 10 cubic meters from a watercourse. |
| **Listing Notice 1**<br>**GN R 327**<br>**Activity 48** | *The expansion of-*<br>*Infrastructure or structures where the physical footprint is expanded by 100 square metres or more; where such expansion occurs-*<br>*(a) within a watercourse;*<br>*(c) if no development setback exists, within 32 metres of a watercourse, measured from the edge of a watercourse.* | Existing roads to and from the proposed re-alignment and bridges within 32 m of a watercourse will require expansion. This can only be determined during planning and design phase of the facility and not before.<br>The cumulative footprint of all proposed development expansion within 32 m of a watercourse will exceed 100 square metres. |
| **Listing Notice 1**<br>**GN R 327**<br>**Activity 56** | *The widening of a road by more than 6 metres, or the lengthening of a road by more than 1 kilometre-*<br>*(i) where the existing reserve is wider than 13.5 meters; or (ii) where no reserve exists, where the existing* | The proposed road re-alignment of the road will be more than 1 km in length and occurs outside urban areas. |

| Listing Notices 1, 2 and 3<br>07 April 2017 | Listed Activity | Description of project activity that triggers listed activity |
|---|---|---|
| | *road is wider than 8 metres; excluding where widening or lengthening occur inside urban areas.* | |
| **Listing Notice 3**<br>**GN R 324**<br>**Activity 4** | *The development of a road wider than 4 metres with a reserve less than 13,5 metres*<br>*a. Eastern Cape*<br>*(i) Areas outside urban areas;*<br>*(ee) Critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans* | The proposed road re-alignment will be wider than 4 m with a reserve of up to 12 m.<br>The site falls outside of an urban area and part of it falls within ESAs and CBA 2. |
| **Listing Notice 3**<br>**GN R324**<br>**Activity 10** | *The development and related operation of facilities or infrastructure for the storage, or storage and handling of a dangerous good, where such storage occurs in containers with a combined capacity of 30 but not exceeding 80 cubic metres.*<br>*a. Eastern Cape*<br>*i. Outside urban areas:*<br>*(ee) Critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans*<br>*(ll) Within a watercourse* | The proposed road re-alignment will require the storage of dangerous goods during the construction period of a capacity which will not exceed 80 $m^3$.<br>The site falls outside of an urban area and part of it falls within ESAs and CBA 2 and crosses two watercourses. |
| **Listing Notice 3**<br>**GN R324**<br>**Activity 12** | *The clearance of an area of 300 square metres or more of indigenous vegetation except where such clearance of indigenous vegetation is required for maintenance purposes undertaken in accordance with a maintenance management plan.*<br>*a. Eastern Cape*<br>*(i) Within any critically endangered or endangered ecosystem listed in terms of section 52 of the NEMBA or prior to the publication of such a list, within an area that has been identified as critically endangered in the National Spatial Biodiversity Assessment 2004;*<br>*(ii) Within critical biodiversity areas identified in bioregional plans;* | The proposed road re-alignment will require the clearance of natural vegetation in excess of 300 $m^2$ in areas of natural vegetation. Parts of the site fall within ESAs and CBA 2. |
| **Listing Notice 3**<br>**GN R324**<br>**Activity 14** | *The development of –*<br>*(ii) infrastructure or structures with a physical footprint of 10 square metres or more;*<br>*where such development occurs—*<br>*(a) within a watercourse;*<br>*(c) if no development setback has been adopted, within 32 metres of a* | Infrastructure associated with the transmission lines and roads will be constructed within 32 m of a watercourse. The proposed site lies outside of an urban area and the transmission lines traverses ESAs and CBAs. |

| Listing Notices 1, 2 and 3<br>07 April 2017 | Listed Activity | Description of project activity that triggers listed activity |
|---|---|---|
| | *watercourse, measured from the edge of a watercourse;*<br>*a. Eastern Cape*<br>*i. Outside urban areas:*<br>*(bb) National Protected Area Expansion Strategy Focus areas;*<br>*(ff) Critical biodiversity areas or ecosystem service areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans* | |
| **Listing Notice 3**<br>**GN R324**<br>**Activity 18** | *The widening of a road by more than 4 metres or the lengthening of a road by more than 1 kilometre*<br>*a. Eastern Cape*<br>*i. Outside urban areas:*<br>*(bb) National Protected Area Expansion Strategy Focus areas:*<br>*(ee) Critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans* | The proposed road re-alignment will be more than 1 km in length.<br>The site falls outside of an urban area and part of it falls within ESAs and CBA 2. |

# 4 BASIC ASSESSMENT SUMMARY OF FINDINGS

The EMPr has been developed based on the findings and recommendations of the environmental assessments undertaken for the proposed development.

## *Soil Assessment*

The potential impact assessment concluded that the loss of agricultural land is very small in extent to the development area. The proposed land that the road will occupy is of limited land capability and would not be suitable for crop production. The land is currently only suitable for grazing. The cumulative impacts are also acceptable when considering the small extent of the development. The comparative assessment of the alternative routes has no material difference to agricultural impacts.

## *Freshwater and Wetlands (Aquatic) Assessment*

The proposed road alignment would have no detrimental impact on any very high sensitivity areas identified by the DFFE Screening Tool, if the proposed road alignment maintains avoidance of the delineated drainage line areas; and mainstem rivers and wetlands, in particular, that do contain functioning aquatic environments. With the proposed mitigation (proper stormwater management and post construction rehabilitation), the impacts would be low and acceptable for development.

## *Terrestrial Biodiversity, Flora and Fauna*

The site is located within a commercial farming area with high levels of agricultural transformation present. The proposed re-aligned district road will also predominantly be within transformed areas and several watercourse crossings and/or seep areas with a short section (700 m) of the proposed re-aligned district road passing through indigenous vegetation. The proposed re-aligned district road is bounded on the south side by

transformed lands, hence it will not significantly increase habitat fragmentation and it is not anticipated that the other crossings will significantly fragment the landscape significantly above high baseline levels of fragmentation.

### *Avifauna*

Provided the recommendations are implemented, there is no objection to the implementation of the proposed realignment of the road from an avifaunal impact perspective. There is no preferred alignment from an avifaunal perspective, both are acceptable.

### *Noise*

Considering the administrative review of the noise impact as allowed by SANS 10103:2008, it is the opinion of the specialist that there is a low risk for a potential noise impact from the re-alignment of the MN50182 road. This will be valid for both the re-alignment alternatives and is valid for both the construction and post-construction phases.

### *Visual / Landscape*

Two alternative alignments for the proposed re-aligned road have been considered, both of which would have a low visual impact significance. The proposed re-alignment has a positive aspect in that construction traffic for the proposed Banna ba Pifhu Wind Farm would be moved further away from sensitive receptors in the area.

From a visual perspective, the Preferred Alternative is the preferred route as it has a more flowing alignment that would blend with the gently undulating topography.

### *Heritage, Archaeology and Palaeontology*

The assessment has shown that no significant impacts are to be expected from either alternative and that, from a heritage point of view, it can be supported. Significant impacts to any type of heritage are highly unlikely to occur and there are thus no heritage objections to the development proceeding.

The project will result in a small number of short-term jobs being created during the construction phase. Long term benefits will only be to the surrounding landowners who would experience less traffic (including during the phases of the BWF) close to their homes. Although these socio-economic benefits are relatively small, they do still outweigh the even smaller heritage impacts that might occur.

There are currently no obvious threats to heritage resources on the site aside from the natural degradation, weathering and erosion that will affect archaeological materials. Trampling from grazing animals and/or farm/other vehicles could also occur. These impacts would be of negligible negative significance. The wider cultural landscape has been impacted by the development of renewable energy facilities (REF) but, with time, even this, which may have been an impact of high significance originally, becomes of less concern as the turbines eventually become an accepted part of the landscape. Nevertheless, existing cultural landscape impacts from the REFs are considered to be medium negative. At the more local level, there are no threats to the landscape and impacts are considered neutral.

### *Socio-Economic*

The realignment can be approved on the basis of the potential positive socio-economic impacts and risks associated with it. This applies to both realignment alternatives. The preferred alternative would be slightly better from an equity and land use point of view as it would be aligned with the boundary between the BWF and neighbouring farm.

### *Traffic and Transport*

It is recommended that the traffic and transport related impacts of the proposed realignment of Minor Road MN50182 construction/build, post-construction and decommissioning be mitigated as set out in this report. It can be concluded that the proposed relocation of the minor road MN50182 will not have undue detrimental impact on traffic and that identified impacts can be suitably mitigated.

### *Conclusion*

The proposed development will have limited negative impact on the surrounding environment. **Identified impacts can be mitigated to acceptable levels, based on specialist assessment, and are generally of low negative significance** (see summary Tables 4.1 – 4.4 below).

The majority of potential impacts identified to be associated with the construction and operation of the proposed development are anticipated to be localised and restricted to the proposed site. The potentially sensitive areas / environmental features that have been identified include:

- Wetlands and watercourses; and
- Sensitive vegetation (such as the Ecological Support Areas and Critical Biodiversity Areas);

*Table 4-1: Summary of Construction Phase Impacts*

| Construction Phase | Extent | Duration | Intensity | Status | Significance | Probability | Confidence |
|---|---|---|---|---|---|---|---|
| **Geology, Soils and Agricultural Potential Impact** | | | | | | | |
| Change to the future agricultural production potential of the land | L | H | L | Negative | **L** | L | H |
| *With Mitigation* | *n/a* | *n/a* | *n/a* | *n/a* | ***n/a*** | *n/a* | *n/a* |
| **Freshwater & Wetlands (Aquatics)** | | | | | | | |
| Loss of aquatic systems and disturbance of the watercourses | M | M | M | Negative | **M** | M | H |
| *With Mitigation* | *L* | *L* | *L* | *Negative* | ***L*** | *L* | *H* |
| Increase in sedimentation & erosion | M | M | M | Negative | **M** | M | H |
| *With Mitigation* | *L* | *L* | *L* | *Negative* | ***L*** | *L* | *H* |
| Localised surface water quality | M | M | M | Negative | **M** | L | H |
| *With Mitigation* | *L* | *L* | *L* | *Negative* | ***L*** | *L* | *H* |
| **Terrestrial Biodiversity** | | | | | | | |
| Impact on vegetation | L | L | L | Negative | **M** | H | H |
| *With Mitigation* | *L* | *L* | *L* | *Negative* | ***L*** | *H* | *H* |
| Impact on ecological processes | L | L | L | Negative | **M** | M | H |
| *With Mitigation* | *L* | *L* | *L* | *Negative* | ***L*** | *M* | *H* |
| Impact on aquatic and riparian processes | L | L | L | Negative | **M** | M | M |
| *With Mitigation* | *L* | *L* | *L* | *Negative* | ***L*** | *M* | *M* |
| **Plant Species** | | | | | | | |

| Construction Phase | Extent | Duration | Intensity | Status | Significance | Probability | Confidence |
|---|---|---|---|---|---|---|---|
| Impact on flora species | L | L | L | Negative | **M** | M | M |
| *With Mitigation* | *L* | *L* | *L* | *Negative* | ***L*** | *M* | *M* |
| Impact on alien invasive species | L | M | L | Negative | **M** | H | H |
| *With Mitigation* | *L* | *M* | *L* | *Negative* | ***L*** | *H* | *H* |
| Impact on erosion | L | M | L | Negative | **M** | M | M |
| *With Mitigation* | *L* | *M* | *L* | *Negative* | ***L*** | *M* | *M* |
| **Animal Species** | | | | | | | |
| Impact on faunal habitat | L | L | M | Negative | **M** | M | M |
| *With Mitigation* | *L* | *L* | *M* | *Negative* | ***L*** | *M* | *M* |
| Impact on faunal processes | L | L | L | Negative | **M** | M | H |
| *With Mitigation* | *L* | *L* | *L* | *Negative* | ***L*** | *M* | *H* |
| Impact on faunal species | L | L | M | Negative | **M** | M | M |
| *With Mitigation* | *L* | *L* | *M* | *Negative* | ***L*** | *M* | *M* |
| **Avifauna** | | | | | | | |
| Displacement of priority species | L | L | L | Negative | **M** | M | M |
| *With Mitigation* | *L* | *L* | *L* | *Negative* | ***L*** | *L* | *M* |
| **Heritage, Archaeology & Palaeontology** | | | | | | | |
| On palaeontological resources | L | H | L | Negative | **L** | L | H |
| *With Mitigation* | *L* | *H* | *L* | ***Positive*** | ***L*** | *L* | *H* |
| On archaeological resources | L | H | L | Negative | **L** | L | H |

| Construction Phase | Extent | Duration | Intensity | Status | Significance | Probability | Confidence |
|---|---|---|---|---|---|---|---|
| *With Mitigation* | *L* | *H* | *L* | *Negative* | ***L*** | *L* | *H* |
| Cultural Landscape | L | L | L | Negative | **M** | H | H |
| *With Mitigation* | *L* | *L* | *L* | *Negative* | ***L*** | *H* | *H* |
| **Visual** | | | | | | | |
| Visual intrusion of the roadway and traffic on the rural landscape | L | L | L | Negative | **L** | M | M |
| *With Mitigation* | *L* | *L* | *L* | *Negative* | ***L*** | *L* | *M* |
| **Social** | | | | | | | |
| Overall socio-economic impacts | L | L | L | Negative | **L** | H | H |
| *With Mitigation* | *L* | *L* | *L* | *Negative* | ***L*** | *H* | *H* |
| **Traffic and Transport** | | | | | | | |
| Traffic Flow | M | L | H | Negative | **M** | M | M |
| *With Mitigation* | *M* | *L* | *L* | *Negative* | ***L*** | *L* | *M* |
| Minor road dust | L | L | M | Negative | **M** | M | M |
| *With Mitigation* | *L* | *L* | *L* | *Negative* | ***L*** | *L* | *M* |
| Traffic safety | L | L | H | Negative | **M** | M | M |
| *With Mitigation* | *L* | *L* | *L* | *Negative* | ***L*** | *L* | *M* |
| Intersection traffic safety | L | L | H | Negative | **M** | M | M |
| *With Mitigation* | *L* | *L* | *M* | *Negative* | ***L*** | *L* | *M* |
| Road design | L | H | H | Negative | **M** | M | M |

| Construction Phase | Extent | Duration | Intensity | Status | Significance | Probability | Confidence |
|---|---|---|---|---|---|---|---|
| *With Mitigation* | *L* | *H* | *M* | *Negative* | ***L*** | *L* | *M* |
| Stormwater | L | L | M | Negative | **M** | M | M |
| *With Mitigation* | *L* | *L* | *L* | *Negative* | ***L*** | *L* | *M* |
| Site clearance | L | L | M | Negative | **M** | M | M |
| *With Mitigation* | *L* | *L* | *L* | *Negative* | ***L*** | *L* | *M* |
| Construction zone | L | L | M | Negative | **M** | M | M |
| *With Mitigation* | *L* | *L* | *L* | *Negative* | ***L*** | *L* | *M* |
| Construction camp | L | L | M | Negative | **M** | M | M |
| *With Mitigation* | *L* | *L* | *L* | *Negative* | ***L*** | *L* | *M* |
| Laydown area | L | L | M | Negative | **M** | M | M |
| *With Mitigation* | *L* | *L* | *L* | *Negative* | ***L*** | *L* | *M* |

*Table 4-2: Summary of Operation / Post-Construction Phase Impacts*

| Operational Phase | Extent | Duration | Intensity | Status | Significance | Probability | Confidence |
|---|---|---|---|---|---|---|---|
| **Geology, Soils and Agricultural Potential Impact** | | | | | | | |
| Change to the future agricultural production potential of the land | L | H | L | Negative | L | L | H |
| *With Mitigation* | *n/a* | *n/a* | *n/a* | *n/a* | ***n/a*** | *n/a* | *n/a* |
| **Freshwater & Wetlands (Aquatics)** | | | | | | | |
| Impact on aquatic systems | M | M | M | Negative | M | M | H |
| *With Mitigation* | *L* | *L* | *L* | *Negative* | ***L*** | *L* | *H* |
| Increase in sedimentation & erosion | M | M | M | Negative | M | M | H |

| Operational Phase | Extent | Duration | Intensity | Status | Significance | Probability | Confidence |
|---|---|---|---|---|---|---|---|
| *With Mitigation* | *L* | *L* | *L* | *Negative* | ***L*** | *L* | *H* |
| Localised surface water quality | M | M | M | Negative | M | L | H |
| *With Mitigation* | *L* | *L* | *L* | *Negative* | ***L*** | *L* | *H* |
| **Terrestrial Biodiversity** | | | | | | | |
| Impact on vegetation | L | L | L | Negative | M | H | H |
| *With Mitigation* | *L* | *L* | *L* | *Negative* | ***L*** | *H* | *H* |
| Impact on ecological processes | L | L | L | Negative | M | M | H |
| *With Mitigation* | *L* | *L* | *L* | *Negative* | ***L*** | *M* | *H* |
| Impact on aquatic and riparian processes | L | L | L | Negative | M | M | M |
| *With Mitigation* | *L* | *L* | *L* | *Negative* | ***L*** | *M* | *M* |
| **Plant Species** | | | | | | | |
| Impact on flora species | L | L | L | Negative | M | M | M |
| *With Mitigation* | *L* | *L* | *L* | *Negative* | ***L*** | *M* | *M* |
| Impact on alien invasive species | L | M | L | Negative | M | H | H |
| *With Mitigation* | *L* | *M* | *L* | *Negative* | ***L*** | *H* | *H* |
| Impact on erosion | L | M | L | Negative | M | M | M |
| *With Mitigation* | *L* | *M* | *L* | *Negative* | ***L*** | *M* | *M* |
| **Animal Species** | | | | | | | |
| Impact on faunal habitat | L | L | M | Negative | M | M | M |
| *With Mitigation* | *L* | *L* | *M* | *Negative* | ***L*** | *M* | *M* |

| Operational Phase | Extent | Duration | Intensity | Status | Significance | Probability | Confidence |
|---|---|---|---|---|---|---|---|
| Impact on faunal processes | L | L | L | Negative | M | M | H |
| *With Mitigation* | *L* | *L* | *L* | *Negative* | ***L*** | *M* | *H* |
| Impact on faunal species | L | L | M | Negative | M | M | M |
| *With Mitigation* | *L* | *L* | *M* | *Negative* | ***L*** | *M* | *M* |
| **Visual** | | | | | | | |
| Visual intrusion of the roadway and traffic on the rural landscape | L | L | L | Negative | L | M | M |
| *With Mitigation* | *L* | *L* | *L* | *Negative* | ***L*** | *L* | *M* |
| **Heritage, Archaeology & Palaeontology** | | | | | | | |
| Cultural Landscape | L | L | L | Negative | M | M | H |
| *With Mitigation* | *L* | *L* | *L* | *Negative* | ***L*** | *L* | *H* |
| **Social** | | | | | | | |
| Overall socio-economic impacts | L | H | L | Negative | L | H | H |
| *With Mitigation* | *L* | *H* | *L* | *Negative* | ***L*** | *H* | *H* |
| **Traffic and Transport** | | | | | | | |
| Minor road maintenance | L | H | M | Negative | M | M | M |
| *With Mitigation* | *L* | *H* | *L* | *Negative* | ***L*** | *L* | *M* |
| Traffic flow | L | H | M | Negative | M | M | M |
| *With Mitigation* | *L* | *H* | *L* | *Negative* | ***L*** | *L* | *M* |
| Traffic safety | L | H | M | Negative | M | M | M |

| Operational Phase | Extent | Duration | Intensity | Status | Significance | Probability | Confidence |
|---|---|---|---|---|---|---|---|
| *With Mitigation* | *L* | *H* | *L* | *Negative* | ***L*** | *L* | *M* |

*Table 4-3: Summary of Decommissioning Phase Impacts*

| Decommission Phase | Extent | Duration | Intensity | Status | Significance | Probability | Confidence |
|---|---|---|---|---|---|---|---|
| **Freshwater & Wetlands (Aquatics)** | | | | | | | |
| Loss of aquatic systems and disturbance of the watercourses | M | M | M | Negative | M | M | H |
| *With Mitigation* | *L* | *L* | *L* | *Negative* | ***L*** | *L* | *H* |
| Impact on aquatic systems | M | M | M | Negative | M | M | H |
| *With Mitigation* | *L* | *L* | *L* | *Negative* | ***L*** | *L* | *H* |
| Increase in sedimentation & erosion | M | M | M | Negative | M | M | H |
| *With Mitigation* | *L* | *L* | *L* | *Negative* | ***L*** | *L* | *H* |
| Localised surface water quality | M | M | M | Negative | M | L | H |
| *With Mitigation* | *L* | *L* | *L* | *Negative* | ***L*** | *L* | *H* |
| **Terrestrial Biodiversity, Flora and Fauna** | | | | | | | |
| Destruction of habitat | M | L | M | Negative | L | L | H |
| *With Mitigation* | *M* | *L* | *L* | *Negative* | ***L*** | *L* | *H* |
| Destruction of habitat – access roads | M | L | M | Negative | M | L | H |
| *With Mitigation* | *M* | *L* | *L* | *Negative* | ***M*** | *L* | *H* |
| Disturbance / Displacement | L | L | M | Negative | M | H | H |
| *With Mitigation* | *L* | *L* | *L* | *Negative* | ***L*** | *L* | *H* |

| Decommission Phase | Extent | Duration | Intensity | Status | Significance | Probability | Confidence |
|---|---|---|---|---|---|---|---|
| Disturbance / Displacement – access roads | L | L | M | Negative | M | H | H |
| *With Mitigation* | *L* | *L* | *L* | *Negative* | ***L*** | *L* | *H* |
| **Heritage, Archaeology & Palaeontology** | | | | | | | |
| On paleontological resources | L | H | L | Negative | L | L | H |
| *With Mitigation* | *L* | *H* | *L* | *Neutral / **Positive*** | ***L*** | *L* | *H* |
| On archaeological resources | L | H | L | Negative | M | H | H |
| *With Mitigation* | *L* | *H* | *L* | *Neutral / **Positive*** | ***L*** | *L* | *H* |
| **Visual** | | | | | | | |
| Construction of Infrastructure | M | L | M | Negative | M | M | M |
| *With Mitigation* | *M* | *L* | *L* | *Negative* | ***L*** | *L* | *M* |
| **Social** | | | | | | | |
| Loss of employment opportunities | M | M | M | Negative | M | M | M |
| *With Mitigation* | *M* | *L* | *L* | *Negative* | ***M*** | *M* | *M* |
| **Traffic** | | | | | | | |
| Road closure | L | H | M | Negative | L | M | M |
| *With Mitigation* | *L* | *H* | *L* | *Negative* | ***L*** | *L* | *M* |

*Table 4-4: Summary of Cumulative Phase Impacts*

| Cumulative Phase | Extent | Duration | Intensity | Status | Significance | Probability | Confidence |
|---|---|---|---|---|---|---|---|
| **Freshwater & Wetlands (Aquatics)** | | | | | | | |

| Cumulative Phase | Extent | Duration | Intensity | Status | Significance | Probability | Confidence |
|---|---|---|---|---|---|---|---|
| Aquatic Systems | M | M | M | Negative | M | M | H |
| *With Mitigation* | *L* | *L* | *L* | *Negative* | ***L*** | *L* | *L* |

# 5 ENVIRONMENTAL MANAGEMENT PROGRAMME

This section, including those to follow, forms the core of the EMPr and outlines the specific mitigation measures for those key impacts identified in the section above.

## 5.1 Environmental Awareness and Compliance

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

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

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

## 5.2 Roles and Responsibilities for Good Environmental Management

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

### *Environmental Manager - Developer Representative*

- Ensure that any EMPr updates or amendments are reviewed and approved.
- Ensure environmental requirements are integrated into the project plans, method statements and tender processes.
- Support the site environmental control officer during the construction phase, to ensure implementation of the EMPr.
- Follow up and close out all environmental incidents and non-conformances.
- Appoint a suitably qualified independent environmental control officer during the construction phase.

### *Environmental Control Officer - Principal Contractor Representative*

An independent environmental control officer (ECO) will arrange for inspections of the construction activities and EMPr implementation throughout the construction phase. After each inspection, the ECO will produce a monitoring report that will be submitted to the client, DFFE, Eastern Cape Environmental Department and any other stakeholder as required. Relevant sections of the minutes of customary (monthly) site meetings will be attached to the monitoring report.

The Environmental Control Officer (ECO) will be responsible for overseeing the implementation of the EMPr during the construction and post-construction phase, and for monitoring, reviewing and verifying compliance of the contractor with the EMPr, record-keeping and updating of the EMPr as and when necessary.

The ECO will:

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

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

- Meeting on site with the Construction Manager prior to the commencement of construction activities to confirm the construction procedure and designated activity zones;
- Daily / weekly (depending on the extent of construction activities, at any given time) monitoring of site activities during construction to ensure adherence to the specifications contained in the EMPr, using a monitoring checklist that is to be prepared by an independent environmental assessment practitioner at the start of the construction phase;
- Preparation of the monitoring report based on the site visit;
- Conducting an environmental inspection on completion of the construction period and signing off the construction process with the Construction Manager; and
- Maintain an Incidents Register and Complaints Register on site.

**During *operation / post-construction*, the Environmental Control Officer will be responsible for:**

- Overseeing the implementation of the EMPr for the post-construction phase;
- Ensure that the necessary environmental monitoring takes place as specified in the EMPr; and
- Update the EMPr and ensure that records are kept of all monitoring activities and results.

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

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

### *Contractor*

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

The Contractor will:

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

### *Environmental Site Officer*

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

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

The ESO will:

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

## 5.3 Training and Induction of Employees

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

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

- What is meant by "Environment"?
- Why the environment needs to be protected and conserved.
- How construction activities can impact on the environment.
- What can be done to militate against such impacts?
- Awareness of emergency and spills response provisions.
- Social responsibility during construction e.g., being considerate to local residents.

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

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

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

## 5.4 Complaints Register and Environmental Incidents Book

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

The following information will be recorded:

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

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

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

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

## 5.5 Construction Environmental Monitoring

Environmental audits must be undertaken by the ECO, who acts as an independent environmental consultant, on a monthly basis, or what is deemed necessary by the ECO during times of heavy earth works and vegetation clearing, to ensure compliance with all aspects of the EMPr.

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

## 5.6 Dealing with Non-Compliance with the EMPr

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

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

## 5.7 EMPr Amendments

Once the EMPr is approved, no amendments shall be allowed without the approval of the DFFE. Amendments may be possible, following discussions with the relevant ECO or environmental consultant, who may propose EMPr amendments on behalf of the developer

or issue EMPr instructions, either corrective actions, remediation or rehabilitation. These correction actions must be completed within the specified timeframes.

# 6 MANAGEMENT PLAN FOR DESIGN PHASE

The objectives of the pre-construction phase are:

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

## 6.1 Mitigation measures for Legal Compliance

- Walkthrough of final layout to be undertaken by specialists as required in the EA, unless already completed.
- Appoint an independent ECO.
- Appoint an internal ESO to oversee day-to-day environmental activities.
- Staff should be educated as to the need to refrain from indiscriminate waste disposal and/or pollution of local soil and water resources and receive the necessary safety training.
- The contractor must ensure compliance with conditions described in the environmental authorisation.
- Confirm with ESO / ECO, suitable sites for the construction camps (equipment and batching etc.) and storage areas for materials. All construction equipment must be stored within this construction camp and all associated oil changes etc. (no servicing) must take place within this camp.
- Unskilled labourers should be drawn from the local market where possible, in line with the socio-economic mitigation measures.
- Environmental awareness training for site personnel, concerning the prevention of accidental spillage of hazardous chemicals and oil; pollution of water resources (both surface and groundwater), air pollution and litter control and identification of archaeological artefacts and fossils.
- The Contractor, together with the ESO shall ensure that the training and capabilities of the Contractor's site staff are adequate to carry out the designated tasks. Training developed by the Contractor and ESO must be approved by the ECO.
- Site personnel operating light, and heavy duty equipment (such as excavators, loaders, etc.) shall be adequately trained and sensitised to any potential hazards associated with their tasks.
- No operator shall be permitted to operate critical items of mechanical equipment without having been trained by the Contractor and certified competent by the Project Manager.
- Confirmation of approval by provincial / local road authority and permits must be sought by the Contractor.
- Permits and Approval of Plans, as recommended in this EMPr must be obtained, such as search and rescue, and WUL, etc.
- A flora and fauna search and rescue (relocation) must be undertaken before commencement of the vegetation clearing. A comprehensive list of species for which permits will be required is provided in Appendix D of this EMPr.

- Vegetation clearing should occur in a phased manner in accordance with the construction programme (method statements) to minimise erosion and/or run-of.
- Preparation and implementation of a Stakeholder Engagement Plan (SEP) prior to and during the construction phase.
- Preparation and implementation of a Community Health, Safety and Security Plan (CHSSP) prior to and during the construction phase.
    - The SEP and CHSSP should include a Grievance Mechanism that enables stakeholders to report resolve incidents, and
    - An on-site Security Management Plan should also be included to address how security is to be handled on site.
- Emergency Preparedness and Response plan which outlines response actions for potential incidents of any size.
- Aquatic Rehabilitation and Monitoring plan for existing crossings that may be used and/or upgraded and that intersect valley bottom wetlands.
- Maintenance Management Plan ('MMP') to address future maintenance activities that may be required within the affected stretches of the watercourses, and for the associated structures and/or infrastructure encroaching into these watercourses.
- Storm Water Management Plan (SWMP) which is to be produced by responsible engineers appointed at the site during the construction and operational phases of the project. An effective SWMP will include bunds and ditches, where it is required - that is at all points of disturbance where water accumulation might occur. The system must effectively collect and safely disseminate any run-off water from all hardened surfaces and it must prevent any potential down slope erosion.
- Plant Search and Rescue Plan.
- Alien Species Control Plan.
- A health and safety plan must be drawn up to ensure worker safety.
- Noise Abatement Programme.

## 6.2 Permit Requirements

Activities undertaken during site preparation, construction and operation may require additional permits, over and above the Environmental Authorisation. Banna ba Pifhu Wind Farm (RF) (Pty) Ltd is responsible for ensuring that they hold the necessary permits in order to comply with national and local regulations. Additional permit requirements which may be required are described below.

### *6.2.1 Borrow Pits*

A borrow pit refers to an open pit where material (soil, sand or gravel rock) is removed for use at another location. The Developer or their contractors may want to use borrow pits for certain earthworks operations, such as the construction of roads, embankments, bunds, berms, and other structures. The establishment of borrow pits is regarded as a mining activity and is legislated in terms of the Mineral and Petroleum Resources Development Act, 2002 (No. 28 of 2002) (MPRDA). A mining permit must be obtained from the Department of Minerals and Energy prior to the establishment of borrow pits on the site.

### *6.2.2 Water Use License*

Certain aspects of the development may also trigger the need for Section 21, Water Use License Applications (WULAs) (or General Authorisation (GA) applications) such as river or watercourse crossings or any activities within 500 m of a wetland boundary. The proposed re-aligned road will cross 2 watercourses. A potential GA in terms of Section 21 (c) and (i) of the National Water Act (Act 36 of 1998) (NWA), should any construction take place within these areas will be required. Should any of the present road crossings need to be

upgraded then the opportunity exists to improve the current state (lack of habitat continuity) for example by replacing pipe culverts with box culverts. This opportunity to improve the hydrological conditions can be seen as a net benefit. DHSWS will determine if a GA or WULA application will be required during the pre-application phase, and typically if one of the below identified water-uses requires a WULA then all applications will be treated as a WULA and not GA.

Based on an assessment of the proposed activities and past engagement with DHSWS, the following WULs / GA's could be required based on the following thresholds as listed in the following Government Notices:

- DHSWS Notice 538 of 2016, 2 September in GG 40243– Section 21 a, Abstraction of water.
- Government Notice 509 in GG 40229 of 26 August 2016 – Section 21 c & i, Impeding or diverting the flow of water in a watercourse and or altering the bed, banks, course or characteristics of a watercourse.

| | **Water Use Activity** | **Applicable to this development proposal** |
|---|---|---|
| S21(a) | Taking water from a water resource | Yes, if any water is abstracted from any local boreholes, farm dams and rivers during construction. |
| S21(b) | Storing water | Not applicable, as any water must be stored in temporary reservoirs. |
| S21(c) | Impeding or diverting the flow of water in a watercourse | Yes, as works (permanent or temporary) are located within a watercourse where a GA process can potentially be followed if the DWS Risk Assessment Matrix indicates that all impacts with mitigation are low. |
| S21(d) | Engaging in a stream flow reduction activity | Not applicable |
| S21(e) | Engaging in a controlled activity | Not applicable |
| S21(f) | Discharging waste or water containing waste into a water resource through a pipe, canal, sewer or other conduit | Not applicable |
| S21(g) | Disposing of waste in a manner which may detrimentally impact on a water resource | Typically, the conservancy tanks at construction camps and then O/M buildings require a license (GA if volumes are below 5000 $m^3$). |
| S21(h) | Disposing in any manner of water which contains waste from, or which has been heated in, any industrial or power generation process | Not applicable |
| S21(i) | Altering the bed, banks, course or characteristics of a watercourse | Yes, as works (permanent or temporary) are located within a watercourse where a GA process can potentially be followed if the DWS Risk Assessment Matrix indicates that all impacts with mitigation are low. |
| S21(j) | Removing, discharging or disposing of water found underground for the continuation of an activity or for the safety of persons | Not applicable |
| S21(k) | Using water for recreational purposes | Not applicable |

### *6.2.3 Heritage, Archaeology and Palaeontology*

- Any artefact collection or archaeological excavations are subject to a section 35 of the NHRA permit application process; and
- Should any heritage resources, including evidence of graves and human burials, archaeological material and paleontological material be discovered during the execution of the activities above, all works must be stopped immediately and heritage authorities must be notified without delay.

### *6.2.4 Vegetation Search and Rescue*

Under the Forests Act, 1998 (Act No. 84 of 1998) (NFA), a license must be applied for from the Department of Forestry, Fisheries and the Environment (DFFE) for the removal or disturbance of any protected trees on the site, in terms of the List of Protected Tree Species promulgated under the NFA. The abundance of species of conservation concern within this habitat is relatively low and no species of high conservation concern were observed.

Furthermore, a permit from the Provincial Department of Economic Development, Environmental Affairs and Tourism (DEDEAT) must be obtained for approval for the flora and fauna search and rescue (relocation) programme, refer to Section 10.1 for more details.

## 6.3 Method Statements

Prior to construction, the developer must ensure that the contractor supply the following method statements (these must be kept on file on site):

- Vegetation clearing;
- Cement mixing;
- Hazardous waste management;
- Emergency preparedness and response;
- Hazardous spills clean up;
- Topsoil stockpiling management;
- Laydown area management;
- Pollution control measures; and
- Hazardous materials management.

## 6.4 Site Establishment

The objective of site establishment is to ensure that an appropriate location is selected for the construction camp / site office and that the site office is managed in an environmentally responsible manner with minimal impact on the environment.

### *6.4.1 Mitigation Measures*

Before establishing the construction office areas, carefully plan the layout and develop a Construction Site Office Plan. The Construction Site Office Plan shall provide a description of the site and shall show, on a reasonably scaled map, the intended use of the site. Indicate and/or describe the location, size / quantity / capacity and design of:

- Access routes;
- Ablution facilities (including details on the handling of sewage and wastewater);
- On-site waste management facilities (waste containers, etc.);
- Design of bunds and other structures for containment of hazardous substances;
- Fencing;
- Water storage and supply;
- Power supply (for cooking, space heating, lighting, etc.);
- Fire extinguishers, first aid kit and any other relevant safety equipment;

- Emergency exit and gathering points for in case of an emergency;
- Other structures and buildings (offices, storerooms, workshops, etc.); and
- Other storage areas and stockpiles (i.e., topsoil, construction materials, equipment, etc.).

**The following must also be undertaken:**

- An area within the site must be demarcated for a construction site office, which will include storage area. This area must be fenced off.
- Site establishment shall take place in an orderly manner and all required amenities shall be installed at the laydown area before the main workforce move onto site.
- The construction camp shall have the necessary ablution facilities with chemical toilets at commencement of construction.
- The Contractor shall inform all site staff to make use of supplied ablution facilities and under no circumstances shall indiscriminate sanitary activities be allowed other than in supplied facilities.
- The Contractor shall supply waste collection bins and all solid waste collected shall be disposed of at a registered landfill.
- Potable water for use by on site workers must be made available on a daily basis at the site office and the working areas on site.
- A certificate of disposal shall be obtained by the Contractor and kept on file. Where a registered waste site is not available close to the construction site, the Contractor shall provide a method statement with regard to waste management.
- The disposal of waste shall be in accordance with all relevant legislation. Under no circumstances may solid waste be burnt or buried on site.
- Safe disposal certificates for general, hazardous and recycled waste should be retained for a minimum period of five years in accordance with the provisions of the National Waste Information Regulations promulgated in Government Notice ("GN") No. R. 625 of 13 August 2012.
- Preconstruction environmental induction for all construction staff on site to ensure that basic environmental principles are adhered to. This includes topics such as no littering, appropriate handling of pollution and chemical spills, avoiding fire hazards, minimizing wildlife interactions, remaining within demarcated construction areas etc.
- Determine the pre-construction condition of the road immediately prior to construction by carrying out a condition assessment or from recent pavement management system condition assessments if available from the Provincial Authorities.

## 6.5 Siting, Establishment and Management of Materials

- Mitigation measures as provided in this EMPr must be adhered to during site establishment.
- Choice of location for a storage area must take into account prevailing winds, distances to water bodies, general onsite topography and water erosion potential of the soil. Impervious surfaces must be provided where necessary.
- The storage area must be designated, demarcated and fenced within berms / bunds to avoid spread of any contamination.
- The storage area should be secure so as to minimize the risk of crime; and should also be safe from access by children / animals etc.
- Fire prevention facilities must be present at the storage facility.
- Proper storage facilities for the storage of oils, paints, grease, fuels, chemicals and any hazardous materials to be used must be provided to prevent the migration of spillage into the ground and groundwater regime around the temporary storage area(s).
- These pollution prevention measures for storage should include a bund wall high enough to contain at least 110% of any stored volume, and this should be sited away from drainage lines in a site with the approval of the Engineer.

- Any water that collects in the bund must not be allowed to stand and must be removed immediately and the hydrocarbon digestion agent within must be replenished.
- All legal compliance requirements with respect to Fuel storage and dispensing must be met.
- All fuel storage tanks (temporary or permanent) and associated facilities must be designed and installed in accordance with the relevant oil industry standards, SANS codes and other relevant requirements.
- Areas for storage of fuels and other flammable materials must comply with standard fire safety regulations[1].
- Flammable fuel and gas must be well separated from all welding workshops, assembly plants and loading bays where ignition of gas by an accidental spark may cause an explosion or fire.
- The tank must be erected at a safe distance from buildings, boundaries, welding sites and workshops and any other combustible or flammable materials.
- Symbolic safety signs depicting "No Smoking", "No Naked Flames" and "Danger" are to be prominently displayed in and around the fuel storage area.
- The capacity of the tank must be clearly displayed and the product contained within the tank clearly identified.
- There must be adequate fire-fighting equipment at the fuel storage and dispensing area or areas.
- The storage tank must be removed on completion of the construction phase of the project.
- All such tanks to be designed and constructed in accordance with the national standard for storage tanks, i.e., ISO 16961:2015 and a recognised international standard code if required.
- The rated capacity of tanks must provide sufficient capacity to permit expansion of the product contained therein by the rise in temperature during storage.
- Only empty and externally clean tanks may be stored on the bare ground. All empty and externally dirty tanks must be sealed and stored in an area where the ground has been protected.
- Any electrical or petrol-driven pump must be equipped and positioned so as not to cause any danger of ignition of the product.
- If fuel is dispensed from 200 litre drums, the proper dispensing equipment must be used.
- The drum must not be tipped in order to dispense fuel. The dispensing mechanism of the fuel storage tank must be stored in a waterproof container when not in use.
- All waste fuel and chemical impregnated rags must be stored in leak-proof containers and disposed of at an approved hazardous waste site.
- The amounts of fuel and chemicals stored on site must be minimised.
- Storage sites must be provided with bunds to contain any spilled liquids and materials.
- These storage facilities (including any tanks) must be on an impermeable surface that is protected from the ingress of storm water from surrounding areas in order to ensure that accidental spillage does not pollute local soil or water resources.
- Clear signage must be placed at all storage areas containing hazardous substances / materials.
- Material Safety Data Sheets (MSDSs) shall be readily available on site for all chemicals and hazardous substances to be used on site. Where possible the available, MSDSs should additionally include information on ecological impacts and measures to minimise negative environmental impacts during accidental releases or escapes.
- Staff dealing with hazardous materials / substances must be aware of their potential impacts and follow the appropriate safety measures.

[1] https://www.nfast.co.za/gallery/fire%20extinguisher%20regulations.pdf

- A suitable Waste Disposal Contractor must be employed to remove waste oil. These wastes should only be disposed of at licensed landfill sites designed to handle hazardous wastes.
- The contractor must ensure that its staff is made aware of the health risks associated with any hazardous substances used and has been provided with the appropriate protective clothing/equipment in case of spillages or accidents and have received the necessary training.
- All excess cement and concrete mixes are to be contained on the construction site prior to disposal off site.
- Any spillage, which may occur, shall be investigated and immediate action must be taken.
- Washing and cleaning of equipment should be done in berms or bunds, in order to trap any cement and prevent excessive soil erosion.
- Mechanical plant and bowsers must not be refuelled or serviced within or directly adjacent to any channel.
- All construction camps should be well outside any demarcated water courses.

Recommended persons as provided in Table 6.1 below should take responsibility for the implementation and monitoring to ensure that all design mitigation measures outlined in this document, and all revisions thereof, are complied with.

*Table 6-1: Design Phase Impact Management Outcomes and Actions*

| Potential Impact Management Outcomes and Impact Management Actions | Responsibility for Implementation and Monitoring | Frequency of Monitoring |
|---|---|---|
| **Geology, Soils and Agricultural Potential** | | |
| **Loss of agricultural land**<br>Avoid areas under cultivation (if any) | Site engineer/ site contractor | Design Phase |
| **Freshwater and Wetlands** | | |
| **Loss of aquatic systems and water courses**<br>• Where new 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 minimise the loss of riparian vegetation (reduce footprint as much as possible).<br>• 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.<br>• Vegetation clearing should occur in a phased manner in accordance with the construction programme to minimise erosion and/or run-off. Large tracts of bare soil will either cause dust pollution or quickly erode and then cause sedimentation in the lower portions of the catchment.<br>• Use existing tracks as far as possible. Should new crossings be required these must be licensed under the appropriate General Authorisation in terms of Section 39 of the National Water Act 36 of 1998 (NWA, 1998). | Site engineer/ site contractor | Design Phase |
| **Impact on localized surface water quality**<br>• Strict use and management of all hazardous materials used on site.<br>• Strict management of potential sources of pollution (e.g., litter, hydrocarbons from vehicles & machinery, cement during construction, etc.).<br>• Strict control over the behaviour of construction workers.<br>• Working protocols incorporating pollution control measures (including approved method statements by the contractor) should be strictly enforced.<br>• Appropriate ablution facilities should be provided for construction workers. | Site engineer/ site contractor | Design Phase |
| **Terrestrial Biodiversity, Flora and Fauna** | | |

| Potential Impact Management Outcomes and Impact Management Actions | Responsibility for Implementation and Monitoring | Frequency of Monitoring |
|---|---|---|
| **Impact on vegetation**<br>• Blanket clearing of vegetation must be limited to the site. No clearing outside of footprint to take place.<br>• Topsoil must be striped and stockpiled separately during site preparation and replaced on completion where revegetation will take place.<br>• Any site camps and laydown areas requiring clearing must be located within already disturbed areas away from watercourses. | Site engineer/ site contractor | Design Phase |
| **Impact on Flora**<br>• A flora search and rescue is advisable before commencement for areas where natural vegetation is affected.<br>• Respective permits will be required for destruction.<br>• Alien trees must be removed from the site as per CARA/NEMBA requirements. | Site engineer/ site contractor<br>Consultation with specialist | Design Phase |
| **Faunal impacts**<br>• A faunal search and rescue is recommended before construction for areas where natural vegetation is present.<br>• No animals are to be harmed or killed during the course of operations.<br>• Workers are NOT allowed to snare any faunal species.<br>• It is important that clearing activities are kept to the minimum and take place in a phased manner, where applicable. This allows animal species to move into safe areas and prevents wind and water erosion of the cleared areas. | Site engineer/ site contractor<br>Consultation with specialist | Design Phase |
| **Heritage, Archaeology and Palaeontology** | | |
| • Do not disturb and old stone kraals or ruins, do not remove stone from walls, or artefacts from the earth or earth surface.<br>• Report any chance discoveries of human remains to an archaeologist or a heritage authority.<br>• Do not demolish without authority authorisation, ideally reuse old structures and cottages, care for the fabric but change it as little as possible. | Site engineer/ site contractor | Design Phase |

| Potential Impact Management Outcomes and Impact Management Actions | Responsibility for Implementation and Monitoring | Frequency of Monitoring |
|---|---|---|
| **Cultural Landscape** | | |
| • No street lighting to be installed.<br>• Road to remain gravel in keeping with existing road. | Site engineer/ site contractor | Design Phase |
| **Social-Economic** | | |
| • Ensure neighbouring landowners and wider community are clearly and timeously informed about project timing and both temporary and permanent access changes.<br>• To the degree possible, and without unreasonable additional cost, use local sub-contractors and labour for construction.<br>• Provide clear orientation to contractors and construction workers with respect to what types of behaviour and activities by workers are not permitted in agreement with surrounding landowners and land managers. This should, for example, include clarity on allowable access to surrounding lands.<br>• The community should be able to contact the site manager or their representative to report and resolve any issues which they may have. | Site engineer/ site contractor | Design Phase |
| **Traffic and Transport** | | |
| • Adherence to the National Road Traffic Act (Act 93 of 1996) and the National Road Traffic Regulations, 2000 that prescribe certain limitations on vehicle dimensions and axle and vehicle masses that a vehicle using a public road must be complied with. Abnormal load vehicles are allowed to travel on public roads under an exemption permit issued in terms of Section 81 of the National Road Traffic Act.<br>• Prepare and adhere to a Traffic Management Plan.<br>• Place warning construction vehicle signage on each approach to Minor Road M50182.<br>• Ensure that all construction vehicles are roadworthy.<br>• Ensure that all construction vehicles have appropriate driver's licence.<br>• Post speed restriction signage (40 km/h) for construction vehicles on minor roads.<br>• Document condition of gravel roads prior to construction. | Site engineer/ site contractor | Design Phase |

| Potential Impact Management Outcomes and Impact Management Actions | Responsibility for Implementation and Monitoring | Frequency of Monitoring |
|---|---|---|
| **Stormwater Mitigation Measures** | | |
| • Any management actions must be dealt with in the Stormwater Management Plan (SWMP) typically submitted post EA, forming part of any WULA.<br>• Any storm water within the site must be handled in a suitable manner, i.e. trap sediments and reduce flow velocities.<br>• Install drainage structures before and during road construction.<br>• Construct frequent diversion structures (cross-drains).<br>• Construct appropriate road cross-section.<br>• Install stormwater culverts in dry season.<br>• Storm water management plan for road engineering must be followed. | Site engineer/ site contractor | Design Phase |
| **General Mitigation Measures** | | |
| Portable toilets must be supplied to the workforce in areas of activity. A licenced contractor must be appointed by the contractor to provide this facility, and ensure that wastes are correctly disposed of. Servicing must take place regularly, proof of which must be retained on site by the contractor. | Site engineer/ site contractor | Design Phase |
| **Health and Safety** | | |
| • Implementation of safety measures, work procedures and first aid must be implemented on site.<br>• Workers should be thoroughly trained in using potentially dangerous equipment.<br>• Contractors must ensure that all equipment is maintained in a safe operating condition.<br>• A safety officer must be appointed.<br>• A record of health and safety incidents must be kept on site.<br>• Any health and safety incidents must be reported to the project manager immediately.<br>• First aid facilities must be available on site at all times.<br>• The contractor must ensure that all construction workers are well educated about HIV/ AIDS and the risks surrounding this disease. The location of the local clinic where more information and counselling are offered must be indicated to workers. | Site engineer/ site contractor | Design Phase |

| Potential Impact Management Outcomes and Impact Management Actions | Responsibility for Implementation and Monitoring | Frequency of Monitoring |
|---|---|---|
| • Material stockpiles or stacks, such as, pipes must be stable and well secured to avoid collapse and possible injury to site workers / local residents.<br>• Personal Protective Equipment (PPE) must be made available to all construction staff and their usage must be compulsory. Hard hats and safety shoes must be worn at all times and other PPE worn were necessary i.e., dust / masks, ear plugs etc. | | |

# 7 MANAGEMENT PLAN FOR CONSTRUCTION PHASE

The developer is to ensure that the contractor complies with all mitigation measures during the construction period.

The following is not allowed on site:

- No poaching of any animals or harvesting of any flora;
- No construction camp, for workforce accommodation is allowed on site; contractors are to ensure suitable housing for staff outside of the development footprint;
- No cooking or fires allowed on site; and
- No alcohol or drugs are allowed on site.

## 7.1 Potential Construction Phase Impacts

The following impacts are likely to occur during the construction of the re-aligned MN50182 District Road. Specific mitigation measures for each impact are presented in the table below.

- The accidental, negligent, or deliberate spillage or inappropriate disposal of hazardous substances could result in air, soil and water pollution and may affect the health and well-being of people, plants and animals.
- Excessive noise could be made by the construction activity which would affect neighbouring communities.
- Potential damage to the soil structure, soil compaction and loss of soil fertility.
- Loss of the vegetation cover and increased erosion risks.
- Dust related problems.
- Safety hazards to the public, workers and animals in the area.
- Disturbance to local hydrology from construction activities.
- Pollution of surface water bodies.
- Dust can be a nuisance to the construction workforce and to the public and can negatively affect the growth and recovery rate of plants. Potential sources of fugitive dust include, but are not limited to:
    - Demolition of concrete foundations and existing buildings;
    - Grading / movement of soil;
    - Transportation and unloading of construction materials;
    - Vehicular movement over unsurfaced roads and tracks; and,
    - Wind erosion of stockpiles.
- Construction activities will result in the exposure of the soil to erosive factors, i.e., wind and water, and the compaction of the soil in other areas.
- Illegal poaching and collection of animals and plant material.
- Loss of established indigenous and exotic habitat.
- Unnecessary trampling of vegetation and harm to animals.
- Degradation of the scenic quality due to the major earthworks and any unsightly structures.
- Damage or loss of important cultural, historical or pre-historical sites and artefacts.
- Dangerous conditions near road.
- Trespassing and illegal access onto land.

Recommended persons as provided in Table 7.1 below should take responsibility for the implementation and monitoring to ensure that all construction mitigation measures outlined in this document, and all revisions thereof, are complied with.

*Table 7-1: Construction Phase Impact Management Outcomes and Actions*

| Potential Impact Management Outcomes and Impact Management Actions | Responsibility for Implementation and Monitoring | Frequency of Monitoring |
|---|---|---|
| **Geology, Soils and Agricultural Potential** | | |
| **Loss of agricultural land**<br>Avoid areas under cultivation (if any) | Site engineer/ site contractor | Upon commencement<br>Throughout construction<br>Monthly checks |
| **Freshwater and Wetlands** | | |
| **Loss of aquatic systems and water courses**<br>• Where new 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 minimise the loss of riparian vegetation (reduce footprint as much as possible).<br>• Monitor culverts to see if erosion issues arise and if any erosion control is required.<br>• 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.<br>• Vegetation clearing should occur in a phased manner in accordance with the construction programme to minimise erosion and/or run-off. Large tracts of bare soil will either cause dust pollution or quickly erode and then cause sedimentation in the lower portions of the catchment.<br>• Use existing tracks as far as possible. Should new crossings be required these must be licensed under the appropriate General Authorisation in terms of Section 39 of the National Water Act 36 of 1998 (NWA, 1998).<br>• All alien plant re-growth must be monitored, and should it occur these plants should be eradicated. The scale of the operation does however not warrant the use of a Landscape Architect and / or Landscape Contractor.<br>• As per the legal requirement (National Water Act), no stormwater should be discharged directly into natural watercourses and any stormwater run-off should be captured / managed on site to reduce the downstream effect of pollutants and the potential for flooding. This is particularly important due to the site, although not directly linked, being upstream of two estuarine systems. Grass swales are ideal in this scenario, as stormwater management features and are easily created due to the nature of the surrounding soils and geology. | Site engineer/ site contractor | Throughout construction<br>Monthly checks |

| Potential Impact Management Outcomes and Impact Management Actions | Responsibility for Implementation and Monitoring | Frequency of Monitoring |
|---|---|---|
| • Install properly sized culverts with erosion protection measures at the present road / track crossings. | | |
| **Impact on localized surface water quality**<br>• Strict use and management of all hazardous materials used on site.<br>• Strict management of potential sources of pollution (e.g., litter, hydrocarbons from vehicles & machinery, cement during construction, etc.).<br>• Containment of all contaminated water by means of careful run-off management on the development site.<br>• Working protocols incorporating pollution control measures (including approved method statements by the contractor) should be strictly enforced.<br>• Appropriate ablution facilities should be provided for construction workers. | Site engineer/ site contractor | Throughout construction<br>Monthly checks |
| **Terrestrial Biodiversity, Flora and Fauna** | | |
| **Impact on alien invasive species**<br>• A suitable weed management strategy to be implemented. | Site engineer/ site contractor | Upon commencement.<br>Monthly checks |
| **Faunal impacts**<br>• No animals are to be harmed or killed.<br>• Workers are NOT allowed to snare any faunal species.<br>• Reptiles such as lizards are less mobile compared to mammals, and some mortalities could arise. A reptile handler should be on call for such circumstances.<br>• Should any amphibian migrations occur between wetland areas during construction, appropriate measures (including temporarily suspending works in the affected area) should be implemented. | Site engineer/ site contractor | Throughout construction<br>Monthly checks |
| **Visual / Landscape** | | |
| • Concrete drainage channels to be avoided in the rural landscape, and only grass swales provided. | Site engineer/ site contractor | Throughout construction<br>Monthly checks |

| Potential Impact Management Outcomes and Impact Management Actions | Responsibility for Implementation and Monitoring | Frequency of Monitoring |
|---|---|---|
| • Concrete headwalls to culverts to be avoided, and natural stone gabions used instead.<br>• Only essential traffic signs to be provided, and advertising signs are prohibited. | | |
| **Heritage, Archaeology and Palaeontology** | | |
| • Do not disturb any old stone kraals or ruins, remove stone from walls, or artefacts from the earth or earth surface.<br>• Examine fresh bedrock exposures for any signs of fossils.<br>• Examine cobble exposures for any dense accumulations of artefacts.<br>• If any archaeological material or human burials are uncovered during the course of development, then work in the immediate area should be halted. The find would need to be reported to the heritage authorities and may require inspection by an archaeologist. Such heritage is the property of the state and may require excavation and curation in an approved institution.<br>• Do not demolish without authority authorisation, ideally reuse old structures and cottages, care for the fabric but change it as little as possible. | Site engineer/ site contractor | Throughout construction<br>Monthly checks |
| **Cultural Landscape** | | |
| • No street lighting to be installed.<br>• Road to remain gravel in keeping with existing road. | Site engineer/ site contractor | Prior to operation<br>During maintenance |
| **Social-Economic** | | |
| • Ensure neighbouring landowners and wider community are clearly and timeously informed about project timing and both temporary and permanent access changes.<br>• To the degree possible, and without unreasonable additional cost, use local sub-contractors and labour for construction.<br>• The community should be able to contact the site manager or their representative to report and resolve any issues which they may have. | Site engineer/ site contractor | Throughout construction<br>Monthly checks |

| Potential Impact Management Outcomes and Impact Management Actions | Responsibility for Implementation and Monitoring | Frequency of Monitoring |
|---|---|---|
| **Traffic and Transport** | | |
| • Build the road to a consistent design speed and to a high standard. Recommended speed is 60 km/h.<br>• Upgrade gravel roads to suitable condition for proposed construction vehicles. | Site engineer/ site contractor | Throughout construction<br>Monthly checks |
| **Traffic flow and safety**<br>• Adherence to the National Road Traffic Act (Act 93 of 1996) and the National Road Traffic Regulations, 2000 that prescribe certain limitations on vehicle dimensions and axle and vehicle masses that a vehicle using a public road must be complied with. Abnormal load vehicles are allowed to travel on public roads under an exemption permit issued in terms of Section 81 of the National Road Traffic Act.<br>• Adhere to a Traffic Management Plan.<br>• Alert motorists to construction traffic at the access and at the intersection, i.e. temporary heavy vehicle crossing signage.<br>• Place warning construction vehicle signage on each approach to Minor Road M50182.<br>• Ensure that all construction vehicles are roadworthy.<br>• Ensure that all construction vehicles have appropriate driver's licence. | Site engineer/ site contractor | Throughout construction<br>Monthly checks |
| **Minor road dust**<br>• Reduce travel speed on gravel road to reduce dust.<br>• Post speed restriction signage (40 km/h) for construction vehicles on minor roads.<br>• Suppress dust by watering road under construction during windy periods. | Site engineer/ site contractor | Throughout construction<br>Monthly checks |
| **Site clearance, construction zone / camp and laydown area**<br>• Ensure appropriate storage of topsoil and revegetation post construction, i.e., create windrows on one side of the road within the road reserve along the length of the site / road under construction.<br>• Ensure that vehicles do not travel over the windrows.<br>• Appropriate control (fence, tape, on-site management) to ensure that vehicles do not travel outside the realigned MN50182 road reserve.<br>• Locate the construction site office away from natural vegetation (i.e., on current farming / degraded area). | Site engineer/ site contractor | Throughout construction<br>Monthly checks |

| Potential Impact Management Outcomes and Impact Management Actions | Responsibility for Implementation and Monitoring | Frequency of Monitoring |
|---|---|---|
| • Providing temporary sanitation on-site.<br>• Provide refuse removal.<br>• Reinstate vegetation at the construction camp after construction.<br>• Locating the lay-down area in a less sensitive area (degraded farming area).<br>• Proper storage of hazardous materials (i.e., fuel).<br>• Disposal of contaminates (i.e., hydraulic or other oil, grease) off-site.<br>• Reinstate vegetation at the laydown area after construction. | | |
| **Stormwater Mitigation Measures** | | |
| • Any storm water within the site must be handled in a suitable manner, i.e. trap sediments and reduce flow velocities.<br>• Install drainage structures as required during road construction.<br>• Construct frequent diversion structures (cross-drains).<br>• Construct appropriate road cross-section.<br>• Install stormwater culverts in dry season.<br>• Periodic maintenance of drains and side slopes should be carried to prevent erosion and scouring.<br>• Work in "wetlands/low lying poor drainage areas" and construction of culverts should be restricted to the dry season.<br>• Improve the current stormwater and energy dissipation features not currently found along the tracks and roads within the region. | Site engineer/ site contractor | Throughout construction<br>Monthly checks |
| **General Mitigation Measures** | | |
| Portable toilets must be supplied to the workforce in areas of activity. A licenced contractor must be appointed by the contractor to provide this facility, and ensure that wastes are correctly disposed of. Servicing must take place regularly, proof of which must be retained on site by the contractor. | Site engineer/ site contractor | Design Phase |
| **Health and Safety** | | |
| • Implementation of safety measures, work procedures and first aid must be implemented on site. | Site engineer/ site contractor | Design Phase |

| Potential Impact Management Outcomes and Impact Management Actions | Responsibility for Implementation and Monitoring | Frequency of Monitoring |
|---|---|---|
| • Workers should be thoroughly trained in using potentially dangerous equipment.<br>• Contractors must ensure that all equipment is maintained in a safe operating condition.<br>• A safety officer must be appointed.<br>• A record of health and safety incidents must be kept on site.<br>• Any health and safety incidents must be reported to the project manager immediately.<br>• First aid facilities must be available on site at all times.<br>• The contractor must ensure that all construction workers are well educated about HIV/ AIDS and the risks surrounding this disease. The location of the local clinic where more information and counselling are offered must be indicated to workers.<br>• Material stockpiles or stacks, such as, pipes must be stable and well secured to avoid collapse and possible injury to site workers / local residents.<br>• Personal Protective Equipment (PPE) must be made available to all construction staff and their usage must be compulsory. Hard hats and safety shoes must be worn at all times and other PPE worn were necessary i.e., dust / masks, ear plugs etc. | | |

## 7.2 Post Construction Management

- Once construction has been completed on site and all excess material has been removed, the storage area shall be rehabilitated. If the area was badly damaged, re-seeding shall be done and fencing in of the area shall be considered if livestock/faunal species specific to the area may subsequently have access to such an area.
- Such areas shall be rehabilitated to their natural state. Any spilled concrete shall be removed and soil compacted during construction shall be ripped, levelled and re-vegetated.
- Only designated areas must be used for storage of construction materials, soil stockpiles, machinery and other equipment.
- Specific areas must be designated for cement/concrete mixing/ batching plants. Sufficient drainage for these plants must be in place to ensure that soils do not become contaminated.
- The construction camp must be kept clear of litter at all times.
- Spillages within the construction camp need to be cleaned up immediately and disposed of in the hazardous skip bin for correct disposal.
- All remaining material including building rubble and waste are to be removed from the site.
- All areas disturbed should be managed to ensure efficient drainage.
- The area designated for the deposition of spoil material is to be levelled and shaped to ensure the efficient drainage of the site. Under no circumstances is general or hazardous waste to be disposed of at this site.

### *7.2.1 Infrastructure*

- Disassemble all temporary infrastructure units and remove components from the working areas and contractors camp. This will include storage structures and containers, water storage container, power supply, and sewage systems etc.
- Drain all potable chemical toilets, being careful not to spill the contents. Transfer the waste to an appropriate disposal site.
- Drain all waste water and sewage associated with temporary ablution facilities and transfer the waste to an appropriate disposal site to be identified by the contractor.
- Disassemble all fencing around the camp and either sell, suction or donate to the local community or transfer the waste components to a disposal site or the contractor's base.
- Do not leave any components, waste or infrastructure units within the working area and camp unless specifically required for the operation and maintenance phases and as agreed by the ESO / ECO.

### *7.2.2 Contaminated Substrate and Pollution Control Structures*

- Excavate all areas of contaminated substrate, transfer the contaminated substrate to an appropriate disposal site and treat the affected areas.
- Remove all plastic linings used for pollution control and transfer to an appropriate disposal site.
- Break up all concrete structures that have been created and remove concrete waste to an appropriate disposal site.

### *7.2.3 Waste*

- Remove all remaining construction materials from the camp and working areas and either sell, auction, donate to the local community or transfer the waste components to a disposal site or the contractor's base.
- Remove all construction debris, litter and domestic waste from the camp and working areas and transfer to an appropriate disposal site.

- Remove all waste receptacles from the camp and working areas and either sell, auction, donate to the local community or transfer the waste components to a disposal site or the contractor's base.

# 8 MANAGEMENT PLAN FOR OPERATION PHASE

Once the construction and commissioning of the re-aligned MN50182 District Road is complete, the road will become operational. The only development related activities will be routine servicing and unscheduled maintenance.

The operator of the road has the responsibility to ensure that the mitigation measures proposed for the operational phase is implemented and conducted appropriately. The main impacts associated with the operation phase relate to birds and bats required maintenance and ensuring the commuters are informed ahead of time of possible road closures.

Recommended persons as provided in Table 8.1 below should take responsibility for the implementation and monitoring to ensure that all operational mitigation measures outlined in this document, and all revisions thereof, are complied with.

*Table 8-1: Operation Phase Impact Management Outcomes and Actions*

| Potential Impact Management Outcomes and Impact Management Actions | Responsibility for Implementation and Monitoring | Frequency of Monitoring |
|---|---|---|
| **Freshwater and Wetlands** | | |
| **Loss of aquatic systems and water courses**<br>• A further legal requirement (National Water Act), is that no stormwater be discharged directly into natural watercourses and any stormwater run-off is captured / managed on site to reduce the downstream effect of pollutants and the potential for flooding. This is particularly important due to the site, although not directly linked, being upstream of two estuarine systems. Grass swales are ideal in this scenario, as stormwater management features and are easily created due to the nature of the surrounding soils and geology. | Site engineer/ site contractor | During maintenance |
| **Terrestrial Biodiversity, Flora and Fauna** | | |
| **Impact on alien invasive species**<br>• A suitable weed management strategy to be implemented.<br>• After clearing and construction is completed, an appropriate cover may be required, should natural re-establishment of grasses not take place in a timely manner along road verges. This will also minimise dust. | Site engineer/ site contractor | Prior to operation<br>During maintenance |
| **Impact on erosion**<br>• Suitable measures must be implemented in areas that are susceptible to erosion. Areas must be rehabilitated, and a suitable cover crop planted once construction is completed.<br>• Topsoil must be stripped and stockpiled separately and replaced on completion.<br>• If natural vegetation re-establishment does not occur, a suitable grass must be applied. | Site engineer/ site contractor | Prior to operation<br>During maintenance |
| **Visual / Landscape** | | |
| • Rehabilitation / revegetation of road verges after construction. | Site engineer/ site contractor | Prior to operation<br>During maintenance |

| Potential Impact Management Outcomes and Impact Management Actions | Responsibility for Implementation and Monitoring | Frequency of Monitoring |
|---|---|---|
| • Concrete drainage channels to be avoided in the rural landscape, and only grass swales provided.<br>• Concrete headwalls to culverts to be avoided, and natural stone gabions used instead.<br>• Only essential traffic signs to be provided, and advertising signs are prohibited. | | |
| **Traffic and Transport** | | |
| **Road maintenance**<br>• Carry out regular maintenance of the road to ensure that its condition is maintained or improved.<br>• Ensure that the minor road is left in a better condition post-construction.<br>• Ensure correct cross-section to drain stormwater water off road.<br>• Ensure side drains, culverts remain fully functional.<br>• Regularly maintain minor road. | Site engineer/ site contractor | During maintenance |
| **Stormwater Mitigation Measures** | | |
| • Any storm water within the site must be handled in a suitable manner, i.e. trap sediments and reduce flow velocities.<br>• Install drainage structures before and during road construction.<br>• Construct frequent diversion structures (cross-drains).<br>• Construct appropriate road cross-section.<br>• Install stormwater culverts in dry season. | Site engineer/ site contractor | Design Phase |
| **General Mitigation Measures** | | |
| Portable toilets must be supplied to the workforce in areas of activity. A licenced contractor must be appointed by the contractor to provide this facility, and ensure that wastes are correctly disposed of. Servicing must take place regularly, proof of which must be retained on site by the contractor. | Site engineer/ site contractor | Design Phase |

# 9 MANAGEMENT PLAN FOR DECOMMISSIONING PHASE

Should the road be decommissioned a decommissioning plan must be produced. The plan must include details on the decommissioning, taking in consideration the potential environmental impact associated with it. Environmental monitoring plans must be produced to ensure no pollution occurs during this phase. The plan must include the steps that will be taken to rehabilitate the area after the WEF is dismantled, as well as recycling options of the equipment and structures.

The following mitigation measures must be implemented, should the development be decommissioned.

*Table 9-1: Decommission Phase Impact Management Outcomes and Actions*

| Potential Impact Management Outcomes and Impact Management Actions | Responsibility for Implementation and Monitoring | Frequency of Monitoring |
|---|---|---|
| **Freshwater and Wetlands** | | |
| **Loss of aquatic systems and water courses**<br>• Where new 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 minimise the loss of riparian vegetation (reduce footprint as much as possible).<br>• Monitor culverts to see if erosion issues arise and if any erosion control is required.<br>• 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.<br>• Vegetation clearing should occur in a phased manner in accordance with the construction programme to minimise erosion and/or run-off. Large tracts of bare soil will either cause dust pollution or quickly erode and then cause sedimentation in the lower portions of the catchment.<br>• Use existing tracks as far as possible. Should new crossings be required these must be licensed under the appropriate General Authorisation in terms of Section 39 of the National Water Act 36 of 1998 (NWA, 1998).<br>• All alien plant re-growth must be monitored, and should it occur these plants should be eradicated. The scale of the operation does however not warrant the use of a Landscape Architect and / or Landscape Contractor.<br>• As per the legal requirement (National Water Act), no stormwater should be discharged directly into natural watercourses and any stormwater run-off should be captured / managed on site to reduce the downstream effect of pollutants and the potential for flooding. This is particularly important due to the site, although not directly linked, being upstream of two estuarine systems. Grass swales are ideal in this scenario, as stormwater management features and are easily created due to the nature of the surrounding soils and geology. | Site engineer/ site contractor | Throughout decommission<br>Monthly checks |
| **Impact on localized surface water quality**<br>• Strict use and management of all hazardous materials used on site.<br>• Strict management of potential sources of pollution (e.g., litter, hydrocarbons from vehicles & machinery, cement during construction, etc.).<br>• Containment of all contaminated water by means of careful run-off management on the development site. | Site engineer/ site contractor | Throughout decommission<br>Monthly checks |

| Potential Impact Management Outcomes and Impact Management Actions | Responsibility for Implementation and Monitoring | Frequency of Monitoring |
|---|---|---|
| • Working protocols incorporating pollution control measures (including approved method statements by the contractor) should be strictly enforced.<br>• Appropriate ablution facilities should be provided for construction workers. | | |
| **Traffic and Transport** | | |
| **Road closure**<br>• Advertise road closure in Government Gazette.<br>• Place signage informing of road closure for a 6 months period, once road is closed. | Site engineer/ site contractor | Prior to decommission |

# 10 BIODIVERSITY ENVIRONMENTAL MANAGEMENT PLAN

This Biodiversity Environmental Management Plan (EMP) contains guidelines, operating procedures, and rehabilitation control requirements, which will be binding on the holder of the environmental authorisation after approval of the EMPr. The impacts identified will be managed / controlled as set out under the mitigating measures in Section 5 – 8 above, and as detailed in this section for the more significant impacts during the various phases of the development.

## 10.1 Protection of Flora and Fauna

The following actions must be implemented at construction phase.

- Search and rescue operations for Species of Conservation Concern must be undertaken before the commencement of site clearing activities.
- Indigenous vegetation encountered on the sites that are to be conserved and left intact.
- It is important that clearing activities are kept to the minimum and take place in a phased manner. This allows animal species to move into safe areas and prevents wind and water erosion of the cleared areas.
- Stripped vegetation should be temporarily stored during operations and to be used later to stabilise slopes. This excludes exotic invasive species.
- No animals are to be harmed or killed during operations.
- Workers are NOT allowed to collect any flora or snare any faunal species. All flora and fauna remain the property of the landowner and must not be disturbed, upset, or used without their expressed consent.
- It is the responsibility of the Contractor to provide sufficient fuel for cooking and heated as needed by the staff.
- No domestic animals are permitted on the sites.
- Trees and shrubs that are directly affected by the operations may be felled or cleared but only by the expressed written permission of the ECO.
- Rehabilitation of vegetation of the site must be done as described in the Rehabilitation Plans.

### *10.1.1 Flora search and Rescue*

The following flora relocation plan is recommended:

- Once the road design has been determined, the botanist will be consulted in order to finalise the plant relocation and vegetation clearing plan.
- Respective permits to be obtained.
- Flora search and rescue is to be conducted before vegetation clearing takes place.
- Areas should only be stripped of vegetation as and when required and once species of conservation concern have been relocated for that area.
- Once site clearing is to commence, the area to be cleared of vegetation will be surveyed by the vegetation and plant search and rescue team clearing under the supervision of the botanist to identify and remove species suitable for rescue and commence removal of plants.
- These species are to be replanted immediately in a suitable area of similar vegetation, where future development is unlikely to occur, or within a protected area.

## 10.2 Alien and Invasive Plant Management Plan

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

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

### *10.2.1 Problem Outline*

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

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

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

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

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

### *10.2.2 Vulnerable Ecosystems and Habitats*

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

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

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

#### *10.2.2.1 Wetlands, drainage lines and other mesic areas*

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

#### *10.2.2.2 Cleared and disturbed areas*

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

#### *10.2.2.3 Construction camps and laydown areas*

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

### *10.2.3 General Clearing and Guidance Principles*

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

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

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

### *10.2.4 Clearing Methods*

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

### *10.2.5 Use of Herbicide for Alien Control*

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

- Area contamination must be minimised by careful, accurate application with a minimum amount of herbicide to achieve good control.
- All care must be taken to prevent contamination of any water bodies. This includes due care in storage, application, cleaning equipment and disposal of containers, product and spray mixtures.

- Equipment should be washed where there is no danger of contaminating water sources and washings carefully disposed of in a suitable site.
- To avoid damage to indigenous or other desirable vegetation, products should be selected that will have the least effect on non-target vegetation.
- Coarse droplet nozzles should be fitted to avoid drift onto neighbouring vegetation.
- The appropriate health and safety procedures should also be followed regarding the storage, handling and disposal of herbicides.

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

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

### *10.2.6 Mitigation Measures*

The following mitigation measures have been identified in order to ensure that the introduction and spread of alien invasive vegetation is minimised:

- Alien species must be removed from the site as per the National Environmental Management: Biodiversity Act (No. 10 of 2004) requirements.
- A suitable weed management strategy must be implemented in the construction phase and carried through the operational phase.
- Weeds and alien species must be cleared by hand before the rehabilitation phase of the areas. Removal of alien plants are to be done according to the Working for Water Guidelines.
- The Contractor is responsible for the removal of alien species within all areas disturbed during construction activities. Disturbed areas include (but are not limited to) access roads, construction camps, site areas and temporary storage areas.
- In consultation with relevant authorities, the Engineer may order the removal of alien plants (when necessary). Areas within the confines of the site are to be included.
- All alien plant material (including brushwood and seeds) should be removed from site and disposed of at a registered waste disposal site. Should brushwood be utilised for soil stabilization or mulching, it must be seed free.
- After clearing is completed, an appropriate cover crop may be required, should natural re-establishment of grasses not take place in a timely manner.

## 10.3 Soil Aspects

- Sufficient topsoil must be stored for later use during decommissioning, particularly from outcrop areas.
- Topsoil shall be removed from all areas where physical disturbance of the surface will occur.
- All available topsoil shall be removed after consultation with the botanist and horticulturalist prior to commencement of any operations.
- The removed topsoil shall be stored on high ground within the site footprint outside the 1:50 flood level within demarcated areas.
- Topsoil shall be kept separate from overburden and shall not be used for building or maintenance of roads.
- The stockpiled topsoil shall be protected from being blown away or being eroded. The application of a suitable grass seed/runner mix will facilitate this and reduce the minimise weeds.

## 10.4 Dust

- To manage complaints relation to impacts on the nearby communities, a dust register will be developed.
- If required, water spray vehicles will be used to control wind cause by strong winds during activities on the works.

- No over-watering of the site or road surfaces.
- Wind screens should be used to reduce wind and dust in open areas.

## 10.5 Infrastructural Requirements

### *10.5.1 Topsoil*

- Topsoil shall be removed from all areas where physical disturbance of the surface will occur.
- All available topsoil shall be removed after consultation with the Regional Manager prior to commencement of any operations.
- The removed topsoil shall be stored on high ground within the footprint outside the 1:50 flood level within demarcated areas.
- Topsoil shall be kept separate from overburden and shall not be used for building or maintenance of roads.
- The stockpiled topsoil shall be protected from being blown away or being eroded. The use of a suitable grass seed/runner mix will facilitate soil protection and minimise weeds/weed growth.

### *10.5.2 Site Office / Camp Sites*

- No site offices or camp sites will be constructed on the site under current operating conditions, existing structures will be used.

### *10.5.3 Operating Procedures in the Site*

- Construction shall only take place within the approved demarcated site.
- Construction may be limited to the areas indicated by the Regional Manager on assessment of the application.
- The holder of the environmental authorisation shall ensure that operations take place only in the demarcated areas as described in this report.
- Watering to minimise the effect of dust generation should be carried out as frequently as necessary. Noise should also be kept within reason.
- No workers will be allowed to damage or collect any indigenous plant or snare any animal.
- Grass and vegetation of the immediate environment or adapted grass / vegetation will be re-established on completion of construction activities, where applicable.
- No firewood to be collected on site and the lighting of fires must be prohibited.
- Cognisance is to be taken of the potential for endangered species occurring in the area.

### *10.5.4 Excavations*

Whenever any excavation is undertaken, the following procedures shall be adhered to:

- Topsoil shall be handled as described in this EMPr.
- Excavations shall take place only within the approved demarcated site.
- Excavations must follow the contour lines where possible.
- The construction site will not be left in any way to deteriorate into an unacceptable state.
- The excavated area must serve as a final depositing area for waste rock and overburden during the rehabilitation process.
- Once excavations have been filled with overburden, rocks and coarse natural materials and profiled with acceptable contours (including erosion control measures), the previous stored topsoil shall be returned to its original depth over the area.

- The area shall be fertilised, if necessary, to allow vegetation to establish rapidly. The site shall be seeded with a local or adapted indigenous seed mix in order to propagate the locally occurring flora.

### *10.5.5 Rehabilitation of Processing and Excavation Areas*

- On completion of construction, the surface of the processing areas especially if compacted due to hauling and dumping operations shall be scarified to a depth of at least 200 mm and graded to an even surface condition and the previously stored topsoil will be returned to its original depth over the area.
- The area shall be fertilised, if necessary, to allow vegetation to establish rapidly. The site shall be seeded with suitable grasses and local indigenous seed mix.
- Excavations may be used for the dumping of construction wastes. This shall be done in such a way as to aid rehabilitation.
- Waste (non-biodegradable refuse) will not be permitted to be deposited in the excavations.
- If a reasonable assessment indicates that the re-establishment of vegetation is unacceptably slow, the Regional Manager may require that the soil be analysed and any deleterious effects on the soil arising from the activity, be corrected and the area be seeded with a vegetation seed mix to his or her satisfaction. This must be done in conjunction with the ECO.
- Final rehabilitation must comply with the requirements mention in the Rehabilitation Plan.

## 10.6 Rehabilitation Plan

### *10.6.1 Rehabilitation Objective*

The overall objective of the rehabilitation plan is to minimize adverse environmental impacts associated with the activity whilst maximizing the future utilization of the property. Significant aspects to be borne in mind in this regard is, revegetation of undeveloped footprint and stability and environmental risk. The depression and immediate area of the working must also be free of alien vegetation. Additional broad rehabilitation strategies / objectives include the following:

- Rehabilitating the worked-out areas to take place concurrently within prescribed framework established in the EMPr.
- All infrastructure, equipment, plant, and other items used during the construction period will be removed from the site.
- Waste material of any description, including scrap, rubble, and tyres, will be removed entirely from the site, and disposed of at a recognised landfill facility. It will not be permitted to be buried or burned on site.
- Final rehabilitation shall be completed within a period specified by the Regional Manager.

### *10.6.2 Topsoil and Subsoil Replacement*

Topsoil and subsoil will be stripped and stockpiled separately and only used in rehabilitation work towards the end of the operation. This is in contract to the gravel activity where rehabilitation and topsoil replacement was earmarked at the completion of each phase.

Stripped overburden will be backfilled into the worked-out areas where needed. Stripped topsoil will be spread over the re-profiled areas to an adequate depth to encourage plant regrowth. The vegetative cover will be stripped with the thin topsoil layer to provide organic matter to the relayed material and to ensure that the seed store contained in the topsoil is not diminished. Reseeding may be required should the stockpiles stand for too long and be

considered barren from a seed bank point of view. Stockpiles should ideally be stored for no longer than a year.

The topsoil and overburden will be keyed into the reprofiled surfaces to ensure that they are not eroded or washed away. The topsoiled surface will be left fairly rough to enhance seedling establishment, reduce water runoff and increase infiltration.

### *10.6.3 Revegetation*

All prepared surfaces will be seeded with suitable grass species to provide an initial ground cover and stabilize the soil surface. The following grass seed that is commonly available and suitable.

| **Botanical name** | **Common name** | **Approx. seed mixture /Ha** |
|---|---|---|
| *Cynodon dactylon* | Kweek | 12 kg/ Ha |
| *Eragrostis curvula* | Weeping Love Grass | 6 kg/ Ha |
| *Eragrostis tef* | Teff | 2 kg/ Ha |
| *Digitaria eriantha* | Smuts Grass | 4 kg/ Ha |
| Other indigenous veld grasses can be added to the seed mix | | ± 4 kg/Ha |

The overall revegetation plan will, therefore, be as follows:

- Ameliorate the aesthetic impact of the site
- Stabilise disturbed soil and rock faces
- Minimize surface erosion and consequent siltation of natural water course located on site
- Control wind-blown dust problems
- Enhance the physical properties of the soil
- Re-establish nutrient cycling
- Re-establish a stable ecological system

Every effort must be made to avoid unnecessary disturbance of the natural vegetation during operations.

### *10.6.4 Drainage and Erosion Control*

To control the drainage and erosion at site the following procedures will be adopted:

- Areas where construction is completed should be rehabilitated immediately.
- Areas to be disturbed in future activities will be kept as small as possible (i.e. conducting the operations in phases), thereby limiting the scale of erosion.
- Slopes will be profiled to ensure that they are not subjected to excessive erosion but capable of drainage runoff with minimum risk of scour (maximum 1:3 gradient).
- All existing disturbed areas will be re-vegetated to control erosion and sedimentation
- Existing vegetation will be retained as far as possible to minimize erosion problems.

### *10.6.5 Visual Impacts Amelioration*

The overall visual impact of the proposed activities will be minimised by the following mitigating measures:

- Confining the footprint to an area as small as possible
- Re-topsoiling and vegetating all disturbed areas

### *10.6.6 Monitoring and Reporting*

Adequate management, maintenance and monitoring will be carried out annually by the applicant to ensure successful rehabilitation of the property until a closure certificate is obtained.

To minimise adverse environmental impacts associated with operations it is intended to adopt a progressive rehabilitation programme, which will entail carrying out the proposed rehabilitation procedures concurrently with activity.

### *10.6.7 Closure objectives and extent of alignment to pre-construction environment*

#### *10.6.7.1 Closure Objectives*

The closure of the site will involve removal of all debris and rehabilitation of areas disturbed during the construction phase of the project. This will comprise the scarification of compacted areas, reshaping of areas, topsoiling, and rehabilitating all prepared surfaces.

## 11 STORMWATER MANAGEMENT PLAN

The objective of the storm water management plan (SWMP) is to prevent increased soil erosion, to contain any contaminated run-off and to avoid water logging and pollution. The Erosion Management Plan (see below) must therefore be seen in conjunction with the SWMP. Actions are listed that will ensure that storm water is channelled in a controlled manner from roads towards natural drainage lines, without impeded natural surface flows.

Stormwater Management Plans *must* be developed for the site during the detailed design phase of the project and prior to construction and should include the following:

- The management of stormwater during construction.
- The installation of stormwater and erosion control infrastructure.
- The management of infrastructure after completion of construction.

Other measures to note are the following:

- Temporary drainage works may be required to prevent stormwater to prevent silt laden surface water from draining into river systems in proximity to the site. Stormwater must be prevented from entering or running off site.
- To ensure that site is not subjected to excessive erosion and capable of drainage runoff with minimum risk of scour, their slopes should be profiled at a maximum 1:3 gradient.
- Diversion channels should be constructed ahead of the open cuts, and above emplacement areas and stockpiles to intercept clean runoff and divert it around disturbed areas into the natural drainage system downstream of the site.
- Rehabilitation is necessary to control erosion and sedimentation of all eroded areas (where works will take place).
- Existing vegetation must be retained as far as possible to minimise erosion problems.
- It is importation that the rehabilitation of site is planned and completed in such a way that the runoff water will not cause erosion.
- Visual inspections will be done on a regular basis regarding the stability of water control structure, erosion, and siltation.
- Sediment-laden runoff from cleared areas must be prevented from entering rivers and streams.
- No river or surface water may be affected by silt emanating from the site.
- Enforce 32 m construction buffers of all rivers, streams and waterbodies;
- At any crossings with any banks or channels these must be secured with erosion protection (i.e., gabions etc.);
- Monitor for erosion during the clearing of vegetation;

- Avoid hard-engineered surfaces (i.e., construct gravel roads and not asphalt roads to maintain cultural landscape);
- Roads in steep topography must be equipped with side drainages and culverts that channel the run-off to natural drainage lines without gaining velocity and causing erosion;
- Stockpiles must be located on flat areas and protected from erosion; and
- Prevent surface run-off from areas of potential contamination.

# 12 Erosion Management Plan

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

## 12.1 Scope and Limitations

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

## 12.2 Background

### *12.2.1 Types of Erosion*

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

#### *Raindrop impact*

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

#### *Sheet Erosion*

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

#### *Rill Erosion*

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

#### *Gully Erosion*

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

#### *Wind Erosion*

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

### *12.2.2 Promoting Factors*

#### *Rainfall Characteristics*

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

#### *Soil erodibility*

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

#### *Length and Steepness of Slope*

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

#### *Soil Surface Cover*

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

### *12.2.3 Erosion and Sediment Control Principles*

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

- Protect the land surface from erosion;
- Intercept and safely direct run-on water from undisturbed upslope areas through the site without allowing it to cause erosion within the site or become contaminated with sediment.
- Progressively revegetate or stabilise disturbed areas.
- Prevent damage to hydrological features such as drainage lines or wetlands, either within or adjacent to the site.

These goals can be achieved by applying the following principles:

1. Integrate project design with site constraints.
2. Plan and integrate erosion and sediment control with construction activities.

3. Minimise the extent and duration of disturbance.
4. Control stormwater flows onto, through and from the site in stable drainage structures.
5. Use erosion controls to prevent on-site damage.
6. Use sediment controls to prevent off-site damage.
7. Control erosion and sediment at the source.
8. Stabilise disturbed areas promptly.
9. Inspect and maintain control measures.

### *12.2.4 On-site Erosion Management*

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

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

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

## 12.3 Concentration of flows into downstream areas

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

- Culverts should be adequately spaced such that they do not result in shrinkage of downstream wetlands. Where roads cross minor drainage channels, a single culvert may be adequate, aligned with the downstream drainage line. Where more substantial wetland systems are intercepted by a road, sufficient culverts should be provided such that downstream shrinkage of wetland width does not occur. Moreover, culverts should be aligned, as far impossible, with existing, natural channels.
- All crossings of drainage systems should ensure that both surface and shallow subsurface flows can be accommodated where appropriate and that unnatural channelisation does not occur downstream.

## 12.4 Runoff Concentration

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

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

### *12.4.1 Diversion of Flows*

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

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

## 12.5 Monitoring Requirements

### *12.5.1 Construction Phase*

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

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

### *12.5.2 Operational Phase*

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

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

## 13 OPEN SPACE MANAGEMENT PLAN

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

In the context of the development, the primary purpose of the open plan management plan is therefore to:

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

The development may impact negatively on the character of the area. The following actions must be implemented to minimise this visual impact:

- Measures to control wastes and litter to be included in the contract specification documents.
- Provision to be made for rehabilitation / re-vegetation of areas damaged by construction activities.
- Substation to be sited in unobtrusive low-lying areas, away from roads and habitations, and screened by berms and/or tree-planting where feasible.
- Operations and maintenance buildings and parking areas to be located in an unobtrusive area and consolidated to avoid sprawl of buildings in the open landscape.
- Disturbed areas rather than pristine or intact land to preferably be used for the construction camp. Construction camp and laydown areas to be limited in area to only that which is essential.

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

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

- Promote environmental awareness in all employees and sub-contractors and create an understanding of the environmental sensitivities of the project site;
- No waste, including organic matter may be disposed of anywhere on site, except in provided bins placed at convenient locations, especially during the construction period. Disciplinary actions should be taken against littering;

- Open spaces are to be kept free of alien plants and weeds; and
- Indigenous plants may not be collected or removed from the site.

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

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

## 14 Fire Management Plan

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

Although fires are not a regular occurrence at the site, fires may occasionally occur under the right circumstances. Ignition risk sources in the area include lightning strikes; and Personnel.

To avoid and manage the likelihood of fire, the following must be followed:

- The Contractor must ensure that an emergency preparedness plan is in place in order to fight accidental fires or veld fires, should they occur. The adjacent landowners/users/managers *should* also be informed or otherwise involved.
- Enclosed areas for food preparation should be provided and the Contractor *must* strictly prohibit the use of open fires for cooking and heating purposes.
- The use of branches of trees and shrubs for fire-making *must* be strictly prohibited.
- The Contractor *should* take all reasonable and active steps to avoid increasing the risk of fire through their activities on-site. No fires may be lit except at places approved by the ECO.
- The Contractor *must* ensure that the basic fire-fighting equipment is to the satisfaction of the Local Emergency Services.
- The Contractor *must* supply all living quarters, site offices, kitchen areas, workshop areas, materials, stores, and any other relevant areas with tested and approved fire-fighting equipment.
- Fires and "hot work" *must* be restricted to demarcated areas.
- A braai facility may be considered at the discretion of the Contractor and in consultation with the ECO. The area *must* be away from flammable stores. All events must be under management's supervision and a fire extinguisher *will* be immediately available. "Low-smoke" fuels must be used (e.g. charcoal) and smoke control regulations, if applicable, must be considered.
- The Contractor *must* take precautions when working with welding or grinding equipment near potential sources of combustion. Such precautions include having a suitable, tested, and approved fire extinguisher immediately at hand and the use of welding curtains.

### *14.1.1 Firebreaks*

Extensive firebreaks are not recommended as a fire risk management strategy. The site is small in extent and the maintenance of firebreaks would impose a large management burden. In addition, the risk of fires is not distributed equally across the site as there is not sufficient biomass to carry fires and the risk of fires within these areas is very low. Rather targeted risk management should be implemented around vulnerable or sensitive elements

such as storage areas or other high risk components. Within such areas, the extent over which management action needs to be applied is relatively limited and it is recommended that firebreaks are created by mowing and that burning to create firebreaks is not used, as this in itself poses a risk of runaway fires. Where such firebreaks need to be built such as around storage areas, a strip of vegetation 5 - 10 m wide can be cleared manually and maintained relatively free of vegetation through manual clearing during construction.

# 15 FUEL STORAGE MEASURES

## 15.1 Storage Tanks

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

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

## 15.2 General Procedures

- Transport routes for the transport of fuel will be clearly indicated;
- Pollution control equipment (spill and leak cleaning kits) must be readily available;
- Ensure personnel training, including: measures to prevent fuel spills, to treat/clean fuel spills, how to react on spill of flammable liquids on clothing and in the inhalation of vapours, leaks simulations; fuel vapour recovery processes, etc. Keep records of all training;
- Maintain the premises and equipment in a clean and tidy state;
- Regularly clean outdoor areas with a broom;
- Wastewater from outside areas must be directed to the contaminated water drainage system, and not enter the storm water system;
- Used oils (waste oil) will be collected, re-used, stored and disposed of in line with disposal procedures for hazardous wastes; and
- Ensure the proper management of other hazardous wastes (contaminated soils, used spilling kits, waste lube, etc.).

### *Filling operations*

- Isolate the area by cones and a rope;
- Prohibit refueling operations during tank filling operations;
- Avoiding having people who are not involved in the operation within a 10-metre radius;
- Prohibit smoking and the use of mobile telephones or any other ignition sources during tank filling operations or vehicle refueling, within a 3-metre radius;
- Use a tight-fill cap to completely seal off the connections between the tubing and the trucks and station's tanks;
- Engines must be turned off during refueling; and
- Prevent overflowing and spilling situations when the storage tanks are being filled (verify filling sensors and be aware of overflow alarms).

### *Preventing Accidents with fuel mixtures*

Establish a procedure to deal with the potential occurrence of these situations, such as:

- The chemicals and reaction mechanisms associated with the substances mixed or blended must be well understood and documented;
- Chemical and process hazards must be understood and addressed and the facilities

should ensure that process equipment, controls, and procedures are designed, installed and maintained to safely operate the process;
- All employees should understand the chemical and process hazards;
- Facilities should establish a system for Standard Operating Procedures and ensure that they are understood and followed;
- Display clear and informative messages for users of the station, as to how to deal with this situation; and
- Prepare a procedure to suitably dispose of wastes recovered from the batches of fuel mixture.

### *Spill Kits*

- Emergency spill kits of absorbent material (e.g., sand) must be provided and stored next to the higher risk sites, and must be easily-accessible, ideally outside, in order to allow an immediate response when a spill occurs. This will be clearly labelled and ready for use.
- Drums for the storage of contaminated material must be provided.
- An accurate drawing of the local drainage system shall be posted next to the spill kit.

### *Closure Phase*

- During the closure phase, there may be loss of product into the soil, as a result of a deliberate or accidental release during closure and removal of tanks and tubing. In addition, this risk may arise outside of the facility site, if the tanks and/or tubing are not properly disposed of.
- In the closure phase, it is important to remove all tanks and pipes. A risk may arise if the tanks are left on site with residual products. As the integrity of the equipment will no longer be ensured or monitored.
- During closure, it must be ensured that facilities do not present a risk to the environment, health or safety. Measures must be taken to ensure that the closure does not result in an unacceptable risk, including:
    - Any and all waste products will be removed from the tanks. Care will be taken to ensure that no product is lost into the soil. Tank closure must be carried out safely, with the removal of explosive vapours, for example by filling the tanks with water or inert gases. All tanks will be safe prior to their removal from the ground. Similar methods will be employed prior to the removal of the pipes.
    - Water used in this process will be contaminated with residual product, and thus a water contamination risk may arise if the contaminated water is not disposed of in a way which is appropriate for hydrocarbon contamination. This would normally imply the removal to a suitable waste handling facility.
    - According to best environmental practices, the tanks, tubing and distributors will be disposed of. However, if the tanks remain in situ, it will be ensured that the procedure is safe. After making the tanks inert and safe, they will be filled in with sand, concrete, inert mud or hydrophobic foam.
    - The tanks and associated tubing which are no longer considered appropriate or safe for fuel storage will not be used for storage of other hydrocarbons, without first ensuring their integrity.
    - The oil/water separators will be removed for disposal, off the facility site. Otherwise they will be filled in a similar way to the tanks. Regardless of the fate of the oil/water separator, all liquid and mud waste will be removed (off the facility site) and all the inlets and outlets will be sealed.
    - Whatever drainage system left behind will be modified to ensure that it does not serve as a path for pollutants to reach groundwater or other waters.

- If the deactivation is temporary, product can be left in the tanks. In this case, all monitoring procedures will be carried out as if the facility were in operation. If for any reason the monitoring cannot carry on, the tanks will be emptied and made inert.
- Personnel involved in the closure of a filling and fuel station will be aware and respect obligations with regards to waste disposal, in line with the best practices described above.

| Environmental Aspect | Action or Measure |
|---|---|
| **Prevent accidental spills from entering the stormwater drainage system** | Provide cleaning equipment conceived specifically to deal with minor spills as may occur at the station.<br>Place a clearly-identified spill kit in a visible location for each fueling line. |
| | Develop a step-by-step guide to use of the spill kit. |
| | Develop an evacuation plan and/or response procedures for emergencies involving large fuel spills. |
| | Train the whole team in the emergency response procedures. Make sure that all staff knows where the emergency equipment is to be found and is acquainted with its maintenance. |
| | Label all of the stormwater drains on site in the proximity of the facilities as "Clean Water Only". |
| | Inspect the fuel distribution area in order to confirm that rainwater drained or emptied from the roof doesn't enter the areas marked out. |
| | Check whether the embankment around the fuel distribution area is in good condition and has the capacity to contain a fuel leak in the event of an emergency. |
| **Minimise the risks of environmental contamination and from issues of workers' health and safety** | Provide training to the staff regarding the disposal of material contaminated with fuel, such as absorbent material from the spill kit, soaked in fuel. |
| | Ensure that the product safety cards for all fuels and oils are up-to-date and accessible at all times. |
| **Minimise the risks of fuel leaks as may result in pollution of the sub-soil and groundwater** | Check if there is fuel, from a possible leak, in the spill containment sumps installed at the tank's discharge nozzle. |
| | Check if there is fuel, from a possible leak, in the all tanks containment sumps, installed on the manhole to the storage tanks. In the event of suspected leakage, report it immediately. |
| | Check if there is fuel or lube, from a possible leak in the containment sumps installed under the tanks. |
| **Minimise the risks of fuel leaks as this may result in pollution of the sub-soil and groundwater** | Check if there is fuel, from a possible leak, in the chambers of the containment sumps installed under the pumps. |
| **Minimise the risks of harmful emissions to the atmosphere and the loss of fuel** | Check that lids, flanges and connections are closed. |
| | Confirm that the ventilation conduits are not blocked. |
| | Supervise the fuel deliveries. |
| **Minimise the risks of water pollution** | Carry out an Oil-Water Separator inspection to ensure effective treatment. |
| **Integrity control** | Adequate maintenance and calibration of the monitoring equipment. |

## 16 TRAFFIC MANAGEMENT PLAN

The objective of the traffic management plan is the prevention of incidents from the use of vehicles and disturbance of local traffic on public roads. Traffic volumes are most likely to increase during the construction phase. However, due to the remote location of the site, and the low volume of traffic on public roads in the area the impact is expected to be low.

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

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

Actions to be implemented by the Contractor and the Developer:

- Monitor for overloading of vehicles;
- Use only well trained, suitably qualified and experienced drivers in possession of an appropriate and valid driver's license;
- All vehicles must be roadworthy and serviced regularly;
- Clear and visible signage must be placed on and around site, clearly demarcating safe entry and exit points;
- Require all drivers to abide by standard road and safety procedures on site;
- When travelling on public roads all speed limits and rules of the road must be adhered to; and
- Limit dust generation by applying dust suppressants and postponing dust generating activities during period of strong winds and enforcing a strict speed limit of 40 – 60 km/h on unpaved roads.

Monitoring actions to be conducted by the ECO / ESO:

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

## 17 NOISE MANAGEMENT PLAN

Environmental Noise Measurement can be divided into two distinct categories, namely:

- Passive measuring – the registering of any complaints (reasonable and valid) regarding noise; and
- Active measuring – the measurement of noise levels at identified locations.

No active environmental noise monitoring is recommended due to the low significance for a noise impact to develop. However, should a reasonable and valid complaint about noise be registered, it is the responsibility of the developer to investigate this complaint as per

the following sections. Should a noise complaint be registered it is recommended that a noise investigation be done by an independent acoustic consultant.

While this section recommends a noise monitoring programme, it should be used as a guideline as site specific conditions may require that the monitoring locations, frequency or procedure be adapted.

## 17.1 Measurement Localities and Procedures

### *17.1.1 Measurement Localities*

No routine noise measurements or locations are recommended. Noise measurements must be conducted at the location of the person that registered a valid and reasonable noise complaint. The measurement location should consider the direct surroundings to ensure that other sound sources cannot influence the reading. A second instrument must be deployed at a control point away from the potential noise source during the measurement period.

### *17.1.2 Measurement Frequencies*

Once-off measurements if and when a reasonable and valid noise complaint is registered. Results and feedback must be provided to the complainant. If required and recommended by an acoustic consultant, there may be follow-up measurements or a noise monitoring programme can be implemented.

### *17.1.3 Measurement Procedures*

When a noise complaint is being investigated, measurements should be collected during a period or in conditions similar to when the receptor experienced the disturbing noise event. Ambient sound measurements should be collected as defined in SANS 10103:2008. Due to the variability that naturally occurs in sound levels at most locations, it is recommended that semi-continuous measurements are conducted over a period of at least 24 hours, covering at least a full day- (06:00 – 22:00) and night-time (22:00 – 06:00) period. Measurements should be collected in 10-minute bins defining the 10-minute descriptors such as $L_{Aeq,I}$ (National Noise Control Regulation requirement), $L_{A90,f}$ (background noise level as used internationally) and $L_{Aeq,f}$ (Noise level used to compare with IFC noise limit). Spectral frequencies should also be measured to define the potential origin of noise.

## 17.2 Relevant Standard for Noise Measurements

Noise measurements must be conducted as required by the National Noise Control Regulations (GN R154 of 1992) and SANS 10103:2008. It should be noted that the SANS standard also refers to a number of other standards.

## 17.3 Data Capture Protocols

### *17.3.1 Measurement Technique*

Noise measurements must be conducted as required by the National Noise Control Regulations (GN R154 of 1992) and SANS 10103:2008, if required.

### *17.3.2 Variables to analyse*

Measurements should be collected in 10-minute bins defining the 10-minute descriptors such as $L_{Aeq,I}$ (National Noise Control Regulation requirement), $L_{A90,f}$ (background noise level as used internationally) and $L_{Aeq,f}$ (Noise level used to compare with IFC noise limit). Noise levels should be co-ordinated with the 10-m wind speed. Spectral frequencies should also be measured to define the potential origin of noise.

### *17.3.3 Database Entry and Backup*

Data must be stored unmodified in the electronic file saved from the instrument. This file can be opened to extract the data to a spread sheet system to allow the processing of the data and to illustrate the data graphically. Data and information should be safeguarded from accidental deletion or corruption.

### *17.3.4 Feedback to Receptor*

A measurement report must be compiled considering the requirements of the National Noise Control Regulations (GN R154 of 1992) and SANS 10103:2008. The facility must provide feedback to the potential noise-sensitive receptors using the channels and forums established in the area to allow interaction with stakeholders, alternatively in a written report.

## 17.4 Standard Operating Procedures for Registering a Complaint

When a noise complaint is registered, the following information must be obtained:

- Full details (names, contact numbers, location) of the complainant;
- Date and approximate time when this non-compliance occurred;
- Description of the noise or event; and
- Description of the conditions prevalent during the event (if possible).

# 18 HERITAGE MANAGEMENT PLAN

The purpose of this Heritage Management Plan (HMP) is to provide a framework, under the EMPr, for the management of heritage resources during the construction.

The objective of the HMP is to put in place clear and practical management actions to ensure that heritage resources are protected and conserved and, where they occur, impacts to these resources are appropriately managed and mitigated.

The HMP identifies the below:

- What heritage resources require management;
- Who will carry out the management of heritage resources;
- Appropriate management and mitigation actions to be implemented to ensure that heritage resources are not negatively impacted; and
- Procedures and processes to follow in the event of negative impact to previously identified or new discovered heritage resources.

## 18.1 Heritage Resource Requiring Management

There are currently no obvious threats to heritage resources on the site aside from the natural degradation, weathering and erosion that will affect archaeological materials.

Heritage sites and materials are protected by the National Heritage Resources Act (NHRA) (25 of 1999) which provides protection for various categories of heritage resource from unauthorised disturbance, damage, or destruction, thereby ensuring their protection and preservation for the future.

Should any heritage resources be identified, these would have to be graded, in terms of the provisions of section 3 of the NHRA. Grading provides an indication of the significance and heritage value of a heritage resource and is key to the management of such resources.

## 18.2 Responsibility for the Management of Heritage Resources

The proposed re-alignment of the MN50182 District Road is located in the Eastern Cape Province and, therefore, falls under the jurisdiction of the Eastern Cape Provincial Heritage Resources Authority (ECPHRA).

The contact details for the ECPHRA are:

| **Eastern Cape Provincial Heritage Resources Authority (ECPHRA)** | |
|---|---|
| Contact Person | Africa Maxongo |
| Tel | 043 745 0888 |
| Email | africam@ecphra.org.za / markm@ecphra.org.za |
| SAHRA Website | www.ecphra.org.za |

The ultimate responsibility for ensuring that heritage resources within the boundaries of the development are appropriately protected and managed rests with the Developer.

In terms of the organisational structure set out in this EMPr, a Contractor, ESO and ECO will be appointed to monitor the project compliance with the EMPr and conditions of the environmental authorisation.

The ESO is expected to be in constant liaison with contractors and staff will be the key person responsible for ensuring the effective day to day management of heritage resources for the project. Based on the responsibilities set out in the EMPr, therefore, in respect of heritage resources the ESO will be expected to:

- Monitor, on a daily basis, the implementation of and compliance with the heritage management specifications and mitigation measures set out in the EMPr;
- Keep a register of compliance / non-compliance with the heritage management specifications;
- Identify and assess previously unforeseen, actual or potential impacts on heritage resources; and
- Ensure that a brief monthly heritage management monitoring report is submitted to the ECO.

This information should be presented in the site induction programme for project staff and in any refresher programmes that may be occur.

### *18.2.1 Revision of the HMP*

This HMP included in the EMPr is a living document that can and must be reviewed and updated to reflect any changes to the heritage information for the site or the management protocols set out above.

The HMP must be revised every five (5) years, or more regularly should circumstances require it.

# 19 FOSSIL FIND PROTOCOL

The following Monitoring Programme for Palaeontology is only required if fossils are seen on the surface and when excavations commence.

- When excavations begin the rocks must be given a cursory inspection by the ESO or contractor. Any fossiliferous material (plants, insects, bone, trace fossils) should be put aside in a suitably protected place. This way the project activities will not be interrupted.
- Photographs of similar fossil plants must be provided to the ESO and ECO to assist in recognizing the fossil plants in the shales and mudstones. This information must be built into the EMPrs training and awareness plan and procedures.

- Photographs of the putative fossils can be sent to the palaeontologist for a preliminary assessment.
- If there is any possible fossil material found, a qualified palaeontologist should be sub-contracted and visit the site to inspect the selected material and check the dumps where feasible.
- Fossil plants or vertebrates that are considered to be of good quality or scientific interest by the palaeontologist must be removed, catalogued and housed in a suitable institution where they can be made available for further study. Before the fossils are removed from the site a South African Heritage Resources Agency (SAHRA) permit must be obtained. Annual reports must be submitted to SAHRA as required by the relevant permits.
- If no good fossil material is recovered then no site inspections by the palaeontologist will be necessary. A final report by the palaeontologist must be sent to SAHRA once the project has been completed and only if there are fossils.
- If no fossils are found and the excavations have finished then no further monitoring is required.

The contact details for the SAHRA are:

| **South African Heritage Resources Agency (SAHRA)** | |
|---|---|
| Contact Person | Ms Natasha Higgitt |
| Tel | 021 4624502 |
| Email | nhiggit@sahra.org.za |
| SAHRA Website | www.sahra.org.za |

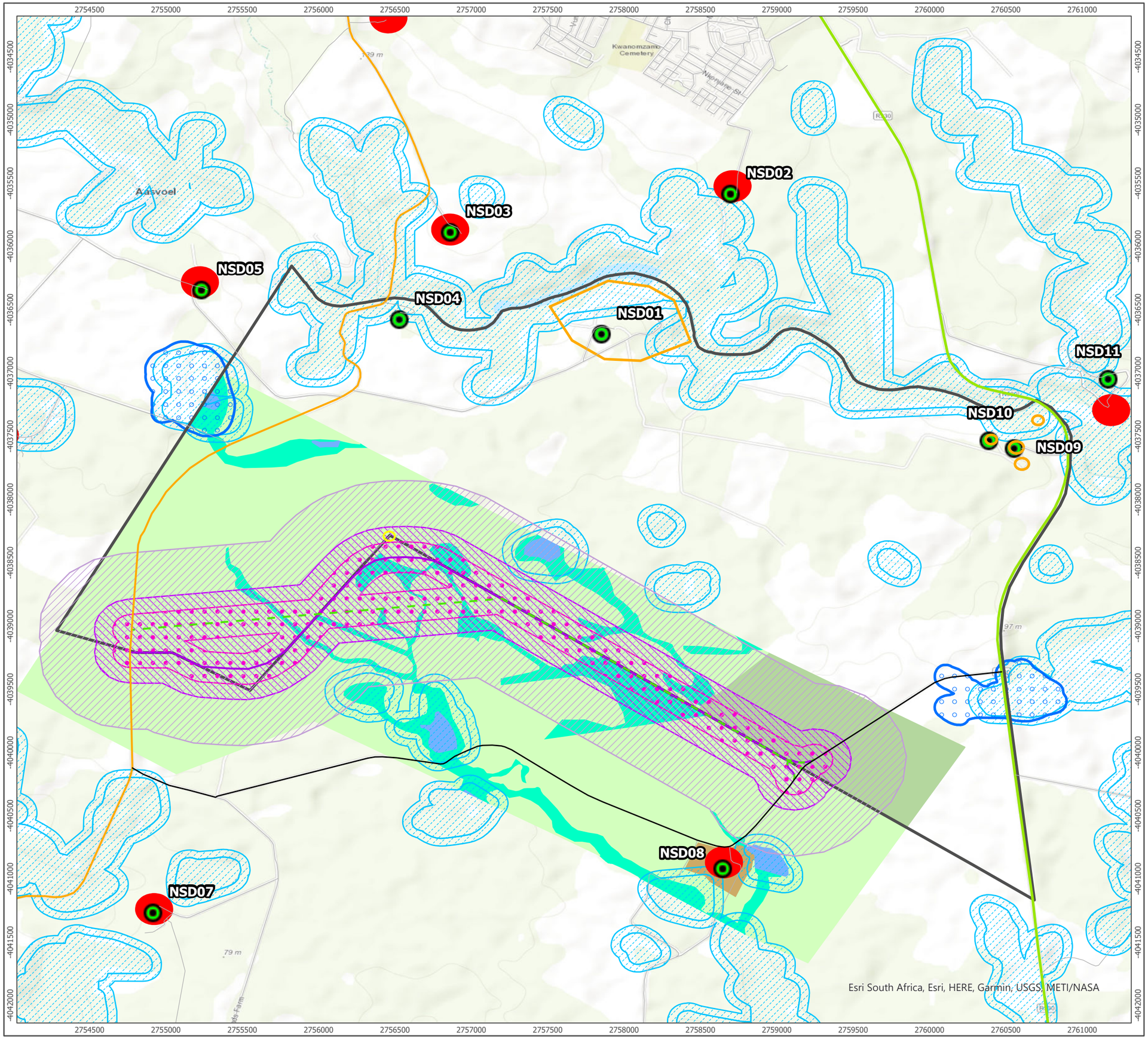
## 20 CONCLUSION

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

Although all foreseeable actions and potential mitigation measures and management actions are contained in this document, the EMPr should be seen as a day-to-day management document. The EMPr thus sets out the environmental and social standards, which would be required to minimise the negative impacts and maximise the positive benefits of the proposed re-alignment of the MN50182 District Road, Eastern Cape Province. The EMPr could thus change daily, and if managed correctly lead to successful construction and operational phases of the road.

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

**APPENDIX A: ENVIRONMENTAL SENSITIVITY MAP**




ARCUS

**Exisiting Public Roads**

- Main Road
- Secondary Road
- Minor Road
- Existing District Road (MN50182)

**Proposed Development**

- Preferred Road Realignmet Alternative
- Second Road Realignment Alternative

**Sensitivities**

- Banna ba Pifhu Site Boundary
- Noise Buffer 100m
- Noise Buffer 200m
- Noise Buffer 500m
- NSD
- Heritage Sensitivity Medium
- Heritage Sensitivity Low
- Dam
- Riparian
- Transformed
- Renosterveld/Inland Pan
- Cultivated Lands
- Depression wetlands with buffer
- Visual-Wetlands Sensitvity
- Visual-Farmsteads Sensitivity

1:24,000 Scale @ A3

0 0.5 1 km

NORTH

| | |
|---|---|
| Produced By: AD | Ref: 3109-GIS-019 |
| Checked By: AA | Date: 10/4/2022 |

**Environmental Sensitivity Map**
Figure 1

**EMPr**
**Proposed Re-alignment of MN50182 District Road**

G:\Projects\3109 Banna Ba Pifhu WEF\3109 Banna Ba Pifhu WEF.aprx\3109-REP-019 Fig 1 Environmental Sensitivity Map

**APPENDIX B: EAP CURRICULUM VITAE**

# CURRICULUM VITAE

*Ashlin Bodasing*

*Technical Director and Environmental Assessment Practitioner*

*Email: Ashlin.Bodasing@arcusconsulting.co.za Tel: +27 (0) 21 412 1529*

**Specialisms**

- Environmental Impact Assessments
- Environmental Management Plans and Programmes
- Environmental Feasibility Studies
- Environmental Due Diligence and Compliance
- Client Relationship Management

**Summary of Experience**

Ashlin Bodasing is a Director at Arcus Consultancy Services South Africa (Pty) Ltd (Arcus is an ERM Group Company). She manages the Arcus South African office and the team based in Cape Town. Ashlin is a Registered EAP with the EAPASA Governing Body.

Having obtained her Bachelor of Social Science Degree (Geography and Environmental Management) from the University of Kwa-Zulu Natal; she has over seventeen years' experience in the environmental consulting industry in southern Africa. She has gained extensive experience in the field of Integrated Environmental Management, environmental impact assessments and public participation. She has also been actively involved in a number of industrial and infrastructural projects, including electricity power lines and substations; road and water infrastructure upgrades and the installation of telecommunication equipment, green and brown field coal mines, as well as renewable energy facilities, both wind and solar and hydrogen. Ashlin has excellent Project Management experience and has gained major project experience in the development of Environmental Impact Assessments, Environmental Management Programmes and the monitoring of construction activities. Her areas of expertise include project management, environmental scoping and impact assessments, environmental management programmes, environmental compliance monitoring and environmental feasibility studies. Having spent over two year working at Glencore's Coal Mine in Mpumalanga, she has excellent knowledge of EMPr implementation and reporting on EMPr compliance in the construction phase. Experience also includes International Finance Corporation Performance Standards and World Bank Environmental Guidelines environmental due diligence reviews. She has worked in Mozambique, Namibia, Botswana, Lesotho and Zimbabwe.

**Professional History**

| | | |
|---|---|---|
| **2017 – Present** | - | Technical Director, Arcus Consultancy Services SA (Pty) Ltd |
| **2015 – 2017** | - | Team Leader, Arcus Consultancy Services SA (Pty) Ltd |
| **2012 – 2015** | - | Lead Environmental Officer, Tweefontein Optimisation Project, Glencore / Xstrata Coal Mine, Witbank, Mpumalanga, South Africa (*Secondment*) |
| **2007 – 2015** | - | Senior Environmental Assessment Practitioner, Parsons Brinckerhoff Africa |
| **2005 – 2007** | - | Environmental Consultant, WSP Environment and Energy |

**Qualifications and Professional Interests**

- **University of Kwa-Zulu Natal, 2004**
  Bachelor of Social Science (Geography and Environmental Management)
- **Environmental Assessment Practitioners Association of South Africa, 2020**
  Registered Environmental Assessment Practitioner: Number 2020/780.
- Member of IAIA International and South Africa.

**Project Experience (Selected)**

**<u>Environmental Impact Assessments</u>**

- **De Aar 2 South Wind Farm Transmission Corridor and Road, 2022-present.** Project Director (client liaison) and Lead EAP.
- **De Aar 2 South Wind Farm Grid Connection and Battery Energy Systems, 2019-2022.** Project Director (client liaison) and Lead EAP.

- **Darling Wind Farm, 2020-2022.** Project Director and Lead EAP.
- **Elands Bay Housing Development, 2017-2018.** Project Director, Project Manager and Lead EAP.
- **Highlands North, South and Central Wind Energy Facilities, 2018-2020**. Project Director (client liaison) and Lead EAP.
- **Paulputs Wind Energy Facility, 2018-present.** Project Director (client liaison) and Lead EAP.
- **San Kraal Wind Energy Facility, 2016- 2018**. Project Director (client liaison) and Lead EAP.
- **Phezukomoya Wind Energy Facility, 2016 – 2018**. Project Director (client liaison) and Lead EAP.
- **Kolkies and Karee Wind Energy Facilities, 2016-2016**. Project Director (Client liaison) and Lead EAP.
- **Komsberg East and West Wind Energy Facilities 2015-2016**. Project Director (Client Liaison) and EAP.
- **Umsinde Emoyeni Wind Energy Facilities, 2015-2018.** Project Director (Client Liaison) and EAP.

**Amendment Applications**

- **Paulputs Wind Energy Facility, 2020 –2021.** Project Director (client liaison) and Lead EAP.
- **San Kraal and Phezukomoya Wind Energy Facilities, 2019.** Project Director (client liaison) and Lead EAP.
- **Banna ba Phifu Wind Farm, 2019-present.** Project Director (client liaison) and Lead EAP.
- **Juno WEF Amendment 2021-2022.** Project Director (client liaison) and Lead EAP.

**Ecological Impact Assessments and Monitoring**

- **Nuweveld Wind Farms, 2018-2021.** Coordination and management of bat specialists, review of technical reports and input into impact assessments.
- **Confidential Wind Farm, Mozambique, 2021-present.** Coordination and management of bat specialists, review of technical reports and input into impact assessments.
- **Kurland Housing Development, Western Cape, 2022.** Coordination and management of ecological specialist, review of technical reports and input into impact assessments.
- **Confidential Wind Farm, Zambia, 2019-2021.** Coordination and management of bat specialists, review of technical reports and input into impact assessments.
- **Confidential Wind Farm, 2017-2018, Northern Cape Province**. Project Director (Client Liaison), coordination and management of ecologists (bird and bat), review of technical and specialists impact assessments.
- **Paulputs Wind Energy Facility 2017-present, Northern Cape Province.** Project Director (Client Liaison), coordination and management of ecologists (bird and bat), review of technical and specialists impact assessments.
- **Highlands Wind Energy Facilities 2017 – 2018, Northern Cape Province.** Project Director (Client Liaison), coordination and management of ecologists (bird and bat), review of technical and specialists impact assessments.
- **Komsberg Wind Farms, 2015-2016.** Project Director (Client Liaison), coordination and management of ecologists (bird and bat), review of technical and specialists impact assessments.
- **Kolkies and Karee Wind Energy Facilities 2015-2016.** Project Director (Client Liaison), coordination and management of bird and bat specialists and review of technical and impact assessment reports.

- **Umsinde Wind Energy Facilities, Additional Bird Monitoring**. Project Director. Coordination and management of bird specialists and review of technical reports.
- **Kap Vley Wind Energy Facility, Bird and Bat Pre-Construction Monitoring.** Project Director. Coordination and management of bird and bat specialists, review of technical reports.
- **Highlands Wind Energy Facility, Bird and Bat Pre-Construction Monitoring.** Project Director. Coordination and management of bird and bat specialists, review of technical reports.
- **Hopefield Wind Farm –Operational Monitoring.** Project Manager. Coordination and management of bird and bat specialists, review of technical reports.
- **Gouda Wind Farm – Operational Monitoring.** Project Director. Coordination and management of bird and bat specialists, review of technical reports.
- **West Coast 1 Wind Farm – Operational Monitoring.** Project Director. Coordination and management of bird and bat specialists, review of technical reports.
- **Oyster Bay Wind Farm – Operational Monitoring.** Project Director. Coordination and management of bird and bat specialists, review of technical reports.
- **Nxuba Wind Farm – Operational Monitoring.** Project Director. Coordination and management of bird and bat specialists, review of technical reports.

**Feasibility Studies and Due Diligence Reviews**

- **Ecological Feasibility Studies for Three Potential Wind Farm Sites for EDF.** Project Director and Reviewer.
- **Lenders Technical Advisor – Environmental Professional – ABSA, Standard Bank and Nedbank, Wind Farm and Solar PV Due Diligence (six projects).** Project Director and Client Liaison. Technical review of Solar projects for REIPPPP Financial Close.
- **Total Energies South Africa Solar PV Due Diligence.** Project Director and Client Liaison. Technical review of Solar projects for REIPPPP.
- **Environmental Feasibility for confidential wind farm, Western Cape Province, 2020.** Project Director and Client Liaison. Technical review of specialist reports and feasibility study.
- **Ecological due diligence for IFC PS6 – Wind Energy Developments:** Project Manager. Review and reporting on bird and bat specialist reports to IFC/World Bank Standards – Various sites across South Africa.
- **Power Plant – Ghana**. Project Manager Compilation of environmental due diligence for refinancing, IFC and World Bank Standards, on behalf of Botswana Development Corporation.
- **Ecological Feasibility Study.** Project Director. Review of the feasibility of a site for a wind energy facility in relation to bats.
- **Environmental Feasibility Study.** Project Director and EAP. Review of a proposed site for the development of industrial facility.

**Previous Project Experience**

**Environmental Scoping and Impact Assessments and Project Management for:**

- eThekwini Municipality
- Moreland Developments
- RBCH – Bulk Materials and Handling Facility
- SAPREF
- Mittal Steel Permit Amendment
- Transnet Projects
- ArcelorMittal South Africa
- MCA-Lesotho
- Talbot Group Holdings (Australian Mining Company)
- Ncondezi Energy – Mozambique

# CURRICULUM VITAE

**Environmental Management Plans and Compliance Monitoring**

- Nongoma Road Monitoring – Compliance Monitoring
- eThekwini Municipality - Taxi Holding Areas: Canberra Road and Umgeni Road Compilation of the EMP; and Bi-monthly compliance monitoring (site visits) and reporting.
- EMP for Kwezi V3 - Kwamashu Fuel Tank Exemption
- eThekwini Municipality - Ridgeview Road – Compliance Monitoring
- eThekwini Municipality and Merz and Mclellen - Phoenix Overhead Transmission Lines – Compliance Monitoring
- eThekwini Municipality and Merz and Mclellen - E8546 E8699 Compliance Monitoring
- eThekwini Municipality and Merz and Mclellen - Environmental Assessment and EMP
- EMP for eThekwini Municipality - Parlock Switching Station

**Training and Auditing**

- Petronet Alien Plant Training - Compilation of the training material for alien plant identification and removal methods.
- eThekwini Municipality - Taxi Holding Areas – Canberra and Umgeni Road - Contactor and workforce training.
- eThekwini Municipality - Kingsway Road Taxi Rank - Contactor and workforce training.

**Environmental Reviews / Terms of Reference**

- Biotherm Energy - Environmental Project Manager: Independent review of environmental impact assessment reports and management plans compiled for 3 wind farms in the Western Cape and 2 PV Solar Plants in the Northern Cape, to ensure compliance to IFC and World Bank Standards.
- Government of Zimbabwe – Hwange Power Station - Environmental Project Manager: Compilation of the Terms of Reference for Environmental Management Plan and Environmental and Social Audit of the Hwange Power Plant in Zimbabwe.

**Pre-Feasibility Studies**

- Pre-feasibility studies for eThekwini Municipality, Investec, Sekoko Coal Resources, Mulilo, Sekoko Mining and MCA-Lesotho for renewable energy, coal mines and power plants.