ESIZAYO WIND (RF) (PTY) LTD

PROPOSED ESIZAYO WIND ENERGY FACILITY EXPANSION AND ASSOCIATED INFRASTRUCTURE NEAR LAINGSBURG, WESTERN CAPE

DRAFT ENVIRONMENTAL MANAGEMENT PROGRAMME

06 MAY 2022

DRAFT

PROPOSED ESIZAYO WIND ENERGY FACILITY EXPANSION AND ASSOCIATED INFRASTRUCTURE NEAR LAINGSBURG, WESTERN CAPE

DRAFT ENVIRONMENTAL MANAGEMENT PROGRAMME

ESIZAYO WIND (RF) (PTY) LTD

TYPE OF DOCUMENT (VERSION)
DRAFT

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QUALITY MANAGEMENT

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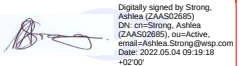
Authorised by	Ashlea Strong			
Signature	 Digitally signed by Strong, Ashlea (ZAAS02685) DN: cn=Strong, Ashlea (ZAAS02685), ou=Active, email=Ashlea.Strong@wsp.com Date: 2022.05.04 09:19:18 +02'00'			
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Senior Consultant

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Ashlea Strong
Associate

This Environmental Management Programme (Report) for the Proposed the proposed Esizayo WEF Expansion Project by WSP Group Africa (Pty) Ltd (WSP) on behalf and at the request of Esizayo Wind (RF) (Pty) Ltd (Client), as part of the application process for Environmental Authorisation.

Unless otherwise agreed by us in writing, we do not accept responsibility or legal liability to any person other than the Client for the contents of, or any omissions from, this Report.

To prepare this Report, we have reviewed only the documents and information provided to us by the Client or any third parties directed to provide information and documents to us by the Client. We have not reviewed any other documents in relation to this Report, except where otherwise indicated in the Report

DOCUMENT DESCRIPTION

CLIENT

Esizayo Wind (RF) (Pty) Ltd

PROJECT NAME

Esizayo WEF Expansion and Associated Infrastructure, Western Cape, South Africa

PRE-APPLICATION REFERENCE NUMBER

2022-03-0020

DFFE REFERENCE NUMBER

Not yet issued

REPORT TYPE

Draft Environmental Management Programme

WSP PROJECT NUMBER

41103063

PRODUCTION TEAM

ESIZAYO WIND (RF) (PTY) LTD

Environmental Manager	Maanda Maseli

WSP

Project Manager / EAP	Ashlea Strong
Senior Consultant	Megan Govender
Consultant	Lukanyo Kewana

SUBCONSULTANTS

Avifauna Specialist	Chris van Rooyen Consulting: Chris van Rooyen
Terrestrial Ecology and Bat Specialist	The Biodiversity Company: Andrew Husted
Heritage Specialist	ACO Associates: John Gribble
Palaeontology Specialist	Natura Viva cc: Dr John Edward Almond
Socio-Economic Specialist	Tony Barbour Environmental Consulting: Tony Barbour
Soil Specialist	WSP Group: Karen King
Hydrologist	WSP Group: Zakariya Nakhooda
Visual Specialist	LOGIS: Lourens Du Plessis
Traffic Specialist	WSP Group Africa: Christo Bredenhann
Noise Specialist	WSP Group: Kirsten Collett

GLOSSARY OF TERMS AND ABBREVIATIONS

ABBREVIATION	DEFINITION
AEL	Atmospheric Emissions License
BBBEE	Broad-Based Black Economic Empowerment
Contractor	A person or company appointed by Esizayo to carry out stipulated activities
DFFE	Department of Forestry, Fisheries and the Environment
DWS	Department of Water and Sanitation
EA	Environmental Authorisation
EAP	Environmental Assessment Practitioner
ECO	Environmental Control Officer
ECF	Employment Creation Fund
EIA	Environmental Impact Assessment
EIR	Environmental Impact Report
Emergency	An undesired event that may result in a significant environmental impact and requires the notification of the relevant statutory body such as a local authority
EMPr	Environmental Management Programme
EMS	Environmental Management System
Environment	In terms of the National Environmental Management Act (No. 107 of 1998), "environment" means 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) of (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 Control Officer	A suitably qualified individual who, on behalf of Esizayo, would on a weekly basis monitor the project compliance with conditions of the EMPr and conditions of the environmental authorisation.

Environmental Impact	A change to the environment, whether adverse or beneficial, wholly or partially resulting from an organisation's activities, products or services
FMP	Fire Management Plan
General Waste	Waste that does not pose an immediate hazard or risk to health or to the environment and includes domestic waste, building and demolition waste, business waste and inert waste.
GNR	Government Notice Regulation
Hazardous Waste	Waste that contains organic or inorganic elements or compounds that may, owing to the inherent physical, chemical or toxicological characteristics of that waste, have a detrimental impact on health and the environment.
Incident	An undesired event which may result in a significant environmental impact but can be managed through internal response
km	Kilometre
m	Metre
SDS	Safety Data Sheets
NCR	Non-conformance register
NEMA	National Environmental Management Act (No. 107 of 1998)
NEMWA	National Environmental Management Waste Act (No. 59 of 2008)
NWA	National Water Act (No. 36 of 1998)
PPE	Personal Protective Equipment
Project Manager	An appointed person, appointed to act as the manager of the project on behalf of Esizayo
SANS	South African National Standard
Site Manager	Esizayo appointed person, appointed to act as Site Manager by Esizayo, and is responsible for managing the construction process onsite
WUL	Water Use License
WSP	WSP Group Africa (Pty) Ltd

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1 INTRODUCTION

1.1 BACKGROUND AND TERMS OF REFERENCE

On 14 July 2017, BioTherm Energy (Pty) Ltd (BioTherm) (Trading as BTE Renewables) received an EA (DFFE Ref no: 14/12/16/3/3/2/967) for the proposed Esizayo Wind Energy Facility (WEF) to be constructed on Portion 1 of Aanstoot Farm No 72, Annex Joseph's Kraal Farm No 84 and Aurora Farm No 285.

The EA holder was amended in September 2021 to Esizayo Wind (RF) (Pty) Ltd (Esizayo) (DFFE Ref: 14/12/16/3/3/2/967/AM1). Therefore, the applicant for this project will also be Esizayo.

Esizayo now proposes to expand the existing authorised Esizayo WEF extent by adding three new land parcels. The Esizayo WEF Expansion Project is proposed to be constructed on Portion 1 of Farm Leeuwenfontein, 71, Remainder of the Farm Leeuwenfontein, 71 and Portion 2 of Farm Aanstoot, 72 (**Figure 1-1**).

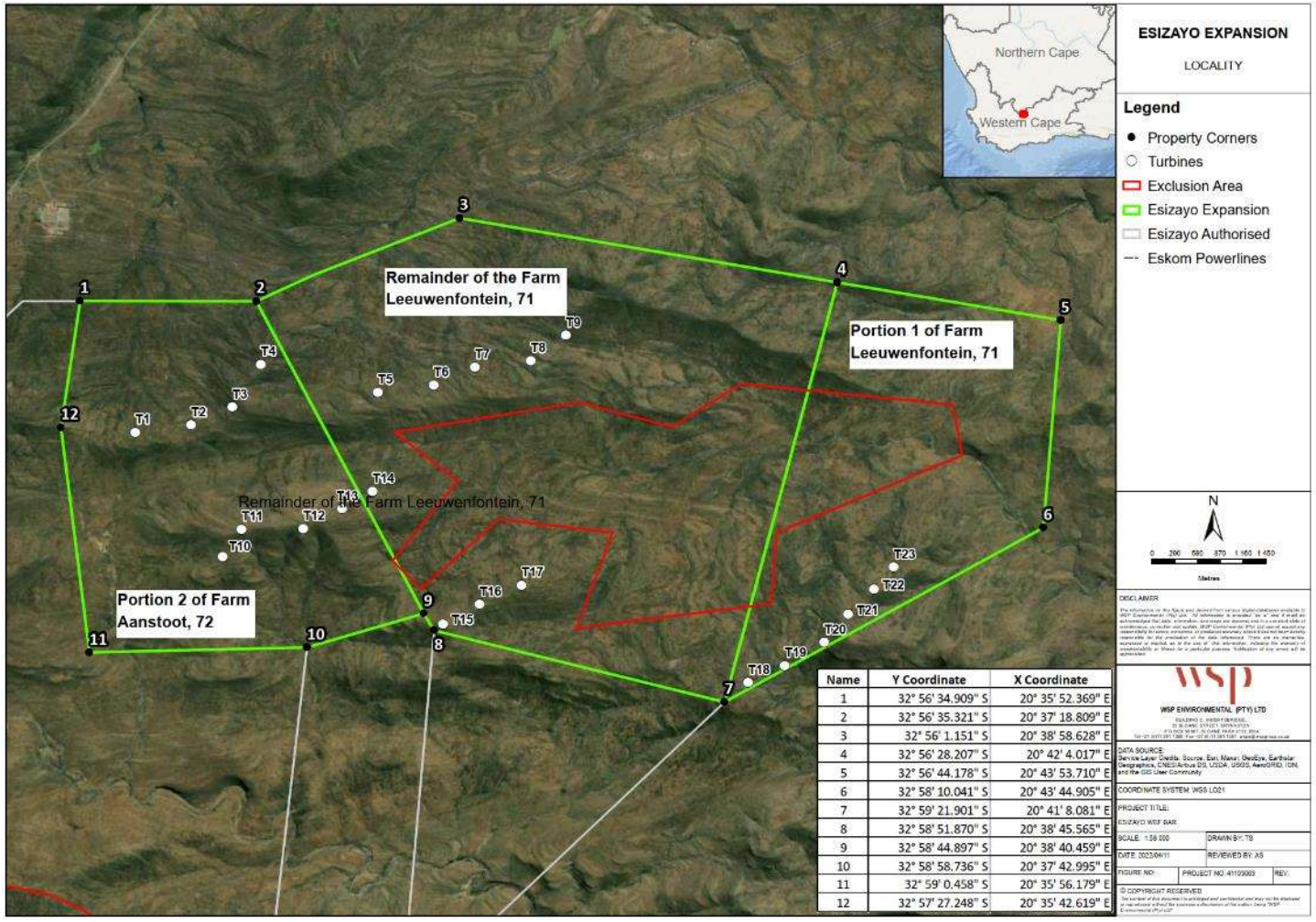
The Esizayo WEF Expansion Project lies approximately 30km north-west of Laingsburg in the Western Cape, and falls within the Laingsburg Local Municipality, which is located within the Central Karoo District Municipality (**Figure 1-2**).

On 16 February 2018, the Department of Environmental Affairs (DEA), now the Department of Forestry, Fisheries and the Environment (DFFE), gazetted the Renewable Energy Development Zones (REDZ) and Strategic Transmission Corridors and procedures for the assessment of large-scale wind and solar photovoltaic energy development activities (Government Notice (GN) 114) and grid infrastructure (GN 113). The proposed Esizayo WEF Expansion Project falls within the Central Strategic Transmission Corridor as well as the Komsberg REDZ.

The WEF falls within a Critical Biodiversity Areas (CBA 1) and Ecological Support Areas (ESA 1 and ESA 2), according to the Western Cape CBA map (2016) (**Figure 1-3**), and falls within the Western Karoo National Protected Area Expansion Strategy (NPAES) focus area (**Figure 1-4**).

The proposed Esizayo WEF Expansion requires an EA in terms of the National Environmental Management Act (Act 107 of 1998), as amended (NEMA) and the associated Environmental Impact Assessment (EIA) Regulations (2014, as amended).

WSP Group Africa (Pty) Ltd (WSP) has been appointed by Esizayo as the independent Environmental Assessment Practitioner (EAP) to facilitate the Basic Assessment (BA) process in accordance with the EIA Regulations (2014, as amended).



Name	Y Coordinate	X Coordinate
1	32° 56' 34.909" S	20° 35' 52.369" E
2	32° 56' 35.321" S	20° 37' 18.809" E
3	32° 56' 1.151" S	20° 38' 58.628" E
4	32° 56' 28.207" S	20° 42' 4.017" E
5	32° 56' 44.178" S	20° 43' 53.710" E
6	32° 58' 10.041" S	20° 43' 44.905" E
7	32° 59' 21.901" S	20° 41' 8.081" E
8	32° 58' 51.870" S	20° 38' 45.565" E
9	32° 58' 44.897" S	20° 38' 40.459" E
10	32° 58' 58.736" S	20° 37' 42.995" E
11	32° 59' 0.458" S	20° 35' 56.179" E
12	32° 57' 27.248" S	20° 35' 42.619" E

Figure 1-1: Regional location of the proposed Esizayo WEF Expansion Project

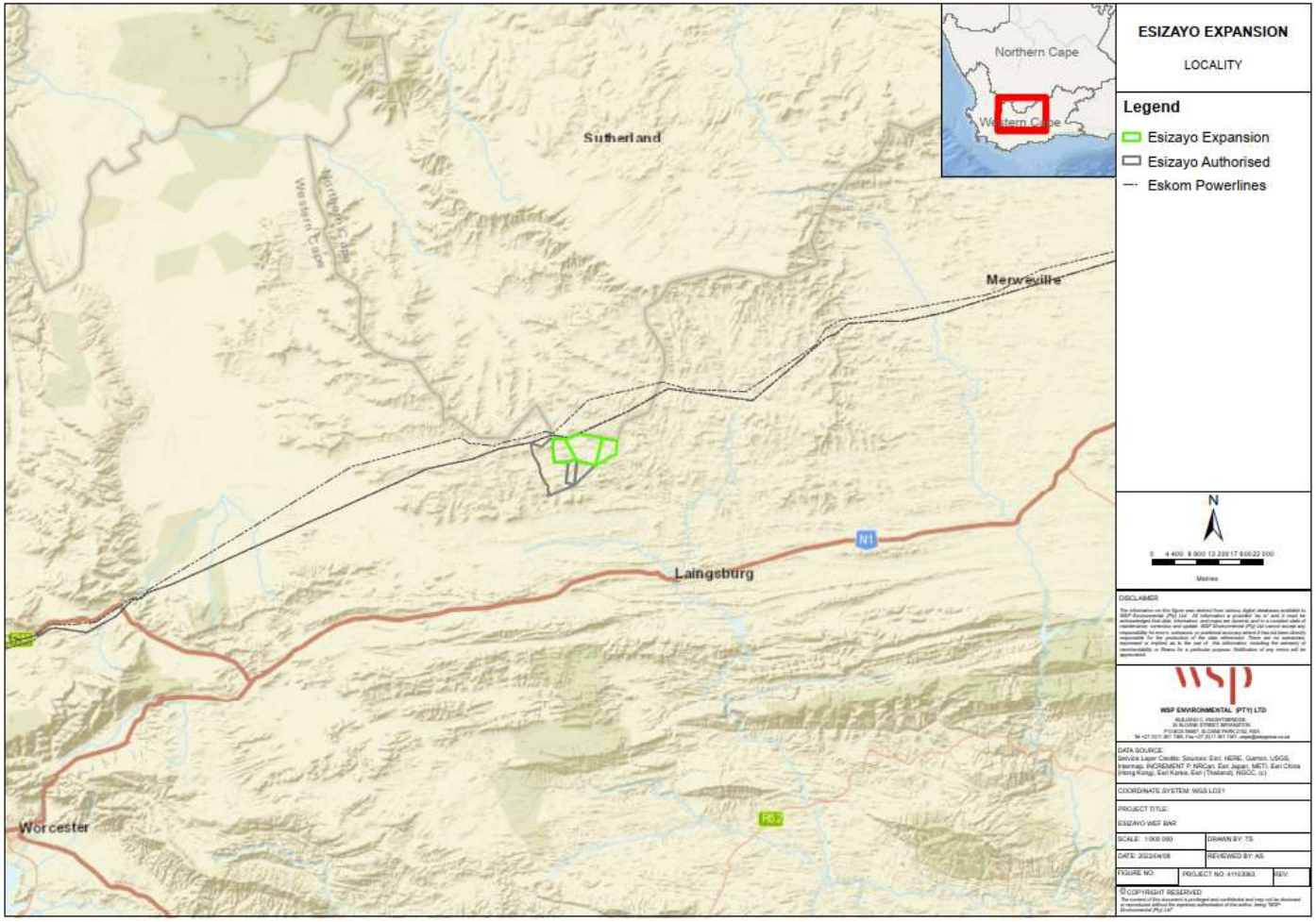


Figure 1-2: Regional location of the proposed Esizayo WEF Expansion Project showing the authorised WEF and proposed expansion

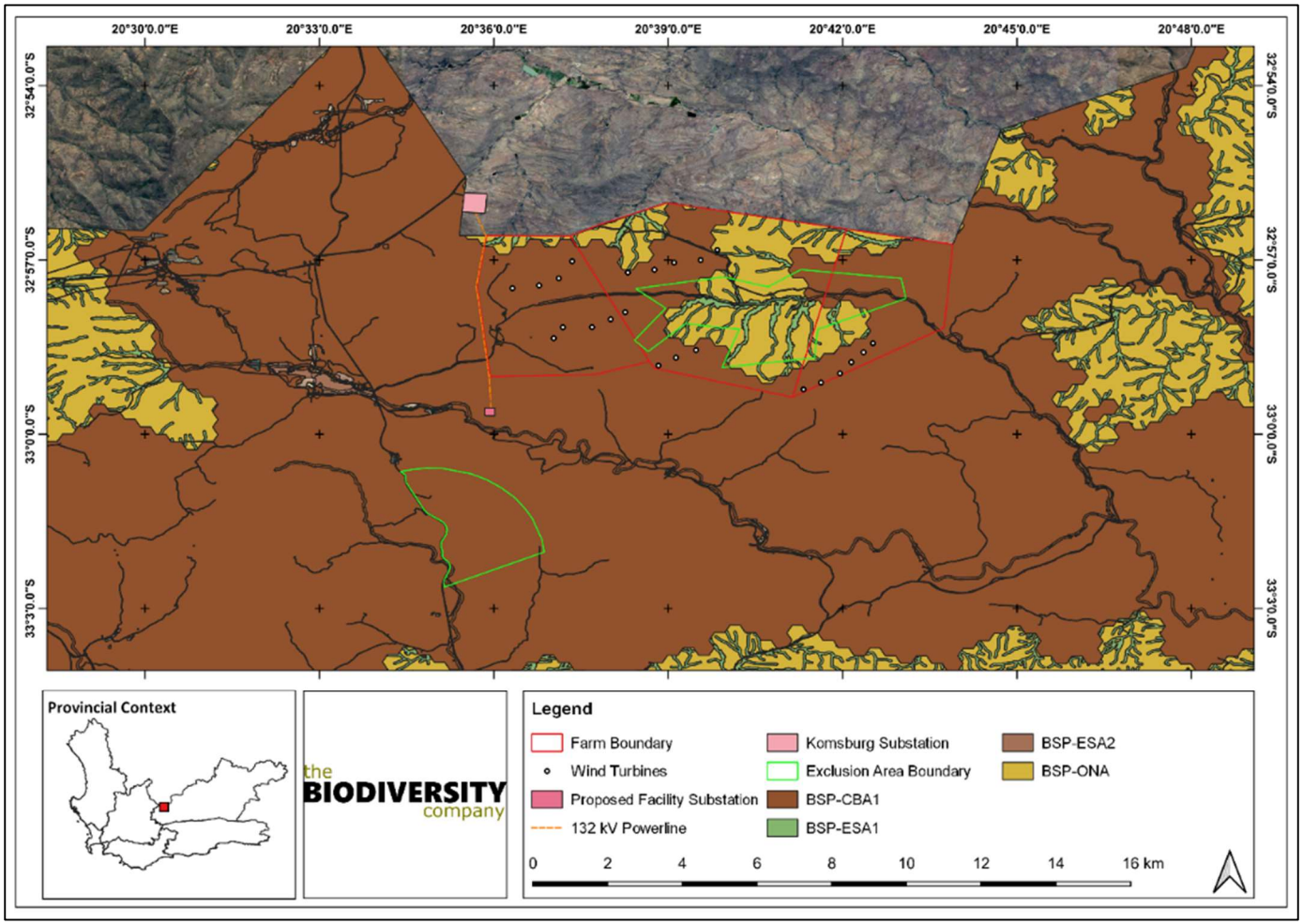


Figure 1-3: Critical Biodiversity Areas (CBA) and Ecological Sensitive Areas (ESA) proximal to the proposed project area.

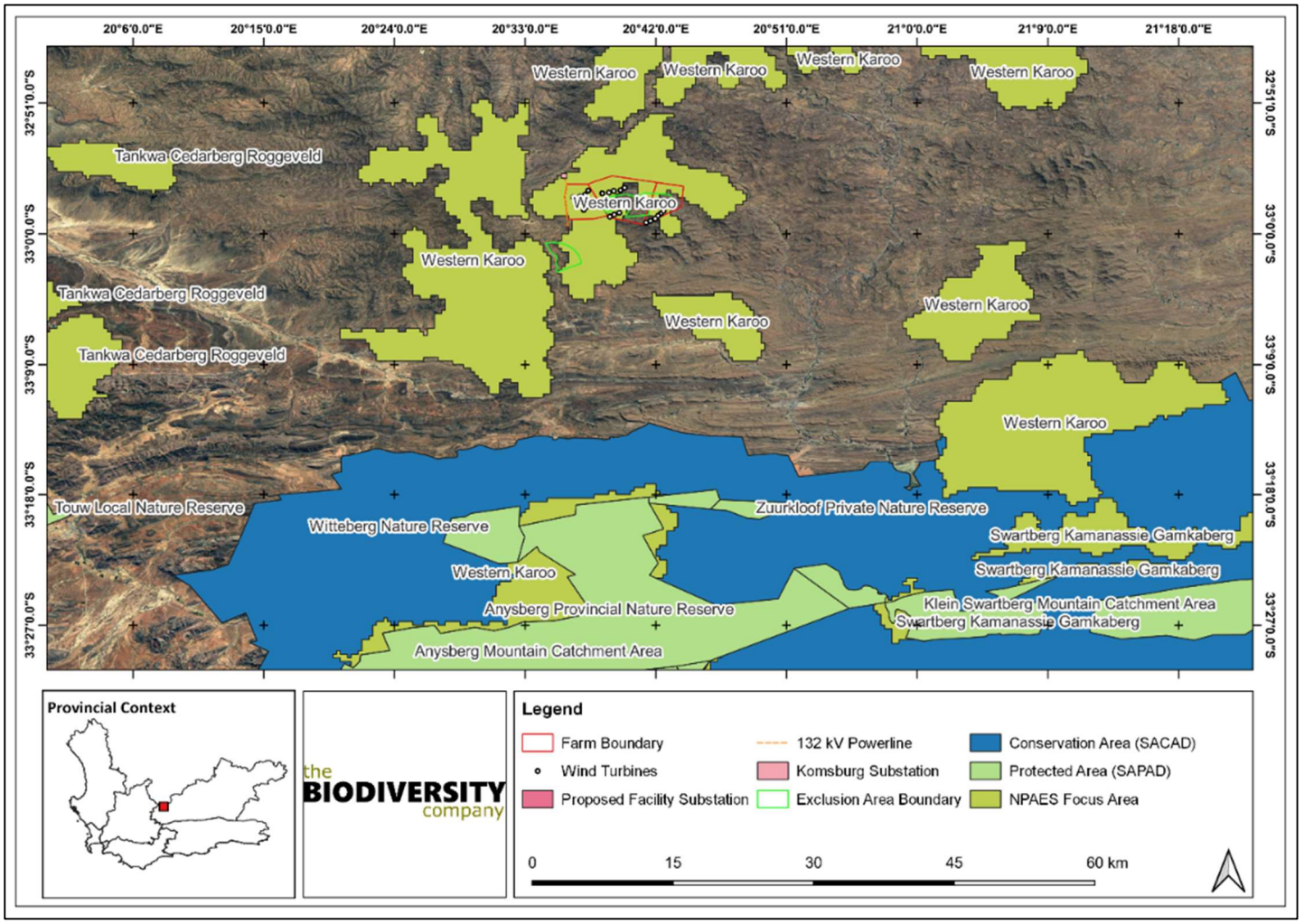


Figure 1-4: The project area in relation to the National Protected Area Expansion Strategy

1.2 DETAILS OF THE APPLICANT

Esizayo Wind (RF) (Pty) Ltd is the project proponent (Applicant) with regards to this application for the construction and operation of the Esizayo WEF Expansion Project. **Table 1-1** provides the relevant details of the Applicant.

Table 1-1: Details of the Applicant

COMPANY NAME:	**ESIZAYO WIND (RF) (PTY) LTD**
Contact Person:	Werner Engelbrecht
Postal Address	Building 1, Leslie Ave East Design Quarter District, Fourways P O Box 69408, Bryanston 2021
Telephone:	011 367 4644
Email:	eiaadmin@biothermenergy.com

1.3 TERMS OF REFERENCE AND DETAILS OF EAP

WSP was appointed in the role of Independent EAP to undertake the BA processes for the proposed Project. This Environmental Management Programme (EMPr) was compiled as part of the BA process and must be read in conjunction with the Basic Assessment Report (BAR) in support of the EA application. The CV of the EAP is available in **Appendix A**. **Table 1-2** details the relevant contact details of the EAP.

Table 1-2: Details of the EAP

NAME OF THE EAP	**WSP GROUP AFRICA (PTY) LTD**
Contact Person:	Ashlea Strong
Physical Address:	Building C, Knightsbridge, 33 Sloane Street, Bryanston, Johannesburg
Postal Address:	P.O. Box 98867, Sloane Park 2151, Johannesburg
Telephone:	011 361 1392
Fax:	011 361 1301
Email:	Ashlea.Strong@wsp.com

To adequately identify and assess potential environmental impacts, the EAP was supported by a number of specialists, the details of which are provided in the BAR.

STATEMENT OF INDEPENDENCE

Neither WSP nor any of the authors of this Report have any material present or contingent interest in the outcome of this Report, nor do they have any business, financial, personal or other interest that could be reasonably regarded as being capable of affecting their independence. WSP has no beneficial interest in the outcome of the assessment.

1.4 ENVIRONMENTAL MANAGEMENT PROGRAMME STRUCTURE

Table 1-3 cross-references the sections within the EMPr with the legislated requirements as per Appendix 4 of GNR 982 of 2014.

Table 1-3: Legislation Requirements as detailed in Appendix 4 of GNR 982

APPENDIX 4	LEGISLATED REQUIREMENTS AS PER THE NEMA GNR 982	REPORT SECTION
(a)	Details of	
	i) the EAP who compiled the EMPr; and	Section 1.3 **Appendix A**
	ii) the expertise of the EAP, including a Curriculum Vitae	Section 1.3 **Appendix A**
(b)	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 sensitivities of the preferred site, indicating any areas that any areas that should be avoided, including buffers;	Section 3.5 **Appendix B**
(d)	A description of the impact management objectives, including management statements, identifying the impacts and risks that need to be avoided, managed and mitigated as identified through the environmental impact assessment process for all phases of the development including-	
	i) Planning and design;	Section 5 Section 7 Section 8
	ii) Pre-construction activities;	
	iii) Construction activities	
	iv) Rehabilitation of the environment after construction and where applicable post closure; and	
	v) Where relevant, operation activities.	
(e)	A description and identification of impact management outcomes required for the aspects contemplated in paragraph (d);	Section 7 Section 8
(f)	A description of proposed impact management actions, identifying the manner in which the impact management objectives and outcomes contemplated in paragraphs (d) and (e) will be achieved, and must, where applicable, include actions to -	
	i) Avoid, modify, remedy, control or stop any action, activity or process which causes pollution or environmental degradation;	Section 7 Section 8
	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 provisions for rehabilitation, where applicable	

APPENDIX 4	LEGISLATED REQUIREMENTS AS PER THE NEMA GNR 982	REPORT SECTION
(g)	The method of monitoring the implementation of the impact management actions contemplated in paragraph (f);	Section 6
(h)	The frequency of monitoring the implementation of the impact management actions contemplated in paragraph (f);	Section 6
(i)	An indication of the persons who will be responsible for the implementation of the impact management actions;	Section 6 Section 7 Section 8
(j)	The time periods within which the impact management actions contemplated in paragraph (f) must be implemented;	Section 7 Section 8
(k)	The mechanism for monitoring compliance with the impact management actions contemplated in paragraph (f);	Section 6
(l)	A program for reporting on compliance, taking into account the requirements as prescribed by the Regulations	Section 6
(m)	An environmental awareness plan describing the manner in which-	
	i) The applicant intends to inform his or her employees of any environmental risk which may result from their work; and	Section 6
	ii) Risks must be dealt with in order to avoid pollution or the degradation of the environment; and	
(n)	any specific information that may be required by the competent authority	N/A

1.5 APPLICABLE DOCUMENTATION

The following documents are to be read in conjunction with the EMPr:

- Draft Basic Assessment Report (BAR) for the proposed Esizayo WEF Expansion;
- Social Impact Assessment For Esizayo Wind Energy Facility Expansion Project Western Cape Province, April (Compiled by Tony Barbour);
- Avifaunal Specialist Assessment - Proposed Esizayo Expansion Wind Energy Facility And Associated Infrastructure Near Matjiesfontein, Western Cape Province, South Africa, November 2021 (Compiled by Chris van Rooyen Consulting);
- Esizayo Wind Energy Facility Expansion - Biodiversity Impact Assessment, Central Karoo District Municipality, Western Cape, February 2022 (Compiled by The Biodiversity Company);
- Heritage Impact Assessment: Proposed Expansion Of The Esizayo Wind Energy, On Portion 2 Of Farm Aanstoot 7 And Portion 1 And Remainder Of Farm Leeuwenfontein 71, Western Cape, April 2022 (Compiled ACO Associates);
- Palaeontological Heritage Basic Assessment: Proposed Expansion Of The Authorized Esizayo Wind Energy Facility Near Laingsburg, Central Karoo District Municipality, Western Cape, April 2022 (Compiled by Natura Viva cc);
- Environmental Acoustic Impact Assessment Esizayo Wind Energy Facility Expansion, April 2022 (Compiled by WSP Group Africa (Pty) Ltd);
- Esizayo Expansion Soil And Agricultural Potential Study, April 2022 (Compiled by WSP Group Africa (Pty) Ltd);

- Esizayo WEF Expansion Project Freshwater Habitat Delineation, April 2022 (Compiled by WSP Group Africa (Pty) Ltd);
- Esizayo WEF Expansion Project Hydrological Assessment, April 2022 (Compiled by WSP Group Africa (Pty) Ltd);
- Proposed Esizayo WEF Expansion Project, Western Cape Province, Visual Impact Assessment, April 2022 (Compiled by Logis);
- Esizayo Expansion Wind Energy Facility Transport Impact Assessment, March 2022 (Compiled by WSP Group Africa (Pty) Ltd);
- The Esizayo Environmental Management System (once developed).

2 ENVIRONMENTAL GOVERNANCE FRAMEWORK

2.1 SOUTH AFRICAN REGULATORY FRAMEWORK

The national environmental legislation applicable to the proposed Esizayo WEF Expansion project includes, but is not limited, to the following:

- The Constitution of the Republic of South Africa (No. 108 of 1996);
- National Environmental Management Act (No. 107 of 1998);
- National Environmental Management, Waste Act (No 59 of 2008);
- National Environmental Management, Air Quality Act (No 39 of 2004);
- National Environmental Management Biodiversity Act (No. 10 of 2004);
- The National Water Act, (No 36 of 1998);
- National Environmental Management Protected Areas Act (No. 57 of 2003);
- Occupational Health and Safety Act, (No 85 of 1993);
- National Heritage Resource Act (No. 25 of 1999);
- Civil Aviation Act (No 13 of 2009);
- Astronomy Geographic Act, 2007 (No. 21 of 2007);
- National Energy Act (No. 34 of 2008);
- Electricity Regulation Act (No. 4 of 2006);
- The Conservation of Agricultural Resources Act, (No 43 of 1983) (CARA); and
- Hazardous Substances Act (No. 15 of 1973).

2.2 INTERNATIONAL REGULATORY FRAMEWORK

2.2.1 IFC PERFOMANCE STANDARDS

The objectives and applicability of the eight International Finance Corporation (IFC) Performance Standards (PS) are detailed in **Table 2-1**.

Table 2-1: Objectives and Applicability of the IFC Performance Standards

REFERENCE	REQUIREMENTS	PROJECT SPECIFIC APPLICABILITY
Performance Standard 1: Assessment and Management of Environmental and Social Risks and Impacts		
Overview	Performance Standard 1 underscores the importance of managing environmental and social performance throughout the life of a project. An effective Environmental and Social Management System (ESMS) is a dynamic and continuous process initiated and supported by management, and involves engagement between the client, its workers, local communities directly affected by the project (the Affected Communities) and, where appropriate, other stakeholders.	
Objectives	— To identify and evaluate environmental and social risks and impacts of the project.	

REFERENCE	REQUIREMENTS		PROJECT SPECIFIC APPLICABILITY
	— To adopt a mitigation hierarchy to anticipate and avoid, or where avoidance is not possible, minimize, and, where residual impacts remain, compensate/offset for risks and impacts to workers, Affected Communities, and the environment. — To promote improved environmental and social performance of clients through the effective use of management systems. — To ensure that grievances from Affected Communities and external communications from other stakeholders are responded to and managed appropriately. — To promote and provide means for adequate engagement with Affected Communities throughout the project cycle on issues that could potentially affect them and to ensure that relevant environmental and social information is disclosed and disseminated.		
Aspects	1.1	Policy	The IFC Standards state under PS 1 (Guidance Note 23) that "*the breadth, depth and type of analysis included in an ESIA must be proportionate to the nature and scale of the proposed project's potential impacts as identified during the course of the assessment process*." This document is the draft deliverable from the BA process undertaken for the proposed Project. The impact assessment comprehensively assesses the key environmental and social impacts and complies with the requirements of the South African EIA Regulations. In addition, an EMPr has been compiled (this report).
	1.2	Identification of Risks and Impacts	
	1.3	Management Programmes	
	1.4	Organisational Capacity and Competency	
	1.5	Emergency Preparedness and Response	
	1.6	Monitoring and Review	
	1.7	Stakeholder Engagement	
	1.8	External Communication and Grievance Mechanism	
	1.9	Ongoing Reporting to Affected Communities	
Performance Standard 2: Labour and Working Conditions;			
Overview	Performance Standard 2 recognises that the pursuit of economic growth through employment creation and income generation should be accompanied by protection of the fundamental rights of workers.		
Objectives	— To promote the fair treatment, non-discrimination, and equal opportunity of workers. — To establish, maintain, and improve the worker-management relationship. — To promote compliance with national employment and labour laws. — To protect workers, including vulnerable categories of workers such as children, migrant workers, workers engaged by third parties, and workers in the client's supply chain. — To promote safe and healthy working conditions, and the health of workers. — To avoid the use of forced labour.		
Aspects	2.1	— Working Conditions and Management of Worker Relationship — Human Resources Policy and Management — Working Conditions and terms of Engagement — Workers organisation	PS2 is not considered highly applicable as construction activities will not be significant for a project of this nature and scale. This BA Report and the EMPr, however, incorporate the requirements for compliance with local and international Labour and Working legislation and good practice on the part of the contractors. Formal human resource and labour policies will be compiled in the event that the project is developed in the future.

REFERENCE	REQUIREMENTS		PROJECT SPECIFIC APPLICABILITY
		— Non- Discrimination and Equal Opportunity — Retrenchment — Grievance Mechanism	
	2.2	— Protecting the Workforce — Child Labour — Forced Labour	
	2.3	Occupational health and Safety	
	2.4	Workers Engaged by Third Parties	
	2.5	Supply Chain	
Performance Standard 3: Resource Efficiency and Pollution Prevention			
Overview	Performance Standard 3 recognises that increased economic activity and urbanisation often generate increased levels of pollution to air, water, and land, and consume finite resources in a manner that may threaten people and the environment at the local, regional, and global levels. There is also a growing global consensus that the current and projected atmospheric concentration of greenhouse gases (GHG) threatens the public health and welfare of current and future generations. At the same time, more efficient and effective resource use and pollution prevention and GHG emission avoidance and mitigation technologies and practices have become more accessible and achievable in virtually all parts of the world.		
Objectives	— To avoid or minimise adverse impacts on human health and the environment by avoiding or minimising pollution from project activities. — To promote more sustainable use of resources, including energy and water. — To reduce project related GHG emissions.		
Aspects	3.1	— Policy Resource Efficiency — Greenhouse Gases — Water Consumption	PS3-related impacts, such as the management of construction waste, hazardous substances, and stormwater were assessed in BAR. There are no material resource efficiency issues associated with the Project. Refer to this EMPr for general resource efficiency measures. The project is not GHG emissions intensive and a climate resilience study or a GHG emissions-related assessment is not deemed necessary for a project of this nature. However, as supporting infrastructure to the Esizayo WEF, the Esizayo WEF Expansion seeks to facilitate resource efficiency and pollution prevention by contributing to the South African green economy. Dust air pollution in the construction phase has been adequately addressed in this EMPr. The Project will not result in the release of industrial effluents. Potential pollution associated with sanitary wastewater is low and mitigation measures have been included in this EMPr. Land contamination of the site from historical land use (i.e. low intensity agricultural / grazing) is not considered to be a cause for concern. The waste generation profile of the project is not complex. Waste mitigation and management measures have been included in this EMPr. Hazardous materials are not a key issue; small quantities of construction materials (oil, grease, diesel fuel etc.) are the only
	3.2	— Pollution Prevention — Air Emissions — Stormwater — Waste Management — Hazardous Materials Management — Pesticide use and Management	

REFERENCE	REQUIREMENTS		PROJECT SPECIFIC APPLICABILITY
			wastes expected to be associated with the project. The EMPr identifies these anticipated hazardous materials and recommends relevant mitigation and management measures.
Performance Standard 4: Community Health, Safety, and Security			
Overview	Performance Standard 4 recognizes that project activities, equipment, and infrastructure can increase community exposure to risks and impacts.		
Objectives	— To anticipate and avoid adverse impacts on the health and safety of the Affected Community during the project life from both routine and non-routine circumstances. — To ensure that the safeguarding of personnel and property is carried out in accordance with relevant human rights principles and in a manner that avoids or minimizes risks to the Affected Communities		
Aspects	4.1	— Community Health and Safety — Infrastructure and Equipment Design and Safety — Hazardous Materials Management and Safety — Ecosystem Services — Community Exposure to Disease — Emergency Preparedness and Response	The requirements included in PS 4 have been addressed in the BAR process and the development of this EMPr. The number of generic plans have been included in Section 9 of this EMPr. All plans will be made site specific as part of the financial close process, in the event that the project is developed in the future. The location of the Esizayo WEF Expansion reduces the potential risk of electrocution and potential electromagnetic fields exposure. Standard safety and security measures and included in the EMPr.
	4.2	Security Personnel	
Performance Standard 5: Land Acquisition and Involuntary Resettlement			
Overview	Performance Standard 5 recognises that project-related land acquisition and restrictions on land use can have adverse impacts on communities and persons that use this land. Involuntary resettlement refers both to physical displacement (relocation or loss of shelter) and to economic displacement (loss of assets or access to assets that leads to loss of income sources or other means of livelihood) as a result of project-related land acquisition and/or restrictions on land use.		
Objectives	— To avoid, and when avoidance is not possible, minimise displacement by exploring alternative project designs. — To avoid forced eviction. — To anticipate and avoid, or where avoidance is not possible, minimise adverse social and economic impacts from land acquisition or restrictions on land use by (i) providing compensation for loss of assets at replacement cost and (ii) ensuring that resettlement activities are implemented with appropriate disclosure of information, consultation, and the informed participation of those affected. — To improve, or restore, the livelihoods and standards of living of displaced persons. — To improve living conditions among physically displaced persons through the provision of adequate housing with security of tenure at resettlement sites.		
Aspects	5.1	— Displacement — Physical Displacement — Economic Displacement — Private Sector Responsibilities under Government Managed Resettlement	PS5 is not applicable to the proposed Esizayo WEF Expnsion as no physical or economic displacement or livelihood restoration will be required. The proposed Esizayo WEF Expansion Project is located on privately owned land that is utilised for agriculture by the landowners. The land will continue to be used for agriculture without impediment by the WEF Expansion Project.

REFERENCE	REQUIREMENTS		PROJECT SPECIFIC APPLICABILITY
Performance Standard 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources			
Overview	Performance Standard 6 recognizes that protecting and conserving biodiversity, maintaining ecosystem services, and sustainably managing living natural resources are fundamental to sustainable development.		
Objectives	— To protect and conserve biodiversity. — To maintain the benefits from ecosystem services. — To promote the sustainable management of living natural resources through the adoption of practices that integrate conservation needs and development priorities.		
Aspects	6.1	Protection and Conservation of Biodiversity	The Esizayo WEF Expansion Project overlaps a CBA and ESA. A Biodiversity Impact Assessment and Freshwater Impact Assessment have been undertaken for the proposed Esizayo WEF Expansion Project. The methodologies for the specialist assessments included a combination of literature review, in-field surveys and sensitivity mapping. This substantively complies with the PS 6 general requirements for scoping and baseline assessment for determination of biodiversity and ecosystem services issues. The determination of habitat sensitivity was undertaken within the legal and best practice reference framework for South Africa. The prevalence of invasive alien species on the site is low; however, the BAR process had noted the propensity for the spread of alien invasive species in the construction and operational phases and mitigation and management measures are included in this EMPr.
Performance Standard 7: Indigenous People			
Overview	Performance Standard 7 recognizes that Indigenous Peoples, as social groups with identities that are distinct from mainstream groups in national societies, are often among the most marginalized and vulnerable segments of the population. In many cases, their economic, social, and legal status limits their capacity to defend their rights to, and interests in, lands and natural and cultural resources, and may restrict their ability to participate in and benefit from development. Indigenous Peoples are particularly vulnerable if their lands and resources are transformed, encroached upon, or significantly degraded.		
Objectives	— To ensure that the development process fosters full respect for the human rights, dignity, aspirations, culture, and natural resource-based livelihoods of Indigenous Peoples. — To anticipate and avoid adverse impacts of projects on communities of Indigenous Peoples, or when avoidance is not possible, to minimize and/or compensate for such impacts. — To promote sustainable development benefits and opportunities for Indigenous Peoples in a culturally appropriate manner. — To establish and maintain an ongoing relationship based on Informed Consultation and Participation (ICP) with the Indigenous Peoples affected by a project throughout the project's life-cycle. — To ensure the Free, Prior, and Informed Consent (FPIC) of the Affected Communities of Indigenous Peoples when the circumstances described in this Performance Standard are present. — To respect and preserve the culture, knowledge, and practices of Indigenous Peoples.		
Aspects	7.1	General — Avoidance of Adverse Impacts — Participation and Consent	As per the international instruments under the United Nations (UN) Human Rights Conventions, no indigenous peoples are present within the study area.
	7.2	Circumstances Requiring Free, Prior, and Informed Consent	

REFERENCE	REQUIREMENTS		PROJECT SPECIFIC APPLICABILITY
		— Impacts on Lands and Natural Resources Subject to Traditional Ownership or Under Customary Use — Critical Cultural Heritage — Relocation of Indigenous Peoples from Lands and Natural Resources Subject to Traditional Ownership or Under Customary Use	
	7.3	Mitigation and Development Benefits	
	7.4	Private Sector Responsibilities Where Government is Responsible for Managing Indigenous Peoples Issues	
Performance Standard 8: Cultural Heritage			
Overview	Performance Standard 8 recognizes the importance of cultural heritage for current and future generations.		
Objectives	— To protect cultural heritage from the adverse impacts of project activities and support its preservation. — To promote the equitable sharing of benefits from the use of cultural heritage.		
Aspects	8.1	Protection of Cultural Heritage in Project Design and Execution	In accordance with prevailing national legislation, A Heritage NID will be submitted to Heritage Western Cape (HWC) for the project in May 2022. A Heritage Impact Assessment (inclusive of palaeontology) has been undertaken as part of the BA process. A Chance Find Procedure is included in this EMPr.

2.2.2 EQUATOR PRINCIPLES

Table 2-2: Requirements and Applicability of the Equator Principles

REQUIREMENT		PROJECT SPECIFIC APPLICABILITY
Principle 1: Review and Categorisation		
Overview	When a project is proposed for financing, the EPFI will, as part of its internal social and environmental review and due diligence, categorise such project based on the magnitude of its potential impacts and risks in accordance with the environmental and social screening criteria of the IFC. Using categorisation, the EPFI's environmental and social due diligence is commensurate with the nature, scale, and stage of the Project, and with the level of environmental and social risks and impacts. The categories are: — Category A: Projects with potential significant adverse environmental and social risks and/or impacts that are diverse, irreversible or unprecedented;	Based upon the significance and scale of the Project's environmental and social impacts, the proposed project is regarded as a Category B project i.e. a project with potential limited adverse environmental or social risks and/or impacts that are few in number, generally site-specific, largely reversible, and readily addressed through mitigation measures.

REQUIREMENT		PROJECT SPECIFIC APPLICABILITY
	— Category B: Projects with potential limited adverse environmental and social risks and/or impacts that are few in number, generally site-specific, largely reversible and readily addressed through mitigation measures; and — Category C: Projects with minimal or no adverse environmental and social risks and/or impacts.	
Principle 2: Environmental and Social Assessment		
Overview	For all Category A and Category B Projects, the EPFI will require the client to conduct an appropriate Assessment process to address, to the EPFI's satisfaction, the relevant environmental and social risks and scale of impacts of the proposed Project (which may include the illustrative list of issues found in Exhibit II). The Assessment Documentation should propose measures to minimise, mitigate, and where residual impacts remain, to compensate/offset/remedy for risks and impacts to Workers, Affected Communities, and the environment, in a manner relevant and appropriate to the nature and scale of the proposed Project. The Assessment Documentation will be an adequate, accurate and objective evaluation and presentation of the environmental and social risks and impacts, whether prepared by the client, consultants or external experts. For Category A, and as appropriate, Category B Projects, the Assessment Documentation includes an Environmental and Social Impact Assessment (ESIA). One or more specialised studies may also need to be undertaken. For other Category B and potentially C Projects, a limited or focused environmental or social assessment may be appropriate, applying applicable risk management standards relevant to the risks or impacts identified during the categorisation process. The client is expected to include assessments of potential adverse Human Rights impacts and climate change risks as part of the ESIA or other Assessment, with these included in the Assessment Documentation.	This document is the draft deliverable from the BA process undertaken for the proposed Project. The impact assessment comprehensively assesses the key environmental and social impacts and complies with the requirements of the South African EIA Regulations. In addition, an EMPr has been compiled (this report).
Principle 3: Applicable Environmental and Social Standards		
Overview	The Assessment process should, in the first instance, address compliance with relevant host country laws, regulations and permits that pertain to environmental and social issues. The EPFI's due diligence will include, for all Category A and Category B Projects globally, review and confirmation by the EPFI of how the Project and transaction meet each of the Principles. For Projects located in Non-Designated Countries, the Assessment process evaluates compliance with the then applicable IFC PS and WBG EHS Guidelines. For Projects located in Designated Countries, compliance with relevant host country laws, regulations and permits that pertain to environmental and social issues.	As South Africa has been identified as a non-designated country, the reference framework for environmental and social assessment is based on the IFC PS. In addition, this BAR process has been undertaken in accordance with NEMA (the host country's relevant legislation).
Principle 4: Environmental and Social Management System and Equator Principles Action Plan		
Overview	For all Category A and Category B Projects, the EPFI will require the client to develop or maintain an Environmental and Social Management System (ESMS). Further, an Environmental and Social Management Plan (ESMP) will be prepared by the client to address issues raised in the Assessment process and incorporate actions required to comply with the applicable standards. Where the applicable standards are not met to the EPFI's satisfaction, the client and the EPFI will agree on an Equator Principles	A formal project specific ESMS will be compiled in the event that the project is developed in the future. Management and monitoring plans outlined in the EMPr will serve as the basis for an ESMS for the proposed Project.

REQUIREMENT		PROJECT SPECIFIC APPLICABILITY
	Action Plan (EPAP). The EPAP is intended to outline gaps and commitments to meet EPFI requirements in line with the applicable standards.	
Principle 5: Stakeholder Engagement		
Overview	EPFI will require the client to demonstrate effective Stakeholder Engagement as an ongoing process in a structured and culturally appropriate manner with Affected Communities Workers and, where relevant, Other Stakeholders. For Projects with potentially significant adverse impacts on Affected Communities, the client will conduct an Informed Consultation and Participation process. To accomplish this, the appropriate assessment documentation, or non-technical summaries thereof, will be made available to the public by the borrower for a reasonable minimum period in the relevant local language and in a culturally appropriate manner. The borrower will take account of and document the process and results of the consultation, including any actions agreed resulting from the consultation. Disclosure of environmental or social risks and adverse impacts should occur early in the Assessment process, in any event before the Project construction commences, and on an ongoing basis. All Projects affecting Indigenous Peoples will be subject to a process of Informed Consultation and Participation, and will need to comply with the rights and protections for Indigenous Peoples contained in relevant national law, including those laws implementing host country obligations under international law.	The BA process includes an extensive stakeholder engagement process which complies with the South African EIA Regulations. The process includes consultations with local communities, nearby businesses and a range of government sector stakeholders (state owned enterprises, national, provincial and local departments). The stakeholder engagement process solicits interest from potentially interested parties through the placement of site notices and newspaper advertisements as well as written and telephonic communication.
Principle 6: Grievance Mechanism		
Overview	For all Category A and, as appropriate, Category B Projects, the EPFI will require the client, as part of the ESMS, to establish effective grievance mechanisms which are designed for use by Affected Communities and Workers, as appropriate, to receive and facilitate resolution of concerns and grievances about the Project's environmental and social performance. The borrower will inform the Affected Communities and Workers about the grievance mechanism in the course of the stakeholder engagement process and ensure that the mechanism addresses concerns promptly and transparently, in a culturally appropriate manner, and is readily accessible, at no cost, and without retribution to the party that originates the issue or concern.	The EMPr includes a *Grievance Mechanism Process for Public Complaints and Issues*. This procedure effectively allows for external communications with members of the public to be undertaken in a transparent and structured manner. This procedure will be revised and updated as part of the EMPr amendment process in the event that the project is developed in the future.
Principle 7: Independent Review		
Overview	For all Category A and, as appropriate, Category B Projects, an Independent Environmental and Social Consultant, not directly associated with the client, will carry out an Independent Review of the Assessment Documentation including the ESMPs, the ESMS, and the Stakeholder Engagement process documentation in order to assist the EPFI's due diligence, and assess Equator Principles compliance.	This principle will only become applicable in the event that that the project is developed in the future.
Principle 9: Independent Monitoring and Reporting		
Overview	To assess Project compliance with the Equator Principles after Financial Close and over the life of the loan, the EPFI will require independent monitoring and reporting for all Category A, and as appropriate, Category B projects. Monitoring and reporting should be provided by	This principle will only become applicable in the event that the project is developed in the future.

REQUIREMENT		PROJECT SPECIFIC APPLICABILITY
	an Independent Environmental and Social Consultant; alternatively, the EPFI will require that the client retain qualified and experienced external experts to verify its monitoring information, which will be shared with the EPFI in accordance with the frequency required.	

2.3 OTHER GUIDELINES AND BEST PRACTICE RECOMMENDATIONS

2.3.1 WORLD BANK GROUP ENVIRONMENTAL, HEALTH, AND SAFETY GUIDELINES

EHS GENERAL GUIDELINES

The Environmental, Health, and Safety (EHS) Guidelines are technical reference documents with general and industry-specific examples of GIIP. They contain the performance levels and measures that are generally considered to be achievable in new facilities by existing technology at reasonable costs.

The EHS General Guidelines contain information on cross-cutting environmental, health and safety issues potentially applicable to all industry sectors, used together with the relevant industry sector guideline(s), to guide the development of management and monitoring strategies for various project-related impacts.

EHS GUIDELINES FOR ELECTRIC POWER TRANSMISSION AND DISTRIBUTION

The EHS Guidelines for Electric Power Transmission and Distribution include information relevant to power transmission between a generation facility and a substation located within an electricity grid, in addition to power distribution from a substation to consumers located in residential, commercial, and industrial areas.

The Guidelines includes industry-specific impacts and management, provides a summary of EHS issues associated with electric power transmission and distribution that occur during the construction and operation phases of a facility, along with recommendations for their management. Additionally, it includes performance indicators and monitoring related to the environment an occupational health and safety.

These Guidelines have been considered in the impact assessment and formulation of mitigation measures in this BAR.

3 PROJECT DETAILS

3.1 LOCATION OF THE PROPOSED PROJECT

The proposed Project is located in the Ward 2 of the Laingsburg Local Municipality in the Central Karoo District Municipality in the Western Cape Province. The Project area is located approximately 30km Northeast of Laingsburg in the Western Cape (**Figure 3-1** and **Figure 3-2**).

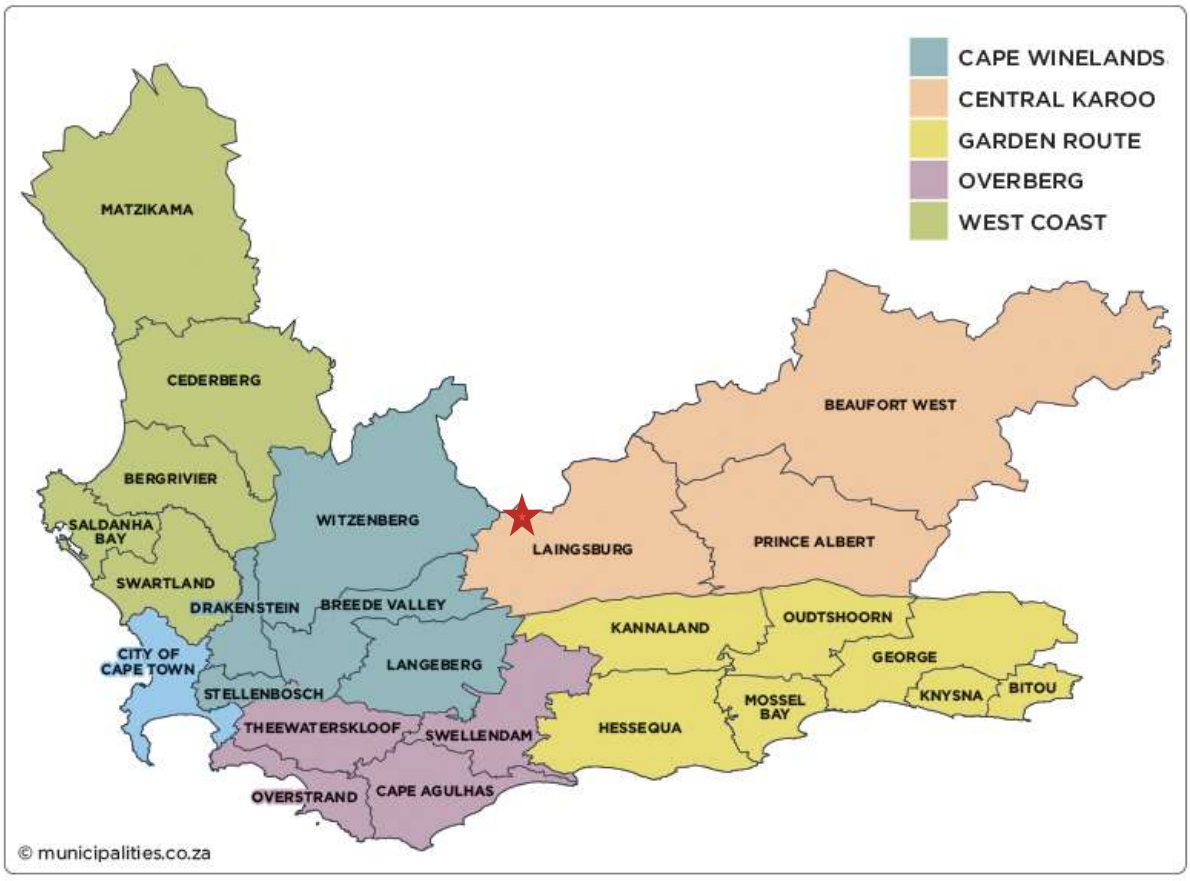


Figure 3-1: The study area (red star) in relation to the Western Cape District and Local Municipalities

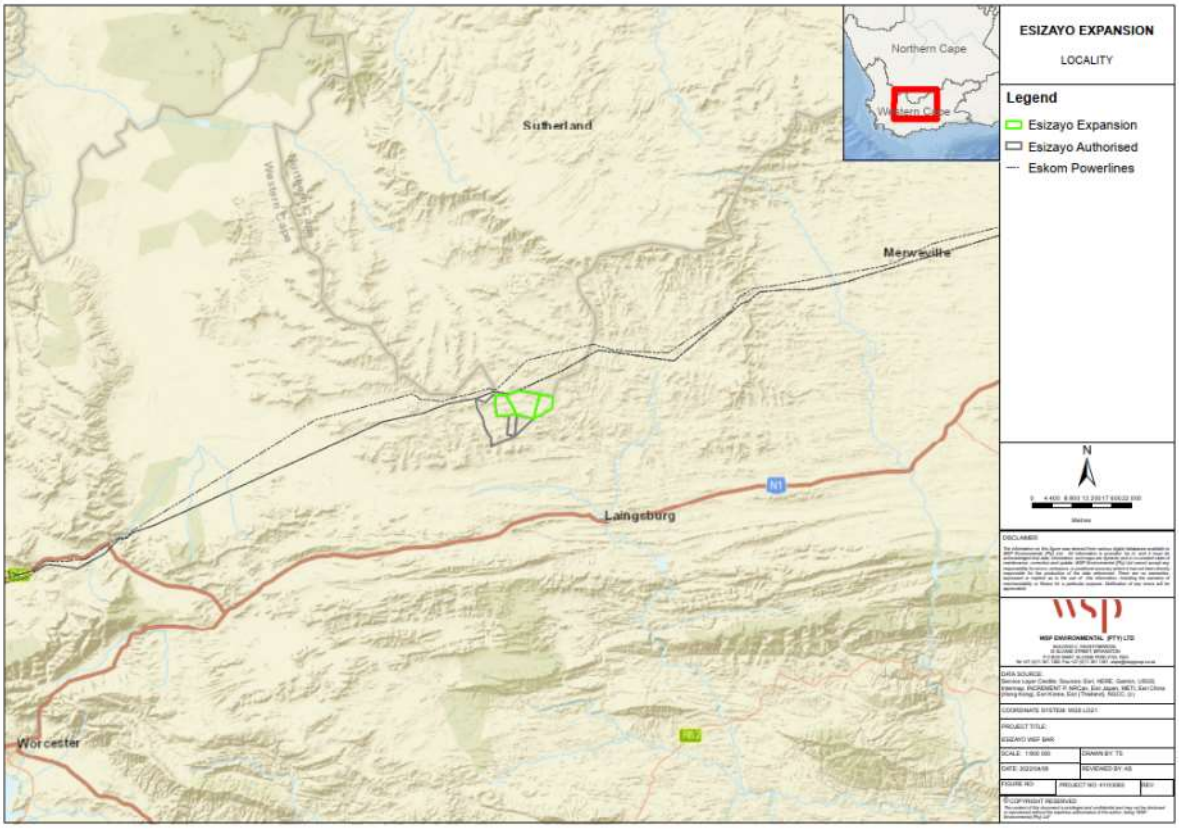


Figure 3-2: Locality of the Proposed Esizayo WEF Expansion Project

The proposed Esizayo WEF Expansion is proposed to be located over three properties with two different landowners (**Table 3-1**).

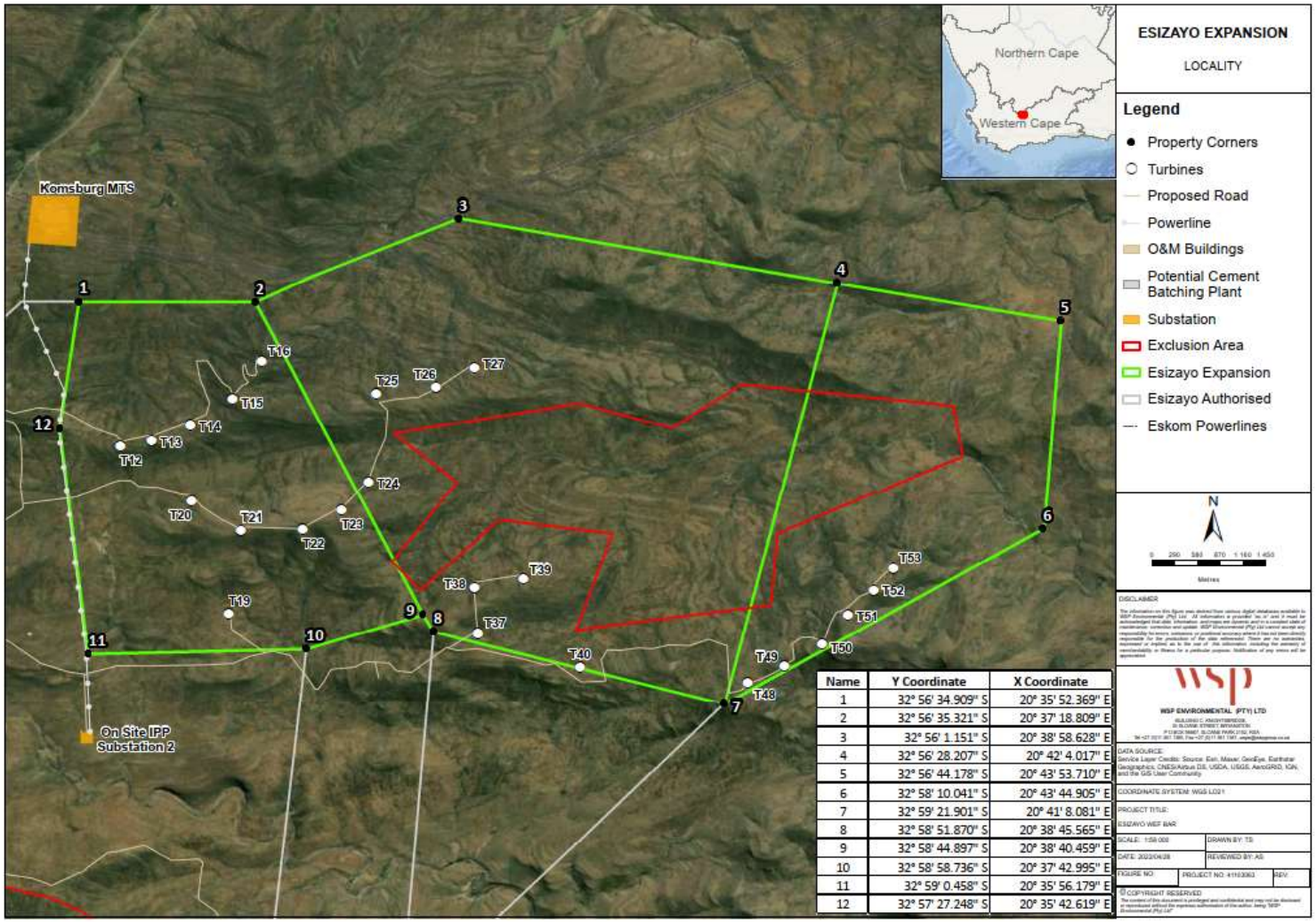
Table 3-1: Farm portions on which the proposed Esizayo WEF Expansion is located

FARM NAME & NUMBER	OWNWER	21 DIGIT SG CODE	MUNICIPALITY / PROVINCE	PROVINCE	FARM SIZE
Portion 1 of Farm Leeuwenfontein 71	Le Roux Trust	C04300000000007100001	Laingsburg Local Municipality/ Karoo Central District Municipality/ Western Cape	Western Cape	1310 ha
Remainder of Farm Leeuwenfontein 71	Le Roux Trust	C04300000000007100000	Laingsburg Local Municipality/ Karoo Central District Municipality/ Western Cape	Western Cape	3082 ha
Portion 2 of Farm Aanstoot Farm 72		C04300000000007200002	Laingsburg Local Municipality/ Karoo Central District Municipality/ Western Cape	Western Cape	1562 ha
Total Area					**5954 ha**

The approximate co-ordinates of the boundary points of the project site for the proposed Esizayo WEF Expansion are detailed in **Table 3-2**. A map corresponding to the co-ordinate points are indicated in **Figure 3-3**.

Table 3-2: Co-ordinate Points along the boundary of the proposed Esizayo WEF Expansion

POINT	CO-ORDINATES	
Portion 2 of Farm Aanstoot Farm 72 Corner Points		
CP1	32° 56' 34.909" S	20° 35' 52.369" E
CP2	32° 56' 35.321" S	20° 37' 18.809" E
CP9	32° 58' 44.897" S	20° 38' 40.459" E
CP10	32° 58' 58.736" S	20° 37' 42.995" E
CP11	32° 59' 0.458" S	20° 35' 56.179" E
CP12	32° 57' 27.248" S	20° 35' 42.619" E
Portion 1 of Farm Leeuwenfontein 71 Corner Points		
CP4	32° 56' 28.207" S	20° 42' 4.017" E
CP5	32° 56' 44.178" S	20° 43' 53.710" E
CP6	32° 58' 10.041" S	20° 43' 44.905" E
CP7	32° 59' 21.901" S	20° 41' 8.081" E
Remainder of Farm Leeuwenfontein 71		
CP2	32° 56' 35.321" S	20° 37' 18.809" E
CP3	32° 56' 1.151" S	20° 38' 58.628" E
CP4	32° 56' 28.207" S	20° 42' 4.017" E
CP7	32° 59' 21.901" S	20° 41' 8.081" E
CP8	32° 58' 51.870" S	20° 38' 45.565" E
CP9	32° 58' 44.897" S	20° 38' 40.459" E



Name	Y Coordinate	X Coordinate
1	32° 56' 34.909" S	20° 35' 52.369" E
2	32° 56' 35.321" S	20° 37' 18.809" E
3	32° 56' 1.151" S	20° 38' 58.628" E
4	32° 56' 28.207" S	20° 42' 4.017" E
5	32° 56' 44.178" S	20° 43' 53.710" E
6	32° 58' 10.041" S	20° 43' 44.905" E
7	32° 59' 21.901" S	20° 41' 8.081" E
8	32° 58' 51.870" S	20° 38' 45.565" E
9	32° 58' 44.897" S	20° 38' 40.459" E
10	32° 58' 58.736" S	20° 37' 42.995" E
11	32° 59' 0.458" S	20° 35' 56.179" E
12	32° 57' 27.248" S	20° 35' 42.619" E

Figure 3-3: Esizayo WEF Expansion Project Boundary Co-ordinate Point Map

3.2 PROJECT INFRASTRUCTURE

The proposed project is for the construction and operation of a wind energy facility that can produce 200 MW of power.

The proposed Esizayo WEF Expansion project entails expanding the existing Esizayo WEF extent through the addition of three (3) land parcels with a total development infrastructure footprint of approximately 200 ha (**Figure 3-2**). The proposed development will incorporate the following infrastructure, to enable the facility to supply a contracted capacity of up to 200 MW:

- Up to 23 wind turbines. Each turbine with a foundation of up to 25 m in diameter and up to 4 m in depth, compacted hard standing areas of up to 4.5 ha each;
- Internal roads traversing a length of 30 km with a width up to 9 m;
- 33 kV underground cables or overhead powerlines; and
- Fence around the project development area.

A technical summary of the facility and its associated infrastructure is included in **Table 3-3.**

Table 3-3: Details of the proposed Esizayo WEF Expansion and associated infrastructure

TECHNICAL DETAILS OF THE PROPOSED ESIZAYO WIND ENERGY EXPANSION PROJECT

Location of the Site	Approximately 30 km northeast of Laingsburg
Total Area of the Site	5 954 ha
Size Of Buildable Area i.e., Project Infrastructure Footprint (Only Referred Layout, Inclusive of All Associated Infrastructure)	Up to 200 ha (including turbine hard standings, roads and powerlines)
Area Occupied By Each Turbine	Each turbine with a foundation of up to 25 m in diameter and up to 4 m in depth, compacted hard standing areas of up to 4.5 ha each
Farm Names	Portion 2 of Farm Aanstoot Farm 72 (C04300000000007200002) Portion 1 of Farm Leeuwenfontein 71 (C04300000000007100001) Remainder of Farm Leeuwenfontein 71 (C04300000000007100000)
Export Capacity	Up to 200 MW
Proposed Technology	Wind turbines
Number Of Turbines	Up to 23 wind turbines
Turbine Generating Capacity	Up to 10 MW
Hub Height From Ground Level	Up to 150 m
Rotor Diameter	Up to 200 m
Width Of Internal Roads	Up to 9 m (vertical curves will have a radii up to 55m)

TECHNICAL DETAILS OF THE PROPOSED ESIZAYO WIND ENERGY EXPANSION PROJECT

Length Of Internal Roads	30 km
Area Of Preferred Operations and Maintenance Building	The expansion project will use the authorised Esizayo project's O&M building
Footprint Of Operations and Maintenance Building(S)	The expansion project will use the authorised Esizayo project's O&M building
Area Of Preferred Construction Laydown Areas	The expansion project will use the authorised Esizayo project's construction laydown area
Cement Batching Plant	The expansion project will use the authorised Esizayo project's cement batching plant
Power Lines	33 kV underground cables or overhead powerlines linking groups of wind turbines to an onsite 132 kV substation. The 132kV substation and grid connection is included in a separate application and not included in the expansion project scope of work.

3.3 PROPOSED PROJECT DEVELOPMENT ACTIVITIES

The typical steps involved in the construction and operation of a wind energy facility is summarised below:

- Planning Phase
  - Step 1: Surveying of the development area and negotiation with affected landowners; and
  - Step 2: Final design and micro-siting of the infrastructure based on geotechnical, topographical conditions and potential environmental sensitivities.
- Construction Phase
  - Step 3: Vegetation clearing and construction of access roads/tracks (where required);
  - Step 4: Construction of turbine tower structure foundations;
  - Step 5: Assembly and erection of infrastructure on site;
  - Step 6: Stringing of conductors; and
  - Step 6: Rehabilitation of disturbed areas and protection of erosion sensitive areas.
- Operation Phase
  - Step 7: Continued maintenance during operation.

3.3.1 CONSTRUCTION PHASE

The main activities associated with the construction phase of the wind energy project will include the following:

CONSTRUCTION SCHEDULE

Construction of the WEF is anticipated to take up to 24 months.

ESTABLISHMENT OF AN ACCESS ROAD TO THE SITE

It is recommended that the access road to the Komsberg substation and Kareedoring Kraal off the R354 be utilised for construction and operational vehicle access. This route traverses the middle portion of the site in a roughly north-west to south-east direction.

Alternatively, the existing access road to the farm Aanstoot off the R354 could be utilised during construction and the future operational phase of the facility. Refer to **Figure 3-2** for the access roads.

If an alternate access off the Provincial Road network such as the R354 is required for the construction and/or operational phases, the access location/s will require assessment in terms of sight distance, topography, access geometry and overall safety and suitability. This assessment will require a formal access application and approval from the Western Cape Department of Roads and Public Works.

The location of the temporary and/or permanent roads that will be constructed on-site to access each of the turbine sites and support buildings has not been determined. It is however recommended that these internal roads take access off the existing farmstead access roads where possible.

ESTABLISHMENT OF INTERNAL ROADS

Internal road access will be constructed onsite. These roads will be up to 9 m in width (vertical curves will have a radii up to 55m). The length of the internal road network is approximately 30 km.

SITE PREPARATION

Site preparation includes the clearance of vegetation and any bulk earthworks (including blasting if required) within the footprint of each construction area that may be required in terms of the facility design.

TRANSPORT OF COMPONENTS AND EQUIPMENT TO SITE

All construction material (i.e., masts, blades and associated infrastructure), machinery and equipment (i.e., graders, excavators, trucks, cement mixers etc.) will be transported to site utilising the national, regional and local road network. Large Components (such as substation transformers and tower sections) may be defined as abnormal loads in terms of the Road Traffic Act (No. 29 of 1989). In such cases a permit may be required for the transportation of these loads on public roads.

ESTABLISHMENT OF A LAYDOWN AREA ON SITE

Construction materials, machinery and equipment will be kept at relevant laydown and/or storage areas. The expansion project will use the authorised Esizayo project's construction laydown area. The laydown area will limit potential environmental impacts associated with the construction phase by limiting the extent of the activities to one designated area.

CONSTRUCT FOUNDATION

Concrete foundations will be constructed at each turbine location. Foundation holes will be mechanically excavated to a depth of 4 m, depending on the local geology. Concrete will be prepared at the authorised Esizayo project's cement batching plant.

CONSTRUCTION OF THE TURBINE

A large lifting crane will be brought onto site to lift each of the tower parts into place (**Figure 3-4** and **Figure 3-5**).

Figure 3-4: Construction of the Turbine – Preparing to lift the Rotor

Figure 3-5: Construction of the Turbine – Lifting Equipment (i.e., Crane)

CONSTRUCT IPP SUBSTATION AND INVERTORS

Invertors will be installed to facilitate the connection between the wind turbines and the Eskom Grid. The turbines will be connected to the substation via underground or overhead cabling. The substation will be constructed with a maximum footprint of approximately 150 m x 150 m. The 132kV substation and grid connection is included in a separate application and not included in the expansion project's scope of work.

ESTABLISHMENT OF ANCILLARY INFRASTRUCTURE

The expansion project will use the authorised Esizayo project's Operations and Maintenance building, storage areas, office and a temporary laydown area for contractor's equipment.

UNDERTAKE SITE REHABILITATION

The site will be rehabilitated once the construction phase is complete, and all construction equipment and machinery have been removed from site.

3.3.2 OPERATIONAL PHASE

The proposed WEF Expansion is anticipated to have a minimum life of 20 years. The facility will operate 7 days a week. While the project is self-sufficient, maintenance and monitoring activities will be required. Potable water requirements for permanent staff will be limited and provided by bottled water.

During the operational phase there will be little to no Project-related movement along the servitude as the only activities are limited to maintaining the servitude (including maintenance of access roads and cutting back or pruning of vegetation to ensure that vegetation does not affect the WEF), inspection of the WEF infrastructure and repairs when required. Limited impact is expected during operation since there will not be any intrusive work done outside of maintenance in the event that major damage occurs to site infrastructure.

Operation of the WEF will involve the following activities, discussed below.

SERVITUDE MANAGEMENT AND ACCESS ROAD MAINTENANCE

Servitude and access road maintenance is aimed at eliminating hazards and facilitating continued access to the WEF. The objective is to prevent all forms of potential interruption of power supply due to overly tall vegetation/climbing plants or establishment of illegal structures within the right servitude. It is also to facilitate ease of access for maintenance activities on the WEF. During the operational phase of the project, the servitude will be maintained to ensure that the functions optimally and does not compromise the safety of persons within the vicinity of the WEF.

WIND ENERGY FACILITY MAINTENANCE AND OPERATIONS

Esizayo will develop comprehensive planned and emergency programmes through its technical operations during the operation and maintenance phase for the WEF. The maintenance activities will include:

- Esizayo's Maintenance Team will carry out periodic physical examination of the WEF and its safety, security and integrity.
- Defects that are identified will be reported for repair. Such defects may include defective conductors, flashed over insulators, defective dampers, vandalised components, amongst others.
- Maintenance / repairs will then be undertaken.

3.3.3 DECOMMISSIONING PHASE

Following the initial 20-year operational period of the wind facility, the continued economic viability will be investigated. If the facility is still deemed viable, the life of the facility will be extended. The facility will only be decommissioned once it is no longer economically viable. If a decision is made to completely decommission the facility, this will be subject to a separate authorisation and impact assessment process, all the components will be disassembled, reused and recycled or disposed. The site would be returned to its current use i.e., agriculture (Grazing).

3.4 NEED AND DESIRABILITY OF THE PROJECT

The DEA&DP Guideline (2013) states that the essential aim of need and desirability is to determine the suitability (i.e., is the activity proposed in the right location for the suggested land-use/activity) and timing (i.e., is it the right time to develop a given activity) of the development. Therefore, need and desirability addresses whether the development is being proposed at the right time and in the right place. Similarly, the 'Best Practicable Environmental Option' (BPEO) as defined in NEMA is "*the option that provides the most benefit and causes the least damage to the environment as a whole, at a cost acceptable to society, in the long term as well as in the short term*."

South Africa is faced with significant increases in electricity demand and a shortage in electricity supply. South Africa is the seventh highest coal producer in the world, with approximately 77% of the country's electricity generated from coal. This large dependence on coal and its use has also resulted in a variety of negative impacts on the environment, including the contribution to climate change. South Africa is also the highest emitter of greenhouse gases in Africa; attributed to the country's energy-intensive economy that largely relies on coal-based electricity generation.

Renewable energy development is regarded as an important contribution to meeting international and national targets of reducing reliance on fossil fuels, such as coal, which contribute towards greenhouse gas emissions and resultant climate change. The need and desirability of proposed Esizayo WEF Expansion has been considered from an international, national, and regional perspective.

3.4.1 INTERNATIONAL PERSPECTIVE

The proposed project will align with internationally recognised and adopted agreements, protocols, and conventions. This includes the Kyoto Protocol (1997) which calls for countries internationally to reduce their greenhouse gas emissions through cutting down on their reliance on fossil fuels and investing in renewable energy technologies for electricity generation. The proposed WEF will therefore add capacity to the energy sector and generate electricity without greenhouse gas emissions and meet international requirements in this regard.

South Africa is also signatory to the United Nations' Development Programmes' (UNDP) Sustainable Development Goals (SDGs), particularly SGD 7 relating to affordable and clean energy. The proposed WEF qualifies as a clean technology that will generate 200MW of affordable energy to contribute to South Africa's energy mix.

The project will also greatly contribute to the countries' efforts to reduce their carbon emissions and play their role as part of the Paris Climate Accord. The Paris Agreement is a legally binding international treaty signed by 196 countries at the COP 21 in Paris, on the 12th of December 2015 to combat climate change. The goal of the Paris Accord is to limit global warming to well below 2 degrees Celsius, compared to industrial levels to avoid catastrophic natural disasters which are driven by the global temperature increase. Therefore, to achieve this long-term temperature goal, countries aim to reach global peaking of greenhouse gas emissions as soon as possible to achieve a climate-neutral world by 2050. This project will aid in the efforts towards a just energy transition in accordance to recently signed Political Declaration between SA, USA, UK, EU, Ireland etc.

The authorization of the Project will further align with South Africa's National Climate Response White Paper which outlines the countries efforts to manage the impacts of climate change and to contribute to the global efforts to stabilize the Greenhouse gases concentrations in the atmosphere.

3.4.2 NATIONAL PERSPECTIVE

The South African Government, through the IRP, has set a target to secure 17 800 MW of renewable energy by 2030. This is an effort to diversify the country's energy mix in response to the growing electricity demand and promote access to clean sources of energy.

The National Development Plan (NDP) is aimed at reducing and eliminating poverty in South Africa by 2030. The NDP also outlines the need to increase electricity production by 2030, with 20 000 MW of electricity capacity generated from renewable sources to move to less carbon-intensive electricity production. The Plan

also envisages that South Africa will have an energy sector that provides reliable and efficient energy service at competitive rates, while supporting economic growth through job creation.

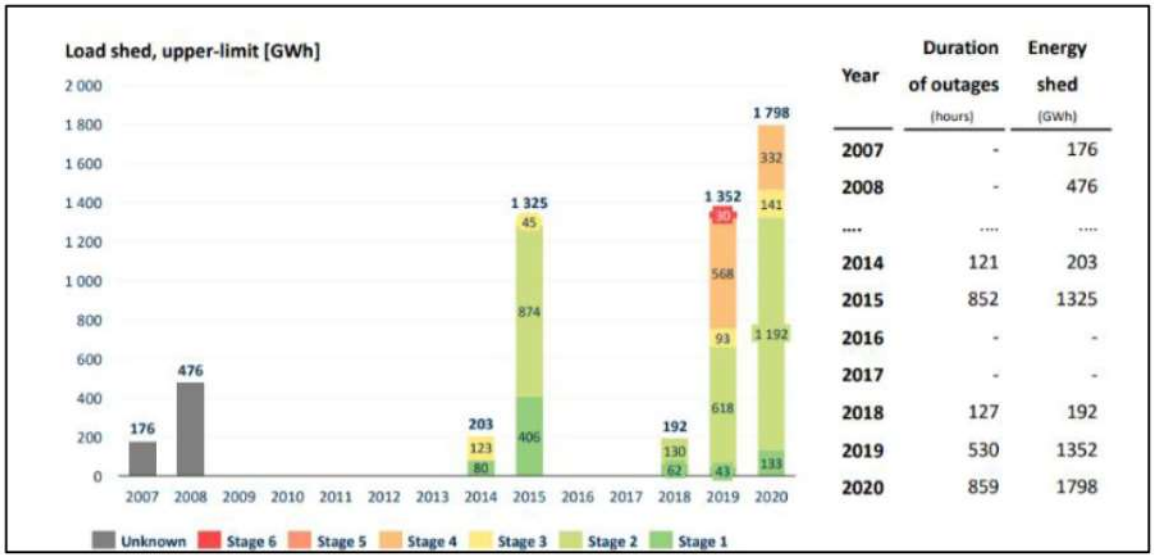
The authorisation of the Esizayo WEF Expansion will further align with South Africa's National Climate Response White Paper which outlines the countries efforts to manage the impacts of climate change and to contribute to the global efforts to stabilize the greenhouse gases concentrations in the atmosphere.

The proposed Esizayo WEF, which includes the authorised WEF as well as this proposed expansion, will pave the way for the Just Energy Transition (JET)[1] in South Africa and promote the transition from a fossil fuel-based economy to a low carbon economy. The proposed project aims towards the aforementioned national energy targets of diversification of energy supply and the promotion of clean energy. Wind and solar energy developments contribute to reduced emissions and subsequently climate change whilst promoting industrial development and job creation.

The proposed Esizayo WEF Expansion will also aid in overcoming the power shortages that are currently faced in the country. In 2020, South Africa witnessed its longest recorded hours of load shedding, with the power being off for 859 hours of the year as shown in **Figure 3-6**. The South African Government has taken strides to try reducing these power cuts through the implementation of bid Windows in REIPPP and lifting the independent power generation threshold to 100MW, but it is still expected that the country will undergo more load shedding.

Over the years the construction of Wind facilities has become cheaper, and less time-consuming. Thus, acting as a faster and more efficient method of meeting the ever-growing demand for electricity in the country.

In addition, the Council for Scientific and Industrial Research (CSIR) reported that renewable energy assisted in relieving pressure on the constrained South African power system during load shedding in the first quarter of 2019. This indicates that renewable energy is a key factor in ensuring that the country does not face further load shedding in the future.



Year	Duration of outages (hours)	Energy shed (GWh)
2007	-	176
2008	-	476
....	....	....
2014	121	203
2015	852	1325
2016	-	-
2017	-	-
2018	127	192
2019	530	1352
2020	859	1798

Figure 3-6: Load shedding hours over the years in South Africa

3.4.3 REGIONAL AND LOCAL PERSPECTIVE

JUST ENERGY TRANSITION

Coal power stations and the coal mining industry play a vital component in the economic and social components of the local Mpumalanga economy. Shifting to a low carbon economy will thus need to offset or exceed the

[1] The Just Transition is described as the transition towards a low-carbon and climate-resilient economy that maximizes the benefits of climate action while simultaneously improving the welfare of the workers and their communities.

benefits being realized by fossil fuels in the province. Thus, a key factor to ensuring the success of the Just Energy Transition is not only to focus on the transition from fossil fuels to renewable energy resources but to simultaneously ensure the Just Transition of jobs and skills.

As various career opportunities are presented by the wind industry, and these are divided into four pillars that are aligned with the value chain. These four pillars are project development, component manufacturing, construction, and operation & maintenance as shown in **Figure 3-7**.

Figure 3-7 shows that the wind industry will create job opportunities throughout the supply chain. The wind industry will contribute to the Just transition in South Africa to ensure that there are no job losses but rather job transfers and skill exchange.

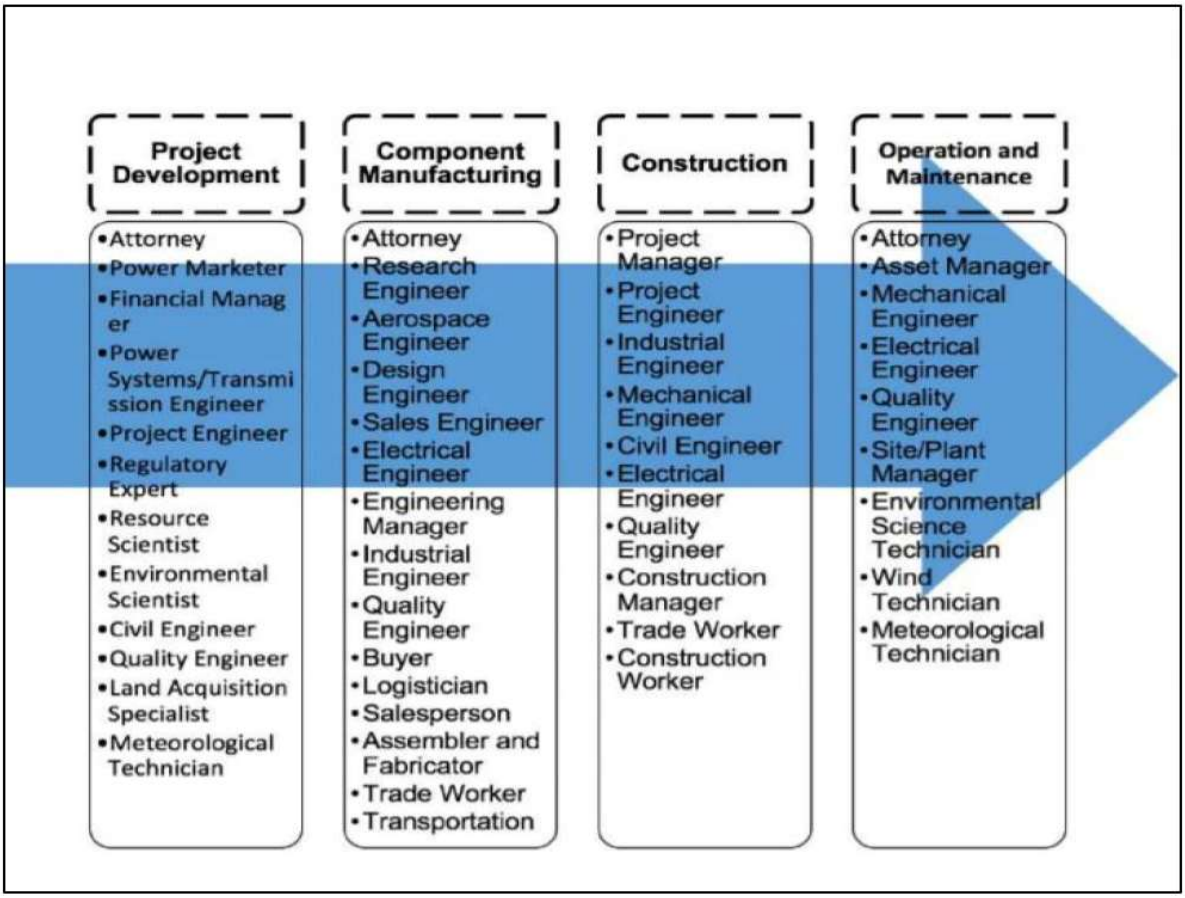


Figure 3-7: Career Opportunities presented by the Wind Industry (Source: https://www.res4africa.org/wp-content/uploads/2020/09/RES4Africa-Foundation-A-Just-Energy-Transition-in-South-Africa.pdf)

SITE SUITABILITY

The proposed project is to be developed approximately 30km Northeast of Laingsburg in the Western Cape.

The project area was identified through a pre-feasibility desktop analysis on the estimation of the wind energy resource. This region of the Western Cape has some of the highest wind resource potentials, receiving an annual mean wind resource of approximately 8 m/s, making the site suitable for the development of a wind farm. This high resource ensures the best value for money is gained for the economy of South Africa.

Whilst there are many wind projects already authorised by the DFFE, many stand a little chance of ever being built due to poor wind regime to be economically competitive and the site being in an area with unfeasible grid connections. Due to the distance to grid and high wind resources the project site is considered to be highly desirable from a development perspective and is considered by BioTherm to stand an excellent chance of success in the imminent bidding round (BW6).

Within the Western Cape region, the reasons for the selection of the specific site by BioTherm is based on the following site selection process summary:

- Grid connection suitability is a key criterion. Long connection lines have increased environmental impacts as well as add increased costs to the project development. This project site has good grid connection potential as the project will connect to the existing Komsberg MTS Substation located approximately 2 km away from the site, thereby minimising the need for an extensive grid network upgrade or long powerline.
- The proposed Esizayo WEF Expansion is located within the Komsberg REDZ and Central Strategic Transmission Corridor as per GN 114 and GN 113 of 2018. Strategic Transmission Corridors support areas where long-term electricity grid infrastructure will be developed **Figure 3-8** below shows the location of the five corridors and the approximate location of the Esizayo WEF Expansion within the Central Corridor.
- The project site has a rolling hill topography which is suitable for the development of a wind project.
- The land on which the WEF Expansion will be constructed is all privately owned agricultural land, which is zoned for agriculture. It is not necessary for each of the properties to be rezoned as the land will continue to be used for agriculture. No physical or economic displacement will be required along the proposed route.
- The project site can be accessed easily via the tarred R354 national road. Upgrades of the regional gravel road will be done by the current preferred bidder projects to allow for direct access to site. Esizayo is located directly adjacent to the R354.

This site was selected based on the above criteria ahead of other regional farms due to the cumulative assessment of all criteria. This internal process ensured that the best practical / technically suitable environmental site option was selected.

Furthermore, negative environmental impacts associated with the activity will be mitigated to acceptable levels in accordance with this EMPr.

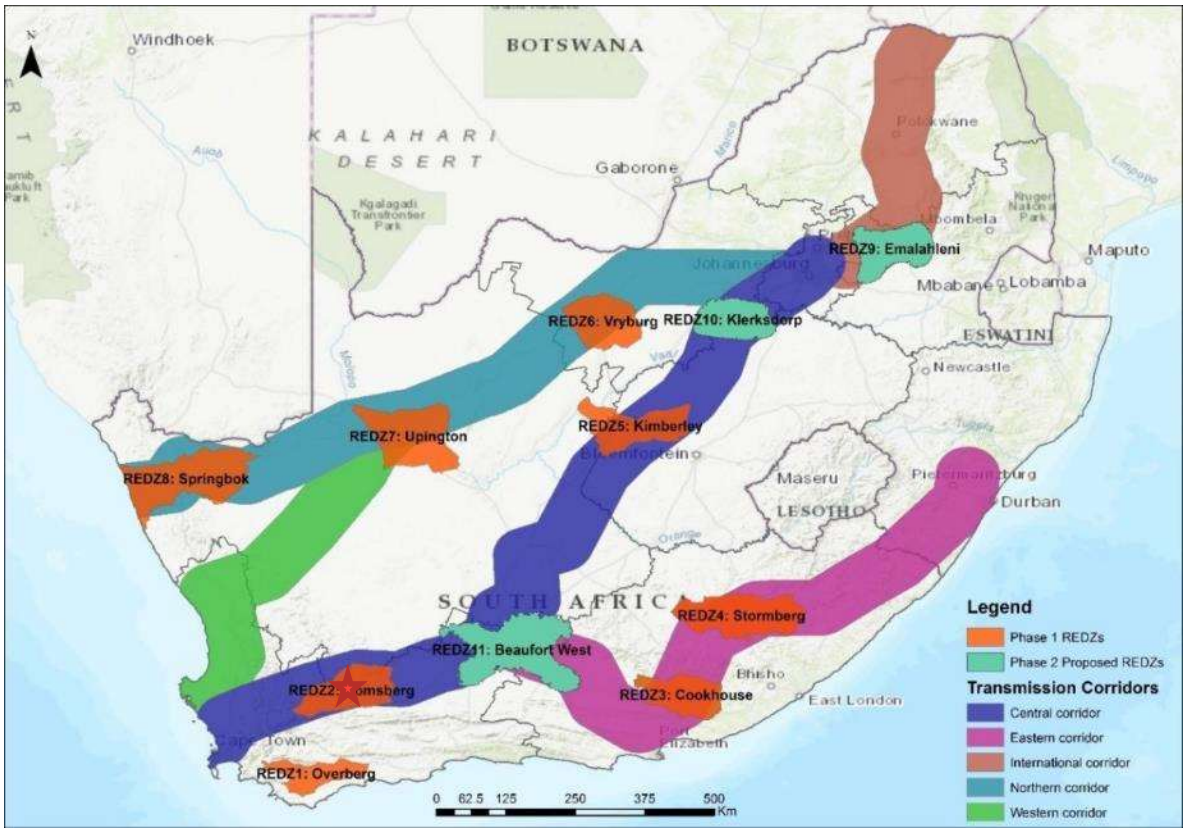


Figure 3-8: Strategic Transmission Corridors and REDZ (GN 113 and 114 of 2018) (red star is approximate location of Esizayo WEF Expansion Project

3.5 ENVIRONMENTAL SENSITIVITY

The following environmental sensitivities were identified on the site, as a result of the Project location and proposed activities and will require specific applications or measures for mitigation to minimise impact.

- **Biodiversity:**
  - CBA & ESA
  - Critically endangered and endangered species
  - Critical habitat
- **Avifauna:**
  - High value habitat unit
  - Presence of sensitive species such as Martial Eagle
- **Freshwater:**
  - Aquatic CBAs
  - Wetland features
  - Freshwater ecosystem priority areas
- **Palaeontology:**
  - Features with very high paleontological sensitivity
- **Bats:**
  - Wetland features
- **Flicker:**
  - Inhibited residences
- **Landscape:**
  - Mountain tops and high ridges

The above sensitivities are discussed in the sub-sections below. The combined environmental sensitivities of the proposed WEF Expansion Project footprint are shown in **Figure 3-9** below.

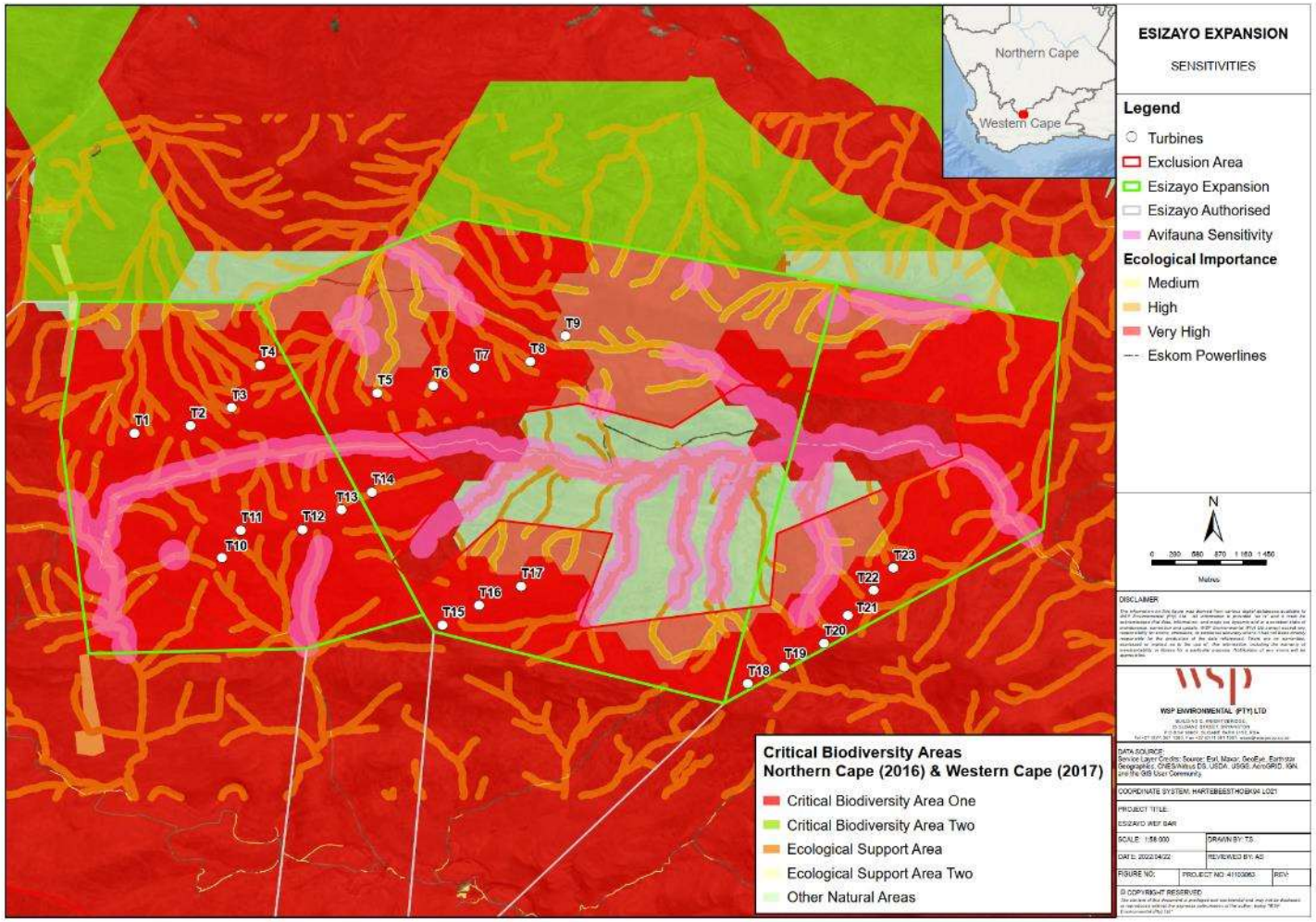
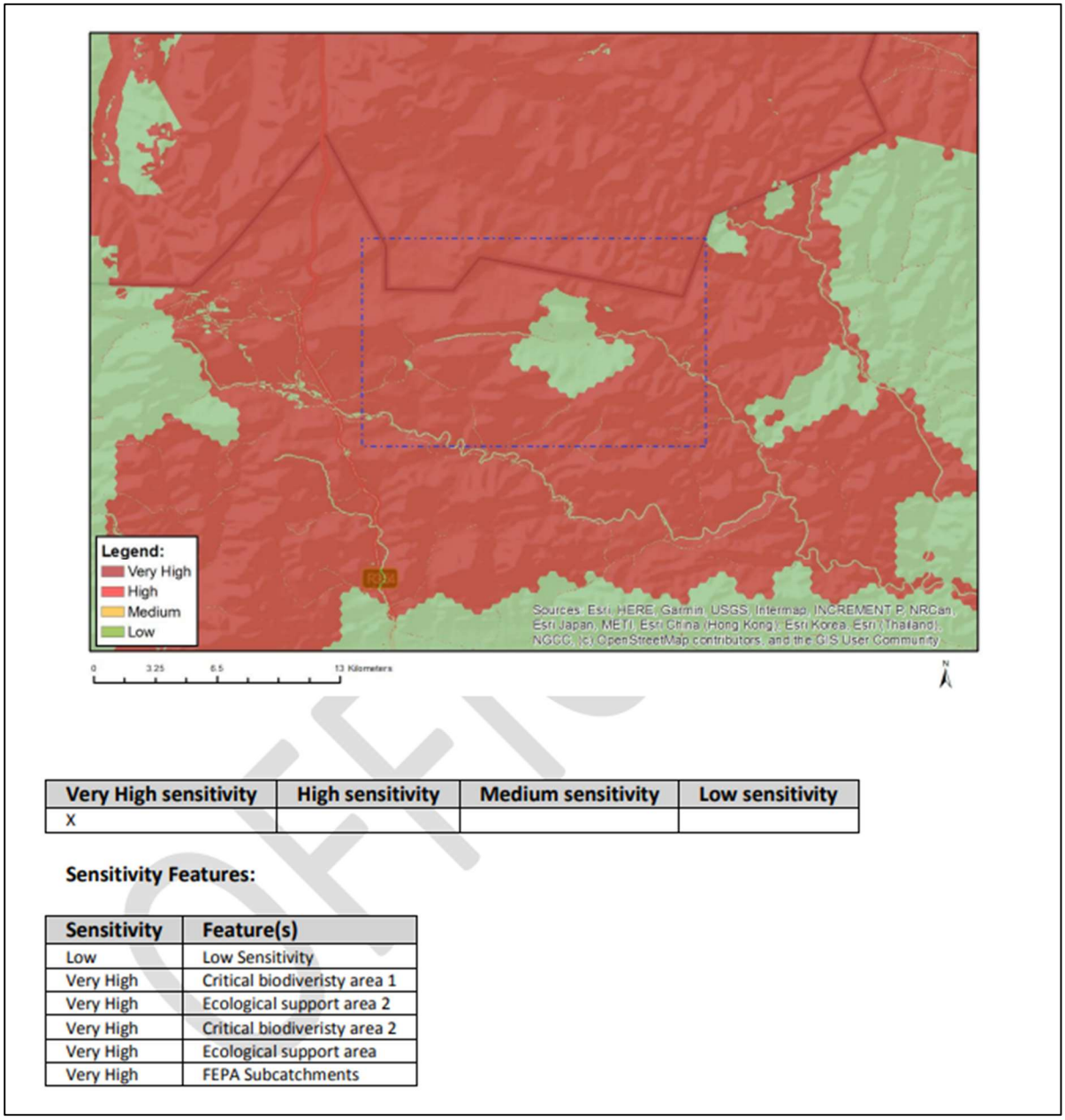


Figure 3-9: Combined Sensitivity Map (Including CBAs)

3.5.1 BIODIVERSITY

The Combined Terrestrial Biodiversity Theme Sensitivity for the PAOI as indicated in the screening report was derived to be 'Very High' (**Figure 3-10**). This is attributed to the area being included in the BSP as a CBA1, ESA1 and ESA2, as well as being a FEPA sub-catchment.



Very High sensitivity	High sensitivity	Medium sensitivity	Low sensitivity
X			

Sensitivity Features:

Sensitivity	Feature(s)
Low	Low Sensitivity
Very High	Critical biodiveristy area 1
Very High	Ecological support area 2
Very High	Critical biodiveristy area 2
Very High	Ecological support area
Very High	FEPA Subcatchments

Figure 3-10: Terrestrial Biodiversity Theme Sensitivity, DEA Screening Report

All habitats within the assessment area of the proposed development were allocated a sensitivity category, i.e., a SEI category (**Table 3-4)**The SEI categories provided are based on a multi-taxon (flora, herpetofauna and non-volant mammalia) context. The SEI of the habitat types delineated within the assessment area is illustrated in **Figure 3-11**.

Table 3-4: Summary of the Site Ecological Importance for the proposed Esizayo WEF Expansion Area PAOI

HABITAT	AREA (HA)	CONSERVATION IMPORTANCE	FUNCTIONAL INTEGRITY	BIODIVERSITY IMPORTANCE	RECEPTIOR RESILIENCE	SITE ECOLOGICAL IMPORTANCE
Drainage Line[2]	3 296.080	Medium	Very High	High	Medium	High
Moderately Steep Rocky Slope	3 249.495	High	Very High	Very High	Low	Very High
Plain	369.437	Medium	High	Medium	Medium	Medium
Plateau	111.528	High	Very High	Very High	Low	Very High
Steep Rocky Slope	710.836	High	Very High	Very High	Low	Very High

The guidelines for interpreting SEI as provided in the Species Assessment Protocol (SANBI, 2020) in the context of the proposed development is provided in **Table 3-5**.

Table 3-5: Guidelines for interpreting Site Ecological Importance in the context of the proposed development activities

SITE ECOLOGICAL IMPORTANCE	INTERPRETATION IN RELATION TO PROPOSED DEVELOPMENT ACTIVITES
Very High	Avoidance mitigation – no destructive development activities should be considered. Offset mitigation not acceptable/not possible (i.e., last remaining populations of species, last remaining good condition patches of ecosystems/unique species assemblages). Destructive impacts for species/ecosystems where persistence target remains.
High	Avoidance mitigation wherever possible. Minimisation mitigation – changes to project infrastructure design to limit the amount of habitat impacted, limited development activities of low impact acceptable. Offset mitigation may be required for high impact activities.
Medium	Minimisation and restoration mitigation – development activities of medium impact acceptable followed by appropriate restoration activities.

[2] Note that for this assessment, a 100 m corridor (50 m buffer) was applied to the drainage lines as provided in Macfarlane *et al* (2009). "The need for wide buffers is supported by a range of other authors, with common buffer widths for maintaining habitat connectivity for general wildlife movement ranging between 50 and 300m, depending on the landscape context and species concerned" (Macfarlane *et al*, 2009). These corridors are presented in the relevant map.

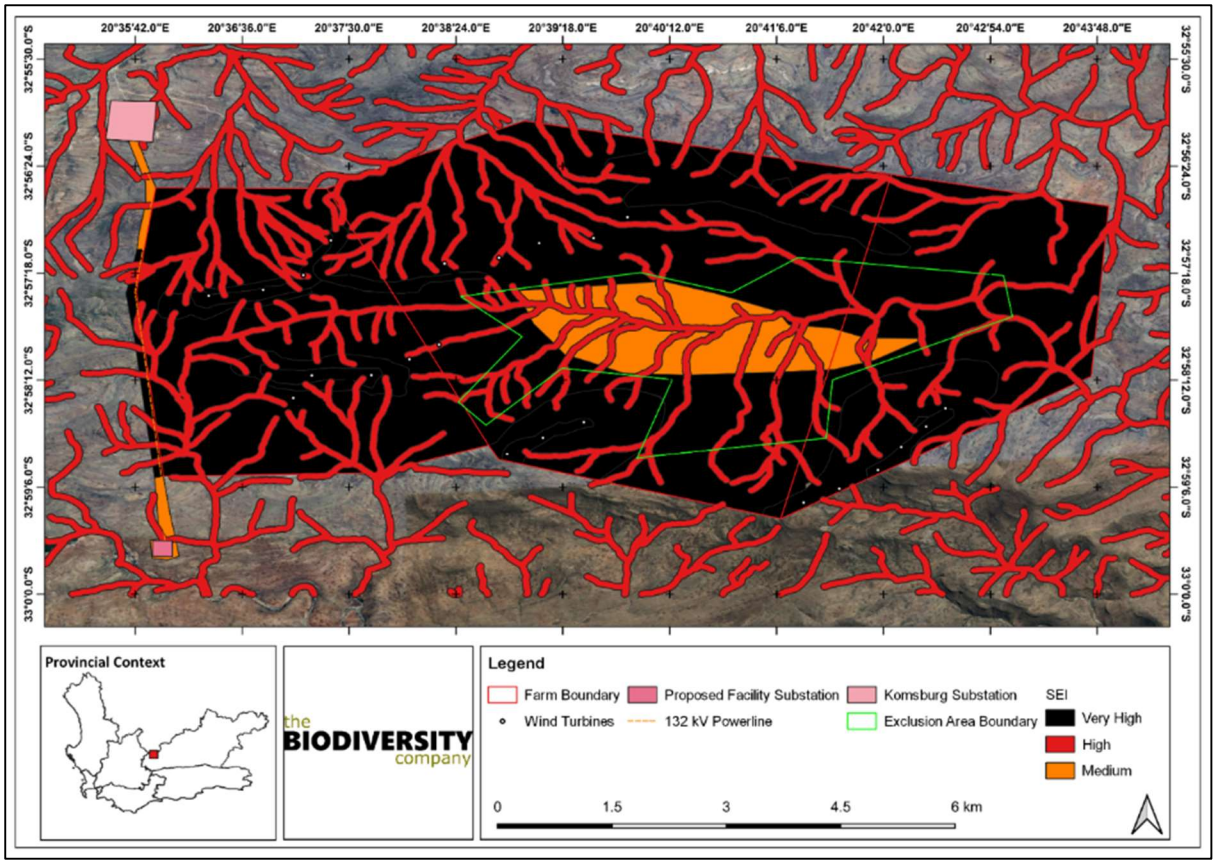


Figure 3-11: Map illustrating the Site Ecological Importance (SEI) of the habitats delineated within the proposed Esizayo Wind Energy Facility Expansion Area PAOI

It is acknowledged that the project falls within a very high sensitivity area, however, the specialist has demonstrated that the opportunities for the avoidance of specific habitats together with the implementation of mitigation measures have resulted in moderate to low post-mitigation impact significance.

3.5.2 AVIFAUNA

According to the DFFE national screening tool, the habitat within the development site is classified as a mixture of Low, Medium and High sensitivity for birds according to the Avian Wind theme (see **Figure 3-12**). This classification is partially accurate as far as the impact of the proposed WEFs is concerned, based on actual conditions recorded on the ground during the 12 months of pre-construction monitoring.

The classification should be High for the whole site based on the recorded presence of Species of Conservation Concern (SCC) i.e. Vulnerable and Endangered Red List wind priority species at the development site, Ludwig's Bustard (Regionally and Globally Endangered), Martial Eagle (Regionally and Globally Endangered), Verreaux's Eagle (Regionally Vulnerable), Lanner Falcon (Regionally Vulnerable), Southern Black Korhaan (Regionally and Globally Vulnerable), Secretarybird (Regionally Vulnerable, Globally Endangered), Black Harrier (Regionally and Globally Endangered) and Black Stork (Regionally Vulnerable).

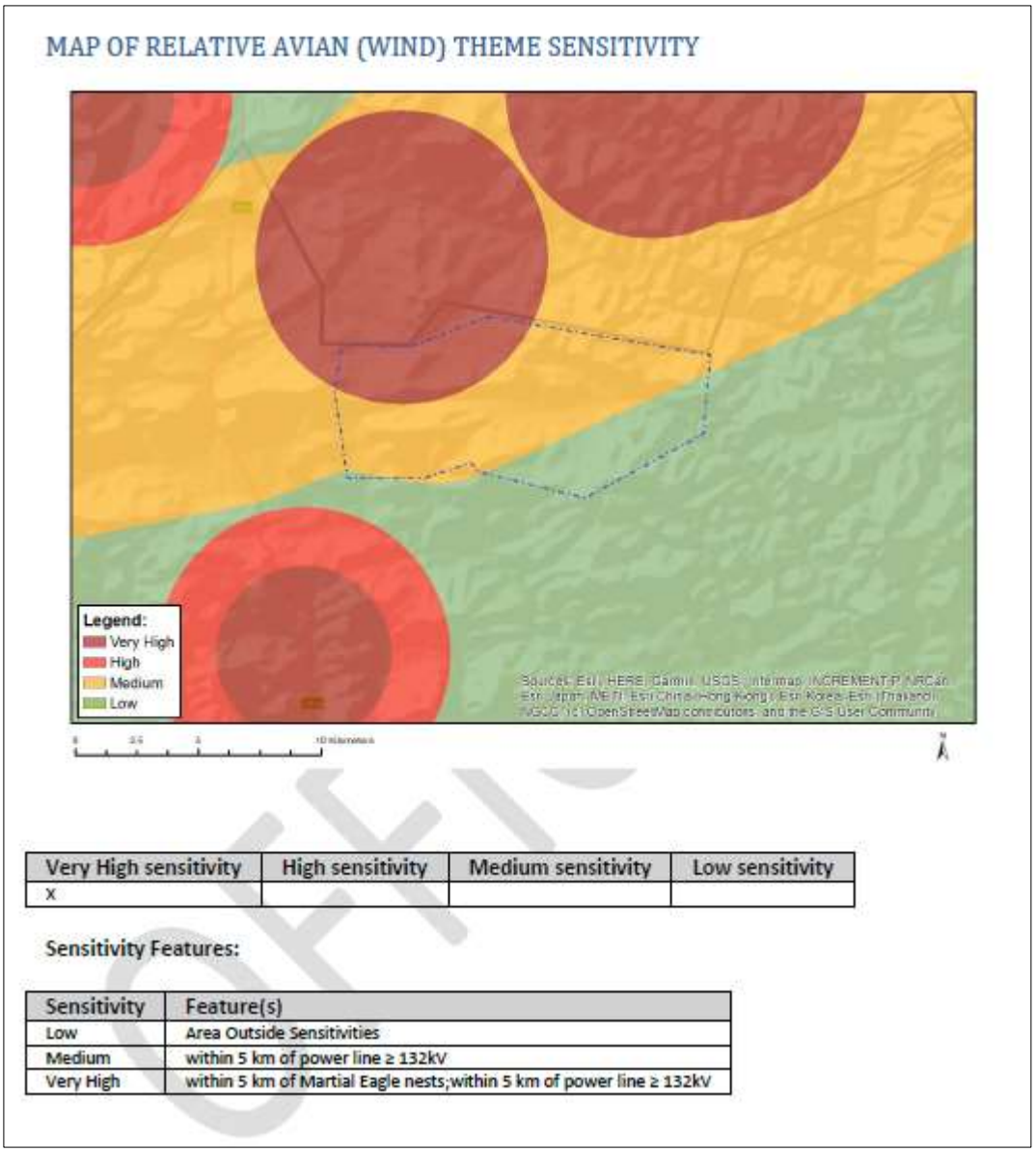


Figure 3-12: Avian Theme Sensitivity for wind development, DEA Screening Report

The following environmental sensitivities were identified from an avifaunal perspective for the Esizayo Expansion WEF:

- **High sensitivity No-turbine buffer: Surface water.**

  Included in this category are areas within 200m of water troughs and earth dams, and 150m from all major drainage lines. Surface water in this arid habitat is crucially important for priority avifauna, including several Red Data species such as Verreaux's Eagle, Martial Eagle, Lanner Falcon, Secretarybird, Black Stork, Greater Flamingo and many non-priority species, including several waterbirds. Drainage lines when flowing attract waterbirds on occasion, as do the large pools that remain in the channel after the flow has stopped. Wind turbines that are placed near these sources of surface water pose a collision risk to birds using the water for drinking and bathing, and drainage lines, when flowing, are natural flight paths for birds.

Figure 3-13 indicates the turbine exclusion zones for the Esizayo Expansion WEF.

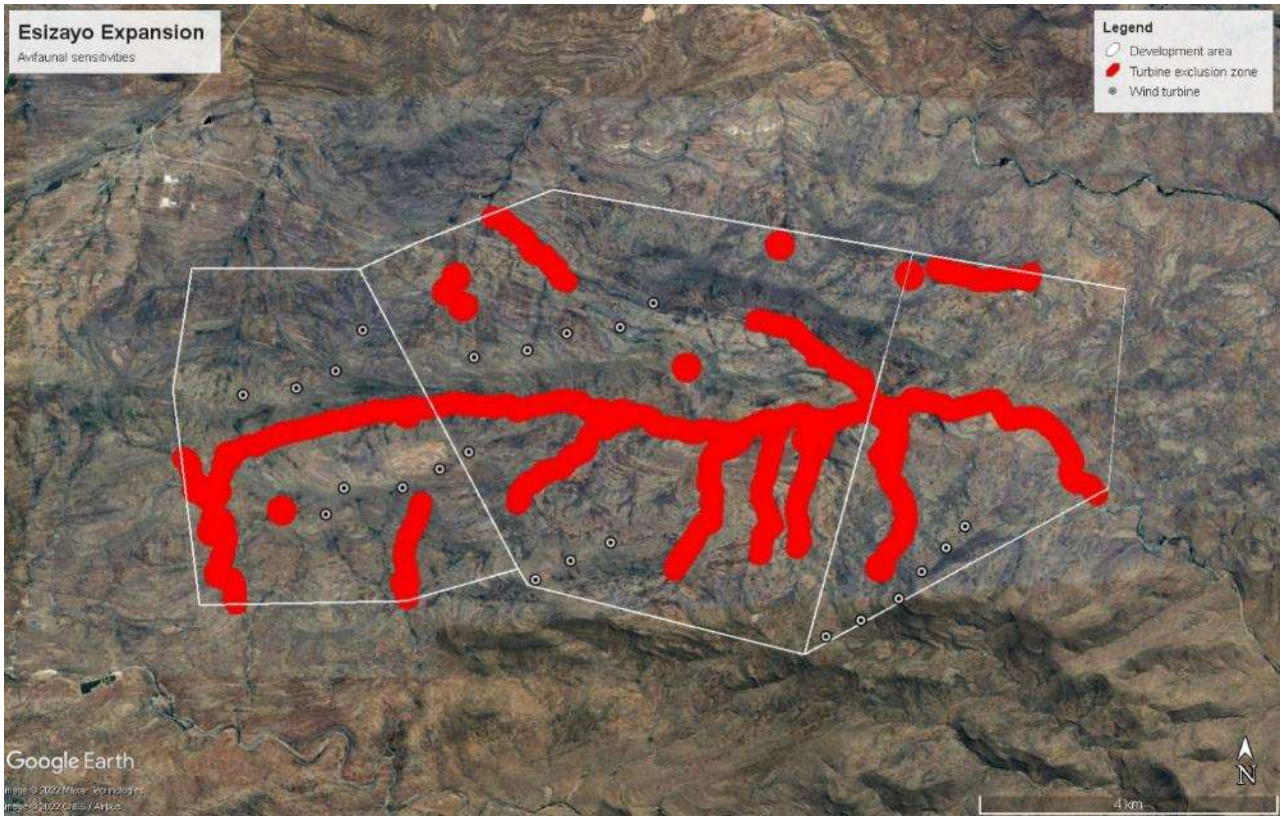
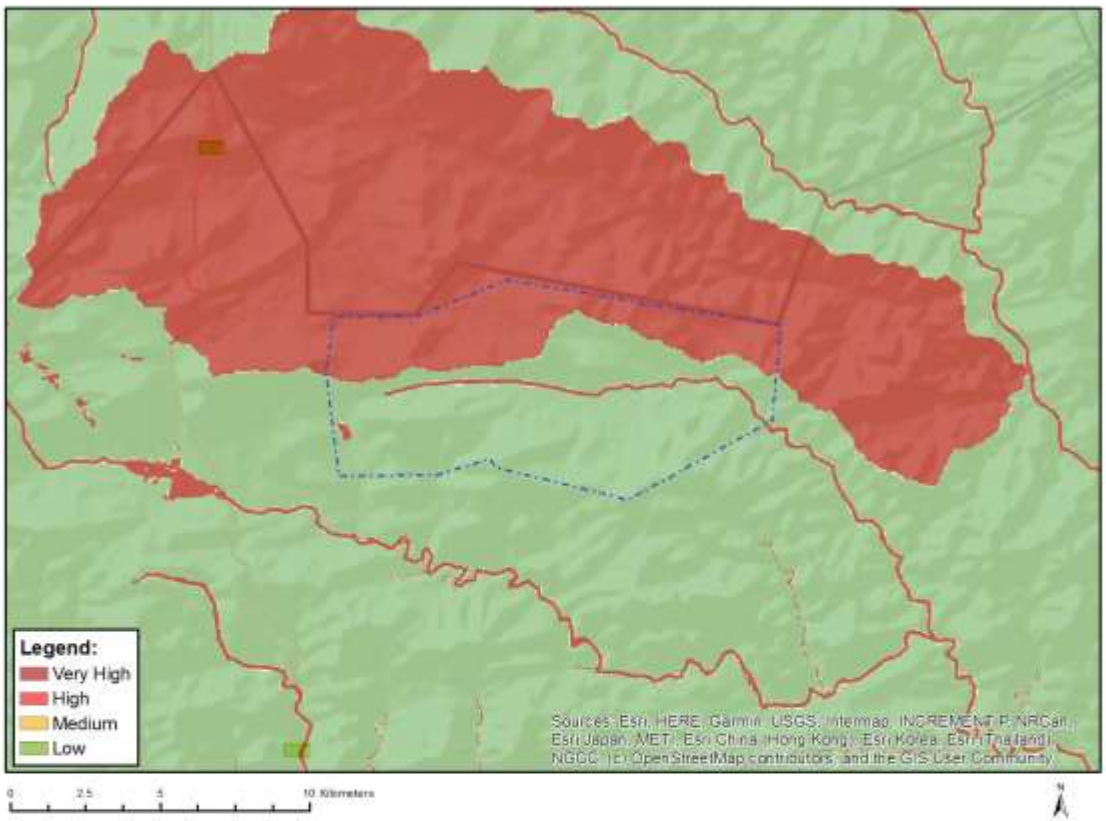


Figure 3-13: **Proposed no-turbine zones for the Esizayo Expansion WEF**

3.5.3 FRESHWATER

The DFFE National Screening Tool classifies parts of the study area as 'Very High' due to the presence of aquatic CBAs, Rivers, Wetland and Estuaries as well as Freshwater ecosystem priority areas (**Figure 3-14**).

MAP OF RELATIVE AQUATIC BIODIVERSITY THEME SENSITIVITY



Very High sensitivity	High sensitivity	Medium sensitivity	Low sensitivity
X			

Sensitivity Features:

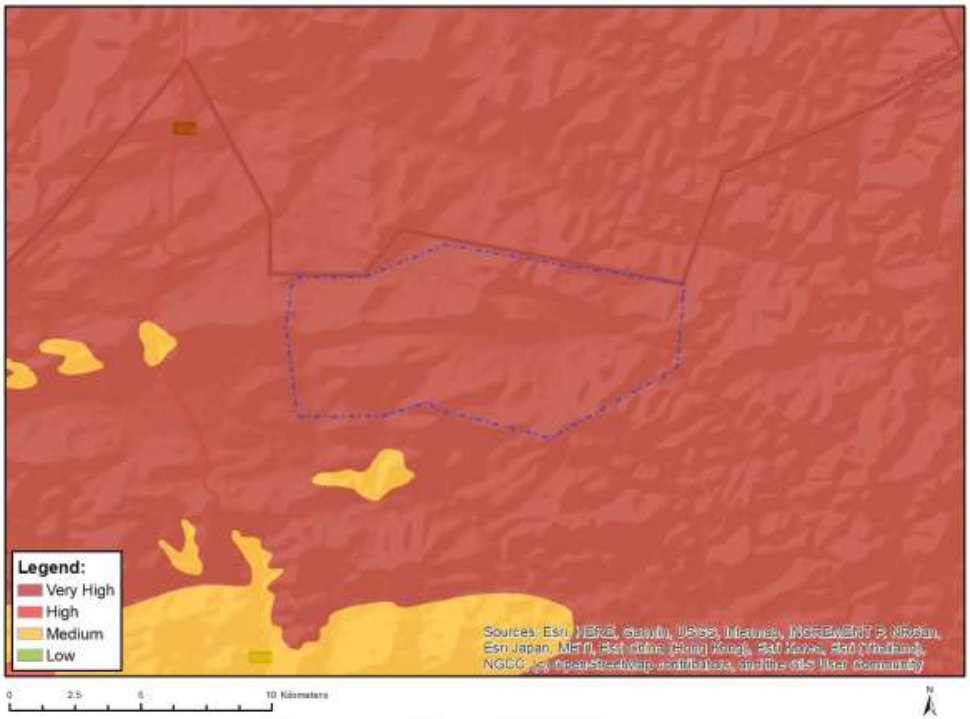
Sensitivity	Feature(s)
Low	Low sensitivity
Very High	Aquatic CBAs
Very High	Rivers
Very High	Wetlands and Estuaries
Very High	Freshwater ecosystem priority area quinary catchments

Figure 3-14: The DFFE screening tool rating for the Aquatic Biodiversity Theme

3.5.4 PALAEONTOLOGY

The DFFE National Screening Tool classifies parts of the study area as very high sensitivity due to the presence of features with a very high palaeontological sensitivity **(Figure 3-15)**.

MAP OF RELATIVE PALEONTOLOGY THEME SENSITIVITY



Very High sensitivity	High sensitivity	Medium sensitivity	Low sensitivity
X			

Sensitivity Features:

Sensitivity	Feature(s)
Very High	Features with a Very High paleontological sensitivity

Figure 3-15: The DFFE screening tool rating for the Palaeontological Theme

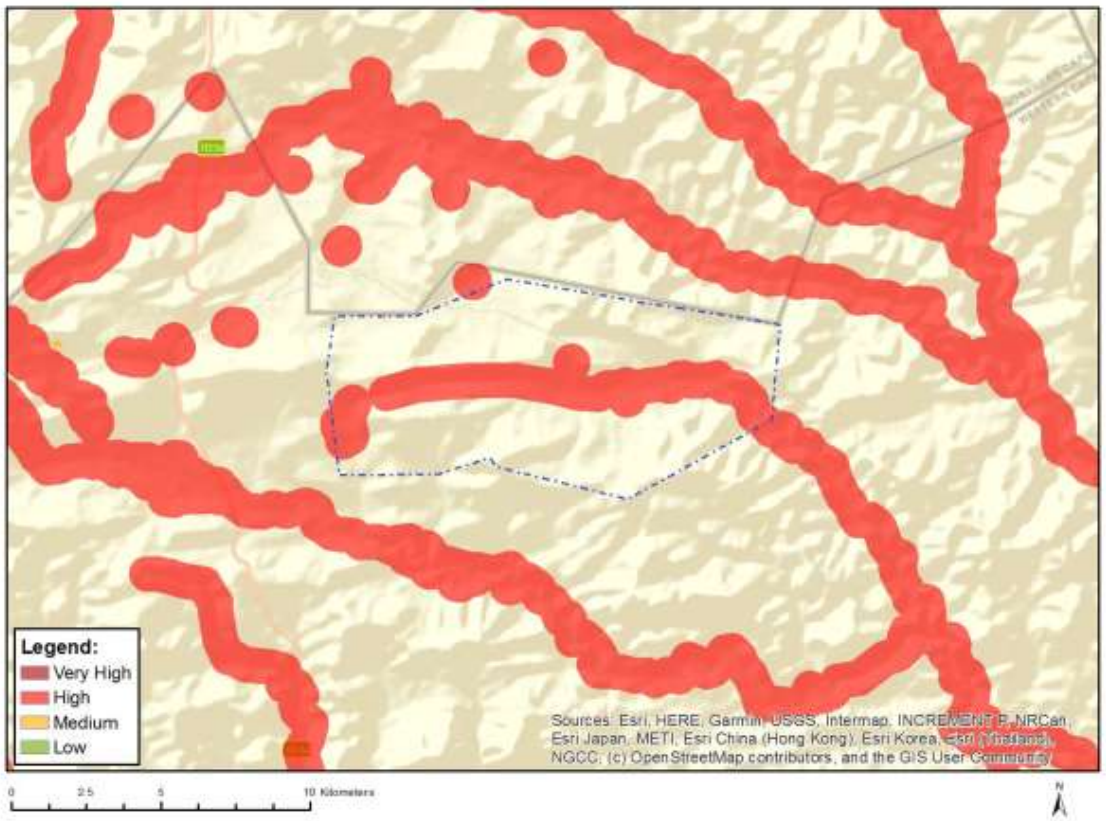
No vertebrate or vascular plant body fossil remains were recorded during the recent site visit to the Esizayo WEF Expansion project area. All of the fossils observed so far within the project area are of widely-occurring forms that are not considered to be of exceptional scientific or conservation value (see Proposed Field Rating IIIC Local Resource in Appendix 1). None of the known fossil sites lies within the provisional wind turbine footprint and no No-Go or High Sensitivity areas have been identified here in terms of palaeontological heritage. Direct impacts on the known fossil sites are unlikely and no mitigation is recommended in regard to them.

It is concluded that the overall palaeontological sensitivity of the Esizayo WEF Expansion project area is in practice LOW. The provisional High to Very High Palaeosensitivity mapped on the SAHRIS palaeosensitivity map and DFFE Screening Tool for this part of the Klein-Roggeveld is therefore contested here. However, the potential for hitherto unrecorded, very rare sites of High Palaeosensitivity (e.g., tetrapod skeletal remains and trackways) cannot be completely excluded.

3.5.5 BATS

The DFFE National Screening Tool classifies parts of the study area as 'High Sensitivity' due to being within 500 m of a wetland (**Figure 3-16**).

MAP OF RELATIVE BATS (WIND) THEME SENSITIVITY



Very High sensitivity	High sensitivity	Medium sensitivity	Low sensitivity
	X		

Sensitivity Features:

Sensitivity	Feature(s)
High	Within 500 m of a river
High	Wetland
High	Within 500 m of a wetland

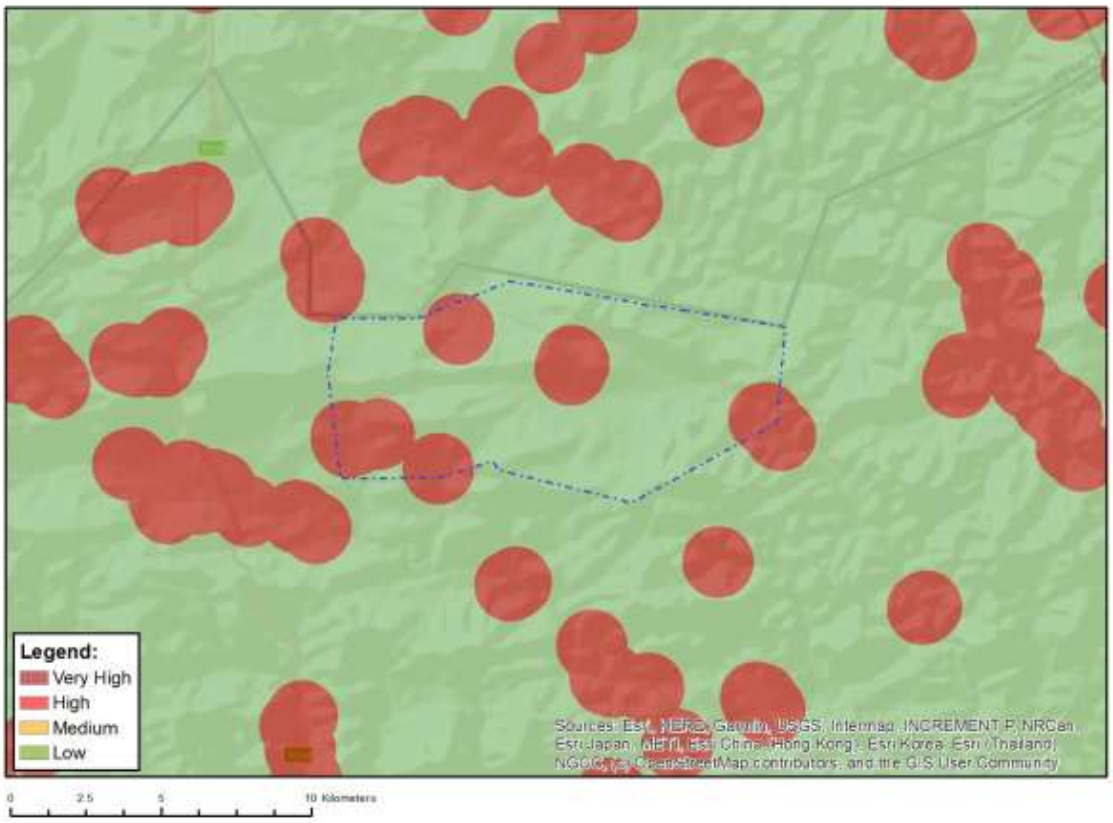
Figure 3-16: The DFFE screening tool rating for the Bats (Wind) Theme

The Esizayo WEF should be designed to avoid areas with known or anticipated high bat activity (such as along drainage lines). The mitigation measures recommended by Animalia (2016) are applicable.

3.5.6 FLICKER

The DFFE National Screening Tool classifies parts of the study area as very high sensitivity due to the potential temporarily or permanently inhabited residence (**Figure 3-17**).

MAP OF RELATIVE FLICKER THEME SENSITIVITY



Very High sensitivity	High sensitivity	Medium sensitivity	Low sensitivity
X			

Sensitivity Features:

Sensitivity	Feature(s)
Low	Area of low sensitivity
Very High	Potential temporarily or permanently inhabited residence

Figure 3-17: The DFFE screening tool rating for the Flicker Theme

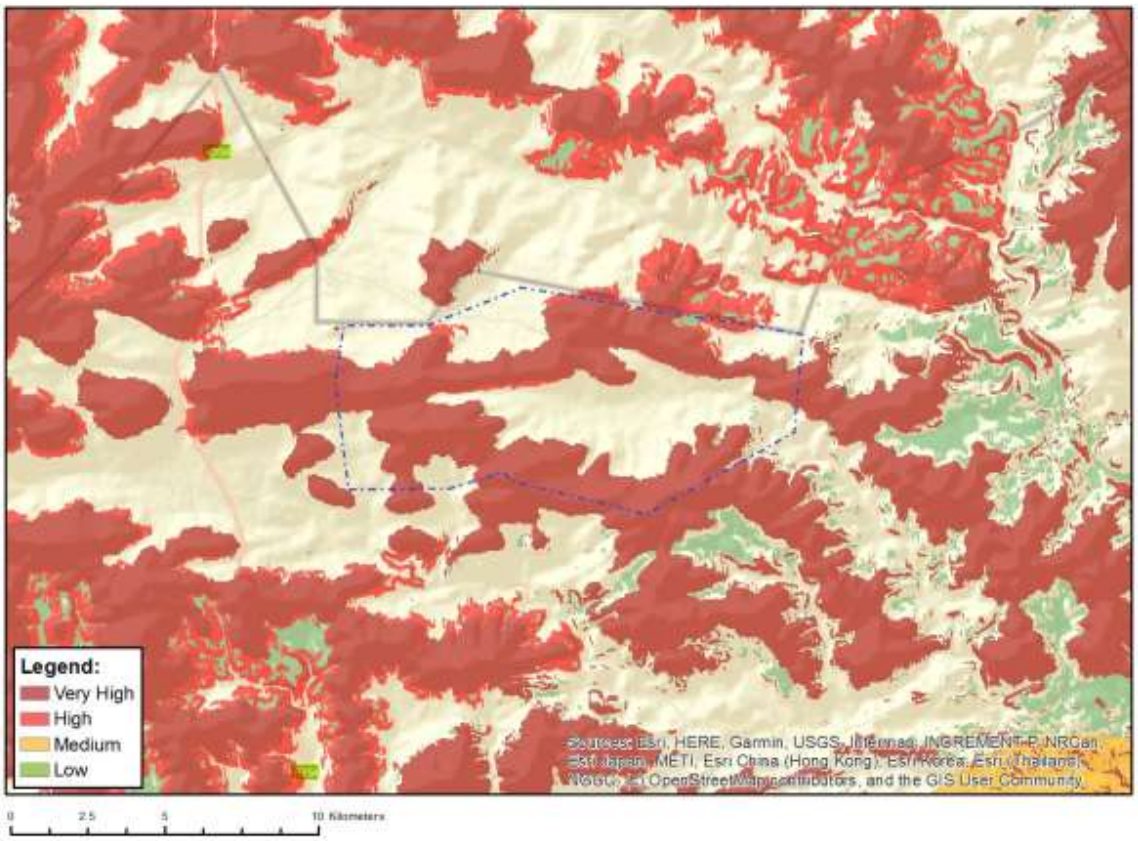
Shadow flicker only occurs when the sky is clear, and when the turbine rotor blades are between the sun and the receptor (i.e. when the sun is low). De Gryse in Scenic Landscape Architecture (2006) found that "most shadow impact is associated with 3-4 times the height of the object". Based on this research, an 1,000m buffer along the edge of the outer most turbines is identified as the zone within which there is a risk of shadow flicker occurring.

There are no places of residence within the 1,000m buffer. The significance of shadow flicker is therefore anticipated to be **low to negligible.**

3.5.7 LANDSCAPE

The DFFE National Screening Tool classifies parts of the study area as 'Very High Sensitivity' due to it being in an area with high ridges and mountain tops with slopes more than 1:4 **(Figure 3-18)**.

MAP OF RELATIVE LANDSCAPE (WIND) THEME SENSITIVITY



Very High sensitivity	High sensitivity	Medium sensitivity	Low sensitivity
X			

Sensitivity Features:

Sensitivity	Feature(s)
High	Slope between 1:4 and 1:10
Low	Slope less than 1:10
Very High	Slope more than 1:4
Very High	Mountain tops and high ridges

Figure 3-18: The DFFE screening tool rating for the Landscape Theme

4 FINDING OF THE IMPACT ASSESSMENT

A summary of the identified impacts and corresponding significance ratings for the proposed project is provided in **Table 4-1** below.

Table 4-1: Impact Summary

ASPECT	IMPACT DESCRIPTION	PHASE	WITHOUT MITIGATION		WITH MITIGATION	
			SIGNIFICANCE	STATUS	SIGNIFICANCE	STATUS
Air Quality	Generation Of Dust And PM	Construction	**Moderate**	(-)	**Low**	(-)
Noise	Construction impact on Noise	Construction	**Low**	(-)	**Very Low**	(-)
	Operational Impact of Noise on Farmhouse A	Operation	**Low**	(-)	**Low**	(-)
	Operational Impact of Noise on Farmhouse B	Operation	**Moderate**	(-)	**Low**	(-)
Soil Erosion & Contamination	Soil Erosion And Sedimentation	Construction	**High**	(-)	**Low**	(-)
	Change In Surface Profile	Construction	**High**	(-)	**Moderate**	(-)
	Change In Land Use	Construction	**Moderate**	(-)	**Moderate**	(-)
	Soil Contamination	Construction	**High**	(-)	**Low**	(-)
	Soil Erosion And Sedimentation	Operation	**High**	(-)	**Very Low**	(-)
Freshwater	Alteration Of The Natural Flow Regime	Construction	**Moderate**	(-)	**Low**	(-)
	Water Quality	Construction	**Moderate**	(-)	**Low**	(-)
	Loss Of Wetland And Riparian Functionality (Associated Infrastructure)	Construction	**Moderate**	(-)	**Low**	(-)

ASPECT	IMPACT DESCRIPTION	PHASE	WITHOUT MITIGATION		WITH MITIGATION	
			SIGNIFICANCE	STATUS	SIGNIFICANCE	STATUS
	Loss Of Wetland And Riparian Functionality (Access Roads)	Construction	**Moderate**	(-)	**Low**	(-)
	Soil Erosion And Sedimentation	Construction	**Moderate**	(-)	**Low**	(-)
	Alien Vegetation Establishment	Construction	**Low**	(-)	**Very Low**	(-)
	Water Quality	Operation	**Low**	(-)	**Very Low**	(-)
	Loss Of Wetland And Riparian Habitat	Operation	**Low**	(-)	**Very Low**	(-)
	Soil Erosion And Sedimentation	Operation	**Low**	(-)	**Very Low**	(-)
Hydrology	Alteration Of The Natural Flow Regime	Construction	**Moderate**	(-)	**Low**	(-)
	Soil Erosion And Sedimentation	Construction	**Moderate**	(-)	**Low**	(-)
	Water Quality	Construction	**Moderate**	(-)	**Low**	(-)
	Alteration Of The Natural Flow Regime	Operation	**Moderate**	(-)	**Low**	(-)
	Soil Erosion And Sedimentation	Operation	**Moderate**	(-)	**Very Low**	(-)
	Water Quality Degradation	Operation	**Moderate**	(-)	**Low**	(-)
Biodiversity	Destruction, Loss And Fragmentation Of Habitats, Ecosystems & Vegetation Community	Construction	**High**	(-)	**Moderate**	(-)
	Introduction Of Alien Species	Construction	**High**	(-)	**Very Low**	(-)
	Destruction Of Threatened Plant Species	Construction	**Moderate**	(-)	**Very Low**	(-)

ASPECT	IMPACT DESCRIPTION	PHASE	WITHOUT MITIGATION		WITH MITIGATION	
			SIGNIFICANCE	STATUS	SIGNIFICANCE	STATUS
	Displacement And Fragmentation Of Faunal Community Due To Habitat Loss, Direct Mortalities & Disturbance	Construction	**Moderate**	(-)	**Low**	(-)
	Dust Pollution	Construction	**Moderate**	(-)	**Very Low**	(-)
	Improper Waste Management	Construction	**High**	(-)	**Very Low**	(-)
	Displacement And Fragmentation Of The Faunal Community Due To Habitat Loss, Direct Mortalities & Disturbance	Construction	**Moderate**	(-)	**Moderate**	(-)
	Continued Disturbance Of Vegetation Communities, Especially Threatened Species, And Encroachment By Alien Invasive Plant Species	Operation	**Moderate**	(-)	**Very Low**	(-)
	Erosion Due To Poor Stormwater Management	Operation	**High**	(-)	**Very Low**	(-)
	Ongoing Displacement, Direct Mortalities And Disturbance Of Faunal Community Due To Habitat Loss And Disturbances	Operation	**High**	(-)	**Moderate**	(-)
	Increase In Pied Crow (Corvus Albus) Density	Operation	**High**	(-)	**Low**	(-)
Avifauna	Displacement Of Priority Species Due To Disturbance Associated With The Construction Of The Wind Turbines And Associated Infrastructure	Construction	**Moderate**	(-)	**Low**	(-)

ASPECT	IMPACT DESCRIPTION	PHASE	WITHOUT MITIGATION		WITH MITIGATION	
			SIGNIFICANCE	STATUS	SIGNIFICANCE	STATUS
	Displacement Due To Habitat Transformation Associated With The Construction	Construction	**Moderate**	(-)	**Moderate**	(-)
	Mortality Of Priority Species Due To Collisions With The Wind Turbines	Operation	**Moderate**	(-)	**Low**	(-)
	Mortality Of Priority Species Due To Collisions With The 33kv Overhead Power Lines	Operation	**Moderate**	(-)	**Moderate**	(-)
	Electrocution Of Priority Species On The On-Site Substation Infrastructure	Operation	**Moderate**	(-)	**Low**	(-)
	Displacement Of Priority Species Due To Disturbance Associated With The Dismantling Of The Wind Turbines And Associated Infrastructure	Decommissioning	**Moderate**	(-)	**Low**	(-)
Visual	Visual Impact Of Construction Activities On Sensitive Visual Receptors In Close Proximity To The Proposed WEF Infrastructure	Construction	**Moderate**	(-)	**Moderate**	(-)
	Visual Impact on Observers (Residents at Homesteads and Visitors/Tourists) In Close Proximity (I.E. Within 5km) To the Wind Turbine Structures	Operation	**High**	(-)	**High**	(-)
	Visual Impact on Observers Travelling Along the Roads in Close Proximity (I.E. Within 5km) To the Wind Turbine Structures	Operation	**High**	(-)	**High**	(-)

ASPECT	IMPACT DESCRIPTION	PHASE	WITHOUT MITIGATION		WITH MITIGATION	
			SIGNIFICANCE	STATUS	SIGNIFICANCE	STATUS
	Visual Impact on Observers Travelling Along the Roads and Residents at Homesteads Within A 5 – 10km Radius of The Wind Turbine Structures	Operation	**Moderate**	(-)	**Moderate**	(-)
	Visual Impact on Observers Travelling Along the Roads and Residents at Homesteads Within A 10 – 20km Radius of The Wind Turbine Structures	Operation	**Moderate**	(-)	**Moderate**	(-)
	Visual Impact of Shadow Flicker on Sensitive Visual Receptors in Close Proximity to The Proposed WEF	Operation	**Low**	(-)	**Low**	(-)
	Visual Impact of Lighting at Night on Sensitive Visual Receptors	Operation	**High**	(-)	**Moderate**	(-)
	Visual Impact of The Ancillary Infrastructure on Observers in Close Proximity to The Structures	Operation	**Low**	(-)	**Low**	(-)
	The Potential Impact on The Sense of Place of The Region	Operation	**Low**	(-)	**Low**	(-)
Waste	Improper Waste Management	Construction	**Moderate**	(-)	**Low**	(-)
Traffic	Vehicle Engine And Tyre On Road Noise, Dust & Exhaust Fumes	Construction	**Low**	(-)	**Very Low**	(-)
	Vehicle Engine And Tyre On Road Noise, Dust & Exhaust Fumes	Construction	**Low**	(-)	**Very Low**	(-)

ASPECT	IMPACT DESCRIPTION	PHASE	WITHOUT MITIGATION		WITH MITIGATION	
			SIGNIFICANCE	STATUS	SIGNIFICANCE	STATUS
	Increase In Vehicle Engine And Tyre On Road Noise & Exhaust Fumes	Construction	**Low**	(-)	**Very Low**	(-)
Heritage	Disturbance, Damage Or Destruction To Heritage Resources	Construction	**Low**	(-)	**Very Low**	(-)
Palaeontology	Disturbance, Damage Or Destruction To Fossil Heritage	Construction	**Low**	(-)	**Low**	(-)
Socio-Economic	Creation Of Employment, Business Development And Skills Development	Construction	**Low**	(+)	**Moderate**	(+)
	Presence Of Construction Workers And Impact On Family Structures And Social Networks	Construction	**Low**	(-)	**Low**	(-)
	Influx Of Job Seekers On Local Community	Construction	**Low**	(-)	**Low**	(-)
	Risk To Safety, Livestock, And Farm Infrastructure	Construction	**Moderate**	(-)	**Low**	(-)
	Construction Activities	Construction	**Low**	(-)	**Very Low**	(-)
	Risk Of Veld Fires	Construction	**Moderate**	(-)	**Low**	(-)
	Development Of Infrastructure To Improve Energy Security And Support Renewable Sector	Operation	**Moderate**	(+)	**High**	(+)
	Creation Of Employment Opportunities	Operation	**Very Low**	(+)	**Moderate**	(+)
	Generate Income For Affected Landowners	Operation	**Low**	(+)	**Moderate**	(+)

ASPECT	IMPACT DESCRIPTION	PHASE	WITHOUT MITIGATION		WITH MITIGATION	
			SIGNIFICANCE	STATUS	SIGNIFICANCE	STATUS
	Socio-Economic Development Contributions	Operation	**Moderate**	(+)	**Moderate**	(+)
	Visual Impact And Impact On Sense Of Place	Operation	**Moderate**	(-)	**Moderate**	(-)
	Impact On Property Values	Operation	**Low**	(-)	**Low**	(-)
	Impact On Tourism In The Region	Operation	**Low**	(-)	**Low**	
Health And Safety	Employee Health & Safety	Construction	**Moderate**	(-)	**Low**	(-)
	Employee Health & Safety	Operation	**Moderate**	(-)	**Low**	(-)

It is acknowledged that the project falls within a very high sensitivity area, with regards to biodiversity, however, the specialist has demonstrated that the opportunities for the avoidance of specific habitats together with the implementation of mitigation measures have resulted in **moderate to low** post-mitigation impact significance.

Considering the findings of the respective studies, no fatal flaws were identified for the proposed Project. Should the avoidance and mitigation measures prescribed be implemented, the post-mitigation significance of the considered impacts for the majority of negative aspects pertaining to the environmental aspects is expected to be **moderate to low**. The only negative aspect with a high rating post-mitigation is the visual impact on observers within 5km of the wind turbine structures, for which no mitigation is possible.

5 ENVIRONMENTAL MANAGEMENT OBJECTIVES

An EMPr is defined as "an environmental management tool used to ensure that undue or reasonably avoidable adverse impacts of the construction, operation and decommissioning of a project are prevented or mitigated, and that the positive benefits of the projects are enhanced."

This EMPr has been compiled in accordance with Appendix 4 of GNR 982, in compliance with section 24N of NEMA, with the purpose of ensuring that negative impacts are reduced and positive effects are enhanced through a process of continual improvement, during both the construction and operational phases of the Esizayo WEF Expansion project.

Due to the nature of the continual improvement process, this EMPr is seen as a working document and is therefore subject to change depending on the requirements of the various project phases. These changes are to be approved by an environmental practitioner or the appointed environmental control officer prior to the implementation onsite.

To facilitate compliance to the EMPr by appointed contractors and sub-contractors, it is required that all onsite personnel are aware of the requirements of the EMPr as well as the prescribed penalties should a non-conformance be identified during the construction, operation and decommissioning activities.

Further to the above, appointed contractors and sub-contractors will also be required to comply with all relevant legislation and standards.

5.1 EMPR OBJECTIVES

This EMPr has the following objectives:

- Identify mitigation measures and environmental specifications which are required to be implemented for the planning, construction and rehabilitation, operation, and decommissioning phases of the project in order to manage and minimise the extent of potential environmental impacts associated with the facility;
- Ensure that all the phases of the proposed project do not result in undue or reasonably avoidable adverse environmental impacts, and ensure that any potential environmental benefits are enhanced;
- Identify entities responsible for the implementation of the measures and outline functions and responsibilities;
- Create management structures that address the concerns and complaints of interested and affected parties (I&APs) with regards to the proposed project;
- Propose mechanisms and frequency for monitoring compliance, and preventing long-term or permanent environmental degradation; and
- Facilitate appropriate and proactive responses to unforeseen events or changes in project implementation that was not considered in the EIA process.

Please note: This EMPr is a working document and therefore subject to change depending on the requirements of the various Project phases. When applicable, these changes are to be approved in accordance with legislative requirements.

5.2 ENVIRONMENTAL OBJECTIVES AND TARGETS

To facilitate compliance to the EMPr by appointed contractors and sub-contractors, it is required that all onsite personnel are aware of the requirements of the EMPr as well as the prescribed penalties should a non-conformance be identified during the construction, operation and decommissioning activities.

Further to the above, appointed contractors and sub-contractors will also be required to comply with all relevant legislation and standards.

It is recommended that environmental and social objectives (as outlined in this document) be emphasised to the appointed contractors and sub-contractors as minimum requirements. Objectives should include:

- Prevention of hazardous spillages/leaks or incidents onsite for the duration of the construction and operation periods. This should include the use of construction vehicles and plant equipment, as well as material storage;
- Avoidance of any complaints from the surrounding land users for the duration of the construction and operation periods;
- Prohibition of waste from remaining onsite for extended periods. Skips and waste receptacles need to be appropriately labelled, covered and regularly emptied;
- Reduction of waste generation;
- Mitigation against dusty conditions as much as is practicable;
- Maintenance of site aesthetics throughout the construction and operational period;
- Utilisation of natural resources sustainably; and
- Completion of work (to the required standard) timeously and prevention of work outside the legislated working hours; and management of activities according to a philosophy of "We respect the environment" and "We are committed to continually improving our processes in order to prevent pollution".

6 MANAGEMENT PROCEDURES AND ADMINISTRATIVE REQUIREMENTS

6.1 ORGANISATIONAL STRUCTURE AND RESPONSIBILITY

Formal responsibilities are necessary to ensure that key management measures/procedures are executed. Esizayo hereafter referred to as Esizayo, together with the appointed EPC Contractor, will be responsible for the overall control of the project site during the pre-construction, construction, operation, decommissioning and rehabilitation phases of the project. Esizayo's responsibilities will include the following:

- Appointing an independent environmental control officer (ECO) for the duration of the Contract and notify the DFFE of their contact details;
- Being fully familiar with the EIA Report, EA conditions and the EMPr;
- Notifying the DFFE of changes in the developments that result in significant environmental impacts;
- Notifying the DFFE within 30 days of change of ownership;
- Notifying the DFFE of any change of address of the owner/Project Company;
- The overall implementation of the EMPr;
- Ensuring compliance, by all parties, and the imposition of penalties for noncompliance
- Implementing corrective and preventive actions, where required;
- Preventing pollution and actions that will harm or may cause harm to the environment;
- Ensuring the activity does not commence within 30 days of the EA being issued;
- Notifying the DFFE within 30 days that construction activity will commence;
- Notifying the DFFE in writing within 24 hours if any condition in the EA cannot be or is not adhered to; and
- Notifying the DFFE14 days prior to commencement of the operational phase

Specific roles and responsibilities for the construction phase of this project are as defined in **Table 6-1**.

Table 6-1: Roles and Responsibilities – Construction (EPC Contractor)

RESPONSIBLE PERSON	RESPONSIBILITIES
Project Manager (EPC Contractor)	— Ensure that Esizayo and the contractor are aware of all specifications, legal constraints pertaining to the project specifically with regards to the environment — Ensure that all stipulations within the EMPr and conditions of the environmental authorisation are communicated and adhered to by Esizayo and its contractor(s) — Monitor the implementation of the EMPr and conditions of the environmental authorisation throughout the project by means of site inspections and meetings. This will be documented as part of the site meeting minutes — Be fully conversant with the BAR for the project, the conditions of environmental authorisation and all relevant environmental legislation
Site Manager (EPC Contractor)	— Be fully conversant with the BAR, the conditions of environmental authorisation and the EMPr — Approve method statements — Provide support to the ECO

RESPONSIBLE PERSON	RESPONSIBILITIES
	— Be fully conversant with all relevant environmental legislation and ensure compliance thereof — Have overall responsibility for the implementation of the EMPr and conditions of the environmental authorisation — Ensure that audits are conducted to ensure compliance to the EMPr and conditions of the environmental authorisation — Liaise with the Project Manager or his delegate, the ECO and others on matters concerning the environment — Prevent actions that will harm or may cause harm to the environment, and take steps to prevent pollution and unnecessary degradation onsite — Confine construction activities to demarcated areas
Environmental Officer (EO) (EPC Contractor)	The EO must be appointed by the Contractor and is responsible for managing the day-to-day onsite implementation of the EMPr, and for the compilation of weekly environmental monitoring reports. In addition, the EO must act as liaison and advisor on all environmental and related issues, seek advice from the ECO when necessary, and ensure that any complaints received from I&APs are duly processed and addressed and that conflicts are resolved in an acceptable manner and timely manner. The EO shall be a full-time dedicated member of the Contractor's team and must be approved by Esizayo. The following qualifications, qualities and experience are recommended for the individual appointed as the EO: — A relevant environmental diploma or degree in natural sciences, as well as a minimum of three years' experience in construction site monitoring, excluding health and safety; — A level-headed and firm person with above-average communication and negotiating skills. The ability to handle and address conflict management situations will be an advantage; and — Relevant experience in environmental site management and EMPr compliance monitoring. The EO's responsibilities include: — Monitoring, on a daily basis, environmental specifications on site and compliance with the conditions of the EA, environmental legislation and EMPr; — Keeping a register of compliance / non-compliance with the environmental specifications; — Identifying and assessing previously unforeseen, actual or potential impacts on the environment; — Ensuring that a brief weekly environmental monitoring report is submitted to the ECO; — Conducting site inspections during the defects liability period, and bringing any environmental concerns to the attention of the ECO and Contractor; — Advising the Contractor on the rectification of any pollution, contamination or damage to the construction site, rights of way and adjacent land; — Attending site meetings (scheduled and ad hoc); — Presenting environmental awareness training to all staff, Contractors and Sub contractors, and monitoring the environmental awareness training for all new personnel on-site, as undertaken by the Contractor; — Ensuring that a copy of the EA and the latest version of the EMPr are available on site at all times; — Ensuring that the Contractor is made aware of all applicable changes to the EMPr that are approved by the DFFE;

RESPONSIBLE PERSON	RESPONSIBILITIES
	— Assisting the Contractor in drafting environmental method statements and/or the Environmental Policy where such knowledge/expertise is lacking; — Undertaking daily environmental monitoring to ensure the Contractor's activities do not impact upon the receiving environment. Such monitoring shall include dust, noise and water monitoring; and — Maintaining the following on site: — A weekly site diary. — A non-conformance register (NCR). — An I&AP communications register, and — A register of audits. The EO will remain employed until all rehabilitation measures, as required for implementation due to construction damage, are completed and the site is handed over to the Operator.
ECO (Independent)	A suitably qualified ECO must be appointed by Esizayo to monitor the project compliance with the EMPr and conditions of the environmental authorisation on a monthly basis. The costs of the ECO shall be borne by Esizayo (proof of appointment must be maintained onsite). Responsibilities of the ECO include: — Be fully conversant with the BAR, the conditions of environmental authorisation and the EMPr; — Be fully conversant with all relevant environmental legislation and ensure compliance thereof; — Undergo training from the Biodiversity specialist to identify any SCC that may be present during the construction clearing activities; — Approve method statements; — Remain employed until the completion of the construction activities; and — Report to the Project Manager, including all findings identified onsite. In addition, the ECO will: — Undertake monthly inspections of the site and surrounding areas in order to audit compliance with the EMPr and conditions of the environmental authorisation; — Communicate directly with the Biodiversity specialist after each clearing event; — Take appropriate action if the specifications contained in the EMPr and conditions of the environmental authorisation are not followed; — Monitor and verify that environmental impacts are kept to a minimum, as far as possible; and — Ensure that activities onsite comply with all relevant environmental legislation.
Contractors, Staff and Service Providers	— Complying with Esizayo's environmental management specifications — Be conversant with all EMPr and conditions of the environmental authorisation, and ensure compliance thereto — Adhering to any environmental instructions issued by the Site Manager/Project Manager on the advice of the ECO

6.2 ENVIRONMENTAL AWARENESS AND COMPETENCE

Legislation (NEMA) requires that Esizayo must develop an environmental awareness plan that describes the manner in which Esizayo intends to inform employees of any environmental risks which may result from their work and the manner in which the risks must be dealt with in order to avoid pollution or the degradation of the environment. In recognition of the need to protect our environment, environmental management should not only be seen as a legal obligation but also as a moral obligation.

It is important to ensure that all relevant personnel have the appropriate level of environmental awareness and competence to ensure continued environmental due diligence and ongoing minimisation of environmental degradation and harm.

To achieve effective environmental management, it is important that employees, contractors (including subcontractors) are aware of the responsibilities in terms of the relevant environmental legislation and the contents of the EMPr, conditions of the EA.

Esizayo will provide appropriate resources to facilitate social and environmental awareness training during the construction, operational and decommissioning phases of the project. Esizayo will require that all managers associated with the project adhere to the mitigation/management measures detailed in the EMPr and identify, evaluate, and minimise risks to the social, physical and biophysical environments. This will be implemented by educating employees in social and environmental matters and responsibilities relating to performance of their assigned tasks. Furthermore, employees will be entrusted to maintain the necessary level of environmental performance for their activities. Contractors, and their associated sub-contractors, will also need to demonstrate compliance to mitigation/ management measures included in the EMPr.

The following methodology will be used to implement and ensure environmental and social awareness and competence:

6.2.1 INTERNAL COMMUNICATION

Internal communication of environmental and social issues to ensure environmental awareness will be achieved by using any combination of the following means:

- Meetings;
- Memos;
- Notice boards;
- Briefs;
- Reports;
- Monthly themes;
- Tool box talks;
- Daily operational bulletins;
- Newsletters;
- E-mail;
- Telephone; and
- Induction training.

6.2.2 STANDARD MEETINGS

The following standard meetings will be held at specific times to ensure that environmental and social awareness; potential problems; complaints etc. are heard and addressed proactively:

- Safety, Health and Environmental Meetings will be held monthly by the Senior Management;
- Safety, Health and Environmental Meetings will be held weekly (during construction) and monthly (during operation) by the relevant personnel, environmental and social issues will form part of the agenda;

— Communication between all personnel and Senior Management will be facilitated through the appropriate reporting lines, or by using complaint and incident forms.

Minutes of all meetings must be compiled by the EPC Contractor and kept on file.

6.2.3 ENVIRONMENTAL AND SOCIAL TALK TOPICS

Monthly environmental and social talk topics will be compiled and distributed to relevant personnel and will be displayed on appropriate notice boards. As a minimum, the following topics must be covered:

— Water Quality;
— Water Use and Consumption;
— Air Quality i.e. dust;
— Power Consumption and Energy Efficiency;
— Waste Management;
— Fauna and Flora;
— Emergency Procedures;
— Incidents Reporting;
— Systems;
— Noise;
— Heritage Impacts;
— Landowner Etiquette; Speed Limits;
— Health Risks (such as HIV/ Aids and COVID-19);
— General Awareness (e.g. World Environment Day, National Arbour Day);
— Grievance Procedures;
— Policy awareness; and
— Code of Conduct.

6.2.4 GENERAL COMMUNICATIONS

Communication to the community, government, landowners, neighbouring farmers, environmental groups, non-government organisations and other stakeholders will be communicated to ensure environmental and social awareness by means of the following:

— Fax or E-mail;
— Telephone;
— Formal meetings; and
— Open days.

6.2.5 TRAINING

It is important to ensure that all personnel, contractors and their sub-contractors have the appropriate level of environmental awareness and competence to ensure continued environmental due diligence and on-going minimisation of environmental harm. As a minimum environmental training must include the following:

— Employees must have a basic understanding of the key environmental features of the site and the surrounding environment;

— Employees will be thoroughly familiar with the requirements of the EMPr and the environmental specifications as they apply to the project.

- Employees must undergo training for the operation and maintenance activities associated with project and have a basic knowledge of the potential environmental impacts that could occur and how they can be minimised and mitigated.
- Awareness of any other environmental matters, which are deemed to be necessary by the Environmental Officer.
- Training must include the environment, health and safety as well as basic HIV/AIDS education.

The following facets to training form part of this Environmental and Social Awareness Plan:

- **Induction**: Environmental and social awareness training will be given at induction when personnel join the company and/or return from leave. Induction training will also be given to visitors entering the site. Induction training will include, *inter alia*:
  - A discussion on the environment concept, what does it comprise of and how do we interact with it;
  - A description on the components and phases of the specific renewable power generation facility;
  - A general account of how the facility and its associated activities can affect the environment, giving rise to what are called environmental impacts;
  - A discussion on what staff can do in order to help prevent the negative environmental impacts from degrading the environment i.e. environmental impact management.
- **Job Specific Training**: Job specific training programmes will be developed as and when required. The programs will be based on the significant environmental and social aspects/ impacts that are identified during regular audits and site inspections. Supervisory staff will be equipped with the necessary knowledge and information to guide their employees on environmental and social aspects applicable to performing a specific task.
- **Competency Training**: The Environmental Officer will be responsible for the environmental and social competency and awareness training of Middle Management and supervisors. This training will be performed both on a one-on-one basis and through workshops and presentations. Competence and the effectiveness of training and development initiatives will be determined through the following methods:
  - Trend analysis of incidents reported; and
  - Analysis of work areas during visits and audits.

  The process to declare competency of personnel is documented in the ISO9001:2000 procedure. This plan will be amended periodically in light of operational changes, learning experienced during its implementation and other activities that can affect the risk profiles.
- **Training Records**: Training can be done either in a written or verbal format but will be in an appropriate format for the receiving audience. Persons having received training must indicate in writing that they have indeed attended a training session and have been notified in detail of the contents and requirements of the EMPr. The attendance registers must be kept on file.

6.3 MONITORING

The internal EO will monitor the day-to-day site activities on an ongoing basis and will produce weekly monitoring reports. The external ECO will undertake monthly audits to ensure compliance with the EMPr and conditions of the environmental authorisation during the construction activities, and will report to the Site Manager should any non-compliance be identified or corrective action deemed necessary.

During the operational phase, Esizayo will establish, implement and maintain a procedure to monitor and measure, on a regular basis, the key characteristics of the operations that may have a significant environmental impact. The procedure shall include the documenting of information to monitor performance, applicable operational controls and conformity with the operation's environmental objectives and targets.

Esizayo will ensure that all instruments and devices used for the measurement or monitoring are calibrated and appropriately operated and maintained. Calibration records must be kept on site or in close proximity to the equipment for ease of availability. All the conditions outlined in the EMPr (Section 8) will be subject to the

required internal day-to-day monitoring and external compliance monitoring. Where required, any specific additional monitoring has been outlined in the EMPr (Section 8).

6.4 NON-CONFORMANCE AND CORRECTIVE ACTION

The auditing of the construction and operational activities may identify non-conformances to the EMPr and conditions of the environmental authorisation. Non-conformances may also be identified through incidents, emergencies or complaints recorded. In order to correct non-conformances, the source must be determined and corrective actions must be identified and implemented.

6.4.1 COMPLIANCE WITH THE EMPR AND CONDITIONS OF THE ENVIRONMENTAL AUTHORISATION

- A copy of the EMPr and conditions of the environmental authorisation will be available onsite at all times for the duration of the construction and operational activities;
- All persons employed by a contractor or their sub-contractors will abide by the requirements of the EMPr and conditions of the environmental authorisation;
- Any members of the workforce found to be in breach of any of the specifications contained within the EMPr and conditions of the environmental authorisation may be ordered by the Site Manager to leave the site. A contractor will not direct a person to undertake any activity which would place them in contravention of the specifications contained within the EMPr and conditions of the environmental authorisation;
- Should a contractor be in breach of any of the specifications contained in the EMPr and conditions of the environmental authorisation, the Site Manager will, in writing, instruct the contractor responsible for the incident of non-compliance regarding corrective and/or remedial action required, specify a timeframe for implementation of these actions, implement a penalty and/or indicate that work will be suspended should non-compliance continue;
- Should non-compliance continue, further written notification will be forwarded to the contractor responsible for the incident of non-compliance outlining the required corrective and/or remedial action, the timeframe for implementation, penalties and/or work will be suspended as specified previously; and
- Departmental officials will be given access to the property referred to in the EIR and EMPr for the purpose of assessing and/or monitoring compliance with the EMPr and conditions of the environmental authorisation, at all reasonable times.

6.4.2 DUTY OF CARE

All personnel involved with the construction and operational activities onsite will be responsible for implementing measures to prevent pollution or degradation of the environment from occurring, continuing or recurring. Insofar as such harm to the environment is authorised by law, or cannot reasonably be avoided or stopped, personnel shall minimise and rectify such pollution or degradation of the environment.

6.5 DOCUMENTATION AND REPORTING

The following documentation must be kept onsite by the EO in order to record compliance with the EMPr and conditions of the environmental authorisation:

- Record of complaints; and
- Record of emergencies and incidents.

The contractor will be required to report on the following:

- Environmental incidents involving contractor/ employees and/or the public;
- Environmental complaints and correspondence received from the public and employees;

- Incidents that cause harm or may cause harm to the environment;
- All transgressions against the EMPr, EA and all applicable permits;
- Flora and Fauna Monitoring;
- Water usage;
- Electrical usage; and
- Waste generation, disposal and recycling.

The above records will form an integral part of the ECO's reports and records thereof maintained for the duration of the project. These records will be kept with the EMPr and conditions of the environmental authorisation, and will be made available for scrutiny if so requested by the Site Manager or his delegate and the ECO.

The contractor will ensure that the following information is recorded for all environmental complaints/incidents/emergencies:

- Date of complaint/incident/emergency;
- Contact details of the complainant;
- Location of complaint/incident/emergency;
- Nature of complaint/incident/emergency;
- Causes of complaint/incident/emergency;
- Party/parties responsible for causing complaint/incident/emergency;
- Immediate actions undertaken to stop/reduce/contain the causes of the complaint/incident/emergency;
- Additional corrective or remedial action taken and/or to be taken to address and to prevent reoccurrence of the complaint/incident/emergency;
- Timeframes and the parties responsible for the implementation of the corrective or remedial actions;
- Procedures to be undertaken and/or penalties to be applied if corrective or remedial actions are not implemented;
- Copies of all correspondence received regarding complaints/incidents/emergency; and
- Closure evidence.

6.6 PUBLIC COMPLAINTS

A signboard must be erected at the entrance to the project site, informing the public of the construction activities taking place. The signboard must include the following information:

- The name of the contractor; and
- The name and contact details of the site representative to be contacted in the event of emergencies or the location of the complaint registration.

7 ENVIRONMENTAL MANAGEMENT PROGRAMME

The EMPr contains guidelines, operating procedures, rehabilitation and pollution control requirements which will be binding to the onsite personnel working for, or on behalf of Esizayo. It is essential that the EMPr be carefully studied, understood, implemented and adhered to at all times.

In instances where the method statements provided by the contractor conflict with the EMPr, such conflicts will be discussed between the Site Manager, ECO and contractor and if unresolved the EMPr will take precedent.

To simplify the EMPr requirements, each column related to the EMPr tables has been described in **Monitoring**

The internal EO will monitor the day-to-day site activities on an ongoing basis and will produce weekly monitoring reports. The external ECO will undertake monthly audits to ensure compliance with the EMPr and conditions of the environmental authorisation during the construction activities, and will report to the Site Manager should any non-compliance be identified or corrective action deemed necessary.

During the operational phase, Esizayo will establish, implement and maintain a procedure to monitor and measure, on a regular basis, the key characteristics of the operations that may have a significant environmental impact. The procedure shall include the documenting of information to monitor performance, applicable operational controls and conformity with the operation's environmental objectives and targets.

Esizayo will ensure that all instruments and devices used for the measurement or monitoring are calibrated and appropriately operated and maintained. Calibration records must be kept on site or in close proximity to the equipment for ease of availability. All the conditions outlined in the EMPr (Section 8) will be subject to the required internal day-to-day monitoring and external compliance monitoring. Where required, any specific additional monitoring has been outlined in the EMPr (Section 8).

7.1 NON-CONFORMANCE AND CORRECTIVE ACTION

The auditing of the construction and operational activities may identify non-conformances to the EMPr and conditions of the environmental authorisation. Non-conformances may also be identified through incidents, emergencies or complaints recorded. In order to correct non-conformances, the source must be determined and corrective actions must be identified and implemented.

7.1.1 COMPLIANCE WITH THE EMPR AND CONDITIONS OF THE ENVIRONMENTAL AUTHORISATION

- A copy of the EMPr and conditions of the environmental authorisation will be available onsite at all times for the duration of the construction and operational activities;
- All persons employed by a contractor or their sub-contractors will abide by the requirements of the EMPr and conditions of the environmental authorisation;
- Any members of the workforce found to be in breach of any of the specifications contained within the EMPr and conditions of the environmental authorisation may be ordered by the Site Manager to leave the site. A contractor will not direct a person to undertake any activity which would place them in contravention of the specifications contained within the EMPr and conditions of the environmental authorisation;
- Should a contractor be in breach of any of the specifications contained in the EMPr and conditions of the environmental authorisation, the Site Manager will, in writing, instruct the contractor responsible for the incident of non-compliance regarding corrective and/or remedial action required, specify a timeframe for implementation of these actions, implement a penalty and/or indicate that work will be suspended should non-compliance continue;

- Should non-compliance continue, further written notification will be forwarded to the contractor responsible for the incident of non-compliance outlining the required corrective and/or remedial action, the timeframe for implementation, penalties and/or work will be suspended as specified previously; and
- Departmental officials will be given access to the property referred to in the EIR and EMPr for the purpose of assessing and/or monitoring compliance with the EMPr and conditions of the environmental authorisation, at all reasonable times.

7.1.2 DUTY OF CARE

All personnel involved with the construction and operational activities onsite will be responsible for implementing measures to prevent pollution or degradation of the environment from occurring, continuing or recurring. Insofar as such harm to the environment is authorised by law, or cannot reasonably be avoided or stopped, personnel shall minimise and rectify such pollution or degradation of the environment.

7.2 DOCUMENTATION AND REPORTING

The following documentation must be kept onsite by the EO in order to record compliance with the EMPr and conditions of the environmental authorisation:

- Record of complaints; and
- Record of emergencies and incidents.

The contractor will be required to report on the following:

- Environmental incidents involving contractor/ employees and/or the public;
- Environmental complaints and correspondence received from the public and employees;
- Incidents that cause harm or may cause harm to the environment;
- All transgressions against the EMPr, EA and all applicable permits;
- Flora and Fauna Monitoring;
- Water usage;
- Electrical usage; and
- Waste generation, disposal and recycling.

The above records will form an integral part of the ECO's reports and records thereof maintained for the duration of the project. These records will be kept with the EMPr and conditions of the environmental authorisation, and will be made available for scrutiny if so requested by the Site Manager or his delegate and the ECO.

The contractor will ensure that the following information is recorded for all environmental complaints/incidents/emergencies:

- Date of complaint/incident/emergency;
- Contact details of the complainant;
- Location of complaint/incident/emergency;
- Nature of complaint/incident/emergency;
- Causes of complaint/incident/emergency;
- Party/parties responsible for causing complaint/incident/emergency;
- Immediate actions undertaken to stop/reduce/contain the causes of the complaint/incident/emergency;
- Additional corrective or remedial action taken and/or to be taken to address and to prevent reoccurrence of the complaint/incident/emergency;
- Timeframes and the parties responsible for the implementation of the corrective or remedial actions;
- Procedures to be undertaken and/or penalties to be applied if corrective or remedial actions are not implemented;

- Copies of all correspondence received regarding complaints/incidents/emergency; and
- Closure evidence.

7.3 PUBLIC COMPLAINTS

A signboard must be erected at the entrance to the project site, informing the public of the construction activities taking place. The signboard must include the following information:

- The name of the contractor; and
- The name and contact details of the site representative to be contacted in the event of emergencies or the location of the complaint registration.

8 ENVIRONMENTAL MANAGEMENT PROGRAMME

The EMPr identifies various actions which are undertaken throughout the construction and operational phases. Not every action will be required during the entire course of activities. Therefore, the actions identified in the EMPr have been given priority timeframes for proposed implementation.

Table 8-1: Structure of EMPr

COLUMN	DESCRIPTION
Activity / Impact	Highlights the various activities/aspects associated with the project i.e. the contractors' activities that will interact with the environment. Each impact / activity is cross referenced to the impacts identified in the BA report.
Mitigation and Management Measures	Indicates the actions required to prevent and/or minimise the potential impacts on the environment that are associated with the project
Responsibility	Indicates the party responsible for implementing the environmental measures and action plans laid out in the EMPr. Please note that the site manager will have authority to stop works if/as necessary
Development Phase	Indicates during which phase of development the actions for the specific aspect must be implemented and/or monitored
Condition of Authorisation	Indicates whether the specific mitigation measures should or should not be included as a condition in the Environmental authorisation
Additional Monitoring Requirements	Indicates the method and frequency of any additional monitoring requirements over and above the day-to-day monitoring undertaken by the EO and the monthly compliance monitoring undertaken by the ECO.

The following assumptions have been made in the development of the environmental specification in this EMPr:

- An electronic environmental file containing the information/documentation required by this EMPr is to remain onsite and to be made available at the request of the auditor or similar monitoring body; and
- For ease of reference, any person(s) employed to assist in the project i.e. contractors, sub-contractor and permanent and temporary staff, will be collectively referred to as 'onsite personnel'.

8.1 CONTRACTOR LAYDOWN AREA AND SITE ACCESS

8.1.1 OBJECTIVES

To implement measures to minimise impacts on the environment from the initiation of construction activities through planning, careful site access route selection and implementation of mitigation measures.

8.1.2 INDICATOR AND COMPLIANCE MECHANISMS

The following indicator and compliance mechanisms are applicable:

- Health, safety, environmental and community incident and complaints management system register;
- Close-out on incidents, non-conformances and audit findings;
- Monitoring and audit reports;
- Inductions training and register; and
- Environmental awareness programme/toolbox talks.

8.1.3 MITIGATION AND MANAGEMENT MEASURES

IMPACT / ACTIVITY	MITIGATION AND MANAGEMENT MEASURE	RESPONSIBLE PERSON	APPLICABLE DEVELOPMENT PHASE	INCLUDE AS CONDITION OF AUTHORISATION	ADDITIONAL MONITORING REQUIREMENTS
Project Initiation of Construction Activities	Construction activities to remain within demarcated project footprint	ECO Contractor Project Manager	Construction	No	No additional monitoring required.
	Site clearing and topsoil removal must be limited to the footprint of the infrastructure requirements				

IMPACT / ACTIVITY	MITIGATION AND MANAGEMENT MEASURE	RESPONSIBLE PERSON	APPLICABLE DEVELOPMENT PHASE	INCLUDE AS CONDITION OF AUTHORISATION	ADDITIONAL MONITORING REQUIREMENTS
	Clearly mark health and/or safety hazards onsite				
	Locate firefighting measures onsite, such as fire extinguishers, and make personnel aware of fire prevention and firefighting measures.				
	Firefighting equipment must be securely placed and inspected monthly				
	Undertake fuel and chemical management for storage, handling and spillages in accordance Section 6.3.				
	Manage surface and groundwater impacts as per Water Management section.				

8.2 VEHICLE, EQUIPMENT AND MACHINERY MANAGEMENT

8.2.1 OBJECTIVES

To implement measures to minimise impacts on the environment from poorly maintained equipment, machinery and vehicles onsite.

8.2.2 INDICATOR AND COMPLIANCE MECHANISMS

The following indicator and compliance mechanisms are applicable:

— Health, safety, environmental and community incident and complaints management system register;

- Close-out on incidents, non-conformances and audit findings;
- Monitoring and audit reports;
- Transport route delineation;
- Daily equipment, machinery and vehicle checklists; and
- Incident classification and reporting procedure.

8.2.3 MITIGATION AND MANAGEMENT MEASURES

IMPACT / ACTIVITY	MITIGATION AND MANAGEMENT MEASURE	RESPONSIBLE PERSON	APPLICABLE DEVELOPMENT PHASE	INCLUDE AS CONDITION OF AUTHORISATION	ADDITIONAL MONITORING REQUIREMENTS
Vehicle and Equipment Maintenance	Undertake all significant vehicle maintenance work off-site at a registered workshop. Evidence of such maintenance must be recorded and maintained onsite for verification.	EO ECO Contractor Operator	Construction Operation De-commissioning	No	No additional monitoring required.
	Minor maintenance can be undertaken onsite within a designated area on a hard standing.				
	Utilise drip trays under all stationary vehicles and equipment.				
Operation of Equipment, Machinery and Vehicles	Adequately maintain equipment, machinery and vehicles so as to reduce the potential for spillages of oil, diesel, fuel or hydraulic fluid, as well as to ensure road-worthiness. Evidence of such maintenance must be recorded and maintained onsite for verification.				
	Large loads must be secured before entering the local road network.				
	Increase visibility of heavy vehicles by utilising sufficient reflectors and activating headlights during operation				

IMPACT / ACTIVITY	MITIGATION AND MANAGEMENT MEASURE	RESPONSIBLE PERSON	APPLICABLE DEVELOPMENT PHASE	INCLUDE AS CONDITION OF AUTHORISATION	ADDITIONAL MONITORING REQUIREMENTS
	Do not allow machinery or plant equipment used onsite to pose a pollution hazard. The contractor must order any equipment to be repaired or withdrawn from use if evident that it is not operating optimally. The contractor shall inspect all vehicles, machinery and equipment every morning for defects (indicator lights, oil leaks, etc.) and excessive emissions				
	Identify and use transport routes that will least impact local road users and traffic i.e. routes which minimise right turns across traffic. Identified routes must be documented and made available for inspection on request.				
	Avoid heavy vehicle use on the local road network during peak hours i.e. 07h00 – 08h00 and 16h00 – 17h00				
	Undertake fuel and chemical management for storage, handling and spillages in accordance with the Fuel and Chemical Management section				
	Manage air quality as per the Air Quality section below (Section 6.9)				

8.3 FUEL AND CHEMICAL MANAGEMENT

8.3.1 OBJECTIVES

To ensure the correct storage and handling of fuels and chemicals in order to prevent impacts to the surrounding environment

8.3.2 INDICATOR AND COMPLIANCE MECHANISMS

The following indicator and compliance mechanisms are applicable:

- Maintenance records;
- Safe Disposal certificates (if applicable);
- Material safety data sheets;
- Health, safety, environmental and community incident and complaints management system register;
- Chemicals management procedure (to be developed);
- Waste management procedure (to be developed);
- Monitoring and audit reports; and
- Training records.

8.3.3 MITIGATION AND MANAGEMENT MEASURES

IMPACT / ACTIVITY	MITIGATION AND MANAGEMENT MEASURE	RESPONSIBLE PERSON	APPLICABLE DEVELOPMENT PHASE	INCLUDE AS CONDITION OF AUTHORISATION	ADDITIONAL MONITORING REQUIREMENTS
Fuel and Chemical Management	Undertake fuel and chemical management for storage, handling and spillages in accordance with an Incident Classification and Reporting Procedure	ECO Contractor Operator	Construction Operation	No	No additional monitoring required.
	Indicate the location of the fuel and chemical storage area on the layout plans				
	Securely fence and lock the storage areas to accommodate all hazardous substances such as fuel, oils and chemicals. The storage area must be covered and the floor must be an impermeable surface and suitably bunded as per the requirements outlined in SANS 10089-1 (2008)				

IMPACT / ACTIVITY	MITIGATION AND MANAGEMENT MEASURE	RESPONSIBLE PERSON	APPLICABLE DEVELOPMENT PHASE	INCLUDE AS CONDITION OF AUTHORISATION	ADDITIONAL MONITORING REQUIREMENTS
	Develop and implement a procedure for the management of all hydrocarbon spillages				
	Maintain oil traps or interceptors on a regular basis and maintain records				
	Develop and implement a procedure for the storage and handling of chemicals, hydrocarbon materials and hazardous substances onsite. The procedure must ensure adherence to the Hazardous Substances Act (No. 15 of 1973) and its relevant regulations.				
	Label all liquids (chemicals and hydrocarbons) stored onsite for easy identification. Safety data sheets (SDS) for onsite chemicals, hydrocarbon materials and hazardous substances must be readily available. SDSs must include mitigation measures to ameliorate potential environmental impacts which may result from a spill, incorporating health and safety mitigation measures				
	Keep fuels, oils or other chemicals used outside of the bunded area to a minimum and use suitable secondary containment in the form of drip trays.				
Health and Safety	Display “no smoking” and “no naked flame” signs in and around the project area, as well as near the hazardous material store	EO ECO Contractor Operator	Construction Operation De-commissioning	No	No additional monitoring required.
	Strategically place the correct types of fire extinguishers onsite and near the hazardous material store. Train key personnel on basic firefighting skills				

IMPACT / ACTIVITY	MITIGATION AND MANAGEMENT MEASURE	RESPONSIBLE PERSON	APPLICABLE DEVELOPMENT PHASE	INCLUDE AS CONDITION OF AUTHORISATION	ADDITIONAL MONITORING REQUIREMENTS
	Frequently inspect and maintain containment facilities and retain records onsite				

8.4 WASTE MANAGEMENT

8.4.1 OBJECTIVES

To ensure the correct handling, storage, transportation and disposal of general waste and hazardous waste.

8.4.2 INDICATOR AND COMPLIANCE MECHANISMS

The following indicator and compliance mechanisms are applicable:

- Induction training and records;
- Material safety data sheets;
- Waste Management Procedure (to be developed);
- Relevant SANS Codes of Practice;
- Safety disposal certificates and waste manifests (all waste streams);
- Emergency preparedness and response procedure (to be developed);
- Incident classification and reporting management procedure (to be developed);
- Waste manifest documentation;
- Health, safety, environmental and community incident and complaints management system register; and
- Monitoring and audit reports.

8.4.3 MITIGATION AND MANAGEMENT MEASURES

IMPACT / ACTIVITY	MITIGATION AND MANAGEMENT MEASURE	RESPONSIBLE PERSON	APPLICABLE DEVELOPMENT PHASE	INCLUDE AS CONDITION OF AUTHORISATION	ADDITIONAL MONITORING REQUIREMENTS
General Waste Management	General waste generated as a result of construction and operational activities must be managed in accordance with a Waste Management Procedure	EO ECO Contractor Operator	Construction Operation De-commissioning	Yes	No additional monitoring required.
	Train and inform all onsite personnel regarding general waste minimisation, management and disposal as per the Waste Management Procedure			No	
	Prohibit littering and burning of waste onsite				
	Place an adequate number of general waste bins around the site during construction and operational activities in order to minimise littering. The bins must be suitably labelled "General Waste" to prevent mixing of waste. The bins must be removed from the site on a regular basis for disposal at a registered or licensed disposal facility				
	Retain records of appropriate waste manifest documentation and safety disposal certificates associated with general waste removal, transportation and disposal				
	Prohibit the mixing of general waste with hazardous waste. Should general waste be mixed with hazardous waste, it will be considered hazardous waste				
	Recover, recycle and reuse waste of general waste as far as possible.				

IMPACT / ACTIVITY	MITIGATION AND MANAGEMENT MEASURE	RESPONSIBLE PERSON	APPLICABLE DEVELOPMENT PHASE	INCLUDE AS CONDITION OF AUTHORISATION	ADDITIONAL MONITORING REQUIREMENTS
Hazardous Waste Management	Hazardous waste generated as a result of construction, operational and de-commissioning activities must be managed in accordance with a Waste Management Procedure.	EO ECO Contractor Operator	Construction Operation De-commissioning	Yes	No additional monitoring required.
	The Waste Management Procedure must include a procedure for handling spillages.				
	Train and inform all onsite personnel regarding hazardous waste minimisation, management and disposal as per the Waste Management Procedure			No	
	A designated and appropriately demarcated and covered hazardous waste storage area must be established on a hard standing area (SANS 10089-1 (2008)).				
	Ensure that all hazardous wastes temporarily stored on site are stored in a covered skip and are placed on a hard standing				
	Clean areas where hazardous waste spills have occurred and dispose of the hazardous material appropriately. Key personnel must be trained on handling spillages.				
	Retain records of appropriate safety disposal certificates associated with hazardous waste removal, transportation and disposal				

IMPACT / ACTIVITY	MITIGATION AND MANAGEMENT MEASURE	RESPONSIBLE PERSON	APPLICABLE DEVELOPMENT PHASE	INCLUDE AS CONDITION OF AUTHORISATION	ADDITIONAL MONITORING REQUIREMENTS
	Ensure cognisance of the following SANS codes of practice: — SANS 10234: Classification and Labelling of Chemicals — SANS 10228: The Identification and Classification of Dangerous Substances — SANS 10229: Packing of Dangerous Goods for Road and Rail Transportation				
	Manage all liquid hazardous waste spillages as per the Waste Management Procedure				
	An emergency preparedness and response plan is to be developed by the contractor/operator for any hazardous waste being removed, transported and disposed of offsite				
	Ensure that waste manifest documentation (as per the draft Classification and Management Regulations, GNR.614 of 2012) is prepared and maintained for the generation, transportation and disposal of hazardous waste				

8.5 SOIL AND LAND MANAGEMENT

8.5.1 OBJECTIVES

To prevent any disturbance, erosion or contamination of soil resources

8.5.2 INDICATOR AND COMPLIANCE MECHANISMS

The following indicator and compliance mechanisms are applicable:

- Induction training and records;
- Waste Management Procedure (to be developed);
- Incident Classification and Reporting Management Procedure (to be developed);
- Health, safety, environmental and community incident and complaints management system register;
- Monitoring and audit reports; and
- Stormwater Management Plan.

8.5.3 MITIGATION AND MANAGEMENT MEASURES

IMPACT / ACTIVITY	MITIGATION AND MANAGEMENT MEASURE	RESPONSIBLE PERSON	APPLICABLE DEVELOPMENT PHASE	INCLUDE AS CONDITION OF AUTHORISATION	ADDITIONAL MONITORING REQUIREMENTS
Change in land use due to vegetation clearance and establishment of infrastructure	Limit earthworks and vehicle movement to demarcated paths and areas.	EO ECO Contractor Operator	Construction	No	No additional monitoring required.
	Limit removal of vegetation to demarcated areas only				
	Rehabilitate disturbed areas around the poles as soon as practicable following disturbance thereof.				
Increased potential for soil erosion due to vegetation clearance, soil disturbance and	Limit earthworks and vehicle movement to demarcated paths and areas.	EO ECO Contractor	Construction, Operational	No	
	Limit the duration of construction activities where possible, especially those involving earthwork / excavations.				

IMPACT / ACTIVITY	MITIGATION AND MANAGEMENT MEASURE	RESPONSIBLE PERSON	APPLICABLE DEVELOPMENT PHASE	INCLUDE AS CONDITION OF AUTHORISATION	ADDITIONAL MONITORING REQUIREMENTS
high traffic movement on site.	Access roads associated with the development should have gradients or surface treatment to limit erosion, and road drainage systems should be accounted for.	Operator			
	Removal of vegetation must be avoided and exposed surfaces and should be re-vegetated or stabilised as soon as is practically possible.				
	A storm water management plan should be designed for the site and adhered-to.				
	Soil stripping should be undertaken in the dry season, if necessary, and silt fences erected if unexpected weather washes loose soil into the relatively nearby watercourse				
	Gabions or Reno Mattresses should be used where evidence of erosion is present.				
	Upon completion of construction, the laydown areas and construction camp sites are to be rehabilitated.				
	The site should be monitored for signs of erosion continually and an erosion management plan should be put in place.				

IMPACT / ACTIVITY	MITIGATION AND MANAGEMENT MEASURE	RESPONSIBLE PERSON	APPLICABLE DEVELOPMENT PHASE	INCLUDE AS CONDITION OF AUTHORISATION	ADDITIONAL MONITORING REQUIREMENTS
Potential spillage of hazardous substances such as oils, fuel, grease from construction and operational vehicles, and sewage from on-site sanitation systems	The proper handling and storage of hazardous materials, the use of hardstanding in storage areas of hazardous substances and where spillages are possible. The use of bunding around storage of hazardous materials and proper upkeep of machinery and vehicles. A complete spill kit must be onsite at all times.	ECO Contractor Operator	Construction, Operational Decommissioning	No	
Stockpile Management	Adequately maintain stockpiled material to prevent becoming the source air pollution (windblown dust)	EO ECO Contractor	Construction	No	
	Level and shape the area designated for the deposition of stockpiled material to ensure the efficient drainage of the site. No general or hazardous waste may be disposed of at this site				
	Stormwater control systems must be implemented within the site and must be managed and maintained to ensure no contamination of soil reserves				
Soil and Land Management	Soils excavated during construction of the facility must be appropriately stored in stockpiles which are protected so as to limit the loss of soils. The stockpile shall be located away from seepage zones, floodlines, water courses and other ecological sensitive areas (drainage lines).	EO ECO Contractor	Construction	No	
	Opting for pole positions where a smaller profile change is necessary				

IMPACT / ACTIVITY	MITIGATION AND MANAGEMENT MEASURE	RESPONSIBLE PERSON	APPLICABLE DEVELOPMENT PHASE	INCLUDE AS CONDITION OF AUTHORISATION	ADDITIONAL MONITORING REQUIREMENTS
	Topsoil is expected to have a higher fertility than the subsoil horizons, and contains the vegetation seeds. As a result, the topsoil must be stored separately from the subsoils. Topsoil stock piles must be designated and not higher than 2m.				
	Due to the potential for soil compaction due to vehicles, traffic must be limited to existing or proposed roadways as far as possible.				
	The construction of roads must be limited in width and length as far as is practical to limit impacts.				
	Where soil compaction outside of the designated development areas occurs, this needs to be rehabilitated to the pre-development soil permeability to maintain infiltration				
	Vegetation removal must be kept to a minimum and limited to the area of development				
	Where an impact to the vegetation outside of the development footprint occurs, rehabilitation measures must be undertaken to maintain the baseline vegetation population and health				
	Once the operations have concluded, the stockpiled soils must be returned to the impacted land to reinstate the land capability, with topsoil being returned as the top layer. If necessary, soil amelioration in the form of fertilisers may be required to return the fertility to baseline conditions. To limit erosion, it must be ensured that the soils are rehabilitated to their pre-development characteristics as far as is practicable to ensure infiltration and vegetation rooting.	EO ECO Contractor Operator	Construction Operation Decommissioning		

IMPACT / ACTIVITY	MITIGATION AND MANAGEMENT MEASURE	RESPONSIBLE PERSON	APPLICABLE DEVELOPMENT PHASE	INCLUDE AS CONDITION OF AUTHORISATION	ADDITIONAL MONITORING REQUIREMENTS
	When the site is decommissioned, the surface profile thereof can be altered to more closely resemble its current profile through earthworks				
	The ECO or a suitably qualified ecologist must be appointed to monitor the rehabilitation and to ensure that the vegetation health is returned to the baseline health where practically feasible				
	Erosion observed (both on- and off-site) must be rehabilitated, with mitigation measures adopted in high risk areas (i.e. gabions, gabion mattresses)				
	Machinery must be regularly checked to ensure hydrocarbon leaks (including fuel and hydraulic fluids) are not occurring. Drip trays must be used where necessary. In addition, during the filling of vehicles this must be undertaken in a designated area where any spills are contained. Fuels and oils must be stored within bunded areas. Parking areas for staff vehicles must ideally be placed on hardstanding (e.g. asphalt) to limit the impacts of oil leaks to the soil environment				
	Sufficient on-site ablutions must be made available during site construction and decommissioning				
	Weed and invader species growth needs to be appropriately monitored and managed, both during the site construction, operation and after decommissioning				

IMPACT / ACTIVITY	MITIGATION AND MANAGEMENT MEASURE	RESPONSIBLE PERSON	APPLICABLE DEVELOPMENT PHASE	INCLUDE AS CONDITION OF AUTHORISATION	ADDITIONAL MONITORING REQUIREMENTS
	The decommissioning and rehabilitation measures must be phased to limit areas of exposed soil. Vegetation must be reintroduced during rehabilitation as soon as possible to limit erosion	EO Project Manager Operator	Decommissioning		

8.6 WATER MANAGEMENT

8.6.1 OBJECTIVES

- To implement measures to prevent the contamination on surface and groundwater resources; and
- To prevent erosion and loss of topsoil.

8.6.2 INDICATOR AND COMPLIANCE MECHANISMS

The following indicator and compliance mechanisms are applicable:

- Induction training and records;
- Waste Management Procedure (to be developed);
- Incident classification and reporting management procedure (to be developed);
- Water Use License;
- Environmental awareness programme/toolbox talks; and
- Stormwater management plan (to be developed).

8.6.3 MITIGATION AND MANAGEMENT MEASURES

IMPACT / ACTIVITY	MITIGATION AND MANAGEMENT MEASURE	RESPONSIBLE PERSON	APPLICABLE DEVELOPMENT PHASE	INCLUDE AS CONDITION OF AUTHORISATION	ADDITIONAL MONITORING REQUIREMENTS
Alterations of flow regimes of watercourses, in close proximity to the site, or that is proposed to be traversed.	Conduct a pre-construction inspection to identify Red List species that may be breeding within the project footprint to ensure that the impacts to breeding species (if any) are adequately managed.	ECO Contractor Operator Surface Water and Aquatic Specialists	Planning and Design Construction Operation Decommissioning	Yes	A freshwater habitat specialist must conduct an in-depth site walkover prior to the construction phase commencing to assess the area for any Red List species that may be breeding within the project footprint which may be affected by the actions conducted during the construction phase (e.g. road construction, trenching, etc.). Any identified systems must be visibly demarcated
	No water should be abstracted from the wetland area or watercourse. Ideally water required during the construction phase must be sourced from an external source (i.e. outside of the wetland contributing area).				
	Existing access routes should be utilised. Should access roads need to traverse watercourse, these should be perpendicular to the watercourse with appropriately designed culverts.				
	It is recommended that, where possible, laydown areas and construction camps are to be developed outside the riparian zone or 100m from a watercourse, whichever is greatest.				
	The pole sites should be contoured to allow for surface water to readily drain away (as it would under natural conditions) and to prevent ponding of water within areas where it would not have ponded before the construction activities.				
	Vegetation clearing, soil stripping and major earthmoving activities must be phased to minimise the extent of bare soils surfaces exposed at any one time. Ideally, this should be undertaken during the dry season.				
	If possible, construction activities should be undertaken during the dry season.				

IMPACT / ACTIVITY	MITIGATION AND MANAGEMENT MEASURE	RESPONSIBLE PERSON	APPLICABLE DEVELOPMENT PHASE	INCLUDE AS CONDITION OF AUTHORISATION	ADDITIONAL MONITORING REQUIREMENTS
Surface Water Management	To appropriately manage storm water, the Storm Water Management Plan needs to be implemented, including the following recommendations incorporating measures outlined in the DWA GN704 and Best Practice Guidelines as well as on-site observations: — To prevent contamination, it must be ensured that there is no storage and handling of materials (i.e. raw materials, product and waste material) within the designated "clean areas" — All channels must be checked monthly and after any major rainfall events to ensure that there are no blockages and that the water will not be restricted in any way — Spills must be appropriately managed on site, including within the bunds — At the outlet of the stormwater channel discharging to the environment, erosion protection is required To reduce the velocity of runoff generated from site, velocity dissipation infrastructure must be constructed at the point of stormwater discharge to the environment. Any areas of erosion must be suitably rehabilitated	Project Manager ECO Contractor Operator	Planning Construction Operation	Yes	No additional monitoring required.
Groundwater Management	Areas with the potential to contaminate the groundwater must be underlain by hardstanding of suitable integrity.	EO ECO Contractor Operator	Construction Operation	No	
Potable Water Management	Onsite staff are to be provided with an appropriate potable water supply, safe and healthy sanitary facilities and protection against exposure to environmentally dangerous or unhealthy situations or conditions.				
	Onsite staff must be made aware and encouraged to use water sparingly such that there is no water wastage.				

IMPACT / ACTIVITY	MITIGATION AND MANAGEMENT MEASURE	RESPONSIBLE PERSON	APPLICABLE DEVELOPMENT PHASE	INCLUDE AS CONDITION OF AUTHORISATION	ADDITIONAL MONITORING REQUIREMENTS
Water quality of wetlands	Areas for waste disposal should be clearly demarcated and should be bunded and on hard standing. These areas should be located outside the riparian zone or 100m from a watercourse, whichever is greatest.	EO ECO Contractor Operator	Construction Operation	No	No additional monitoring required.
	Ensure that no equipment is washed in the streams and wetlands of the area, and if washing facilities are provided, that these are located outside the riparian zone or 100m from a watercourse, whichever is greatest.				
	Procedures for containment of leaks/spills as well as associated emergency response plans should be developed.				
	Machinery and equipment must be inspected regularly for faults and possible leaks. If required, servicing of these should occur off outside the riparian zone or 100m from a watercourse, whichever is greatest.				
	Potential contaminants used and stored at the proposed project site should be stored and prepared on bunded surfaces to contain spills and leaks.				
	Adequate ablution facilities should be developed and located outside the riparian zone or 100m from a watercourse, whichever is greatest.				
Loss Of Wetland And Riparian Functionality	Areas for waste disposal should be clearly demarcated and should be bunded and on hard standing. These areas should be located outside the riparian zone or 100m from a watercourse, whichever is greatest.	EO ECO Contractor Operator	Construction	No	No additional monitoring required.
	A layout plan must be compiled indicating the limits of disturbance associated with the proposed infrastructure in relation to the identified sensitive areas (i.e. wetlands). No-go areas and any stormwater infrastructure must be indicated on this plan together with erosion and sediment, controls and measures				

IMPACT / ACTIVITY	MITIGATION AND MANAGEMENT MEASURE	RESPONSIBLE PERSON	APPLICABLE DEVELOPMENT PHASE	INCLUDE AS CONDITION OF AUTHORISATION	ADDITIONAL MONITORING REQUIREMENTS
	Stringing should make use of a running block and span, limiting intrusion into the freshwater habitat systems.				
	The pole sites should be contoured to allow for surface water to readily drain away (as it would under natural conditions) and to prevent ponding of water within areas where it would not have ponded before the construction activities.				
	The identified wetlands and riparian areas are to be designated as “highly sensitive”.				
	Existing access routes must be utilised.				
	Should the need for additional access routes arise, these should be perpendicular to the watercourse and developed with appropriately sized culvers.				
	Planning the location of poles should factor in the wetlands and riparian areas, with pole placement taking place outside these systems.				
	In the event that poles or access roads need to be placed within the wetland or riparian systems, an application for a Water Use Licence (WUL) in terms of Section 21 of the National Water Act (NWA) (Act 36 of 1998) must be undertaken.				

8.7 BIODIVERSITY MANAGEMENT

8.7.1 OBJECTIVES

To ensure that impacts to the biodiversity (fauna and flora) of the surrounding environment are ameliorated

8.7.2 INDICATOR AND COMPLIANCE MECHANISMS

The following indicator and compliance mechanisms are applicable:

- Induction training and records;
- Incident Classification and Reporting Management Procedure (to be developed);
- Environmental awareness programme/toolbox talks; and
- Biodiversity monitoring procedure (to be developed).

8.7.3 MITIGATION AND MANAGEMENT MEASURES

IMPACT / ACTIVITY	MITIGATION AND MANAGEMENT MEASURE	RESPONSIBLE PERSON	APPLICABLE DEVELOPMENT PHASE	INCLUDE AS CONDITION OF AUTHORISATION	ADDITIONAL MONITORING REQUIREMENTS
General	A hydrocarbon spill management plan must be put in place to ensure that should there be any chemical spill out or over that it does not run into the surrounding areas. The Contractor shall be in possession of an emergency spill kit that must always be complete and available on site. Drip trays or any form of oil absorbent material must be placed underneath vehicles/machinery and equipment when not in use. No servicing of equipment on site unless necessary. All contaminated soil / yard stone shall be treated in situ or removed and be placed in containers. Appropriately contain any generator diesel storage tanks, machinery spills (e.g., accidental spills of hydrocarbons oils, diesel etc.) in such a way as to prevent them leaking and entering the environment.	EO ECO Contractor	Construction Operation	No	No additional monitoring required
	Leaking equipment and vehicles must be repaired immediately or be removed from project area to facilitate repair.				
	A Fire Management Plan needs to be compiled to restrict the impact of fire. This is especially concerning stochastic fire events such as discarding of lit cigarette butts and/or glowing embers from cooking fires. The fire management plan must ensure that natural fire regimes of the surrounding vegetation is not affected.				
	Dust control measures to be implemented such as wetting of road surfaces and properly managed stockpiles.				
	Development and implementation of an Erosion Management Programme				
	Poaching of plants must not be tolerated and made a punishable offence.				

IMPACT / ACTIVITY	MITIGATION AND MANAGEMENT MEASURE	RESPONSIBLE PERSON	APPLICABLE DEVELOPMENT PHASE	INCLUDE AS CONDITION OF AUTHORISATION	ADDITIONAL MONITORING REQUIREMENTS
	Speed control measures must be implemented.				
	Noise must be kept to an absolute minimum during the evenings and at night to minimize all possible disturbances to amphibian species and nocturnal mammals.				
	No trapping, killing, or poisoning of any wildlife is to be allowed. Signs must be put up to enforce this and must be made a punishable offence.				
	The duration of the construction should be minimized to as short term as possible, to reduce the period of disturbance on fauna.				
	Outside lighting should be designed and limited to minimize impacts on fauna. Fluorescent and mercury vapor lighting should be avoided, and sodium vapor (yellow) lights should be used wherever possible.				
	Development and implementation of a Waste Management Plan				
Loss Of Habitat Due To Infrastructure Development It is further recommended that a qualified Biodiversity specialist is present	Designs capacity must be kept to a minimum feasibility in Very High SEI areas, with set-aside areas created in support of conservation	EO ECO Contractor	Construction	Yes	No additional monitoring required
	Areas of indigenous vegetation, even secondary communities outside of the direct project footprint, should under no circumstances be fragmented or disturbed further.				
	Minimise (preferably avoid) disturbances to rocky habitats, these areas must be managed as no-go areas.				

IMPACT / ACTIVITY	MITIGATION AND MANAGEMENT MEASURE	RESPONSIBLE PERSON	APPLICABLE DEVELOPMENT PHASE	INCLUDE AS CONDITION OF AUTHORISATION	ADDITIONAL MONITORING REQUIREMENTS
during all clearance activities	Areas that are denuded during construction need to be re-vegetated with indigenous vegetation to prevent erosion. This will also reduce the likelihood of encroachment by alien invasive plant species. Topsoil must also be utilised, and any disturbed area must be re-vegetated with plant and grass species which are indigenous to this vegetation type.				
	Several Search and Rescue operations must occur in the proposed infrastructure footprint to ensure that species are relocated to proximal natural areas.				
	A Walk-through Survey must be undertaken to enable micro-siting of infrastructure so that it does not overlap SCC				
	A qualified Biodiversity specialist is present during initial clearance activities, as well as adhoc visits. The Biodiversity specialist will provide relevant training to the on-site ECO to be present at all clearance activities. Furthermore, the ECO will be required to directly communicate with the biodiversity specialist after each clearing event.				
	Relocation can occur within the surrounding areas but at least 500 m from areas directly influenced by development infrastructure. An additional survey must be undertaken within the southern exclusion area to determine the presence of SCC and the feasibility of relocating species to this area in order to reduce the probability of loss from the main project area.				
Loss Of Flora Species Of Conservation Concern (SCC)	Areas with threatened flora species should be avoided.	EO ECO Contractor	Construction	Yes	No additional monitoring required
	The areas to be developed must be specifically demarcated to prevent movement into surrounding environments.				

IMPACT / ACTIVITY	MITIGATION AND MANAGEMENT MEASURE	RESPONSIBLE PERSON	APPLICABLE DEVELOPMENT PHASE	INCLUDE AS CONDITION OF AUTHORISATION	ADDITIONAL MONITORING REQUIREMENTS
	Areas of indigenous vegetation, even secondary communities outside of the direct project footprint, should under no circumstances be fragmented or disturbed further.				
	Areas that are denuded during construction need to be re-vegetated with indigenous vegetation to prevent erosion. This will also reduce the likelihood of encroachment by alien invasive plant species. Topsoil must also be utilised, and any disturbed area must be re-vegetated with plant and grass species which are indigenous to this vegetation type.				
	A Walk-through Survey must be undertaken to enable micro-siting of infrastructure so that it does not overlap SCC.				
	Several Search and Rescue operations must occur in the proposed infrastructure footprint to ensure that species are relocated to proximal natural areas.				
Direct Mortality Of Fauna Including Species Of Conservation Concern (SCC) Due To Roadkill, Blasting And Earthworks	Several Search and Rescue operations must occur in the proposed infrastructure footprint to ensure that species are relocated to proximal natural areas.	EO ECO Contractor	Construction	Yes	No additional monitoring required
	Relocation can occur within the surrounding areas but at least 500 m from areas directly influenced by development infrastructure. An additional survey must be undertaken within the southern exclusion area to determine the presence of SCC and the feasibility of relocating species to this area in order to reduce the probability of loss from the main project area				
	Minimise (preferably avoid) disturbances to rocky habitats, these areas must be managed as no-go areas.				

IMPACT / ACTIVITY	MITIGATION AND MANAGEMENT MEASURE	RESPONSIBLE PERSON	APPLICABLE DEVELOPMENT PHASE	INCLUDE AS CONDITION OF AUTHORISATION	ADDITIONAL MONITORING REQUIREMENTS
	The developer must fund or partially-fund and enable research into the biology and ecology of *Chersobius boulengeri* within their project areas. The research must include pre-construction, construction and operational phase spatial ecology and behaviour. The developer along with a research institution should devise a study plan with relevance to long-term survivability				
	A species management plan must be developed for the *Chersobius boulengeri (*Karoo Dwarf tortoise*)*				
Encroachment Of Disturbed Areas By Invasive Alien Plants (IAPs)	An Invasive Alien Plant Management Programme must be developed and implemented.	EO ECO Contractor	Construction Operation	No	No additional monitoring required
	Erosion Control Programme must be developed and implemented.				
	All denuded areas to be rehabilitated using local indigenous species.				
	A pest control plan must be put in place and implemented; it is imperative that poisons not be used due to the presence of indigenous fauna.				
Behavioural Changes And Emigration Of The Fauna Community Due To Disturbance From Noise And Vibration Pollution	Night time construction related activities must be avoided as far as possible to limit impacts to amphibians.	EO ECO Contractor	Construction Operation	No	No additional monitoring required
	Unauthorised staff and contractors are not allowed to go beyond their specific demarcated working areas.				

IMPACT / ACTIVITY	MITIGATION AND MANAGEMENT MEASURE	RESPONSIBLE PERSON	APPLICABLE DEVELOPMENT PHASE	INCLUDE AS CONDITION OF AUTHORISATION	ADDITIONAL MONITORING REQUIREMENTS
Increase In Pied Crow (Corvus Albus) Density	Installation of anti-perching devices may impede the increase in density of Pied Crows due to increase in anthropogenic structures.	EO ECO Contractor	Operation	No	No additional monitoring required

8.8 BAT MANAGEMENT

8.8.1 OBJECTIVES

To ensure that impacts to bats are ameliorated.

8.8.2 INDICATOR AND COMPLIANCE MECHANISMS

The following indicator and compliance mechanisms are applicable:

- Induction training and records;
- Incident classification and reporting management procedure (to be developed);
- Environmental awareness programme/toolbox talks; and
- Bat monitoring procedure (to be developed)

8.8.3 MITIGATION AND MANAGEMENT MEASURES

IMPACT / ACTIVITY	MITIGATION AND MANAGEMENT MEASURE	RESPONSIBLE PERSON	APPLICABLE DEVELOPMENT PHASE	INCLUDE AS CONDITION OF AUTHORISATION	ADDITIONAL MONITORING REQUIREMENTS
Bat Management	The Esizayo WEF should be designed to avoid areas with known or anticipated high bat activity (such as along drainage lines).	Project Manager Contractor ECO	Construction	No	No additional monitoring required.
	Blasting should be minimised and used only when necessary. If blasting of a rocky area with crevices and cracks is necessary, a Bat Specialist must be consulted before blasting in order to determine whether a bat roost is present in the rocky area. The mitigation measures will reduce the impact blasting and earthworks will have on the environmental parameter, through avoiding sensitive areas				
	Keep to designated areas when storing building materials, resources, turbine components and/or construction vehicles and keep to designated roads with all construction vehicles. .				
	Damaged areas not required after construction should be rehabilitated by an experienced vegetation succession specialist				
	The mitigation measures will reduce the degree of habitat loss				

OPERATIONAL PHASE

The mitigation schedule outlined in the table below is based on the passive data collected. The data infers that mitigation be applied during the peak activity periods and times, and when the advised wind speed and temperature ranges are prevailing simultaneously (considering conditions in which 80% of bat activity occurred). Bat activity at 10m height of the Met Mast was used, with wind speed data at 38m and temperature data at 7.5 meters.

TERMS OF MITIGATION IMPLEMENTATION

Peak activity (times to implement curtailment/ mitigation)	22 October - 2 February From the time of sunset to 04:40
Environmental conditions in which to implement curtailment/ mitigation	Wind speed below 5.5m/s (measured at 38m above ground level) *and simultaneously* Temperature above 13°C
Peak activity (times to implement curtailment/ mitigation)	15 March – 4 April From the time of sunset to 05:20
Environmental conditions in which to implement curtailment/ mitigation	Wind speed below 6m/s (measured at 38m above ground level) *and simultaneously* Temperature above 12°C
Peak activity (times to implement curtailment/ mitigation)	25 August – 20 October From the time of sunset to 04:40
Environmental conditions in which to implement curtailment/ mitigation	Wind speed below 6.0m/s (measured at 38m above ground level) *and simultaneously* Temperature above 10°C

Mitigation options include curtailment, blade feathering, blade lock, acoustic deterrents or light lures. The following terminology applies:

- **Curtailment:**

  Curtailment is defined as the act of limiting the supply of electricity to the grid during conditions when it would normally be supplied. This is usually accomplished by locking or feathering the turbine blades.

- **Cut-in speed:**

  The cut-in speed is the wind speed at which the generator is connected to the grid and producing electricity. For some turbines, their blades will spin at full or partial RPMs below cut-in speed when no electricity is being produced.

- **Feathering or Feathered:**

Adjusting the angle of the rotor blade parallel to the wind, or turning the whole unit out of the wind, to slow or stop blade rotation. Normally operating turbine blades are angled almost perpendicular to the wind at all times.

- **Free-wheeling:**

  Free-wheeling occurs when the blades are allowed to rotate below the cut-in speed or even when fully feathered and parallel to the wind. In contrast, blades can be "locked" and cannot rotate, which is a mandatory situation when turbines are being accessed by operations personnel.

- **Increasing cut-in speed:**

  The turbine's computer system (referred to as the Supervisory Control and Data Acquisitions or SCADA system) is programmed to a cut-in speed higher than the manufacturer's set speed, and turbines are programmed to be feathered at 90° until the increased cut-in speed is reached over some average number of minutes (usually 5 – 10 min), thus triggering the turbine blades to pitch back "into the wind" and begin to spin normally and produce power. Blade locking or feathering that renders blades motionless below the manufacturers cut in speed, and don't allow free rotation without the gearbox engaged, is more desirable for the conservation of bats than allowing free rotation below the manufacturer's cut in speed. This is because bats can still collide with rotating blades even when no electricity is being produced.

- **Acoustic deterrents:**

  Are a developing technology and will need further investigation closer to the time of the wind farm operation, opportunities to test such devices may be available during operation of the facility.

- **Light lures:**

  Refers to the concept where strong lights are placed on the periphery (or only a few sides) of the wind farm to lure insects and therefore bats away from the turbines. However, the long term effects on bat populations and local ecology of this method is unknown.

- **Habitat modification:**

  With the aim of augmenting bat habitat around the wind farm in an effort to lure bats away from turbines, is not recommended. Such a method can be adversely intrusive on other fauna and flora and the ecology of the areas being modified. Additionally, it is unknown whether such a method may actually increase the bat numbers of the broader area, causing them to move into the wind farm site due to resource pressure.

Currently the most effective method of mitigation, after correct turbine placement, is alteration of blade speeds and cut-in speeds under environmental conditions favourable to bats.

A basic "6 levels of mitigation" (by blade manipulation or curtailment), from light to aggressive mitigation is structured as follows:

- Level 1 - No curtailment (free-wheeling is unhindered below manufacturer's cut in speed so all momentum is retained, thus normal operation).
- Level 2 - Partial feathering (45-degree angle) of blades below manufacturer's cut-in speed in order to allow the free-wheeling blades half the speed it would have had without feathering (some momentum is retained below the cut in speed).
- Level 3 - Ninety degree feathering of blades below manufacturer's cut-in speed so it is exactly parallel to the wind direction as to minimise free-wheeling blade rotation as much as possible without locking the blades.

- Level 4 - Ninety degree feathering of blades below manufacturer's cut-in speed, with partial feathering (45-degree angle) between the manufacturer's cut-in speed and mitigation cut-in conditions.
- Level 5 - Ninety degree feathering of blades below mitigation cut in conditions.
- Level 6 - Ninety degree feathering throughout the entire night.

All turbines of the Esizayo WEF must be curtailed below cut in speed and not allow for free-wheeling from the start of operation (Level 3 mitigation), for every night of the year from sunset to sunrise. However, actual impacts on bats will be monitored during the operational phase monitoring, and the recommended mitigation measures and levels of curtailment will be adjusted according to the results of the operational monitoring. This is an adaptive management approach, and it is crucial that any suggested changes to the initial proposed mitigation schedule be implemented within a maximum of 2 weeks from the date of the recommendation, unless the recommendation refers to a time period later in the future (e.g. the following similar season/climatic condition).

8.9 AVIFAUNA MANAGEMENT

8.9.1 OBJECTIVES

To ensure that impacts to avifauna are ameliorated

8.9.2 INDICATOR AND COMPLIANCE MECHANISMS

The following indicator and compliance mechanisms are applicable:

- Induction training and records;
- Incident classification and reporting management procedure (to be developed);
- Environmental awareness programme/toolbox talks; and
- Avifauna monitoring procedure (to be developed).

8.9.3 MITIGATION AND MANAGEMENT MEASURES

IMPACT / ACTIVITY	MITIGATION AND MANAGEMENT MEASURE	RESPONSIBLE PERSON	APPLICABLE DEVELOPMENT PHASE	INCLUDE AS CONDITION OF AUTHORISATION	ADDITIONAL MONITORING REQUIREMENTS
Displacement of priority species due to disturbance during construction operations	A site-specific Avifaunal Construction Environmental Management Plan must be implemented, which gives appropriate and detailed description of how construction activities must be conducted. All contractors are to adhere to the CEMP and must apply good environmental practice during construction.	EO ECO Contractor Avifaunal specialist	Construction	Yes	No additional monitoring required.
	ECO to oversee activities and ensure that the site-specific construction environmental management plan is implemented and enforced				
	The appointed ECO must be trained by an avifaunal specialist to identify the potential priority species as well as the signs that indicate possible breeding by these species. The ECO must then, during audits/site visits, make a concerted effort to look out for such breeding activities of Red Data species, and such efforts may include the training of construction staff to identify Red Data species, followed by regular questioning of staff as to the regular whereabouts on site of these species. If any of the Red Data species are confirmed to be breeding (e.g. if a nest site is found), construction activities within 500 m of the breeding site must cease, and an avifaunal specialist is to be contacted immediately for further assessment of the situation and instruction on how to proceed.				
	Prior to construction, an avifaunal specialist must conduct a site walkthrough to identify any nests/breeding/roosting activity of priority species, as well as any additional sensitive habitats. The results of which may inform the final construction schedule in close proximity to that specific area, including abbreviating construction time, scheduling activities around avian breeding and/or movement schedules, and lowering levels of associated noise.				

IMPACT / ACTIVITY	MITIGATION AND MANAGEMENT MEASURE	RESPONSIBLE PERSON	APPLICABLE DEVELOPMENT PHASE	INCLUDE AS CONDITION OF AUTHORISATION	ADDITIONAL MONITORING REQUIREMENTS
	During the construction phase, an avifaunal specialist must conduct surveys/exploration of the WEF site (particularly focussing on potential Martial Eagle and Verreaux's Eagle roost sites as well as suitable nesting habitat). This must be done during and after, the breeding season (i.e. approximately in July and again in September) of large Eagles (e.g. Martial and Verreaux's Eagle). The aim will be to locate nest sites, so that these may continue to be monitored during the construction and operation phase.				
	Excavated rocks should be removed, or all infilling for road construction should be compacted and all lose rock piles at the base or periphery of such infilling should be covered and packed down to eliminate all potential crevices and shelter for small mammals such as Rock Hyraxes (the primary source of food for the Verreaux's Eagles).				
Displacement Due To Habitat Transformation Associated With The Construction Of The Wind Turbines And Associated Infrastructure	Construction activity should be restricted to the immediate footprint of the infrastructure.	EO ECO Contractor	Construction	Yes	No additional monitoring required.
	Access to the remainder of the site should be strictly controlled to prevent unnecessary disturbance of priority species.				
Priority species mortality due to	The mitigation measures proposed by the vegetation specialist must be strictly enforced, including rehabilitation of disturbed areas.	EO	Operational	Yes	Once the turbines have been constructed, post-

IMPACT / ACTIVITY	MITIGATION AND MANAGEMENT MEASURE	RESPONSIBLE PERSON	APPLICABLE DEVELOPMENT PHASE	INCLUDE AS CONDITION OF AUTHORISATION	ADDITIONAL MONITORING REQUIREMENTS
collision with the turbines and overhead powerlines	Live-bird monitoring and carcass searches to be implemented in the operational phase, as per the most recent edition of the Best Practice Guidelines at the time (Jenkins et al., 2015) to compare the abundance of avifauna during the pre-construction monitoring with the abundance post-construction. Operational monitoring and carcass searches to be implemented for a minimum of two years, and then again in Year 5 and every fifth year after that.	ECO Contractor Avifaunal specialist			construction monitoring must be implemented under the guidance of an avifaunal specialist to assess collision rates, in accordance with the latest version of the Best practice guidelines for avian monitoring and impact mitigation at proposed wind energy development sites in southern Africa.
	No turbines to be located in the buffer zones around major drainage lines, waterpoints and dams.				
	If an industry approved standard had been developed, one turbine blade must be painted black to reduce the risk of avian collisions.				
	If estimated annual collision rates indicate unacceptable mortality levels of priority species, i.e., if it exceeds the mortality threshold determined by the avifaunal specialist after consultation with other avifaunal specialists and BirdLife South Africa, additional measures will have to be implemented which could include shut down on demand (or other proven measures).				
	The 33kV medium voltage cable should be buried as far as possible. Overhead lines should only be considered if technical constraints to trenching are present.				
	A bird-friendly pole design must be employed for all 33kV overhead lines. The avifaunal specialist must approve the final design.				

IMPACT / ACTIVITY	MITIGATION AND MANAGEMENT MEASURE	RESPONSIBLE PERSON	APPLICABLE DEVELOPMENT PHASE	INCLUDE AS CONDITION OF AUTHORISATION	ADDITIONAL MONITORING REQUIREMENTS
	Bird flight diverters should be installed on all overhead 33kV power lines (according to Eskom guidelines - five metres apart). Light and dark colour devices must be alternated to provide contrast against both dark and light backgrounds respectively. These devices must be installed as soon as the conductors are strung.				
	Live-bird monitoring and carcass searches to be implemented in the operational phase, as per the most recent edition of the Best Practice Guidelines at the time (Jenkins et al., 2015) to compare the abundance of avifauna during the pre-construction monitoring with the abundance post-construction. Operational monitoring and carcass searches to be implemented for a minimum of two years, and then again in Year 5 and every fifth year after that.				
	If estimated annual collision rates indicate unacceptable mortality levels of priority species, i.e., if it exceeds the mortality threshold determined by the avifaunal specialist after consultation with other avifaunal specialists and BirdLife South Africa, additional measures will have to be implemented which could include shut down on demand (or other proven measures).				
Displacement of priority species due to habitat transformation	A site-specific Construction Environmental Management Plan must be implemented, which gives appropriate and detailed description of how construction activities must be conducted to reduce unnecessary destruction of habitat. All contractors are to adhere to the CEMP and must apply good environmental practice during construction	EO ECO Contractor Avifaunal specialist Rehabilitation specialist	Operational	Yes	Environmental Control Officers to oversee activities and ensure that the site-specific construction environmental management plan (CEMP) is implemented and enforced;
	Existing roads and farm tracks must be used where possible;				
	The minimum footprint areas of infrastructure must be used wherever possible, including road widths and lengths				

IMPACT / ACTIVITY	MITIGATION AND MANAGEMENT MEASURE	RESPONSIBLE PERSON	APPLICABLE DEVELOPMENT PHASE	INCLUDE AS CONDITION OF AUTHORISATION	ADDITIONAL MONITORING REQUIREMENTS
	No off-road driving;				
	Environmental Control Officers to oversee activities and ensure that the site-specific construction environmental management plan is implemented and enforced;				
	Any clearing of stands of alien trees on site must be approved first by an avifaunal specialist				
	Following construction, rehabilitation of all areas disturbed (e.g. temporary access tracks and laydown areas) must be undertaken and to this end a habitat restoration plan is to be developed by a rehabilitation specialist and included within the Construction Environmental Management Plan				
Priority species mortality due to electrocution on the on-site powerlines	A bird-friendly pole design must be employed for all 33kV overhead lines. The avifaunal specialist must approve the final design.	EO ECO Contractor Avifaunal specialist	Design	Yes	No additional monitoring required.

8.10 AIR QUALITY MANAGEMENT

8.10.1 OBJECTIVES

To ensure that impacts to air quality of the surrounding environment are ameliorated.

8.10.2 INDICATOR AND COMPLIANCE MECHANISMS

The following indicator and compliance mechanisms are applicable:

- Complaints register
- Incident reporting system
- Health, safety, environmental and community incident and complaints management system register
- Incident Classification and Reporting Management Procedure (to be developed)
- Equipment, machinery and vehicle maintenance/inspection registers

8.10.3 MITIGATION AND MANAGEMENT MEASURES

IMPACT / ACTIVITY	MITIGATION AND MANAGEMENT MEASURE	RESPONSIBLE PERSON	APPLICABLE DEVELOPMENT PHASE	INCLUDE AS CONDITION OF AUTHORISATION	ADDITIONAL MONITORING REQUIREMENTS
Dust	Before the commencement of any site works and during the operation, as much vegetation as possible must be retained, including patches and strips to minimise dust.	EO ECO Contractor	Construction De-commissioning	No	No additional monitoring required.
	Activities with high dust-causing potential, such as topsoil stripping, must not be carried out in sensitive areas during adverse wind conditions. When necessary, topsoil must be stripped in discrete sections, allowing buffer strips (windbreaks) between clearings.				

IMPACT / ACTIVITY	MITIGATION AND MANAGEMENT MEASURE	RESPONSIBLE PERSON	APPLICABLE DEVELOPMENT PHASE	INCLUDE AS CONDITION OF AUTHORISATION	ADDITIONAL MONITORING REQUIREMENTS
	Earth-moving works have the potential to generate large amounts of dust. Pre-planning of earth-moving works can reduce dust emissions by limiting the time the site is exposed. Options for dust control can include the following: — Plan earth-moving works so that they are completed just prior to the time they are needed — Observe weather conditions and do not commence or continue earth moving works if conditions are unsuitable e.g., under conditions of strong winds — Reduce off-site hauling via balanced cut and fill operations — Pre-water areas to be disturbed				

IMPACT / ACTIVITY	MITIGATION AND MANAGEMENT MEASURE	RESPONSIBLE PERSON	APPLICABLE DEVELOPMENT PHASE	INCLUDE AS CONDITION OF AUTHORISATION	ADDITIONAL MONITORING REQUIREMENTS
	Material stockpiles are capable of generating large amounts of dust. In particular, fine materials stored in stockpiles can be subject to dust pick-up. Materials being loaded onto conveyor belts or into trucks are also potential sources of dust emissions. Dust emissions from material stockpiles can be minimised through the use of the following procedures: — Locate stockpiles in sheltered areas. Otherwise, stockpiles must be covered — Where stockpiles are located in open areas, limit the height and slope of the stockpiles to reduce wind pick up, orient stockpiles lengthwise into the wind so they offer the minimum cross-sectional area to prevailing winds, install wind barriers on three sides of the stockpile — Limit activity to the downwind side of the stockpile — Limit drop heights from loading facilities and use closed conveyors where possible Transfer points must also be minimised				

IMPACT / ACTIVITY	MITIGATION AND MANAGEMENT MEASURE	RESPONSIBLE PERSON	APPLICABLE DEVELOPMENT PHASE	INCLUDE AS CONDITION OF AUTHORISATION	ADDITIONAL MONITORING REQUIREMENTS
	Watering is a very effective short-term measure. However, its efficiency decreases as wind velocity and evaporation rate increase. Dust emissions can be minimised using the following watering procedures: — The surface must be dampened to prevent dust from becoming airborne but must not be wet to the extent of producing run-off. Alternatively, wetting agents could be used, particularly for non-wetting soils — Watering is more effective when undertaken prior to strong breezes — Use watering sprays on materials to be loaded and during loading In cases where severe water restrictions are imposed, other measures like the use of wetting agents such as chemical stabilisation or hydromulch, could be considered				
	Vehicles bearing open loads of potentially wind-borne materials must be covered or wet down in order to minimise dust entrainment				
Volatile Organic Compounds and Other Emissions	All equipment, machinery and vehicles must be fitted with appropriate emission control equipment, are maintained frequently and serviced to the manufacturers' specifications	EO ECO Contractor Operator	Construction Operation De-commissioning	No	
	Ensure incident and complaint registers are established and maintained				
	Prohibit burning of waste or vegetation onsite				

8.11 NOISE MANAGEMENT

8.11.1 OBJECTIVES

To ensure that noise impacts to the surrounding environment are minimal or mitigated.

8.11.2 INDICATOR AND COMPLIANCE MECHANISMS

The following indicator and compliance mechanisms are applicable:

- Complaints register;
- Incident reporting system;
- Health, safety, environmental and community incident and complaints management system register;
- Incident classification and reporting management procedure (to be developed); and
- Equipment, machinery and vehicle maintenance/inspection registers.

8.11.3 MITIGATION AND MANAGEMENT MEASURES

IMPACT / ACTIVITY	MITIGATION AND MANAGEMENT MEASURE	RESPONSIBLE PERSON	APPLICABLE DEVELOPMENT PHASE	INCLUDE AS CONDITION OF AUTHORISATION	ADDITIONAL MONITORING REQUIREMENTS
General Noise Management	Fit equipment, machinery and vehicles generating excessive noise with appropriate noise abatement measures and undergo regular maintenance to ensure optimum efficiency during operation	EO ECO	Construction Operation	No	No additional monitoring required.

IMPACT / ACTIVITY	MITIGATION AND MANAGEMENT MEASURE	RESPONSIBLE PERSON	APPLICABLE DEVELOPMENT PHASE	INCLUDE AS CONDITION OF AUTHORISATION	ADDITIONAL MONITORING REQUIREMENTS
	Provide a complaints register to report any excessive noise incidents. Manage all complaints as per the Incident Classification and Reporting Management Procedure	Contractor Operator			
	Regular maintenance of equipment to reduce the generation of additional unwanted noise				
Acoustic impact on residential receptors during construction and de-commissioning	Plan construction activities in consultation with local communities so that activities with the greatest potential to generate noise are planned during periods of the day that will result in least disturbance. Information regarding construction activities must be provided to all local communities. Such information includes: — Proposed working times; — Anticipated duration of activities; — Explanations on activities to take place and reasons for activities; and — Contact details of a responsible person on site should complaints arise.	EO ECO Contractor	Construction De-commissioning	No	No additional monitoring required.
	When working near (within 500 m) a potential sensitive receptor, limit the number of simultaneous activities to a minimum as far as possible				
	Avoid or minimizing project transportation through community areas				
	Use noise control devices, such as temporary noise barriers and deflectors for impact and blasting activities, and exhaust muffling devices for combustion engines				

IMPACT / ACTIVITY	MITIGATION AND MANAGEMENT MEASURE	RESPONSIBLE PERSON	APPLICABLE DEVELOPMENT PHASE	INCLUDE AS CONDITION OF AUTHORISATION	ADDITIONAL MONITORING REQUIREMENTS
	Select equipment with the lowest possible sound power levels				
	Ensure equipment is well-maintained to avoid additional noise generation				
Acoustic impact on residential receptors during operation	Operate turbines in reduced noise mode should any complaints be received (IFC, 2015)	EO ECO Operator	Operation	No	No additional monitoring required.
	Build walls/appropriate noise barriers around potentially affected buildings (IFC, 2015) if complaints are received.				
	Limit turbine operations above the wind speed at which turbine noise becomes unacceptable in the project-specific circumstances (IFC, 2015) if complaints are received.				
	Ensure a larger setback distance from potentially sensitive receptor locations				
	Consideration of installing larger capacity wind turbines, limiting the number of turbines to be installed but having the same power generation potential				

IMPACT / ACTIVITY	MITIGATION AND MANAGEMENT MEASURE	RESPONSIBLE PERSON	APPLICABLE DEVELOPMENT PHASE	INCLUDE AS CONDITION OF AUTHORISATION	ADDITIONAL MONITORING REQUIREMENTS
Blasting	Should blasting activities be required, adequate blast management techniques must be employed. These include: — Informing nearby residents as to when blasting will occur on a certain day at a given time; — Displaying highly visible blast notices along the roadside within a certain vicinity of the site in order to notify any passing receptors; — Not blasting after day-time hours; and — Not allowing any blasting activities at the turbine locations surrounding the Farmhouse 1 receptor, which is located in close proximity (500 m) to the proposed turbines	EO ECO Contractor	Construction	No	No additional monitoring required.

8.12 SITE OF CULTURAL, HERITAGE OR PALAEONTOLOGICAL SIGNIFICANCE

8.12.1 OBJECTIVES

To ensure that sites/artefacts of heritage or palaeontological value are identified and protected.

8.12.2 INDICATOR AND COMPLIANCE MECHANISMS

The following indicator and compliance mechanisms are applicable:

— Health, safety, environmental and community incident and complaints management system register;
— Chance Find Procedure (to be developed);
— Incident Classification and Reporting Management Procedure (to be developed); and
— Monitoring and audit reports

8.12.3 MITIGATION AND MANAGEMENT MEASURES

IMPACT / ACTIVITY	MITIGATION AND MANAGEMENT MEASURE	RESPONSIBLE PERSON	APPLICABLE DEVELOPMENT PHASE	INCLUDE AS CONDITION OF AUTHORISATION	ADDITIONAL MONITORING REQUIREMENTS
Chance Finds	If any archaeological and/or historical sites, features or artefacts are discovered, a qualified archaeologist be called in to investigate the occurrence and the find must be reported to the South African Heritage Resources Agency (SAHRA).	EO ECO Contractor Project Manager	Planning Construction	Yes	Monitor incident register as to whether there have been any chance finds
	A Chance find procedure is to be drafted and implemented before the start of construction				
	Report high concentrations of stone artefacts				
	Report human remains				
Impacts on archaeological and historical sites	The Exclusion Area proposed by the developer must be implemented and no WEF-related activities may take place within the area. Should this not be the case, then the assessment of potential impacts on heritage resources in this report will need to be revisited and new measures to protect heritage resources or mitigate impacts to them will be required.	EO ECO Contractor Project Manager	Construction	Yes	No additional monitoring required
	Once the layout of the access roads is available, they will need to be surveyed for heritage resources and the results incorporated into the Final BA report, or the EMPr.				

IMPACT / ACTIVITY	MITIGATION AND MANAGEMENT MEASURE	RESPONSIBLE PERSON	APPLICABLE DEVELOPMENT PHASE	INCLUDE AS CONDITION OF AUTHORISATION	ADDITIONAL MONITORING REQUIREMENTS
	If any archaeological material or human burials are uncovered during the course of the construction of the WEF expansion, then work in the immediate area must be halted. The find must be reported to Heritage Western Cape and may require inspection and mitigation by an archaeologist. Such heritage is the property of the state and may require excavation and curation in an approved institution.		Operational	Yes	
Disturbance, damage or destruction to Heritage Resources	Monitoring of all surface clearance and substantial excavations (>1 m deep) by the ECO for fossil material (e.g. bones, teeth, fossil wood) on an on-going basis during the construction phase.	EO ECO Contractor Project Manager	Construction	Yes	No additional monitoring required
	Safeguarding of chance fossil finds (preferably in situ) during the construction phase by the responsible ECO, followed by reporting of finds to Heritage Western Cape (HWC)				
	Recording and judicious sampling of significant chance fossil finds by a qualified palaeontologist, together with pertinent contextual data (stratigraphy, sedimentology, taphonomy) (Phase 2 mitigation).				
	Curation of fossil material within an approved repository (museum / university fossil collection) and submission of a Phase 2 palaeontological heritage report to HWC by a qualified palaeontologist				

8.13 VISUAL IMPACT MANAGEMENT

8.13.1 OBJECTIVES

To ensure that the changes to the landscape character of the area are mitigated to minimise the negative impact.

8.13.2 INDICATOR AND COMPLIANCE MECHANISMS

The following indicator and compliance mechanisms are applicable:

- Health, safety, environmental and community incident and complaints management system register;
- Incident classification and reporting management procedure (to be developed); and
- Monitoring and audit reports.

8.13.3 MITIGATION AND MANAGEMENT MEASURES

IMPACT / ACTIVITY	MITIGATION AND MANAGEMENT MEASURE	RESPONSIBLE PERSON	APPLICABLE DEVELOPMENT PHASE	INCLUDE AS CONDITION OF AUTHORISATION	ADDITIONAL MONITORING REQUIREMENTS
Visual Impact Of Construction Activities On Sensitive Visual Receptors In Close Proximity To The Proposed WEF Infrastructure	Retain and maintain natural vegetation immediately adjacent to the development footprint/servitude.	ECO Contractor	Construction	Yes	
	Ensure that vegetation is not unnecessarily removed during the construction phase.				
	Plan the placement of lay-down areas and temporary construction equipment camps in order to minimise vegetation clearing (i.e., in already disturbed areas) wherever possible.				

IMPACT / ACTIVITY	MITIGATION AND MANAGEMENT MEASURE	RESPONSIBLE PERSON	APPLICABLE DEVELOPMENT PHASE	INCLUDE AS CONDITION OF AUTHORISATION	ADDITIONAL MONITORING REQUIREMENTS
	Restrict the activities and movement of construction workers and vehicles to the immediate construction area and existing access roads.				
	Ensure that rubble, litter, and disused construction materials are appropriately stored (if not removed daily) and then disposed of regularly at licensed waste facilities.				
	Reduce and control construction dust using approved dust suppression techniques as and when required (i.e., whenever dust becomes apparent).				
	Restrict construction activities to daylight hours whenever possible in order to reduce lighting impacts.				
	Rehabilitate all disturbed areas immediately after the completion of construction works.				
Operational Impacts	Retain/re-establish and maintain natural vegetation in all areas outside of the development footprint/servitude, but within the project site.	ECO Contractor	Operational	Yes	
	Maintain the general appearance of the facility as a whole.				
	Remove infrastructure not required for the post-decommissioning use.				

IMPACT / ACTIVITY	MITIGATION AND MANAGEMENT MEASURE	RESPONSIBLE PERSON	APPLICABLE DEVELOPMENT PHASE	INCLUDE AS CONDITION OF AUTHORISATION	ADDITIONAL MONITORING REQUIREMENTS
	Rehabilitate all affected areas. Consult an ecologist regarding rehabilitation specifications.				
	Implement needs-based night lighting if considered acceptable by the CAA.				
	Limit aircraft warning lights to the turbines on the perimeter according to CAA requirements, thereby reducing the overall impact.				
	Shield the sources of light by physical barriers (walls, vegetation, or the structure itself).				
	Limit mounting heights of lighting fixtures, or alternatively use foot-lights or bollard level lights.				
	Make use of minimum lumen or wattage in fixtures.				
	Make use of down-lighters, or shielded fixtures.				
	Make use of Low Pressure Sodium lighting or other types of low impact lighting.				
	Make use of motion detectors on security lighting. This will allow the site to remain in relative darkness, until lighting is required for security or maintenance purposes.				

8.14 HEALTH AND SAFETY

8.14.1 OBJECTIVES

- To ensure communication with members of the public to promote safety awareness;
- To prevent public access to construction sites and storage areas; and
- To ensure safety for all onsite personnel.

8.14.2 INDICATOR AND COMPLIANCE MECHANISMS

The following indicator and compliance mechanisms are applicable:

- Induction training and records
- Health, safety, environmental and community incident and complaints management system register
- Monitoring and audit reports
- Incident classification and reporting management procedure (to be developed)
- PPE register
- Occupational health and safety plan (to be developed)
- Health and safety protocol (to be developed)

8.14.3 MITIGATION AND MANAGEMENT MEASURES

IMPACT / ACTIVITY	MITIGATION AND MANAGEMENT MEASURE	RESPONSIBLE PERSON	APPLICABLE DEVELOPMENT PHASE	INCLUDE AS CONDITION OF AUTHORISATION	ADDITIONAL MONITORING REQUIREMENTS
Health and Safety	All onsite personnel are required to undergo induction training and regular toolbox talks in order to raise awareness of the conditions contained herein	SHE Officer Contractor Operator	Construction Operation	No	No additional monitoring required.
	Safety conditions are to be monitored during construction. Continuous monitoring will be undertaken by the SHE Officer will audit monthly.	SHE Officer	Construction		
	Develop and implement an occupational health and safety plan	SHE Officer Operator	Construction Operation		
	The appointed contractor will be responsible for the development of a comprehensive health and safety protocol which must be adhered to	Contractor	Construction		
	Provide and wear appropriate PPE onsite	SHE Officer Contractor Operator	Construction Operation		
	Train all onsite personnel handling chemical or hazardous substances in the use of such substances and the environmental, health and safety consequences of incidents				
	Provide onsite personnel with sufficient potable water for drinking				

IMPACT / ACTIVITY	MITIGATION AND MANAGEMENT MEASURE	RESPONSIBLE PERSON	APPLICABLE DEVELOPMENT PHASE	INCLUDE AS CONDITION OF AUTHORISATION	ADDITIONAL MONITORING REQUIREMENTS
Public Safety	Restrict public access	Contractor Operator	Construction Operation		

8.15 SOCIO-ECONOMIC IMPACT MANAGEMENT

8.15.1 OBJECTIVES

- To ensure that the negative socio-economic impacts are mitigated and managed; and
- To ensure that the positive economic impacts are enhanced.

8.15.2 INDICATOR AND COMPLIANCE MECHANISMS

The following general indicator and compliance mechanisms are applicable:

- Induction training and records;
- Health, safety, environmental and community incident and complaints management system register;
- Monitoring and audit reports;
- Incident classification and reporting management procedure (to be developed);
- PPE register;
- Occupational health and safety plan;
- Health and safety protocol;
- HIV/AIDS awareness and prevention program;
- Trafficking in persons awareness programme;
- Business and skills development plan (to be developed);

— Grievance mechanism.

The following project specific indicator and compliance requirements are applicable:

— Local employment and business targets to be formalised in a document before the construction phase commences;
— Database of potential local service providers to be developed, before the construction phase commences;
— Record of engagement with the Laingsburg Local Municipality and community representatives in respect of employment opportunities and community upliftment projects;
— Engagement with the Khâi-Ma Local Municipality and local enterprises in respect of accommodation of labour;
— Health and Safety Plan prepared and implemented during the construction phase;
— HIV/AIDS campaign implemented throughout the construction and operations phase;
— Evidence of workforce transportation home during and after construction phase;
— Number of complaints raised by stakeholders;
— Code of conduct for workers in place, signed, and implemented; and
— Retrenchments meet South African Labour legislation.

8.15.3 MITIGATION AND MANAGEMENT MEASURES

IMPACT / ACTIVITY	MITIGATION AND MANAGEMENT MEASURE	RESPONSIBLE PERSON	APPLICABLE DEVELOPMENT PHASE	INCLUDE AS CONDITION OF AUTHORISATION	ADDITIONAL MONITORING REQUIREMENTS
Maximise local employment and business opportunities	Preparation and implementation of a Stakeholder Engagement Plan (SEP) prior to and during the construction phase.	Project Manager Contractor ECO	Construction Operational Decommissioning	Yes	No additional monitoring required
	Appointment of local contractors and use of local suppliers and manufacturers where possible.				
	Development of a database of local companies for service provision				

IMPACT / ACTIVITY	MITIGATION AND MANAGEMENT MEASURE	RESPONSIBLE PERSON	APPLICABLE DEVELOPMENT PHASE	INCLUDE AS CONDITION OF AUTHORISATION	ADDITIONAL MONITORING REQUIREMENTS
	Where feasible, training and skills development programmes for locals should be initiated prior to the initiation of the construction phase.				
	Where feasible, training and skills development programmes for locals should be initiated prior to the initiation of the construction phase.				
	Communication with Karoo Hoogland Local Municipality and community representatives in respect of employment opportunities (where possible).				
	Ongoing engagement with the Karoo Hoogland Local Municipality in respect of anticipated community investment and upliftment projects.				
	Ongoing engagement with the Karoo Hoogland Local Municipality with regards the establishment of a database of local companies, specifically BBBEE companies, which qualify as potential service providers (e.g., construction companies, catering companies, waste collection companies, security companies etc.) prior to the commencement of the tender process for construction service providers. These companies should be notified of the tender process and invited to bid for project-related work.				
	Review of Department of Labour skills audits and undertake relevant skills development programmes targeted at local community members.				

IMPACT / ACTIVITY	MITIGATION AND MANAGEMENT MEASURE	RESPONSIBLE PERSON	APPLICABLE DEVELOPMENT PHASE	INCLUDE AS CONDITION OF AUTHORISATION	ADDITIONAL MONITORING REQUIREMENTS
Minimise disruption caused by influx of job seekers	Preparation and implementation of a Community Health, Safety and Security Plan (CHSSP) prior to and during the construction phase.	Project Manager Contractor ECO	Construction Operational Decommissioning	Yes	
	Communicate employment opportunities to Karoo Hoogland Local Municipality and community representatives in order to manage employment expectations as far as possible and to allow these parties to manage potential issues associated with influx of people.				
	The proponent, in consultation with the LM, should investigate the option of establishing a MC to monitor and identify potential problems that may arise due to the influx of job seekers to the area. The MC should also include the other proponents of solar energy projects in the area.				
	The proponent should implement a “locals first” policy, specifically with regard to unskilled and low skilled opportunities.				
	The proponent should implement a policy that no employment will be available at the gate.				
	Engage with, and gain support from, the Karoo Hoogland Local Municipality in respect of accommodation of labour brought into the area by contractors / developers.				
Minimise the increase in	Preparation and implementation of a labour force Health and Safety Plan.	Project Manager	Construction	No	

IMPACT / ACTIVITY	MITIGATION AND MANAGEMENT MEASURE	RESPONSIBLE PERSON	APPLICABLE DEVELOPMENT PHASE	INCLUDE AS CONDITION OF AUTHORISATION	ADDITIONAL MONITORING REQUIREMENTS
communicable diseases and reduced public health	In consultation with local HIV/AIDS organisations and government structures all contractors must design and implement a proactive and ongoing HIV/AIDs awareness and prevention campaign.	Contractor ECO		Yes	
	Implement an HIV/AIDS, COVID-19 and Tuberculosis (TB) awareness programme for all construction workers at the outset of the construction phase. The programmes should form part of the CHSSP.				
	Provide opportunities for workers to go home over the weekends or regularly. The cost of transporting workers home and back must be the responsibility of the contractor			No	
	All workers are to be transported back to their homes within 2 days of completion of the construction contract at the cost of the contractor			No	
Minimise nuisance from dust, noise and traffic	Implement EMPr conditions in respect of mitigating dust, noise and traffic related impacts	ECO Contractor Project Manager	Construction Decommissioning	No	
	Establish a grievance mechanism to provide a means for affected stakeholders to communicate				
Minimise risk to neighbouring land users	Development of a code of conduct for workers, signed by the contractor, and communicated to work force.	ECO Contractor	Construction Decommissioning	No	
	All farm gates must be closed after passing through				

IMPACT / ACTIVITY	MITIGATION AND MANAGEMENT MEASURE	RESPONSIBLE PERSON	APPLICABLE DEVELOPMENT PHASE	INCLUDE AS CONDITION OF AUTHORISATION	ADDITIONAL MONITORING REQUIREMENTS
	Contractor to be held liable for compensating farmers for any losses / damage that can be linked to workers.				
	The proponent should implement a Grievance Mechanism that provides local farmers with an effective and efficient mechanism to address issues related to report issues related to damage to farm infrastructure, stock theft and poaching etc.				
	The Environmental Management Plan (EMP) must outline procedures for managing and storing waste on site, specifically plastic waste that poses a threat to livestock if ingested.				
	Contractors appointed by the proponent must ensure that all workers are informed at the outset of the construction phase of the conditions contained in the Code of Conduct, specifically consequences of stock theft and trespassing on adjacent farms.				
	Contractors appointed by the proponent must ensure that construction workers who are found guilty of stealing livestock and/or damaging farm infrastructure are dismissed and charged. This should be contained in the CoC. All dismissals must be in accordance with South African labour legislation.				
	It is recommended that no construction workers, with the exception of security personnel, should be permitted to stay over-night on the site.				

IMPACT / ACTIVITY	MITIGATION AND MANAGEMENT MEASURE	RESPONSIBLE PERSON	APPLICABLE DEVELOPMENT PHASE	INCLUDE AS CONDITION OF AUTHORISATION	ADDITIONAL MONITORING REQUIREMENTS
Minimise risk of veld fires	No open fires allowed for cooking / heating;	ECO Contractor	Construction Decommissioning	No	
	Activity that pose a fire risk to be properly managed and confined to a designated area;				
	Adequate fire-fighting equipment to be provided on site, and appropriate training conducted; etc.				
Minimise impacts of loss of permanent employment	Relocation of employees to other renewable energy facilities where possible	Project Manager	Decommissioning	No	
	Provision of adequate retrenchment packages, that as a minimum meet relevant South African Labour legislation.				

8.16 TRAFFIC MANAGEMENT

8.16.1 OBJECTIVES

To ensure that the traffic impacts of the project are mitigated and managed.

8.16.2 INDICATOR AND COMPLIANCE MECHANISMS

The following indicator and compliance mechanisms are applicable:

— Induction training and records;

- Health, safety, environmental and community incident and complaints management system register;
- Monitoring and audit reports;
- Incident classification and reporting management procedure (to be developed);
- PPE register;
- Occupational health and safety plan;
- Health and safety protocol; and
- Traffic and transportation management plan.

8.16.3 MITIGATION AND MANAGEMENT MEASURES

IMPACT / ACTIVITY	MITIGATION AND MANAGEMENT MEASURE	RESPONSIBLE PERSON	APPLICABLE DEVELOPMENT PHASE	INCLUDE AS CONDITION OF AUTHORISATION	ADDITIONAL MONITORING REQUIREMENTS
Traffic Management	The posted speed limit on the R354 in the vicinity of the proposed development is currently 120km/h. It is suggested that the speed limit must be reduced to 60km/h in advance of the site access roads, if permitted by the relevant authority.	Project Manager Contractor ECO	Construction Decommissioning	No	No additional monitoring required.
	Intersection warning signs must be erected either side of the access roads in accordance with the requirements of the South African Road Traffic Signs Manual and it is recommended that supplementary warning plates be added to these warning signs indicating the presence of heavy vehicles at the intersection. The aforementioned road signs are shown below: 				

IMPACT / ACTIVITY	MITIGATION AND MANAGEMENT MEASURE	RESPONSIBLE PERSON	APPLICABLE DEVELOPMENT PHASE	INCLUDE AS CONDITION OF AUTHORISATION	ADDITIONAL MONITORING REQUIREMENTS
	The additional loading due to the project is not very high, but is likely to accelerate the deterioration of the existing surfacing.				Monitor intersections and roads for deterioration and repair as necessary
	The transport route/s of the construction materials, components and any oversized/weight components may be National, Provincial or Local roads; and approval will have to be obtained from each authority for the transportation of any oversized or abnormally heavy components.				No additional monitoring required.
	Construction vehicles must only use the roads during daylight hours. No construction vehicles must be operational from 6pm to 6am, unless permission is obtained from the surrounding landowners				
	All heavy vehicles must ensure that their headlights are on to increase their visibility to other vehicles and pedestrians				
	All drivers must comply with the relevant traffic laws and regulations				
Increase in Traffic due to construction	All unsurfaced roads must be regularly sprayed with water to prevent dust generation	ECO Contractor	Construction	No	No additional monitoring required.
	All vehicles that access the site must be roadworthy to ensure noise and emissions levels comply to national vehicle standards, thereby reducing noise/pollution levels				

9 MANAGEMENT PLANS

As defined in the generic EMPr various method statements are to be compiled and implemented throughout the construction phase.

This section provides an overview of various aspects / thematic areas and requirements whereby the Method Statements / management plans must be developed and followed throughout the proposed construction and operation of the Esizayo WEF Expansion. It must be noted that these method statement / management plans can be updated at any stage depending on any changes that may occur on the site.

9.1 ALIEN INVASIVE MANAGEMENT PLAN

Invasive alien species pose the second largest threat to biodiversity after direct habitat destruction. The purpose of this Alien Plant Management Plan is to provide a framework for the management of alien and invasive plant species during the construction and operation of the facility. 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.
- Managing and maintaining the ecosystem in a near-natural state and restoring and/or rehabilitating the ecosystems to such a state.
- Develop 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.

9.1.1 LEGISLATIVE

Conservation of Agricultural Resources Act (Act No. 43 of 1983)

In terms of the amendments to the regulations under the Conservation of Agricultural Resources Act (Act No. 43 of 1983), all declared aliens must be effectively controlled. Landowners are legally responsible for the control of invasive alien plants on their properties. In terms of this Act, 198 alien species were listed as declared weeds and invaders and ascribed to one of the following categories:

- Category 1: Prohibited and must be controlled.
- Category 2 (commercially used plants): May be grown in demarcated areas provided that there is a permit and that steps are taken to prevent their spread.
- Category 3 (ornamentally used plants): May no longer be planted. Existing plants may be retained as long as all reasonable steps are taken to prevent the spreading thereof, except within the flood line of watercourses and wetlands.

National Environmental Management: Biodiversity Act, 2004 (Act No.10 of 2004)

The National Environmental Management: Biodiversity Act (NEM:BA) regulates all invasive organisms in South Africa, including a wide range of fauna and flora. Regulations have been published in Government Notices R.506, R.507, R.508 and R.509 of 2013 under NEMBA. According to this Act and the regulations, any species designated under Section 70 cannot be propagated, grown, bought or sold without a permit. Below is an explanation of the three categories:

- Category 1a: Invasive species requiring compulsory control. Any specimens of Category 1a listed species need, by law, to be eradicated from the environment. No permits will be issued.
- Category 1b: Invasive species requiring compulsory control as part of an invasive species control programme. Remove and destroy. These plants are deemed to have such a high invasive potential that infestations can qualify to be placed under a government sponsored invasive species management programme. No permits will be issued.

- Category 2: Invasive species regulated by area. A demarcation permit is required to import, possess, grow, breed, move, sell, buy or accept as a gift any plants listed as Category 2 plants. No permits will be issued for Category 2 plants to exist in riparian zones.
- Category 3: Invasive species regulated by activity. An individual plant permit is required to undertake any of the following restricted activities (import, possess, grow, breed, move, sell, buy or accept as a gift) involving a Category 3 species. No permits will be issued for Category 3 plants to exist in riparian zones.

Plants listed under the categories above are detailed within Notice 1 of the Alien and Invasive Species published in GNR599 of 01 August 2014. 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.

It is important to note that alien species that are regulated in terms of the Conservation of Agricultural Resources Act (Act 43 of 1983) (CARA) as weeds and invader plants are exempted from NEM:BA. This implies that the provisions of the CARA in respect of listed weed and invader plants supersede those NEM:BA.

9.1.2 ALIEN PLANT MANAGEMENT PRINCIPLES

A. PREVENTION AND EARLY ERADICATION

A prevention strategy must be considered and established, including regular surveys and monitoring for invasive alien plants, effective rehabilitation of disturbed areas and prevention of unnecessary disturbance of natural areas.

Monitoring plans must be developed which are designed to identify Invasive Alien Plant Species shortly after they arrive in the project area. Keeping up to date on which weeds are an immediate threat to the site is important, but efforts should be planned to update this information on a regular basis. When new Invasive Alien Plant Species are recorded on site, an immediate response of locating the site for future monitoring and either hand-pulling the weeds or an application of a suitable herbicide should be planned. It is, however, better to monitor regularly and act swiftly than to allow invasive alien plants to become established on site.

B. CONTAINMENT AND CONTROL

If any alien invasive plants are found to become established on site, action plans for their control must be developed, depending on the size of the infestations, budgets, manpower considerations and time. Separate plans of control actions must be developed for each location and/or each species. Appropriate registered chemicals and other possible control agents must be considered in the action plans for each site/species. The key is to ensure that no invasions get out of control. Effective containment and control will ensure that the least energy and resources are required to maintain this status over the long-term. This will also be an indicator that natural systems are impacted to the smallest degree possible.

C. GENERAL CLEARING &GUIDING PRINCIPLES

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

CLEARING METHODS

Different species require different clearing methods such as manual, chemical or biological methods or a combination of both. Care should however be taken that the clearing methods used do not encourage further invasion. As such, regardless of the methods used, disturbance to the soil must be kept to a minimum.

Fire must not be used for alien control or vegetation management at the site. The best-practice clearing method for each species identified must be used. The preferred clearing methods for most alien species can be obtained from the DWAF Working for Water Website. http://www.dwaf.gov.za/wfw/Control/

MECHANICAL CONTROL

This entails damaging or removing the plant by physical action. Different techniques could be used, e.g. uprooting, felling, slashing, mowing, ringbarking or bark stripping. This control option is only really feasible in sparse infestations or on small scale, and for controlling species that do not coppice after cutting. Species that tend to coppice, need to have the cut stumps or coppice growth treated with herbicides following the mechanical treatment. Mechanical control is labour intensive and therefore expensive, and could cause severe soil disturbance and erosion.

CHEMICAL 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 resprout. Where herbicides are to be used, the impact of the operation on the natural environment must be minimised by observing the following:

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

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

- Working for Water: Policy on the Use of Herbicides for the Control of Alien Vegetation.
- Pesticide Management Policy for South Africa published in terms of the Fertilizers, Farm Feeds, Agricultural Remedies and Stock Remedies Act, 1947 (Act No. 36 of 1947) – GNR 1120 of 2010.
- South African Bureau of Standards, Standard SANS 10206 (2010).

According to Government Notice No. 13424 dated 26 July 1992, it is an offence to “acquire, dispose, sell or use an agricultural or stock remedy for a purpose or in a manner other than that specified on the label on a container thereof or on such a container”.

Contractors using herbicides need to have a valid Pest Control Operators License (limited weeds controller) according to the Fertilizer, Farm Feeds, Agricultural Remedies and Stock Remedies Act (Act No. 36 of 1947). This is regulated by the Department of Agriculture, Forestry and Fisheries.

BIOLOGICAL CONTROL

Biological weed control consists in the use of natural enemies to reduce the vigour or reproductive potential of an invasive alien plant. Biological control agents include insects, mites, and micro-organisms such as fungi or bacteria. They usually attack specific parts of the plant, either the reproductive organs directly (flower buds, flowers or fruit) or the seeds after they have dropped. The stress caused by the biological control agent may kill a plant outright or it might impact on the plants reproductive capacity. In certain instances, the reproductive capacity is reduced to zero and the population is effectively sterilised. All of these outcomes will help to reduce the spread of the species.

To obtain biocontrol agents, provincial representatives of the Working for Water Programme or the Directorate: Land Use and Soil Management (LUSM), Department of Agriculture, Forestry and Fisheries (DAFF) can be contacted.

D. GENERAL MANAGEMENT PRACTICES

The following general management practices must be encouraged or strived for:

- Establish an ongoing monitoring programme for construction phase to detect and quantify any alien species that may become established and identify the problem species.
- Alien vegetation regrowth on areas disturbed by construction must be immediately controlled once recorded throughout the entire site during construction and operation.
- Care must be taken to avoid the introduction of alien invasive plant species to the site. Particular attention must be paid to imported material such as building sand or dirty earth-moving equipment. Stockpiles must be checked regularly and any weeds emerging from material stockpiles must be removed.
- Cleared areas that have become invaded by alien species can be sprayed with appropriate herbicides provided that these are such that break down on contact with the soil. Residual herbicides must not be used.
- The effectiveness of vegetation control varies seasonally and this is also likely to impact alien species. Control early in the wet season will allow species to re-grow and follow-up control is likely to be required. It is tempting to leave control until late in the wet season to avoid follow-up control. However, this may allow alien species to set seed before control and hence will not contribute towards reducing alien species abundance. Therefore, vegetation control must be aimed at the middle of the wet season, with a follow-up event towards the end of the wet season. There are no exact dates that can be specified here as each season is unique and management must therefore respond according to the state and progression of the vegetation.
- Alien management is an iterative process and it may require repeated control efforts to significantly reduce the abundance of a species. This is often due to the presence of large and persistent seed banks. However, repeated control usually results in rapid decline once seed banks become depleted.
- Regular vegetation control to reduce plant biomass within the site must be conducted. This must be timed so as to coincide with the critical growth phases of the most important alien species on site. This will significantly reduce the cost of alien management as this must contribute towards the control of the dominant alien species and additional targeted control will be required only for a limited number of species.
- No alien species must be cultivated on-site. If vegetation is required for aesthetic purposes, then non-invasive, water-wise locally-occurring species must be used.
- During operation, surveys for alien species must be conducted regularly. It is recommended that this be undertaken every 6 months for the first two years after construction and annually thereafter. All aliens identified must be cleared using appropriate means.

E. MONITORING

In order to monitor the impact of clearing activities, follow-ups and rehabilitation efforts, monitoring must be undertaken. This section provides a description of a possible monitoring programme that will provide and assessment of the magnitude of alien invasion on site as well as an assessment of the success of the management programme.

In general, the following principles apply for monitoring:

- Photographic records must be kept of areas to be cleared prior to work starting and at regular intervals during initial clearing activities. Similarly, photographic records must be kept of the area from immediately before and after follow-up clearing activities. Rehabilitation processes must also be recorded.
- Simple records must be kept of daily operations, e.g. area/location cleared, labour units and, if ever used, the amount of herbicide used.
- It is important that, if monitoring results in detection of invasive alien plants, that this leads to immediate action.

The following monitoring must be implemented to ensure management of alien invasive plant species.

MONITORING ACTION	INDICATOR	TIMEFRAME
Construction Phase		
Document alien species present at the site	List of alien species	Pre-construction
Document alien plant distribution	Alien plant distribution map within priority areas	Pre-construction

Document & record alien control measures implemented	Record of clearing activities	3 Monthly
Review & evaluation of control success rate	Decline in documented alien abundance over time	Biannually
Operational Phase		
Document alien species distribution and abundance over time at the site	Alien plant distribution map	Biannually
Document alien plant control measures implemented & success rate achieved	Records of control measures and their success rate. A decline in alien distribution and cover over time at the site	Biannually
Document rehabilitation measures implemented and success achieved in problem areas	Decline in vulnerable bare areas over time	Biannually

9.2 PLANT RESCUE AND PROTECTION PLAN

The purpose of the plant rescue and protection plan is to implement avoidance and mitigation measures, in addition to the mitigation measures included in the EMPr to reduce the impact of the development of the project on listed and protected plant species and their habitats, and to provide guidance on search and rescue of species of conservation concern.

This management plan must be updated prior to project implementation so as to include relevant site specific information.

Mitigation and management measures include, but are not limited to the following:

- Vegetation clearing must only commence after a walk down has been conducted by a suitably qualified ecologist / botanist and the necessary permits obtained.
- Vegetation clearing to be kept to a minimum. No unnecessary vegetation to be cleared.
- Vegetation removal must be limited to the construction site and must be removed only as it becomes necessary rather than removing all the vegetation throughout the site at once
- Materials must not be delivered to the site prematurely which could result in additional areas being cleared or affected.
- No vegetation to be used for firewood.
- Gathering of firewood, fruit, medicinal plants, or any other natural material onsite or in areas adjacent to the site is prohibited unless with prior approval of the ECO.
- Construction site office and laydown areas must be clearly demarcated and no encroachment must occur beyond demarcated areas.
- All natural areas impacted during construction must be rehabilitated with locally indigenous plant species.
- A buffer zone must be established in areas where construction will not take place to ensure that construction activities do not extend into these areas.
- The use of pesticides and herbicides in the study area must be discouraged as these impacts on important pollinator species of indigenous vegetation.
- Soil stockpiles must not become contaminated with oil, diesel, petrol, garbage or any other material, which may inhibit the later growth of vegetation in the soil. Spillage can result in a loss of soil functionality thus limiting the re-establishment of flora.

9.2.1 PRINCIPLES FOR SEARCH AND RESCUE

Successful plant rescue can only be achieved if:

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

The following principles apply in terms of plant rescue and protection:

- A permit is required to translocate or destroy any listed and protected species even if they do not leave the property. This permit must be obtained prior to any search and rescue operations being undertaken.
- Where suitable species are identified, a search and rescue operation of these species must be undertaken within the development footprint prior to the commencement of construction.
- As far as possible, timing of search and rescue activities must be planned with the onset of the growing season.
- Affected individuals must be translocated to a similar habitat outside of the development footprint and marked for monitoring purposes. For each individual plant that is rescued, the plant must be photographed before removal, tagged with a unique number or code and a latitude longitude position recorded using a hand-held GPS device.
- The rescued plants must be planted into a container to be housed within a temporary nursery on site or immediately planted into the target habitat.
- Rescued plants, if re-planted back in the wild, must be placed as close as possible to where they were originally removed. Re-planting into the wild must cause as little disturbance as possible to existing natural ecosystems. The position of the rescued individual/s must be recorded to aid in future monitoring of that plant.
- During construction, the ECO must monitor vegetation clearing at the site. Any deviations from the plans that may be required must first be checked for listed species by the ECO or Environmental Officer and any listed species present which are able to survive translocation must be translocated to a safe site.
- Any listed species suitable for translocation observed within the development footprint that were not previously observed be translocated to a safe site.
- The collecting of plants or their parts must be strictly forbidden. Staff must be informed of the legal and conservation aspects of harvesting plants from the wild as part of the environmental induction training.
- Sensitive habitats and area outside project development must be clearly demarcated as no go areas during the construction and operational phase to avoid accidental impacts.

9.3 RE-VEGETATION AND HABITAT REHABILITATION PLAN

The purpose of the rehabilitation plan is to ensure that areas cleared or impacted during construction activities are rehabilitated with a plant cover that reduces the risk or erosion from these areas as well as restores some ecosystem function. The purpose of the rehabilitation plan for the site can be summarised as follows:

- Achieve long-term stabilisation of all disturbed areas to minimise erosion potential.
- Re-vegetate all disturbed areas with suitable local plant species.
- Minimise visual impact of disturbed areas.
- Ensure that disturbed areas are safe for future uses

The rehabilitation plan must be closely aligned with other site-specific plans for the project, including the erosion management plan, soil management plan, alien plant management plan, and plant rescue and protection plan. Prior to commencement of construction, a detailed rehabilitation plan and Method Statement for the site must be compiled by the EPC Contractor. .

Mitigation and management measures include, but are not limited to the following:

- Re-vegetation must aim to accelerate the natural succession processes so that the plant community develops in the desired way, i.e. promote rapid vegetation establishment
- Re-vegetation of disturbed surfaces must occur immediately after construction activities are completed. This must be done through seeding with locally indigenous species typical of the representative botanical unit.
- Re-vegetation of the disturbed site is aimed at approximating as near as possible the natural vegetative conditions prevailing prior to construction.
- Seeds from surrounding seed banks can be used for re-seeding.
- Rehabilitation must be executed in such a manner that surface run-off will not cause erosion of disturbed areas.
- Planting of indigenous tree species in areas not to be cultivated or built on must be encouraged.
- Habitat destruction must be limited to what is absolutely necessary for the construction of the infrastructure, including the construction of new roads. In this respect, the recommendations from the Ecological Specialist Study must be applied strictly. Personnel must be adequately briefed on the need to restrict habitat destruction, and must be restricted to the actual construction area.
- Monitoring programme to ensure that rehabilitation efforts are successful to ensure that risks such as erosion, spread of exotic species and the edge effect are avoided.

9.3.1 REHABILITATION METHODS

The following rehabilitation methods are only applicable if / where there is construction activity in areas of natural vegetation. These measures can be ignored where construction takes place on agricultural or disturbed land.

- Immediately after replacing topsoil in disturbed areas, the soil surface must be revegetated with a suitable plant cover.
- It is expected that soil seed banks of indigenous vegetation will be present to initiate initial vegetation cover. However, simply applying this topsoil to a well prepared rehabilitation site does not result in the same species richness and diversity as the surrounding areas. In some areas the natural regeneration of the vegetation may be poor and the application of seed to enhance vegetation recovery may be required.
- Where possible, seed must be collected from plants present at the site during plant rescue operations. Indigenous seeds may also be harvested for purposes of re-vegetation in areas that are free of alien or invasive vegetation, either at the site prior to clearance or from suitable neighbouring sites.
- Seed collection must be undertaken by a suitably qualified specialist who is familiar with the various seed types associated with the plant species and rehabilitation in the area.
- Seed collection may be done throughout the year as seed ripens, but can also be restricted to summer, when a large amount of the perennial seed must have ripened. The collection of unripe seeds will reduce the percentage germination thereby reducing the effectiveness of the rehabilitation efforts. Seeds must be stored in paper or canvas bags dusted with insecticide, and sown at the onset of the rainy season.
- Seed can be sown onto the soil, but must preferably be applied in conjunction with measures to improve seedling survival such as scarification of the soil surface or simultaneous application of mulch. Additional organic material may be added to the soil mix, if required, to assist with water retention during the early stages of seedling establishment.
- It must be ensured that the seed mix is as diverse as possible in the first season. After the first season, when pioneer plant communities have successfully established, attempts must be made to re-sow and replant the area with more perennial and woody species. It is a process that will require several follow-ups.
- Planting is dependent on species involved. Planting of species recommended for rehabilitation must be carried out as far as is practicable to coincide with the onset of the first significant rains. In general however, planting must commence as soon as possible after construction is completed in order to minimise the potential for erosion.
- The final vegetation cover must resemble the original (non-encroached and indigenous) vegetation composition and structure as far as practicably possible.

- Progressive rehabilitation is an important element of the rehabilitation strategy and must be implemented where feasible. Re-vegetation of disturbed surfaces must occur immediately after construction activities are completed.
- Once revegetated, areas must be protected to prevent trampling and erosion.
- No construction equipment, vehicles or unauthorised personnel must be allowed onto areas that have been vegetated.
- Where rehabilitation sites are located within actively grazed areas, they must be fenced.
- Fencing must be removed once a sound vegetative cover has been achieved.
- Any runnels, erosion channels or wash aways developing after revegetation must be backfilled and consolidated and the areas restored to a proper stable condition.

9.3.2 MONITORING AND FOLLOW-UP ACTION

Throughout the lifecycle of the development, regular monitoring and adaptive management must be in place to detect any new degradation of rehabilitated areas. During the construction phase, the EO and contractor will be responsible for initiating and maintaining a suitable monitoring system. Once the development is operational, Esizayo will need to identify a suitable entity that will be able to take over and maintain the monitoring cycle and initiate adaptive management as soon as it is required. Monitoring personnel must be adequately trained. This will only be required where there were impacts in areas of natural vegetation. If not impacts on natural vegetation occurred then this will not be required.

The following are the minimum criteria that must be monitored:

- Composition and density of replanted vegetation, distinguishing between species introduced for initial revegetation only and species that are part of the pre-determined desirable end state.
- Associated nature and stability of surface soils
- Re-emergence of alien and invasive plant species. If noted, remedial action must be taken immediately.

The initial revegetation period post construction is estimated to be over a period of 6 (minimum) to 12 months (maximum), or a time period specified by the rehabilitation specialist, particularly if planting of trees and shrubs occurs. The rehabilitation phase (including post seeding maintenance) must be at least 12 months (depending on time of seeding and rainfall) to ensure establishment of an acceptable plant cover is achieved (excluding invasive plant species or weeds).

As rehabilitation success, monitoring and follow-up actions are important to achieve the desired cover and soil protection. The following monitoring protocol is recommended:

- Re-vegetated areas must be monitored every 4 months for the first 12 months following construction.
- Re-vegetated areas showing inadequate surface coverage (less than 20% within 12 months after re-vegetation) must be prepared and re-vegetated;
- Any areas showing erosion, must be re-contoured and seeded with indigenous grasses or other locally occurring species which grow quickly.

If the plants have not established and the acceptable plant cover is not achieved within the specified maintenance period, maintenance of these areas shall continue until an acceptable plant cover is achieved (excluding alien plant species or weeds). Additional seeding or planting may be necessary to achieve acceptable plant cover. Hand seeding may have to be considered as an option in this case.

Monitoring of rehabilitation success and follow-up adaptive management, together with clearing of emerging alien plant species must continue until the decommissioning phase has been completed.

9.4 OPEN SPACE MANAGEMENT PLAN

Open space management measures include, but are not limited to the following:

- A buffer zone must be established in areas where construction will not take place to ensure that construction activities do not extend into these areas.

- Vehicle movement must be restricted to authorised access roads.
- Before construction begins, all areas to be developed must be clearly demarcated.
- All construction camps are to be fenced off in such a manner that unlawful entry is prevented and access is controlled.
- Signage shall be erected at all access points in compliance with all applicable occupational health and safety requirements. All access points to the construction camp must be controlled by a guard or otherwise monitored, to prevent unlawful access.
- The contractor and ECO must ensure compliance with conditions described in the EA.
- Records of compliance/ non-compliance with the conditions of the authorisation must be kept and be available on request.
- Records of all environmental incidents must be maintained and a copy of these records be made available to provincial department on request throughout the project execution.
- All construction equipment must be stored within the construction camp.
- An area for the storage of hazardous materials must be established that conforms to the relevant safety requirements and that provides for spillage prevention and containment
- The Contractor must provide sufficient ablution facilities, in the form of portable / VIP toilets, at the construction camps, and shall conform to all relevant health and safety standards and codes. A sufficient number of toilets shall be provided to accommodate the number of personnel working in the area.
- No fires will be allowed
- The Contractor shall take specific measures to prevent the spread of veld fires, caused by activities at the campsites. These measures may include appropriate instruction of employees about fire risks and the construction of firebreaks around the site perimeter.
- Environmental awareness training for construction staff, 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.
- Staff must 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.

9.5 TRAFFIC AND TRANSPORT MANAGEMENT PLAN

The purpose of a Traffic and Transportation Management Plan is to address regulatory compliance, traffic management practices, and protection measures to help reduce impacts related to transportation and the construction of temporary and long-term access within the vicinity of the project site. The objectives of this plan include the following:

- To ensure compliance with all legislation regulating traffic and transportation within South Africa National, Provincial, Local and associated guidelines.
- To avoid incidents and accidents while vehicles are being driven and while transporting personnel, materials, and equipment to and from the project site.
- To raise greater safety awareness in each driver and to ensure the compliance of all safe driving provisions for all the vehicles.
- To raise awareness to ensure drivers respect and follow traffic regulations.
- To avoid the deterioration of access roads and the pollution that can be created due to noise and emissions produced by equipment, machinery, and vehicles

9.5.1 MITIGATION AND MANAGEMENT MEASURES

Mitigation and management measures include, but are not limited to the following:

- All vehicles used during the transport of materials and in the construction activities are required to be roadworthy per the National Road Traffic Act (NRTA) and display all pertinent certificates as required.

- All vehicles travelling to and from the site shall adhere to all laws imposed by the law enforcement agencies, and shall comply with any requests made by the law enforcement officials.
- For each convoy of abnormal vehicles/loads a designated safety officer shall be nominated. All abnormal vehicles and loads to be transported are required to have a valid permit before any trip is begun.
- The route must be assessed to determine if any structures or vegetation need to be temporarily or permanently relocated so as to avoid damage to the load as well as public and private property during the trips.
- A designated transport coordination manager must be appointed to oversee and manage the traffic safety officers. Additionally, the designated transport coordination manager must inform and keep up-to-date the interested and affected parties of all the activities taking place that may have a direct impact on them.
- A traffic safety officer shall be nominated to make all the necessary arrangements to maintain the required traffic measures for the duration of the project as outlined in the "Standard Specifications for Road and Bridge Works for State Road Authorities,' 1998 edition. The safety officer shall liaise daily with the transportation coordination manager to keep them apprised of the state of all the traffic arrangements.
- All construction vehicles that are entering the site shall also be available via radio or telephone communication to the transport coordination manager. So that in the event of an emergency, all vehicles can be accounted for.
- All vehicles shall comply with the posted speed limits on public roads as well as the speed limits within the development. For additional speed limits that are imposed on the construction traffic, refer to the South African Road Traffic Signs Manual (SARTSM), Volume 2, June 1999 for the restrictions.
- All construction traffic shall comply with the legal load requirements as outlined in the National Road Traffic Act and National Road Traffic Regulations.
- The South African Road Traffic Signs Manual (SARTSM), Volume 2, June 1999 is to be used for all traffic during the construction activities of the proposed project.
- During periods of high construction traffic entering and exiting the site, it is recommended that flagmen help direct the traffic. This will enable the safe movement of construction and public traffic at the entrance and reduce the number of potential conflicts.

9.5.2 DEFINITIONS, ACRONYMS AND ABBREVIATIONS

Table 9-1 outlines the applicable definitions, acronyms and abbreviations.

Table 9-1: Applicable Traffic definitions, acronyms and abbreviations

TERM	DESCRIPTION
Company Vehicles and Mobile Construction Equipment	A vehicle and/or mobile equipment leased or rented by the Construction Cluster
Vehicle Coordinator	An employee trained in this procedure who the operation shall contact prior to travelling and report to upon arrival or report back to upon return from a remote site
Operator	The employee trained in this procedure authorized to operate a vehicle or mobile equipment. The employee shall have completed an approved operator course and be assessed as being competent by a suitably authorized person on Site
Remote Site	Any unmanned Site (e.g. exploration or survey area) to which a person intends travelling
Maintenance Schedule	A pre-determined regular maintenance programme done by a competent qualified person to mobile construction equipment on Site

9.5.3 IDENTIFIED HAZARDS

Identified hazards to people working or travelling in, through or around the road construction areas or infrastructure road system include:

- General public and traffic interface;
- Maintenance crews on roads;
- Vehicle interaction and speed;
- Company vehicle operator training;
- Road conditions;
- Communications;
- Traffic Control;
- Road demarcation and signage;
- Restricted areas and escort vehicles;
- Operational machinery;
- Blind crests and corners;
- Excavations;
- Vehicle safety standards;
- Journey management;
- Road rules;
- Blasting near roadways;
- Equipment and vehicle inspections;
- Defective light vehicles and mobile plant; and
- Search and rescue and emergency access.

9.5.4 GENERAL PUBLIC INTERFACE

Due to interface with the general public, extra precautions are required to restrict access or control traffic in to or through the project area.

This will be achieved by the use of signage and/or demarcations and the issuing of public information bulletins to notify the public that beyond a designated location is a project area and access is restricted to project personnel and contractors only.

Where appropriate, additional warning signs, revolving lights and/or personnel will be used to control traffic flow.

9.5.5 MAINTENANCE CREW ON ROADS

The speed limit for the project is to be limited to a maximum of 40Kph. Roads which have conditions where potentially hazardous work is being undertaken (e.g. culverts, where personnel are close to the access road), shall have a speed restriction of 20Kph, and signs will be placed at both ends of the specific work area.

Where maintenance crews are working close to traffic, additional precautions will be taken to keep visibility and early warning at a maximum. These may include local watering of dust generating areas, wearing of high visibility vests and posting of additional traffic controllers at the extremities of the work environment.

All personnel on site are required to wear high visibility reflective vests or clothing and utilise the correct signage at all times.

9.5.6 FLAGGING

The primary function of a flagman/woman is to guide the flow of traffic (loaders, dozers, dump trucks, excavators, automobiles, etc.) safely and expeditiously through or around work areas or where traffic lanes are intermittently blocked.

FLAGGING TRAFFIC

Flagging personnel are used to control traffic flow through work are as at decreased speeds to reduce the hazards to personnel working in the area. The flagman must be clearly visible from a distance to permit appropriate response to the flagman's instructions by a vehicle operator. If at any point the flagman is not visible, all equipment moving through that area must shut down.

HAND SIGNALLING DEVICES

Hand signalling devices (orange flags) shall be used in controlling traffic through work areas. Flags used for signalling purposes shall be at least 450mm square, made of a good grade of fluorescent orange material, and securely fastened to a staff approximately one meter in length. Yellow flashing lights must be used during periods of darkness or poor visibility.

FLAGMAN

Due to the priority the Construction Cluster places on human safety, the selection of capable personnel is essential. Flagman shall wear an orange reflective safety vest as an outer garment. Reflective apparel must be worn at all times.

TRAINING

Flagmen must be given instruction and training by their Supervisor to develop a clear understanding of their duties and responsibilities.

As a minimum, instruction and training must include:

- Communications;
- Attitude;
- Safety equipment;
- Tools;
- Hand signals;
- Location or positioning;
- Action(s) for directing traffic; and
- Emergency procedures.

Project/Site Management must approve and verify that appropriate training has been conducted for each flagman prior to them being utilised on public highways.

FLAGGING TRAFFIC

It is important for the flagman to remain in full view of all vehicles and to avoid standing in congested areas. Under no circumstances should flagman stand in the lane being used for moving traffic. Flagman must stand adjacent to lanes where vehicles and equipment are travelling.

FLAGGING PROCEDURES

The following methods of flagging shall be used:

- To stop traffic, the flagman shall face approaching traffic and extend the flag horizontally across the traffic lane in a stationary position so that the full area of the flag hanging below the staff is visible. The free arm maybe raised with the palm turned toward approaching traffic.
- When it is safe for the vehicle operator to proceed, the flagman shall turn parallel to the traffic movement.
- When the flag is used, drop the arm with the flag to lower it from the view of the vehicle operator and motion traffic ahead with the free arm. The orange flag shall never be used to signal traffic to proceed.
- To slow traffic with the flag, the flagman shall give the stop signal and then change to the signal to proceed before the vehicle comes to a stop.

9.5.7 RESTRICTED AREAS AND ESCORT VEHICLES

RESTRICTED AREAS

Site personnel will be informed as to the restricted areas of the project. These areas are not to be accessed without authority from the Project Manager.

The speed limit for the project is to be limited to a maximum of 60Kph on site. National road rules apply to all roads.

ESCORT VEHICLE

For large or non-routine loads, an escort vehicle provided by the Contractors must be used in front of and when necessary, behind the vehicle or mobile equipment. Other vehicles must be escorted at the Project Manager's discretion. Drivers entering site must wear the correct PPE.

In order to delineate the paths of the earth moving machinery, a "Scraper and Mobile Equipment Circuit" or similar signs shall be erected 100m (325ft) prior to the circuits.

To minimize the potential of light vehicles entering the blind spots of heavy vehicles, all other equipment and light vehicles and mobile equipment are to give way to heavy vehicles operating on any infrastructure road or facility.

9.5.8 VEHICLE SPEED

Unless otherwise stated (i.e. by means of memo or signage), the following speed restrictions shall apply at all times:

- General speed limit – 40 km/h; and
- Areas of increased hazard (i.e. road works and work groups) – 20 km/h
- Personnel operating a vehicle on any road within the boundaries of facilities, including access roads, MUST ALWAYS DRIVE TO THE CONDITIONS, regardless of the posted speed limit signage, e.g. slower in wet weather or poor visibility, lights on.

9.5.9 EXCAVATIONS

For excavations on roads, barriers will be put in place to prevent vehicle access to the trench.

The barriers must be a suitable height and constructed of high visibility material to make them easily seen by the largest vehicles driving through.

9.5.10 LIGHT VEHICLE DRIVER TRAINING

All personnel operating light vehicles shall have the required authorized license.

VEHICLE SAFETY STANDARDS

Seatbelts must be installed for each seat in a vehicle and worn at all times by all personnel travelling in the vehicle. Vehicle capacity, stability and terrain capabilities will be considered when selecting suitable light vehicles and mobile equipment for the project facilities.

The responsible vehicle operator shall, at the commencement of each day and when taking over a vehicle, complete a pre-use inspection checklist.

9.5.11 DEFECTIVE LIGHT VEHICLES AND MOBILE EQUIPMENT

Any safety related fault or defect in a vehicle or mobile equipment must be reported immediately to the responsible Mechanic and/or Supervisor/Immediate Line Manager.

An unsafe vehicle or unsafe mobile equipment must have a completed “Out of Service” tag attached to the ignitions witch, steering wheel or controls in the Operator’s cabin.

Light vehicles and mobile equipment with an “Out of Service” tag shall not be driven by any persons other than Maintenance Personnel required and authorised to move them for repairs.

NO GO CONDITIONS

Under no circumstances may a vehicle be driven if any of the following no-go conditions exist:

- Defective brakes
- Defective steering
- Radiator water leaks
- Oil leaks
- Defective or no head lights
- Defective or no brake lights
- Defective or no reverse lights
- Smooth or incorrectly inflated tyres
- Indicators not working
- Mirrors damaged or missing

The driver must report all no-go conditions immediately to the responsible Mechanic.

9.5.12 SIGNAGE

All signage must, as a minimum:

- Give clear direction;
- Be visible and not obscured;
- Be maintained;
- Be reviewed regularly for relevance;
- Pictograms may be required where tourists’ numbers are high;
- Flashing lights will be placed to warn drivers of any hazards present at night or in poor visibility;
- All side roads to be signed (STOP and NO ENTRY); and
- No red signage to be erected within 5 meters of any railway.

9.6 STORM WATER MANAGEMENT AND SURFACE WATER PROTECTION PLAN

The main principles in stormwater management include:

- Confine or divert any unpolluted water to a ‘clean’ water system, and polluted water to a ‘dirty’ water system;
- ‘Clean’ and ‘dirty’ water systems must be designed and constructed to prevent cross-contamination between the ‘clean’ and ‘dirty’ water systems; and
- Appropriate maintenance and management of storm water related infrastructure.

The proposed water systems or infrastructure are to be designed to prevent any potential contamination of natural water resources in the area.

Currently, there is no existing water management system at the proposed Esizayo WEF Expansion area as it is bare ground

A Storm Water Management and Surface Water Protection Plan cannot be compiled until the detailed designs are complete, which will only take place in the event that the project is identified as a preferred bidder as part of the REIPPP. It is stipulated in this EMPr that a Storm Water Management Plan must be compiled before any construction commences and implemented during the construction phase. This plan must indicate how all surface runoff generated as a result of the project and associated activities (during both the construction and operational phases) will be managed prior to entering any natural drainage system or wetland and how surface water runoff will be retained outside of any demarcated buffer zones and subsequently released to simulate natural hydrological conditions.

9.7 FIRE MANAGEMENT PLAN

The purpose of this plan is to address firefighting requirements throughout the construction of the project and to preserve and protect human life as well as tangible goods and equipment in the event of a fire.

Mitigation and management measures include, but are not limited to the following:

- All construction camps shall be provided with portable fire extinguishing equipment, in accordance with all relevant legislation and must be readily accessible.
- The Contractor shall take specific measures to prevent the spread of veld fires, caused by activities at the campsites. These measures may include appropriate instruction of employees about fire risks and the construction of firebreaks around the site perimeter.
- Fire prevention facilities must be present at all storage facilities.
- No open fires shall be allowed on site under any circumstance. All cooking shall be done in demarcated areas that are safe and cannot cause runaway fires.
- The Contractor shall have operational fire-fighting equipment available on site at all times. The level of firefighting equipment must be assessed and evaluated through a typical risk assessment process.
- Emergency numbers for local police and fire department etc. must be placed in a prominent area.
- Firefighting equipment must be placed in prominent positions across the site where it is easily accessible. This includes fire extinguishers, a fire blanket as well as a water tank.
- All construction staff must be trained in fire hazard control and firefighting techniques. Translators are to be used where necessary.
- All flammable substances must be stored in dry areas which do not pose an ignition risk to the said substances.
- Smoking may only be conducted in demarcated areas.
- Firefighting equipment must be regularly maintained by an appropriate company.

9.8 EMERGENCY RESPONSE PLAN

Esizayo will provide appropriate resources to respond to process upset, accidental, and emergency situations for operations and activities during construction, operation and decommissioning phases. The procedures will include plans for addressing training, resources, responsibilities, communication and all other aspects required to effectively respond to emergencies associated with their respective hazards.

The purpose of emergency preparedness and response plan (EPRP) / method statement is to ensure that the relevant parties are adequately prepared and able to respond effectively to potential emergency situations that may arise during project activities. These potential emergency situations include medical emergencies and fires

All operations/ activities associated with the project will require site-specific emergency response plans to mitigate impacts, which meet or exceed all applicable regulations.

The objectives of this plan are as follows:

- Protect the communities and the environment through the development of emergency response strategies and capabilities;
- Set out the framework for hazard identification in order to define procedures for response to the situations including the development of contingency measures;
- Structure a process for rapid and efficient response to and manage emergency situations during the construction, operational and decommissioning phases of the project; and
- Assign responsibilities for responding to emergency situations.

The Emergency Response Plan must take the incident procedures referred to in Section 30 of the NEMA into account.

9.8.1 ROLES AND RESPONSIBILITIES

Roles, responsibility, and authority shall be defined, documented and communicated in order to facilitate effective emergency response through implementation of the EPRP. The table below outlines roles and responsibilities related to each position.

— **Emergency Response representative(s)**
— Actively participate in the facilities planning, implementation and reviewing of the sites EPRP. — Ensure all staff members are aware of the procedures outlined in the EPRP. — Setting up regular practical training schedules (drills) to ensure that all staff are prepared in case of an emergency. — Report any incidents that occur to senior management staff and/or the relevant authorities. — Appoint an Emergency Response (ER) team which includes an appropriate first aid representative and a fire warden. — Ensure that the appointed ER team undergo the correct training. — Appoint an appropriate Emergency Coordinator.
— **First Aid representative(s)**
— Ensuring the first aid box is properly stocked to meet all foreseeable incidents which may occur. — Ensure that the boxes are properly safeguarded, and that First Aiders name appears on the box. — Should any activity involve hazardous chemical substances, or any other specific first aid emergencies, this must be brought to the attention of the emergency coordinator. — Ensure the first aid certificate is current. — Ensure that there is always a first aider available at each shift.
— **Fire warden(s)**
— Ensure that the firefighting equipment is regularly serviced. — Attend the relevant firefighting training. — Report any unserviceable or damaged fire-fighting equipment to the ER. — Ensure the firefighting certificate is current. — Ensure that there is always a firefighter available at each shift.
— **Emergency Co-ordinator**
— Ensure that an update of the EPRP is kept on file and is easily accessible in case of an emergency. — Ensure that all staff have been issued with the correct Personal Protective Equipment (PPE). — Ensure that a list of emergency telephone numbers, including those of the Emergency Response team, are visible to all staff at a number of locations around the facility. — In the case of an emergency, the emergency coordinator is responsible for undertaking roll call at the designated Assembly points.

9.8.2 EMERGENCY COMMUNICATIONS AND COORDINATION PLAN

In an emergency situation where there is an immediate threat to communities, personnel or the environment, the Project Manager will be notified immediately. The Project Manager will dispatch the Emergency Response Coordinator who will determine the appropriate plan of action depending on the severity of the emergency, the people affected, and the need to evacuate.

If there is a developing emergency or unusual situation, where an emergency is not imminent, but could occur if no action is taken, the Project Manager (or if the Project Manager is absent the Environmental Manager) is to be informed immediately. Once the emergency or unusual situation has been managed, the correct incident/near miss must be reported to the General Manager.

If an emergency situation poses a direct threat to communities in the area, the Environmental Officer and/or Social Officer will advise persons in the vicinity of the emergency to evacuate due to the potential risk. The appropriate government authorities will immediately be notified of such an emergency evacuation. The Emergency Response Coordinator will be tasked with responding to the potential risk. Should the emergency situation be such that it can be managed by Esizayo, equipment and personnel will be deployed to the maximum extent necessary, so as to prevent/minimise potential risks.

9.8.3 RESPONSE TO INCIDENTS

An incident is any occurrence that has caused, or has the potential to cause, a negative impact on people, the environment or property (or a combination thereof). It also includes any significant departure from standard operating procedures. The reporting and investigation of all potential and actual incidents that could have a detrimental impact on human health, the natural environment or property is required so that remedial and preventive steps can be taken to reduce the potential or actual impacts because of all such incidents.

Any incident must immediately be reported to the relevant authorities and all the necessary documentation must be completed and submitted to the relevant authorities within the prescribed timeframes.

The actions resulting from any formal or informal investigations will be used to update the EMPr.

9.8.4 VERIFICATION

An HSE emergency response system will be developed for the execution of emergency drills that will include the following, inter alia:

- Fire Drills;
- Emergency Evacuation Drills; and
- Medical and Environmental Drills.

Reporting and monitoring requirements for the plan will include:

- Monthly inspections and audits;
- Quarterly reporting of accidents/ incidents;
- Reporting at the time of the incident and monthly spill reporting developed by the Environmental and Quality, Health and Safety departments;
- Bi-annual emergency response drills; and
- Annual reporting on training.

Emergency response drills and reporting will be maintained by the Project Manager and will provide information regarding required revisions to training or the emergency response actions. Each incident reported will be reviewed and investigated upon occurring. Actions will be identified where possible to improve the site's overall response to emergencies. Updates/revisions that are necessary to protect worker or community health and safety will be implemented immediately after approval by the General Manager. On a bi-annual basis, Key Performance Indicators (KPIs) will be compared against past-performance and analysed for trends to determine if there are areas for improvement. Changes because of the trend analysis and identified areas for improvement will be implemented following the project's change management system as required.

This plan will be amended periodically in light of operational changes, learning experienced during its implementation and other activities that can affect the risk profiles.

9.9 COVID-19

PREVENTION AND RESPONSE

A dedicated team with responsibilities to identify and implement actions to mitigate the effects of COVID-19 on the company and community should be appointed.

INFORMATION

Information dissemination and training are an effective way to reduce the risk for both the company and the general public.

COVID-19 symptoms include: fever, tiredness, difficulty breathing, dry cough, chills, repeated shaking with chills, muscle pain, headache, sore throat, and new loss of taste or smell. Some patients may have nasal congestion, runny nose, or diarrhoea. Symptoms may appear two to 14 days after exposure to the virus.

EMPLOYEE QUESTIONNAIRE

To prevent potentially infected staff from entering the workplace and infecting co-workers, a short questionnaire could be used. Workers should only report to work if they answer “no” to all the questions.

The following is an example:

- Have you, in the last two weeks, been in close contact with a person who has COVID-19?
- Have you, in the last two weeks, been in a country/region with a high number of cases of COVID-19?
- Do you have a fever?
- Have you used medications such as paracetamol or aspirin to suppress fever in the last 24 hours?
- Are you coughing (even mildly)?
- Do you currently experience shortness of breath?

PREVENTION METHODS

SICK PERSONS TO STAY HOME

Workers requested to stay away from work in cases where they exhibit any COVID-19 symptoms or have been in close contact with a confirmed COVID-19 patient during the previous 14 days.

Workers who do not feel well should seek immediate medical advice. An employee who works while evidencing mild COVID-19 symptoms can risk spreading this infectious disease to others.

COUGH HYGIENE

To reduce the risk of infected persons spreading the virus by coughing and sneezing, workers are to be instructed to follow the cough etiquette outlined below:

- Cover the mouth and nose with a tissue when coughing or sneezing and dispose of the used tissue in a wastebasket.
- When no tissue is available, cough or sneeze into the upper sleeve or elbow, not into the hands.
- Clean hands after coughing or sneezing, preferably by thorough water-soap handwashing, following the recommendations of health organizations. If soap and water are not available, use a hand sanitizing gel.

SOCIAL DISTANCING

To prevent person-to-person infection, it is important to minimize direct contact as much as possible. The contractor is to inform workers about the hazards of close contacts, including with direct co-workers, and promote alternative behaviours, such as maintaining safe distances and using alternatives for handshakes.

HAND SANITATION

Promote frequent and thorough water-soap hand washing and provide enough places for workers to wash their hands. If soap and running water are not immediately available, provide alcohol-based hand rubs containing at least 60% alcohol. Ensure that these facilities are sufficient in number and are available close to the work area.

CLEANING AND DISINFECTING

Frequently – and at least daily - clean touched surfaces, such as tables, light switches, appliances, countertops, handles, desks, phones, keyboards, toilets, taps, sinks, and so forth. Use the cleaning agents that are routinely used in these areas and follow the directions on the labels. For multiuse equipment, clean after every use.

Workers are to be instructed to clean their work areas and equipment at the end of each shift. Equipment and instructions on how to do this are to be provided

9.10 EROSION MANAGEMENT PLAN

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

The objective of the plan is to provide:

- A general framework for soil erosion and sediment control, which enables the contractor to identify areas where erosion can occur and be accelerated by construction related activities.
- An outline of general methods to monitor, manage and rehabilitate erosion, ensuring that all erosion resulting from all phases of the development is addressed.

This management plan must be updated prior to project implementation so as to include relevant site specific information.

9.10.1 EROSION AND SEDIMENT CONTROL PRINCIPLES

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

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

These goals can be achieved by applying the management practices outlined in the following sections.

ONSITE EROSION MANAGEMENT

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 summer thunder storms can also cause significant soil loss. Therefore precautions to prevent erosion must be present throughout the year.
- Soils loss will be greater on steeper slopes. Ensure that steep slopes are not devegetated and subsequently become hydrophobic (i.e. have increased runoff and a decreased infiltration rate) increasing the erosion potential.
- Soil loss is related to the length of time that soils are exposed prior to rehabilitation or stabilisation. Therefore the gap between construction activities and rehabilitation must be minimised. Phased construction and progressive rehabilitation are therefore important elements of the erosion control strategy.

- The extent of disturbance will influence the risk and consequences of erosion. Therefore site clearing must be restricted to areas required for construction purposes only. As far as possible, large areas must not be cleared at a one time, especially in areas where the risk of erosion is higher.
- Roads must be planned and constructed in a manner which minimises their erosion potential. Roads must therefore follow the contour as far as possible. Roads parallel to the slope direction must be avoided as far as possible.
- Where necessary, new roads constructed must include water diversion structures present with energy dissipation features present to slow and disperse the water into the receiving area.
- Roads and other disturbed areas must be regularly monitored for erosion. Any erosion problems recorded must be rectified as soon as possible and monitored thereafter to ensure that they do not re-occur.
- Compacted areas must have adequate drainage systems to avoid pooling and surface flow. Heavy machinery must not compact those areas which are not intended to be compacted as this will result in compacted hydrophobic, water repellent soils which increase the erosion potential of the area. Where compaction does occur, the areas must be ripped.
- All bare areas must be revegetated with appropriate locally occurring species, to bind the soil and limit erosion potential.
- Silt fences must be used where there is a danger of topsoil or material stockpiles eroding and entering streams and other sensitive areas.
- Gabions and other stabilisation features must be used on steep slopes and other areas vulnerable to erosion to minimise erosion risk as far as possible.
- Activity at the site after large rainfall events when the soils are wet and erosion risk is increased must be reduced.
- Topsoil must be removed and stored separately during construction activities, and must be reapplied where appropriate as soon as possible in order to encourage and facilitate rapid regeneration of the natural vegetation on cleared areas (where applicable – not applicable to farmland / agricultural areas).
- Regular monitoring of the site for erosion problems during construction (ongoing) and operation (at least twice annually) is recommended, particularly after large summer thunderstorms have been experienced.

EROSION CONTROL MECHANISM

The contractor may use the following mechanisms to combat erosion when necessary:

- Reno mattresses
- Slope attenuation
- Hessian material
- Shade catch nets
- Gabion baskets
- Silt fences
- Storm water channels and catch pits
- Soil bindings
- Geofabrics
- Hydro-seeding and/or re-vegetating
- Mulching over cleared areas
- Boulders and size varied rocks
- Tilling

ENGINEERING SPECIFIACTIONS

A detailed Stormwater Management Plan describing and illustrating the proposed stormwater control measures must be prepared by the Civil Engineers and this must include erosion control measures. Requirements for project design include:

- Erosion control measures to be implemented before and during the construction period, including the final stormwater control measures (post construction).

- The location, area/extent (m^2/ha) and specifications of all temporary and permanent water management structures or stabilisation methods must be indicated within the Stormwater Management Plan.
- An onsite Engineer or Environmental Officer to be responsible for ensuring implementation of the erosion control measures on site during the construction period.
- The Developer holds ultimate responsibility for remedial action in the event that the approved stormwater plan is not correctly or appropriately implemented and damage to the environment is caused.

MONITORING

The site must be monitored continuously during construction and operation in order to determine any indications of erosion. If any erosion features are recorded as a result of the activities on site the Environmental Officer (during construction) or Site Manager (during operation) must:

- Assess the significance of the situation.
- Take photographs of the soil degradation.
- Determine the cause of the soil erosion.
- Inform the contractor/operator that rehabilitation must take place and that the contractor/operator is to implement a rehabilitation method statement and management plan.
- Monitor that the contractor/operator is taking action to stop the erosion and assist them where needed.
- Report and monitor the progress of the rehabilitation weekly and record all the findings in a site register.
- All actions with regards to the incidents must be reported on a monthly compliance report which will be submitted to the Competent Authority (during construction) and kept on file for consideration during the annual audits (during construction and operation).

The Contractor/ Developer (in consultation with an appropriate specialist) must:

- Select a system/mechanism to treat the erosion.
- Design and implement the appropriate system/mechanism.
- Monitor the area to ensure that the system functions like it should. If the system fails, the method must be adapted or adjusted to ensure the accelerated erosion is controlled.
- Continue monitoring until the area has been stabilised.

9.11 HAZARDOUS SUBSTANCES MANAGEMENT PLAN

Hazardous substances are chemicals or materials that can cause acute or chronic harm to health, be it humans or the environment. The key potential sources of impact related to the management of hazardous chemical substances (HCS) and fuel during construction relate to the risk of accidental release of hydrocarbons to the environment, accidental exposure to workers, and fire and explosion risks.

Potential impacts associated with these risks, if poorly managed, include:

- Impact to soil and/or groundwater, which may result in degradation of the resource and requirement for remedial action;
- Impacts on pastoralist livelihoods due to contamination of pasture or water resources and consequent impacts to their, health, livelihood and animals;
- Impacts on human health & safety due to either direct exposure or through fire/explosion;
- Gas emissions associated with the combustion of fuel, are mainly compounds of nitrogen, carbon including very small traces of sulphur and particulate matter; and
- Fugitive emissions from HCS & fuel storage.

The purpose of this Hazardous Substances Management Plan (HSMP) is to provide a framework for the management of hazardous substances onsite during the construction and operation of the Esizayo WEF Expansion:

- Ensure the handling and storage of hazardous substances are in accordance with relevant standards;

- To ensure that the storage and handling of chemicals and hydrocarbons on-site does not cause pollution to the environment or harm to persons;
- To ensure that the storage and maintenance of machinery onsite does not cause pollution of the environment or harm to persons.

9.11.1 HAZARDOUS SUBSTANCES MANAGEMENT PROCEDURE

A plan for managing the transportation, delivery, storage and handling of hazardous substances onsite is detailed below. A method statement detailing the specific storage and handling practices during construction must be prepared by the Contractor prior to the commencement of construction.

REGISTER OF HAZARDOUS SUBSTANCES

Contractors shall establish inventories or registers of hazardous substances on site. The inventory is to be updated when new hazardous substances are introduced to the workplace or the use of existing hazardous substances is discontinued. Both the chemicals' register and the Material Safety Data Sheets (MSDSs) must be readily available at a central location or near where the chemicals are being stored or used.

MSDS

It is standard practice that an MSDS is provided by the manufacturer or supplier of all hazardous substances. An MSDS is required for all chemicals and substances on site. These MSDSs are to be made available to all parties affected by the use or storage of the chemical. MSDSs are the key to communicating hazards and safe handling practices for chemicals. In addition, MSDS information is to be made available to all employees.

DELIVERIES

Transport of all hazardous substances must be in accordance with the relevant legislation and regulations. Contractors are responsible for identifying and securing any necessary permits for any proposed bulk fuel storage arrangements. The supplier will fill contractors fuel tanks; fuelling is the responsibility of the licensed contractor who will be supervised by the storage/work area supervisor. No 'black-market' or 'grey-import' fuels shall be used. All fuels purchased must be legitimate and subject to required duties and taxes.

Prior to fuel transfer the operator will verify that: all fuel transfer hoses have been connected properly and couplings are tight; transfer hoses are not obviously damaged; fuel transfer personnel are familiar with procedures; for fuelling stations, personnel are located at both the fuel truck and fuel transfer tank(s) and have the ability to shut off fuel flow manually; a means of communication has been established between the two people transferring fuel; and a high liquid level shutoff device can be substituted for the person at the delivery tank, in which case operation of the shutoff will be verified each time it is used;

The fuel contractor will clean up and report any accidents or spills immediately to the project ESHS team.

ENVIRONMENT AND OCCUPATIONAL HEALTH AND SAFETY

The following requirements are additional to any applicable requirements established in other LTWP management plans such as the Occupational Health & Safety Management Plan:

- Storage facilities will have the applicable Material Safety Data Sheets (MSDS) available;
- Smoking will be strictly prohibited from any areas where fuel loading operations take place;
- Appropriate signage will be used to identify potential spill risks;
- Any accidental damage to containment structures will be inspected immediately and appropriate repairs undertaken. The extent of damage will be reported in writing to WP as well as remedial repairs effected together with the date of repairs and any follow up inspection. Any release of fuels or other substance will be cleaned up;
- All used fuel / oil products will be collected in tanks marked "Waste Oil"; and
- All hydrocarbon associated wastes will be managed in line with the Waste Management Plan.

MATERIALS STORAGE

- All temporary hydrocarbon storage will be situated above ground. There will be no buried storage tanks permitted.
- All chemicals, fuels and other hazardous materials are to be stored in designated and bunded areas, where the bunded area is impermeable and is impervious to the stored substance as per the requirements of SABS 089:1999 Part 1. The bunded area will contain 110% volume of the largest container stored.
- Bunds and service area platforms to be cleaned and maintained regularly.
- SABS approved Spill kits must be made available on-site for the clean-up of spills and leaks of contaminants. The relevant construction crew members must be trained in their use.
- Keep a record of all hazardous substances stored on site. Clearly label all the containers storing hazardous waste.
- The storage of flammable and combustible liquids such as oils will be in designated areas which are appropriately bunded, and stored in compliance with Material Safety Data Sheets (MSDS) files and applicable regulations and safety instructions.
- Chemical and hydrocarbon storage facilities shall be covered to prevent rainfall ingress into secondary containment units and well-ventilated
- Any storage and disposal permits/approvals which may be required must be obtained, and the conditions attached to such permits and approvals will be compiled with.
- An effective monitoring system must be put in place to detect any leakage or spillage of all hazardous substances during their transportation, handling, installation and storage.

SPILL AND LEAK MANAGEMENT AND PREVENTION

- In the event of a major spill or leak of contaminants, the relevant authorities of contaminants. (Please list with contact details)The relevant construction crew members must be trained in their use.
- Spilled cement must be cleaned up immediately and, stored as hazardous waste and disposed of at a suitably licensed hazardous waste disposal facility.
- Routine servicing and maintenance of vehicles must not be undertaken onsite (except for emergencies). If repairs of vehicles must take place, an appropriate drip tray must be used to contain any fuel or oils.
- Any water that collects in bunds must not be allowed to stand. Should the water be contaminated, it is to be removed and treated prior to discharge, or disposed of as hazardous waste. Clean stormwater contained within the bunds may be reused.
- No chemicals must be stored or vehicle maintenance undertaken within 100m of wetlands or drainage lines.
- Construction machinery must be stored in an appropriately sealed area. If machinery cannot be stored in a sealed area then a drip tray must be used to prevent spillage from any leaks.
- As far as practicable, all equipment servicing / maintenance shall be undertaken within designated workshop areas.
- All generators on site, including generators that are not in use must be located in a bunded area or on a drip tray.
- Bunded areas and drip trays must be maintained on a regular basis.
- Diesel generators and water pumps shall be located in secondary containment areas or shall be self-contained to prevent loss of fuels and oils;
- Precautions must be in place to limit the possibility of oil and other toxic liquids from entering the soil or clean stormwater system.
- Upon completion of construction, the area must be cleared of potentially polluting materials.
- Emergency response planning will be managed via the Emergency Preparedness and Response Plan.

9.11.2 OPERATIONAL PHASE

During the operational phase of the project limited hazardous substances and chemicals will be stored onsite. During maintenance activities, contractors will need to produce a method statement detailing the specific storage

and handling practices. The following measures need to be implemented onsite during the operational phase of the project.

- Hazardous substances must be stored in sealed containers within a clearly demarcated designated area.
- Care must be taken to ensure that spillage of oils and other hazardous substances are limited during maintenance. Handling of these materials must take place within an appropriately sealed and bunded area. Should any accidental spillage take place, it must be cleaned up according to specified standards regarding bioremediation.
- The storage of flammable and combustible liquids such as oils will be in designated areas which are appropriately bunded, and stored in compliance with Material Safety Data Sheets (MSDS) files and applicable regulations and safety instructions.
- Used oils and chemicals:
  - Appropriate disposal must be arranged with a licensed facility in consultation with the administering authority;
  - Waste must be stored and handled according to the relevant legislation and regulations.

9.11.3 INSPECTION AND MONITORING

Fuel storage areas must be inspected regularly to ensure bund stability, integrity, and function.

9.11.4 TRAINING

The contents of the Hazardous Substances Management Plan must be communicated to the staff through the induction training. On the job training can also be undertaken through the use of Environmental Toolbox Talks. All training must be undertaken as outlined in the Training Procedure (Document Number: EX-PR-004).

Examples of Toolbox Talks include:

- Storage of hazardous substances
- Working with hazardous substances
- Management of hazardous waste
- Spill Prevention

9.12 GRIEVANCE MECHANISM

This Grievance Mechanism has been developed to receive and facilitate grievances and provide a solution to these concerns and grievances. The aim of the grievance mechanism is to ensure that grievances or concerns raised by local landowners, staff and or communities are addressed in a manner that:

- Provides accessible avenues for all internal and external stakeholders to contact Esizayo;
- Provides a predictable, transparent, and credible process to all parties, resulting in outcomes that are seen as fair, effective, lasting and dealt with in a timely manner;
- Builds trust as an integral component of staff and broader community relations activities; and
- Enables more systematic identification of issues and trends affecting a project, facilitating corrective action and pre-emptive engagement.

The aim of this Grievance Mechanism is to address grievances in a manner that does not require a potentially costly and time consuming legal process. This grievance mechanism also ensures alignment with local and international best practices in human resources development and stakeholder engagement.

9.12.1 RESPONSIBILITIES

Figure 9-1 outlines the reporting structure with regards to grievances.

Figure 9-1: Reporting Structure with regards to Grievances

9.12.2 PROCEDURES

INTERNAL GRIEVANCE MECHANISM

The following process relates directly to the corporate human resources policy and seeks to resolve matters that have arisen within the corporate structure. This applies directly to staff that are located at corporate offices or on site and applies to any phase of the project, that is, during construction and operations. **Figure 9-2** illustrates the prescribed process for internal grievances.

All anonymous grievances received from the grievance box will be recorded and be dealt with according to the procedures set out in this document.

The following best practice guidelines when engaging with internal stakeholders:

- IFC Performance Standards;
- IFC Performance standard 2 – Labour and Working conditions;
- King III;
- Emerging governance trends incorporated in the report, Alternate Dispute Resolution;
- South African Legislation;
- Employment Equity Act No. 55 of 1998;
- Labour Relations Act No. 66 of 1995; and
- Occupational Health and Safety Act No. 85 1993.

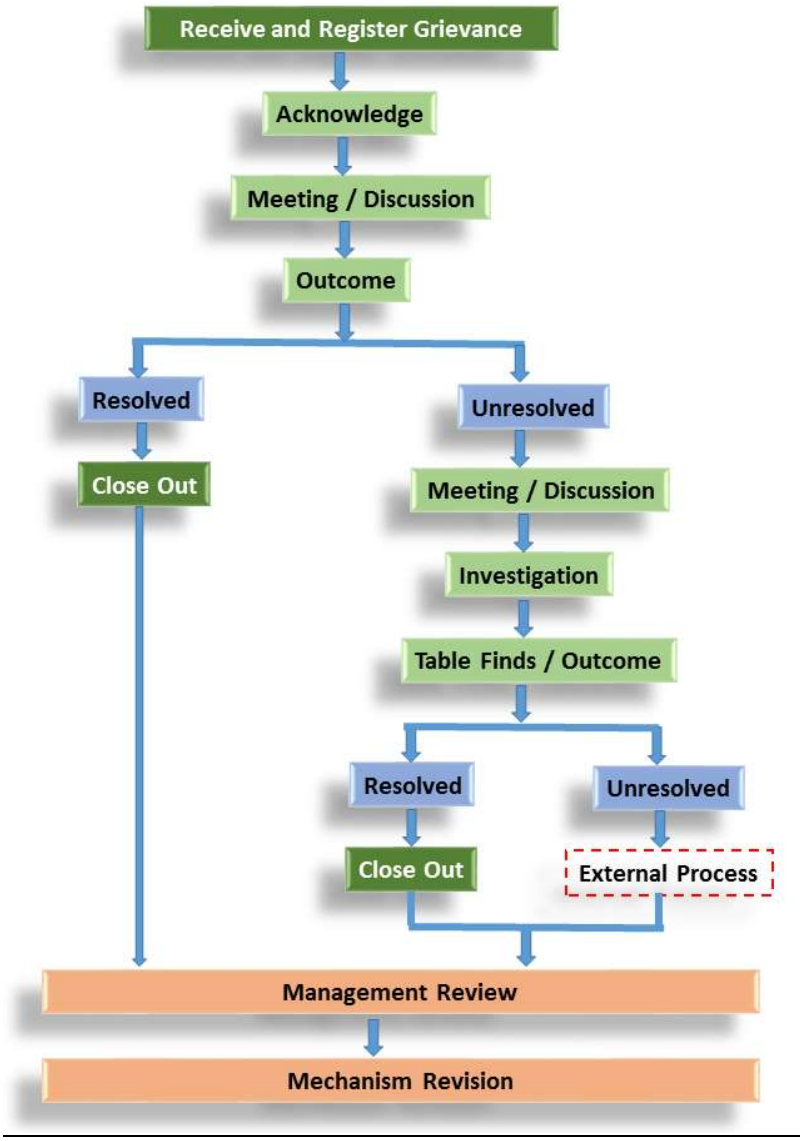


Figure 9-2: Process for Internal Grievances

EXTERNAL GRIEVANCE MECHANISM

A key element of this improvement is the implementation of the external grievance mechanism. This process is applicable through all projects and seeks to resolve issues raised by stakeholders during construction and operations. A formal systematic review of the mechanism will be undertaken every year if and when necessary. **Figure 9-3** illustrates the process that is followed for external grievances.

The following best practice guidelines when engaging with external stakeholders:

- IFC Performance Standards;
- IFC Performance standard 1, 4 and 7;
- King III;
- King III recommends the stakeholder inclusive approach to corporate governance;
- South African Legislation; and
- National Environmental Management Act (NEMA) and other relevant legislation.

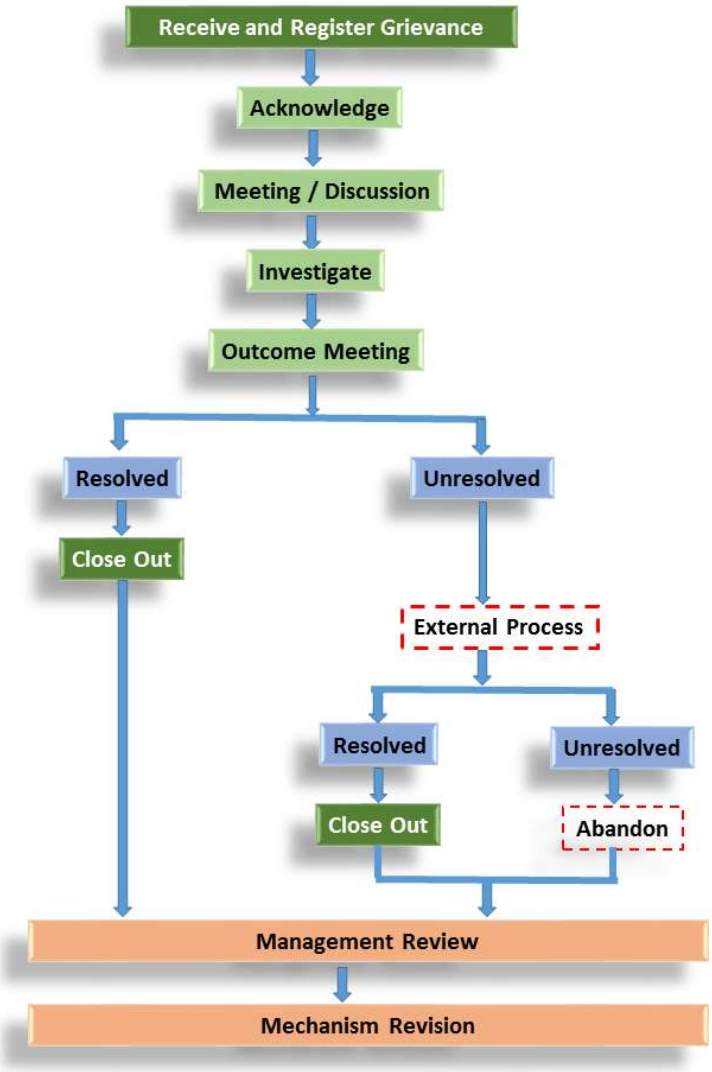


Figure 9-3: Process for External Grievances

GENERAL PROCEDURE FOR RECEIVING AND RESOLVING GRIEVANCES

- Local landowners, communities and authorities must be informed i of the grievance mechanism and the process by which grievances can be brought to the attention of Esizayo through its designated representative.
- A company representative must be appointed as the contact person for grievances to be addressed to. The name and contact details of the contact person must be provided to local landowners, communities and authorities.
- Project related grievances relating to the construction, operational and or decommissioning phase must be addressed in writing to the contact person. The contact person should assist local landowners and or communities who may lack resources to submit/prepare written grievances.
- The grievance must be registered with the contact person who, within 2 working days of receipt of the grievance, must contact the complainant to discuss the grievance and agree on suitable date and venue for a meeting in order to discuss the grievances raised. Unless otherwise agreed, the meeting must be held within 2 weeks of receipt of the grievance.
- The contact person must draft a letter to be sent to the complainant acknowledging receipt of the grievance, the name and contact details of complainant, the nature of the grievance, the date that the grievance was raised, and the date and venue for the meeting (once agreed).

- Prior to the meeting being held the contact person must contact the complainant to discuss and agree on the parties who should attend the meeting. The people who will be required to attend the meeting will depend on the nature of the grievance. While the complainant and or proponent are entitled to invite their legal representatives to attend the meeting/s, it should be made clear that to all the parties involved in the process that the grievance mechanism process is not a legal process. It is therefore recommended that the involvement of legal representatives be limited.
- The meeting must be chaired by the company representative appointed to address grievances. A person must be provided to take minutes of and record the meeting/s. Any costs associated with hiring venues must be covered by Esizayo.
- Draft copies of the minutes must be made available to the complainant and the proponent within 4 working days of the meeting being held. Unless otherwise agreed, comments on the draft minutes must be forwarded to the company representative appointed to manage the grievance mechanism within 4 working days of receipt of the draft minutes.
- In the event of the grievance being resolved to the satisfaction of all the parties concerned, the outcome must recorded and signed off by the relevant parties. The record must provide details of the date of the meeting/s, the names of the people that attended the meeting/s, the outcome of the meeting/s, and where relevant, the measures identified to address the grievance, the party responsible for implementing the required measures, and the agreed upon timeframes for the measures to be implemented.
- In the event of a dispute between the complainant and the proponent regarding the grievance, the option of appointing an independent mediator to assist with resolving the issue should be discussed. The record of the meeting/s must note that a dispute has arisen and that the grievance has not been resolved to the satisfaction of all the parties concerned.
- In the event that the parties agree to appoint a mediator, Esizayo will be required to identify three (3) mediators and forward the names and CVs to the complainant within 2 weeks of the dispute being declared. The complainant, in consultation with Esizayo, must identify the preferred mediator and agree on a date for the next meeting. The cost of the mediator must be borne by Esizayo. A person must be provided to take minutes of and record the meeting/s.
- In the event of the grievance, with the assistance of the mediator, being resolved to the satisfaction of all the parties concerned, the outcome must be recorded and signed off by the relevant parties, including the mediator. The record must provide details on the date of the meeting/s, the names of the people that attended the meeting/s, the outcome of the meeting/s, and where relevant, the measures identified to address the grievance, the party responsible for implementing the required measures, and the agreed upon timeframes for the measures to be implemented.
- In the event of the dispute not being resolved, the mediator must prepare a draft report that summaries the nature of the grievance and the dispute. The report must include a recommendation by the mediator on the proposed way forward with regard to the addressing the grievance.
- The draft report must be made available to the complainant and Esizayo for comment before being finalised and signed by all parties. Unless otherwise agreed, comments on the draft report must be forwarded to the company representative appointed to manage the grievance mechanism within 4 working days. The way forward will be informed by the recommendations of the mediator and the nature of the grievance.

A complaint is closed out when no further action can be or needs to be taken. Closure status will be classified in the complaints register as follows:

- Resolved: Complaints where a resolution has been agreed and implemented and the complainant has signed the confirmation form.
- Unresolved: Complaints where it has not been possible to reach an agreed resolution and the case has been authorised for close out by the appeals committee.
- Abandoned: Complaints where the complainant is not contactable after one month following receipt of a complaint and efforts to trace his or her whereabouts have been unsuccessful.

The grievance mechanism does not replace the right of an individual, community, group or organization to take legal action should they so wish. In the event of the grievance not being resolved to the satisfaction of complainant and or the proponent, either party may be of the opinion that legal action may be the most appropriate option.

9.12.3 INSPECTION AND MONITORING

All grievances will be recorded in the Grievance Register and Guideline and be reviewed on a weekly basis.

A key element of this improvement will be evaluating the effectiveness of this mechanism through internal auditing processes and, if necessary, amend and add to this document. This will include feedback from staff and relevant stakeholders. A formal systematic review will be undertaken every year if considered necessary.

9.12.4 TRAINING

The contents of the Grievance Mechanism must be communicated to the staff through the induction training. On the job training can also be undertaken through the use of Environmental Toolbox Talks. Training must also be provided to neighbouring communities to ensure that they are aware that the grievance process exists and how the process works.

9.13 HIV/AIDS MANAGEMENT PLAN

The HIV/AIDS management plan will be compiled in the event that the project is identified as a preferred bidder as part of the REIPPPP. This plan must be compiled in consultation with the Laingsburg Local Municipality.

The measures must be implemented on site during the construction and operational phases:

- Promote a non-discriminatory and supportive environment for people affected by HIV & AIDS.
- HIV-positive employees must be protected against unfair discrimination, victimisation or harassment.
- Sensitive issues surround HIV & AIDS and it is important to handle matters in a discreet and private manner
- Promote awareness and education programmes to inform employees about HIV & AIDS which will enable them to protect themselves and others against infection by HIV.
- Involve employees and their representatives in the planning and implementation of awareness and counselling programmes, especially as peer educators and counsellors.

9.14 HERITAGE MANAGEMENT PLAN

The purpose of this document is to provide a response guideline should archaeological sites, palaeontological sites or graves become exposed during ground altering activities within the Esizayo WEF Expansion Project area. Heritage resources are protected in terms of the National Heritage Resources Act, Act 25 of 1999 (NHRA).

9.14.1 CHANCE FIND PROCEDURE

The following procedural guidelines must be considered in the event that previously unknown heritage resources are exposed or found during the construction of the Esizayo WEF Expansion Project area. This chance find procedure (CFP) must be read in conjunction with the Environmental Authorisation (DFFE Ref: 14/12/16/3/3/2/963), the Environmental Management Programme, Final EIAR and the final layout archaeological ground-truthing report.

GENERAL REQUIREMENTS

The Contractor or other person discovering a potentially significant site or artefact will initiate the following actions:

- Stop work in the immediate area and take digital photographs to record the find;

- Install temporary site protection measures (e.g. delineate a 'no-go' area using warning tape, stakes and signage / deploy worker and give instructions to prevent access or further disturbance) and take all reasonable steps to avoid any further disturbance or damage from excavation, vibration, plant or machinery;
- Inform site supervisor/foreman;
- Inform all relevant staff /Contractor personnel of the chance find and whether access to work area or along the right-of-way is being restricted;
- Strictly enforce any no-go area needed to protect the site;
- Notify Esizayo who will advise on any additional measures such as deployment of security guard and consultation or a visit from archaeologist / other heritage specialist. In the event of the latter, the specialist/archaeologist will be responsible for evaluating whether the chance find needs to be classified as cultural heritage and if so, whether it is isolated or part of a larger site or feature. Esizayo will notify the relevant authorities;
- The supervisor must then inform the relevant ECO;
- The ECO shall contact the SAHRA and the Heritage Western Cape (HWC) and appoint an archaeological consultant to record the site and excavate if necessary;
- Artefacts are to be left in place for recording by the specialist/archaeologist. It is important they are not disturbed or moved as there setting is as important as the artefact/fossil; if materials are to be collected they will be placed in bags and labelled by the specialist /archaeologist and forwarded to the authorities in a manner that ensures the integrity of the 'chain of custody'. Project personnel are not permitted to take or keep artefacts as personal possessions as that is a crime;
- Any damage, accidental or otherwise, must be investigated by the site foreman, ESHS Team and the details recorded in an interim Incident Report and, if necessary an Incident (Chance Find) Investigation Report;
- Appropriate mitigation / treatment strategies will be developed according to the specific circumstances of each find and, as appropriate, take account of the degree of cultural importance of the find –
- Stakeholder engagement may be needed with affected communities to determine the correct mitigation actions or, if applicable, suitable compensation (e.g. reburial costs). Site treatment scenarios may include:
  - Preservation in place through avoidance or re-routing or specialized construction techniques, and/or
  - Rescue excavations to remove, record and relocate in advance of further construction work if avoidance is not possible.
- If the Chance Find is an isolated artefact/site or is not classed as cultural heritage, Esizayo must approve the removal of site protection measures and activity can resume only with consultation and approval of the local authorities;
- If the heritage specialist and/or archaeologist confirms the chance find to be cultural heritage he/she will inform Esizayo and initiate discussions about the handling process;
- If a chance find is a verified cultural heritage site, prepare a final Chance Finds report once required treatment has been completed;
- While required treatment is ongoing, Esizayo will coordinate with the relevant staff / contractor, keeping them informed as to status and schedule of investigations / actions, and informing them when activities may resume;
- The Grievance Procedure and Guidance will apply to any stakeholder complaints relating to cultural heritage and chance finds;
- Chance find recording shall include the following:
  - Incident Notification;
  - Incident Report;
  - Incident (Chance Find) Investigation Report – e.g. detailing corrective actions, with digital images, maps and plans showing any locations that are no-go, limited access or present risks of further chance finds.

9.14.2 INSPECTION AND MONITORING

Since it is not practical to have a regular monitoring presence over the construction period by either an archaeologist or palaeontologist, environmental awareness training must be conducted by the ECO for all contractors and subcontractors. The training must include, as a minimum, the following:

- Identifying potential features of heritage significance;
- Procedures for dealing with heritage resources discovered on site;
- Applicable Legislation pertaining to the protection of heritage resources; and
- The importance of protecting heritage resources.

9.14.3 TRAINING

The contents of the Heritage Management Plan must be communicated to the staff through the induction training. On the job training can also be undertaken through the use of Environmental Toolbox Talks.

9.15 FAUNA MANAGEMENT PLAN

The purpose of this fauna management plan is to protect species, habitats and eco-system services, ensuring no net reduction to any critically endangered / endangered species and no net loss of any critical habitats (as defined by IFC Performance Standard 6) whilst minimising disturbance to other species and habitats to the extent practicable. This plan provides a strategy to control potential impacts on fauna during the construction and operation of the Esizayo WEF Expansion.

9.15.1 PRINCIPLES FOR MANAGING IMPACTS ON FAUNA

SNAKE FIND AND HANDLING:

During construction, especially clearing of vegetation, it is likely that snakes will be encountered onsite. The following steps need to be undertaken in the event of a snake onsite:

- All work in that area is to cease;
- The site foreman/ site supervisor is to be notified;
- Snake handling will be undertaken by suitably trained and certified onsite personnel. The site supervisor or foreman needs to contact the relevant onsite personnel, who will safely remove and release the snake at a suitable habitat.

The following measures need to be communicated to all staff to ensure both human and snake safety:

- Under no circumstances may any site staff handle snakes without the proper snake handling training.
- All staff are to be provided with the correct Personal Protective Equipment (PPE) (e.g. snake gaiters and safety boots) to limit the potential for snake bites.
- Signage identifying the service provider appointed for snake handling must be erected around site. It is recommended that an individual onsite undergoes snake handling training to ensure that if an emergency arises it can be dealt with immediately.
- Intentional harming of snakes is prohibited onsite.

MAMMALS AND REPTILES

During the construction phase of the project the following mitigation measures need to be implemented and adhered to at all times to ensure that the impacts to fauna is managed and mitigated where possible.

WALK DOWN PRIOR TO CONSTRUCTION

Prior to the start of any construction or associated activities in areas of potential biodiversity concern, the Contractors will carry out a walk-though over the area accompanied by the ECO. The objective is to identify any sensitive habitats including potential for species of conservation interest (i.e. to consider the presence of any rare species of fauna, but establish possible risk of snake bites; inspect tree cavities for bats, etc.) that may be directly or indirectly affected by the proposed works.

Any important and significant habitats must be suitably demarcated and made a no-go area. An appropriate level of mitigation needs to be implemented prior to starting construction.

LIMIT THE DEVELOPMENT FOOTPRINT

- The development area must be clearly defined and marked off accordingly. All No- Go areas must be demarcated and warning signs prohibiting access erected.
- Areas to be cleared must be clearly marked in the field to eliminate unnecessary clearing/ disturbance.

LIMIT DISTURBANCE

- The extent of clearing and disturbance to the native vegetation must be kept to a minimum so that the impact on fauna and their habitats is restricted.
- Where roads pass right next to major water bodies provisions must be made for the fauna such as toads to pass under the roads by using culverts or something similar.
- Vehicles to adhere to speed limits at all times.
- The intentional harming and killing of animals will be prohibited through on-site supervision and worksite rules.
- Any litter onsite needs to be cleaned up immediately to prevent it being blown into the environment surrounding the development site.

INSPECTIONS AND MONITORING

The following inspections and monitoring need to be undertaken during the construction phase:

- Observation of vegetation clearing activities by the Environmental Control Officer (ECO).
- Recording faunal fatalities to monitor success of relocation efforts.
- Regular monitoring of construction activities by the designated onsite personnel and the ECO.
- The ESHS team will collate details and investigate all Project-related wildlife complaints and incidents including instances of unauthorised hunting, poaching, bush trade, disturbance of breeding sites and injuries / fatalities. Corrective actions will be instigated where needed to avoid recurrence.

TRAINING

The contents of the Fauna Management Plan must be communicated to the staff through the induction training. On the job training can also be undertaken through the use of Environmental Toolbox Talks. All training must be undertaken as outlined in the Training Procedure (Document Number: EX-PR-004).

Examples of Toolbox Talks include:

- Snakes bites
- Snake handling
- No-Go areas
- Encountering fauna onsite
- Poaching

9.16 CONSTRUCTION AVIFAUNAL MANAGEMENT PLAN

The purpose of this avifaunal management plan is to provide mitigation and management measures onsite that to minimise the impacts on the 55 priority bird species that potentially occur onsite. A number of the priority species are associated with the aquatic features on the site.

9.16.1 DESIGN MANAGEMENT PROCEDURES

- Ensure that key areas of conservation importance and sensitivity are avoided.
- Siting turbines close together to minimise the development footprint.
- Grouping turbines to avoid alignment perpendicular to main flight paths and to provide corridors between clusters, aligned with main flight trajectories, within large wind farms.
- Increasing the visibility of rotor blades.
- Where possible, installing transmission cables underground (subject to habitat sensitivities and in accordance with existing best practice guidelines for underground cable installation).
- Marking overhead cables using deflectors and avoiding use over areas of high bird concentrations, especially for species vulnerable to collision.

9.16.2 CONSTRUCTION MANAGEMENT PROCEDURE

The following mitigation and management measures must be implemented for the displacement of priority species due to disturbance during the construction phase:

- A site- specific construction management Plan (CEMP) must be implemented, which gives appropriate d detailed description of how construction activities must be conducted. All contractors are to adhere to the CEMP and must apply good environmental practice during construction. This must be done by an Avifaunal Specialist.
- Providing adequate briefing for site personnel and, in particularly sensitive locations. Personnel must be adequately briefed on the need to restrict habitat destruction, and must be restricted to the actual building sites. An on-site ecologist must be appointed during the construction period.
- An ECO must be appointed to oversee activities and ensure that the site-specific CEMP is implemented and enforced. Prior to construction, an avifaunal specialist must conduct a site walkthrough, covering the final road and power line routes as well as the final turbine positions, to identify any nests/breeding/roosting activity of priority species, as well as any additional sensitive habitats. The results of which may inform the final construction schedule in close proximity to that specific area, including abbreviating construction time, scheduling activities around avian breeding and/or movement schedules, and lowering levels of associated noise.
- The appointed ECO must be trained by an avifaunal specialist to identify the potential priority species as well as the signs that indicate possible breeding by these species. The ECO must then, during audits/site visits, make a concerted effort to look out for such breeding activities of Red Data species, and such efforts may include the training of construction staff to identify Red Data species, followed by regular questioning of staff as to the regular whereabouts on site of these species. If any of the Red Data species are confirmed to be breeding (e.g. if a nest site is found), construction activities within 500m of the breeding site must cease, and an avifaunal specialist is to be contacted immediately for further assessment of the situation and instruction on how to proceed.
- No turbines must be constructed in no-go areas, while associated infrastructure (roads, powerlines and substations) must be avoided where possible in these areas.
- Habitat destruction must be limited to what is absolutely necessary for the construction of the infrastructure, including the construction of new roads.
- During the construction phase, an avifaunal specialist must conduct surveys/exploration of the WEF site. The aim will be to locate nest sites, so that these may continue to be monitored during the construction and operation phase.
- Measures to control noise and dust must be applied according to current best practice in the industry.
- Maximum use must be made of existing access roads and the construction of new roads must be kept to a minimum.
- Implementing an agreed post-development monitoring programme.
- Timing construction to avoid sensitive periods.

9.16.3 MONITORING

Monitoring of Red listed species nests (if any) to assess the impact of the construction activities.

9.17 SOIL MANAGEMENT PLAN

Some of the most significant impacts on soil properties occur as a result of activities associated with construction. Construction activity can have adverse impacts on soil in a number of ways by:

- Covering soil with impermeable materials, effectively sealing it and resulting in significant detrimental impacts on soils' physical, chemical and biological properties, including drainage characteristics.
- Contaminating soil as a result of accidental spillage or the use of chemicals.
- Over-compacting soil through the use of heavy machinery or the storage of construction materials.
- Reducing soil quality, for example by mixing topsoil with subsoil.
- Wasting soil by mixing it with construction waste or contaminated materials, which then have to be treated before reuse or even disposed of at landfill as a last resort.

Careful management of topsoil and subsoil is an important aspect of sustainable use of materials that are being stripped. Without a proper Soil Resource Plan there is the risk of losing, damaging or contaminating valuable soil resources. The purpose of this Soil Management Plan is to outline principles for soil management to ensure the integrity of the resource during and post-construction. This plan must be read together with the Emergency Response Plan in order to minimise the risk of contamination of soils.

9.17.1 SOIL HORIZONS

TOPSOIL

Topsoil is the top-most soil layer (0-25 cm) in undisturbed areas, however it should be noted that the majority of the site for the wind farm is farmland and no impacts are expected in undisturbed areas. If no impacts are expected in undisturbed areas then the principals that follow do not apply. The principals are also applicable to any undisturbed areas affected by the power line. This soil layer is important as it contains nutrients, organic material, seeds, communities of micro-organisms, fungi and soil fauna. All the contents of the topsoil layer are necessary for soil processes such as nutrient cycling, and support growth of new plants. The biologically active upper layer of soil is fundamental in the development of soils and the sustainability of the entire ecosystem. Fungi, algae, cyanobacteria and non-vascular plants form a 'living crust' on the soil surface that influences the retention of resources (principally nutrients and water), as well as reducing the potential for soil erosion.

In general, the greatest concentration of seeds (i.e. up to 90% of the seedbank) is found in the top 5-10 cm of topsoil. Soil nutrients and other biological elements also have a higher concentration in the top 5 – 10 cm of soil, but can occur up to 25 cm.

SUBSOIL

Subsoil is soil generally deeper than 25 cm. The subsoil contains lower levels of nutrients, but the soil texture is still suitable for plant growth.

OVERBURDEN

Overburden is all the soil below the subsoil layer, generally characterised by a fine soil texture which is sometimes high in clay and salt content which makes plant growth difficult. Such soils comprise a sterile growth medium, devoid of nutrients, and depending on the clay content, are of high salinity and often phytotoxic. Even shallow-lying overburden soils are largely depleted of nutrients. These soils constitute an unsuitable medium for the establishment of plants.

9.17.2 PRINCIPLES FOR SOIL MANAGEMENT

THE CORRECT HANDLING OF TOPSOIL

- Before beginning work on site, topsoil must be stripped from all areas that will be disturbed by construction activities. Appropriate equipment must be used and appropriate work practices must be implemented for soil stripping as mishandling soil can have an adverse effect on its properties.
- Topsoil must be stripped in the driest condition possible.
- Topsoil must be retained on site in order to be used in site rehabilitation. The correct handling of the topsoil layer is in most cases the key to rehabilitation success.
- It is important that the correct depth of topsoil is excavated in order to ensure good plant growth. If excavation is too shallow, then an important growth medium for new seedlings could be lost. If excavation is too deep, this could lead to the dilution of the seed and nutrient rich topsoil with deeper sterile soil.
- Topsoil and subsoil layers must never be mixed. The mixture of topsoil with the deeper sterile soil hinders the germination of seeds which are buried too deep in the soil layer. Mixture of soil layers also leads to the dilution of nutrient levels which are at highest concentration within the topsoil, resulting in lower levels of nutrients available for new seedlings.
- To enable soil to be reused on site at a later stage, it needs to be stored in temporary stockpiles to minimise any damage or loss of function. Stockpiles must not be higher than 2m. Alternatively topsoil berms can be created on the site boundaries. There are a number of important considerations when creating stockpiles - including soil erosion, pollution to watercourses and the risk of flooding. These will be affected by the size, height and method of forming stockpiles, and how they are protected and maintained.
- Topsoil must be stored separately from other soil in heaps until construction in an area is complete.
- The duration of topsoil storage must be minimised as far as possible. Storing topsoil for long periods leads to seed bank depletion following germination during storage, and anoxic conditions develop inside large stockpile heaps.
- All stockpiles must be positioned away from drainage lines.
- Sediment fencing must be erected downslope of all stockpiles to intercept any sediment and upslope runoff must be diverted away from stockpiles.

STRIPPING OF SUBSOIL

The following protocols must be followed when stripping subsoil:

- On many sites subsoil will not need to be stripped but merely protected from damage. However, on other sites it might need to be temporarily removed. Where subsoil is required to be stripped, this must be undertaken before commencement of construction from all areas that are to be disturbed by construction activities or driven over by vehicles.
- Subsoil stripping depths depend on the correct identification of the sub-soil types on an ad-hoc basis, where no formal survey data exists.
- Subsoil must be stripped in the driest condition possible.
- To enable soil to be reused on site at a later stage, it needs to be stored in temporary stockpiles to minimise any damage or loss of function. There are a number of important considerations when creating stockpiles - including soil erosion, pollution to watercourses and the risk of flooding. These will be affected by the size, height and method of forming stockpiles, and how they are protected and maintained.
- All stockpiles must be positioned away from drainage lines.
- Sediment fencing must be erected downslope of all stockpiles to intercept any sediment and upslope runoff must be diverted away from stockpiles.

9.18 CLOSURE AND DECOMMISSIONING PLAN

The purpose of the Decommissioning and Closure Plan is to give details as to the process to be followed when the Esizayo WEF Expansion is decommissioned. The Decommissioning and Closure Plan should be read in conjunction with the EMPr for the facility. The general specifications of the EMPr Chapter 7 (Construction) and Chapter 8 (Rehabilitation) are also relevant and must be adhered to during decommissioning of the facility.

9.18.1 PROJECT- SPECIFIC DETAILS

In the event that the project is identified as a preferred bidder, the Esizayo WEF Expansion is expected to be commissioned within 24 months of financial close and is expected to be operational for at least 20 years, where after it could be decommissioned or its lifespan extended depending on the power generation requirements at the time.

Following the initial 20-year operational period of the wind facility, the continued economic viability will be investigated. If the facility is still deemed viable, the life of the facility will be extended. The facility will only be decommissioned once it is no longer economically viable. If a decision is made to completely decommission the facility, this will be subject to a separate authorisation and impact assessment process, all the components will be disassembled, reused and recycled or disposed. The site would be returned to its current use i.e., agriculture (Grazing).

9.18.2 ACTIVITIES ASSOCIATED WITH DECOMMISSIONING

ACTIVITY	DETAILED DESCRIPTION
Site preparation	Site preparation activities similar to those undertaken in the construction phase will be required during the decommissioning phase. This will include confirming the integrity of site access to the site in order to accommodate the required equipment (e.g. lay down areas and decommissioning camp) and the mobilisation of decommissioning equipment
Disassemble and remove existing components	The components would be disassembled, and reused and recycled (where possible), or disposed of in accordance with regulatory requirements

Road traffic will temporarily increase due to the movement of decommissioning crews and equipment. There may be an increase in particulate matter (dust) in adjacent areas during the decommissioning phase. Additionally, there will be emissions from the diesel engines of construction machinery and equipment which may cause odour disturbance and localized impacts to air quality. Decommissioning activities may lead to temporary elevated noise levels from heavy machinery and an increase in trips to the project location.

The relevant mitigation measures contained under the construction section of the EMPr must be applied during decommissioning.

9.18.3 PRINCIPLES FOR DECOMMISSIONING AND CLOSURE

In decommissioning the facility, the proponent must ensure that:

- All sites not already vegetated are vegetated as soon as possible after decommissioning is completed with species appropriate to the area (where the impacted area is an indigenous vegetation area - otherwise this is not applicable).
- Any fauna encountered during decommissioning are removed to safety by a suitably qualified person.
- All structures, foundations and sealed areas are demolished, removed and waste material which cannot be recycled disposed of at an appropriately licensed waste disposal site or as required by the relevant legislation.

- All access/service roads not required to be retained by landowners are closed and fully rehabilitated.
- Soil erosion and sedimentation control measures, as well as other mitigation measures used during construction will be re-implemented during the decommissioning phase and maintained until the site is stabilized.
- All vehicles adhere to low speed limits (i.e. 30km/h max) on the site, to reduce risk of faunal collisions as well as reduce dust.
- All disturbed areas are compacted, sloped and contoured to ensure drainage and runoff and to minimise the risk of erosion.
- All rehabilitated areas are monitored for erosion until the site is stabilized.
- Components of the facility are removed from the site and recycled or disposed of appropriately.
- Retrenchments must comply with South African Labour legislation of the day.
- Decommissioning and site restoration activities must be undertaken with the input of the landowner(s).
- The process for notification of decommissioning activities will be the same as the process for notification of construction activities. Decommissioning activities may require the notification of stakeholders given the potential for increased noise and traffic volumes at the project location.

DISPOSAL OF MATERIALS

Most of the materials used can be recycled. The majority of the glass and semiconductor materials can be recovered and re-used or recycled. Recyclable materials must be transported off-site by truck and managed at appropriate facilities in accordance with relevant waste management regulations. No waste materials may be left on-site.

All other structures and/or components must be appropriately disposed of at an appropriately licensed waste disposal site by a licensed contractor.

DISMANTLING OF WIND TURBINE INFRASTRUCTURE

WIND TURBINES

- Disconnect all above ground wirings, cables and electrical interconnections.
- Access roads to turbines may be widened temporarily to sufficient width to accommodate movement of appropriately sized cranes or other machinery required for the disassembly and removal of the turbines.
- High value components will be stripped. The remaining material will be reduced to shippable dimensions and transported off site for proper disposal. Control cabinets, electronic components, and internal cables will be removed.
- The blades, hub and nacelle will be lowered to ground for disassembly. The tower sections will be lowered to the ground where they will be further disassembled into transportable sections.
- The blades, hub, nacelle, and tower sections will either be transported whole for reconditioning and reuse or dissembled into salvageable, recyclable, or disposable components.
- The area will be thoroughly cleaned of all debris.

FOUNDATIONS

- Topsoil will be removed from an area surrounding the foundation and stored for later replacement. Turbine foundations will either be excavated or remain in situ depending on industry best practice. In the event that foundations are removed they will be excavated to a depth sufficient to remove all anchor bolts, rebar, conduits, cable, and concrete.
- After removal of all noted foundation materials, the hole will be filled with clean sub-grade material of quality comparable to the immediate surrounding area.
- The sub-grade material will be compacted to a density similar to surrounding sub-grade material. All unexcavated areas compacted by equipment used in decommissioning shall be decompacted in a manner to adequately restore the topsoil and sub-grade material to the proper density consistent and compatible with the surrounding area. The area will be thoroughly cleaned and all debris removed, and re-seeded.

TRANSFORMERS & INVERTERS

- Disconnect and remove all electrical equipment.

- Remove electrical components and transport off-site to appropriate facility.
- Oil filled electrical equipment must be de-polluted, decommissioned and the constituent elements recovered for further re-recycling and reuse. Oil must be disposed of at a hazardous waste facility

OTHER INFRASTRUCTURE

- Consult with landowner(s) to determine if access roads must be left in place for their continued use. If not required, roads must be decommissioned, ripped and revegetated.
- Removal of fencing.
- Underground electrical lines running between inverters and the substation will be removed.
- All foundation materials will be removed from the site via truck and managed at appropriate facilities

4.3 LAND USE

Based on the zoning and current land use, it is assumed that the probable future use of the project location after decommissioning will be farming land. However, this will be confirmed prior to decommissioning to ensure that restoring the land to its current land use remains the most appropriate option.

9.19 WASTE MANAGEMENT PLAN

A Waste Management Plan (WMP) plays a key role in achieving sustainable waste management. The purpose of this plan is to ensure that effective procedures are implemented for the handling, storage, transportation and disposal of waste that is generated from the activities on site. The plan prescribes measures for the collection, temporary storage and safe disposal of the waste streams associated with the project and includes provisions for the recovery, re-use and recycling of waste.

This WMP has been compiled as part of the project EMPr and includes waste stream information available at the time of compilation. Construction practices and operations must be measured and analysed in order to determine the efficacy of the plan and whether further revision of the plan is required. This plan should be further updated should further detail regarding waste quantities and categorisation become available, during the construction and/or operational stages.

9.19.1 RELEVANT ASPECTS OF THE SITE

Waste generated on site, originates from various sources including:

- Concrete waste generated from foundations.
- Contaminated water, soil and vegetation due to accidental hydrocarbon spills.
- Hydrocarbon waste from vehicle, equipment and machinery parts (oil cans, filters, rags etc), and servicing.
- Hazardous Water (used oils, chemicals, etc.)
- Recyclable waste in the form of paper, cardboard, glass, metal offcuts, wood/ wood pallets and plastic.
- Organic waste from food waste and alien vegetation removal.
- Sewage from portable toilets.
- Inert waste from excess rock and soil from site clearance and trenching works.

9.19.2 LEGISLATIVE REQUIREMENTS

Waste in South Africa is currently governed by means of a number of pieces of legislation, including:

- National Environmental Management: Waste Act (NEM:WA), 2008 (Act 59 of 2008).
- National Environmental Management: Waste Amendment Act, 2014 (Act 26 of 2014).
- The South African Constitution (Act 108 of 1996).
- Hazardous Substances Act (Act 5 of 1973).
- Health Act (Act 63 of 1977).

- Environment Conservation Act (Act 73 of 1989).
- Occupational Health and Safety Act (Act 85 of 1993).
- National Water Act (Act 36 of 1998).
- The National Environmental Management Act (Act 107 of 1998).
- Municipal Structures Act (Act 117 of 1998).
- Municipal Systems Act (Act 32 of 2000).
- Mineral and Petroleum Resources Development Act (Act 28 of 2002).
- Air Quality Act (Act 39 of 2004).

Storage of waste must be undertaken in accordance with the National Norms and Standards for the Storage of Waste published in GN926.

9.19.3 WASTE MANAGEMENT PRINCIPLES

An integrated approach to waste management on site is needed. Such an approach is illustrated in **Figure 9-4**.

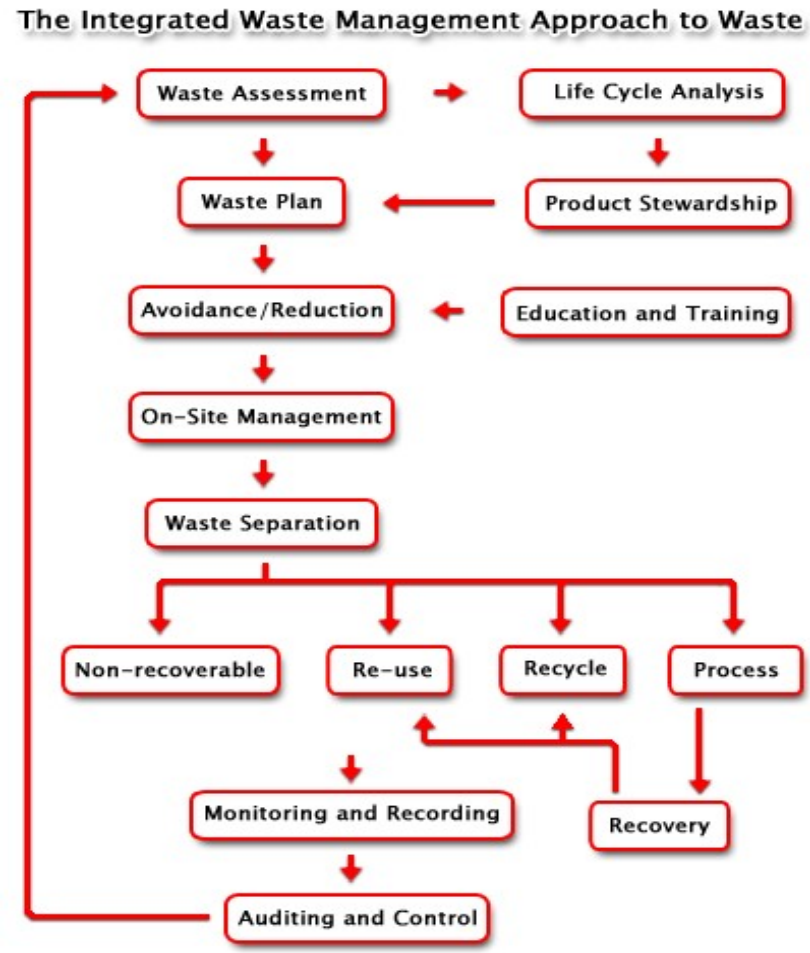


Figure 9-4: Integrated Waste Management Approach to Waste (Source: http://www.enviroserv.co.za/pages/content.asp?SectionId=496)

It is important to ensure that waste is managed with the following objectives in mind during all phases of the project:

- Reducing volumes of waste is a priority;
- If reduction is not feasible, the maximum amount of waste is to be recycled; and

- Waste that cannot be recycled is to be disposed of in the most environmentally responsible manner as possible.

CONSTRUCTION PHASE

A plan for the management of waste during construction is detailed below. As previously stated, construction practices must be measured and analysed in order to determine the efficacy of the plan and whether further revision of the plan is required. A Method Statement detailing specific waste management practices during construction must be prepared by the Contractor prior to the commencement of construction.

WASTE ASSESSMENT / INVENTORY

- The Environmental Officer must develop, implement and maintain a waste inventory reflecting all waste generated during construction for both general and hazardous waste streams.
- Construction method and materials must be carefully considered in view of waste reduction, re-use, and recycling opportunities.
- Once a waste inventory has been established, targets for recovery of waste (minimisation, re-use, recycling) must be set.

WASTE COLLECTION, HANDLING AND STORAGE

- Each subcontractor must implement their own waste recycling system, i.e. separate bins for food waste, plastics, paper, wood, glass, cardboard, metals, etc.
- Portable toilets must be monitored and maintained daily.
- Below ground storage of septic tanks, if installed, must withstand the external forces of the surrounding environment. The area above the tank must be demarcated to prevent any vehicles or heavy machinery from driving around the area.
- Waste collection bins and hazardous waste containers must be provided by the principal contractor and placed at various areas around site for the storage of organic, recyclable and hazardous waste.
- A dedicated waste area must be established on site for the storage of all waste streams, before removal from site.
- Signage/ colour coding must be used to differentiate disposal areas for the various waste streams (i.e. paper, cardboard, metals, food waste, glass etc.).
- Hazardous waste must be stored within a bunded area constructed according to SABS requirements. The volume of waste stored in the bunds must not exceed 110% of the bund capacity.
- The location of all temporary waste storage areas must aim to minimise the potential for impact on the surrounding environment, including prevention of contaminated runoff, seepage, and vermin control.
- Waste storage shall be in accordance with all Regulations and best-practice guidelines and under no circumstances may waste be burnt on site.
- Vegetation removed from the site must be chipped, removed from the site and disposed of at an appropriate waste disposal facility or used as mulch on site.
- A dedicated waste management team must be appointed by the principal contractor's EO, whom will be responsible for ensuring the continuous sorting of waste and maintenance of the area. The waste management team must be trained in all areas of waste management and monitored by the EO.
- All waste removed from site must be done so by a registered/ licensed subcontractor, whom must supply information regarding how waste recycling/ disposal will be achieved. The registered subcontractor must provide waste manifests for all removals at least once a month.

MANAGEMENT OF WASTE STORAGE AREAS

- The position of all waste storage areas must be located away from water courses and ensure minimal degradation to the environment. The main waste storage area must have a suitable storm water system separating clean and dirty storm water.
- Waste storage areas must be under roof or the waste storage containers must be covered with tarpaulins (or similar material) to prevent the ingress of water.
- Collection bins placed around site and at subcontractors' camps must be maintained and emptied on a regular basis by the principal contractor.

- Waste must be stored in designated containers and not on the ground.
- Inspections and maintenance of bunds must be undertaken daily. Bunds must be inspected for leaks or cracks in the foundation and walls.
- It is assumed that any rainwater collected inside the bund is contaminated and must be removed and stored as hazardous waste, and not released into the environment. If any leaks occur in the bund, these must be removed immediately.

DISPOSAL

- Waste generated on site must be removed on a regular basis, as determined by the EO. This frequency may change during construction depending on waste volumes generated at different stages of the construction process.
- Waste must be removed by a suitably qualified contractor and disposed at an appropriately licensed landfill site. Proof of appropriate disposal must be provided by the contractor.

RECORD KEEPING

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

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

TRAINING

Training and awareness regarding waste management shall be provided to all employees and contractors as part of the toolbox talks or on-site awareness sessions.

9.19.4 OPERATION PHASE

It is expected that the operation phase will result in the production of general waste consisting mostly of cardboard, paper, plastic, tins, metals and a variety of synthetic compounds. Limited hazardous wastes (grease, oils) may also be generated during maintenance activities. All waste generated will be required to be temporarily stored at the facility in appropriate sealed containers prior to disposal at a permitted landfill site.

The following waste management principles apply during the operational phase:

- The Site Manager must develop, implement and maintain a waste inventory reflecting all waste generated during operation for both general and hazardous waste streams.
- Adequate waste collection bins at site must be supplied. Separate bins must be provided for general and hazardous waste.
- Recyclable waste must be removed from the waste stream and stored separately.
- All waste must be stored in appropriate temporary storage containers (separated between different operational wastes, and contaminated or wet waste) at each operational area prior to being taken to the waste storage area for final sorting (if required). Waste storage shall be in accordance with all best-practice guidelines and under no circumstances may waste be burnt on site.
- Vegetation removed from the site must be chipped, removed from the site and disposed of at an appropriate waste disposal facility or used as mulch on site.
- Waste generated on site must be removed on a regular basis throughout the operational phase.
- Waste must be removed by a suitably qualified contractor and disposed at an appropriately licensed landfill site. Proof of appropriate disposal must be provided by the contractor.

9.19.5 MONITORING OF WASTE MANAGEMENT

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

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

This report will aid in monitoring the progress and relevance of the waste management procedures that are in place. If it is found that the implemented procedures are not as effective as required, this WMP is to be reviewed and amended accordingly.

10 CONCLUSION

In terms of NEMA, everyone (i.e. all persons engaging in any component of this project) is required to take reasonable measures to ensure that they do not pollute the environment. 'Reasonable measures' includes informing and educating employees about the environmental risks associated with their work and training them to operate in an environmentally responsible manner.

The Proponent also recognises that, in terms of NEMA, the cost to repair any environmental damage will be borne by the person responsible for the damage. Should the above-mentioned environmental guidelines and mitigation measures be adopted, it is anticipated that the negative environmental impacts of the proposed Esizayo WEF Expansion will be mitigated adequately. The Proponent and the selected Contractor shall appoint relevant personnel, as well as an independent ECO, to monitor the site periodically throughout construction to ensure that the required environmental controls are in place and working effectively. During operation and maintenance the area specific Environmental Manager and EO, with the support of the maintenance supervisor, will monitor environmental controls.

If you have any further enquiries, please feel free to contact:

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APPENDIX

A EAP CV

ASHLEA STRONG, MEM, EAP

Principal Consultant (Planning & Advisory Services), Environment & Energy

Years with the firm

8

Years of experience

18

Professional qualifications

EAPASA

Areas of expertise

Auditing

ESIR

Energy

Environmental Control

Infrastructure

Mining

Training

Waste Management

CAREER SUMMARY

Ashlea is a Principal Consultant with 18 years' experience in the environmental field. She currently provides technical and strategic expertise on a diverse range projects in the environmental management field, including environmental scoping and impact assessment studies, environmental management plans, waste and water management, as well as the provision of environmental management solutions and mitigation measures

Ashlea has been involved in the management of a number of large EIAs specifically within the energy sector such as the Medupi Power Station, and Pebble-Bed Modular Reactor (PBMR) and numerous Transmission Powerlines. She also has significant environmental auditing experience and expertise having undertaken over 70 compliance audits.

Ashlea holds a Masters in Environmental Management; a BTech (Nature Conservation), and a National Diploma (Nature Conservation). She is also a Registered Environmental Assessment Practitioner.

EDUCATION

Masters in Environmental Management, University of the Free State, South Africa	2006
B Tech, Nature Conservation, Technikon SA, South Africa	2001
National Diploma in Nature Conservation, Technikon SA, South Africa	1999

ADDITIONAL TRAINING

Conduct outcomes based assessment (NQF Level 5), South African Qualifications Authority (SAQA)	2009

PROFESSIONAL MEMBERSHIPS

Registered Environmental Assessment Practitioner (Registration Number: 2019/1005)	2020

PROFESSIONAL EXPERIENCE

Energy Sector

- 100MW Solar Photovoltatic (PV) Plant (2021). Project Director. This project involved the compilation of a Basic Assessment and Environmental Management Plan for a 100MW Solar PV Plant near Springs in Gauteng, South Africa. Client: Calodex (Pty) Ltd.
- Erica 400kV Loop-in-Loop-out (LILO) Powerline (2020). Compilation of an environmental screening assessment for the Erica 400kV LILO Powerline in Cape Town, Western Cape, South Africa. Client: Eskom Holdings SOC Limited.
- Maralla East and West Wind Energy Facilities (2019). Project Manager. Compilation of two Part 2 Amendment Process for the changes in technical scope of the Wind Energy Facilities near Sutherland in the Northern and Western Cape, South Africa. Client: BioTherm Energies (Pty) Ltd.
- Ruigtevallei 132kV Powerline (2019): Project Manager. Compilation of a Part 2 Amendment Process for the deviation of the Ruigtevallei – Dreunberg 132 kV powerline near Gariep in the Free State, South Africa. Client: Eskom Holdings SOC Limited.

- Nakonde and Mpika Wind Energy Projects (2018): Project Manager. Compilation of two Environmental Project Briefs for the establishment of meteorological masts at the Proposed Nakonde and Mpika Wind Project Sites in Zambia. Client: Globeleq
- Rietkloof Wind Energy Facility Project (2018): Project Director. Compilation of a Basic Assessment and Environmental Management Programme for a 140MW Wind Energy Facility, Matjiesfontein, Western Cape. Client: G7 Renewable Energies
- Mozambique – Zambia Interconnector Powerline (2018): Project Manager. This project involved the compilation of the Environmental and Social Impact Assessment and Environmental and Social Management Plan for a 300km 400kV powerline between Tete, in Mozambique, and Chipata, in Zambia. Client: Southern African Power Pool (SAPP).
- Ankerlig – Koeberg 132kV powerline walkdown (2017): Project Manager. This project involved the compilation of a Construction and Operation Environmental Management Plans for the Ankerlig – Koeberg 132kV powerline. Client: Eskom Holdings SOC Limited.
- Gwanda 100MW Solar Project (2018): Project Manager. This project involved the high-level review of the Environmental Impact Assessment for a 100MW Photovoltaic (PV) Solar Project near the town of Gwanda, Matebeleland South Province of Zimbabwe against relevant legislation and international standards. Client: WSP | Parsons Brinckerhoff.
- Southern Energy Coal Fired Power Station (2016): Project Manager. This project involved the high-level review of the Environmental Impact Assessment for the Southern Energy Coal Fired Power Station near Hwange in Zimbabwe against relevant legislation and standards. Client: WSP | Parsons Brinckerhoff.
- Proposed Solar and Wind Projects located in the Northern and Western Cape Provinces (2015) Project Manager. This project involved the compilation of 15 Environmental Impact Assessments and Environmental Management Plans for 2 Solar and 2 Wind energy Projects near Aggenys and Sutherland respectively. Client: BioTherm Energy (Pty) Ltd.
- Proposed Solar Park, Northern Cape Province, South Africa (2012): Strategic Environmental Advisor. This project involved the provision of process expertise for the compilation of an Environmental Impact Assessment and Environmental Management Plan for the proposed Solar Park in the Northern Cape Province. Client: Central Energy Fund (CEF).
- Proposed Tabor - Nzhelele 400kV Transmission Lines and associated infrastructure, Limpopo Province, South Africa (2012): Project Manager. This project involved the compilation of an Environmental Impact Assessment and Environmental Management Plan for a 100km 400kV powerline between Louis Trichardt and Musina in the Limpopo Province. Client: Eskom Transmission.
- Retrofitting of the existing Electrostatic Precipitators with Fabric Filter Plants at Units 2, 3 and 4 at the Grootvlei Power Station, South Africa (2012): Project Manager. This project involved the compilation of a Basic Assessment Report and Environmental Management Plan for the proposed retrofitting of the existing Electrostatic Precepitators with Fabric Filter Plants at the Grootvlei Power Station. Client: Eskom Holdings SOC Limited.
- Proposed Mulilo Coal Fired Power Station and associated infrastructure as well as associated power lines and substations, Musina, Limpopo, South Africa (2008): Project Manager. This project involved the compilation of an Environmental Impact Assessment and Environmental Management Plan for the proposed Mulilo Coal Fired Power Station and associated infrastructure as well as associated power lines and substations in the Musina area of the Limpopo Province. Client: Parsons Brinkerhoff Africa and Mulilo Power.

- Pebble Bed Modular Reactor Demonstration Plant and Associated Infrastructure, Western Cape, South Africa (2008): Project Manager. This project involved the compilation of an Environmental Impact Assessment and Environmental Management Plan for the proposed Pebble Bed Modular Reactor Demonstration Plant and Associated Infrastructure in the Western Cape Province. Client: Eskom Generation.
- Proposed Bantamsklip – Kappa 765 kV Transmission Lines and associated infrastructure, Western and Northern Cape, South Africa (2008): Project Manager. This project involved the compilation of an Environmental Impact Assessment and Environmental Management Plan for four 260km 765kV powerlines between the Bantamsklip Nuclear Power Station Site and the proposed new Kappa Substation in the Karoo, Western Cape Province. Client: Eskom Transmissions.
- Proposed Bantamsklip – Bacchus, Bacchus - Kappa and Bacchus – Muldersvlei 400 kV Transmission Lines and associated infrastructure, Western and Northern Cape, South Africa (2008): Project Manager. This project involved the compilation of an Environmental Impact Assessment and Environmental Management Plan for a number of 400kV powerlines between the Bantamsklip Nuclear Power Station Site and a number of substations, including Bacchus, Kappa and Muldersvlei, in the Western Cape Province. Client: Eskom Transmission.
- Westgate – Tarlton – Kromdraai 132 kV Sub-Transmission line and associated infrastructure, Gauteng, South Africa (2008): Project Manager. This project involved the compilation of an Environmental Impact Assessment and Environmental Management Plan for the Westgate – Tarlton – Kromdraai 132 kV Sub-Transmission line and associated infrastructure in the Gauteng Province. Client: Eskom Distribution – Central region.
- Environmental Scoping Study for the proposed new distribution line and substation for Eskom, Dundonald, Mpumalanga (also involved in the Public Participation Process**)**, Mpumalanaga, South Africa (2008): Project Manager. This project involved the compilation of an Environmental Impact Assessment and Environmental Management Plan for a 132kV powerline as well as a new substation in the Tarlton area of Gauteng.
- The proposed new 132 kV sub-transmission line between the Dinaledi and GaRankuwa substations for Eskom, GaRankuwa, North West, South Africa (2008): Project Manager. This project involved the compilation of an Environmental Impact Assessment and Environmental Management Plan for a 132kV powerline between the Dinaledi and GaRankuwa substations in the GaRankuwa area of the North West Province. Client: Eskom Distribution.
- Expansion of the Transmission powerline network and associated infrastructure between the Perseus substation and the Beta substation, Free State, South Africa (2008): Project Manager. This project involved the compilation of an alignment specific construction Environmental Management Plan for the 13km 765kV Perseus Beta Turn-ins. Eskom Transmission
- Tarlton – Kromdraai 132 kV Sub-Transmission line and associated infrastructure, Gauteng, South Africa (2008): Project Manager. This project involved the compilation of an Environmental Impact Assessment and Environmental Management Plan for a 132kV powerline as well as a new substation in the Tarlton area of Gauteng. Client: Eskom Distribution – Central Region.
- Basic Assessment for the proposed Watershed – Mmabatho 88kV Power line. North West, South Africa (2008): Project Manager. This project involved the compilation of a Basic Assessment and Environmental Management Plan for a new 88kV powerline near Mmabatho in the North West Province. Client: Eskom Distribution – Central Region.

- Proposed Watershed – Mmabatho 88kV Power line. North West, South Africa (2007): Project Manager. This project involved the compilation of an Environmental Impact Assessment and Environmental Management Plan for the Watershed – Mmabatho 88kV Power line in the North West Province. Client: Eskom Distribution – Central Region.
- Proposed Combined Cycle Gas Turbine Plant and Associated Infrastructure near Majuba, Mpumalanga, South Africa (2007): Project Manager. This project involved the compilation of an Environmental Impact Assessment and Environmental Management Plan for the proposed Combined Cycle Gas Turbine Plant and Associated Infrastructure near Majuba in the Mpumalanga Province. Client: Eskom Holdings SOC Limited.
- Proposed Capacity Increase of the Atlantis OCGT Plant and Associated Infrastructure, Western Cape, South Africa (2006): Project Manager. This project involved the compilation of an Environmental Impact Assessment and Environmental Management Plan for the proposed Capacity Increase of the Atlantis OCGT Plant and Associated Infrastructure in the Western Cape Province. Client: Eskom Generation.
- Proposed Concentrated Solar Thermal Plant in the Northern Cape, South Africa (2006): Project Manager. This project involved the compilation of an Environmental Impact Assessment and Environmental Management Plan for the proposed Concentrated Solar Thermal Plant near Upington in the Northern Cape Province. Client: Eskom Holdings SOC Limited.
- Proposed Underground Coal Gasification plant, Eskom, Mpumalanga, South Africa (2006): Project Manager. This project involved the compilation of an Environmental Impact Assessment and Environmental Management Plan for the proposed Underground Coal Gasification plant near the Majuba Power Station in the Mpumalanga Province. Client: Eskom Holdings SOC Limited.
- Proposed new Coal-fired Power Station in the Lephalale Area for Eskom, Limpopo, South Africa (2005): Project Manager. This project involved the compilation of an Environmental Impact Assessment and Environmental Management Plan for the proposed new Coal-fired Power Station in the Lephalale Area in the Limpopo Province. Client: Eskom Generation.
- Proposed Open Cycle. Gas Turbine Power Station at Atlantis for Eskom, Western Cape, South Africa (2005): Environmental Consultant. This project involved the compilation of an Environmental Impact Assessment and Environmental Management Plan for the proposed Open Cycle. Gas Turbine Power Station at Atlantis in the Western Cape Province. Client: Eskom Generation.

Infrastructure Sector

- Emalahleni Water Treatment Plant Amendment Project (EWRP) (2020). Project Manager. Compilation of a Part 1 Amendment Process for the changes to the EWRP Environmental Authorisation as well as an update of the Environmental Management Programme for the EWRP near Emalahleni in Mpumalanga, South Africa. Client: Anglo American
- Hendrina Leachate Dam (2018): Project Manager. This project involves the compilation of a Basic Assessment and Environmental Management Plan for a leachate Dam at the Domestic Waste Landfill Site at the Hendrina Power Station. Client: Eskom Holdings SOC Limited.
- Rehabilitation of the R34 between Vryburg and Schweizer-Reneke, North West, South Africa (2016): Project Manager. This project involved the compilation of a Basic Assessment and Environmental Management Plan for the upgrading of the R34 between Vryburg and Schweizer-Reneke. Client: SANRAL
- Proposed Expansion of the Cremation Facilities at the Envirocin Pet Crematorium, Gauteng, South Africa (2013): Project Manager. This project involves the compilation of a basic assessment for the expansion of the cremation facilities at

the Evnirocin Pet Crematorium in Kyasands, Gauteng Province. Client: Envirocin Incineration Systems CC.

- Proposed Kraft Paper Mill in Frankfort, Frankfort, Free State, South Africa (2013): Project Manager. This project involved the undertaking of an Environmental Impact Assessment, including the compilation of an Environmental Management Programme, for the proposed establishment of a KRAFT paper mill in Frankfort in the Free State Province. Client: Industrial Development Corporation of SA (Pty) Ltd.
- Rehabilitation of the N14 between Delerayville and Sannieshof, North West, South Africa (2011): Project Manager. This project involved the compilation of a Basic Assessment and Environmental Management Plan for the upgrading of the N14 between Sannieshof and Delerayville as well as the construction of a new bridge over the Hartsriver. This project also included the compilation of Water Use License and Mining Permit Applications. Client: SANRAL.
- Proposed new Waterfall Cemetery, Limpopo, South Africa (2011): Project Manager. This project involved the compilation of a Basic Assessment and Environmental Management Plan for the new Waterfall Cemetery, Limpopo Province. Client: Makhado Municipality.
- Route determination of the proposed Metro Boulevard, Gauteng, South Africa (2008): Project Manager. This project involved the undertaking of an Environmental Impact Assessment for the route determination of the proposed Metro Boulevard in the Weltevreden Park Area of the Gauteng Province. Client: Johannesburg Roads Agency.
- Proposed new fuel supply pipeline between Milnerton and Atlantis, Western Cape, South Africa (2007): Project Manager. This project involved undertaking an Environmental Impact Assessment for the proposed new fuel supply pipeline between Milnerton and Atlantis to supply the Ankerlig Power Station in the Western Cape Province. Client: Eskom Generation.

Mining Sector

- Establishment of the Proposed Rietvlei Opencast Coal Mine, Mpumalanga, South Africa (2013): Project Manager. This project involves the undertaking of an integrated environmental authorisation process, including an Environmental Impact Assessment, Environmental Management Programme Report, Waste Management License Application and Water Use License Application, for the establishment of an opencast coal mine north of Middelburg. Client: Rietvlei Mining Company.
- Decommissioning of Redundant Infrastructure at the Vaal River Operations, North West and Free State, South Africa (2013): Project Manager. This project involves undertaking an integrated Environmental Authorisation and Waste Management License process for the proposed decommissioning of redundant infrastructure at AngloGold Ashanti's Vaal River Operations. Client: AngloGold Ashanti.
- Decommissioning of Redundant Infrastructure at the West Wits Operations, Gauteng, South Africa (2013): Project Manager. This project involves undertaking a Basic Assessment process for the proposed decommissioning of redundant infrastructure at AngloGold Ashanti's West Wits Operations. Client: AngloGold Ashanti (Pty) Ltd.
- Inyanda Mine Pegasus South Expansion, Mpumalanga, South Africa (2011): Project Manager. This project included the compilation of an Environmental Impact Assessment, Environmental Management Plan, the Amendment of the existing Environmental Management Programme Report and the amendment of the existing Water Use License for the Inyanda Mine Pegasus South Expansion project, north of Middelburg in the Mpumalanga Province. Client: Exxaro Coal (Pty) Ltd.

- Sishen Infrastructure Program, Northern Cape, South Africa (2010): Project Manager. This project involved the compilation of an Environmental Impact Assessment and an Environmental Management Plan for the infrastructure expansion programme proposed by the Sishen Mine in the Northern Cape. Client: Sishen Iron Ore (Pty) Ltd.
- Prospecting Permit Applications in the Kuruman area of the Northern Cape, South Africa (2011): Project Manager. This project involved the compilation of Environmental Management plans as part of six applications for Prospecting Permits in the Kuruman area of the Northern Cape. Client: Sound Mining Solutions.
- Borrow pits required by the Limpopo Department of Roads and Transport, Limpopo, South Africa (2010): Project Manager. This project involved the compilation of Environmental Management plans as part of the applications for Mining Permits for borrow pits required for the rehabilitation of provincial roads in the Limpopo Province. Client: Limpopo Department of Roads and Transport.
- Borrow pits required for the Medupi Coal Fired Power Station, Limpopo, South Africa (2008): Project Manager. This project involved the compilation of Environmental Management plans as part of the applications for Mining Permits for borrow pits required for the Medupi Coal Fired Power Station in the Limpopo Province. Client: Eskom Generation.
- Borrow pits required for the Ingula Pumped Storage Scheme, KwaZulu-Natal, South Africa (2008): Project Manager. This project involved the compilation of Environmental Management plans as part of the applications for Mining Permits for borrow pits required for the Ingula Pumped Storage Scheme in the Kwa-Zulu Natal Province. Client: Eskom Generation.
- Project Manager, Mining Right Application for a 23 Hectare Borrow Pit required for the Steelpoort Pumped Storage Scheme, Mpumalanga, South Africa (2007): Project Manager. This project entailed the compilation of the required Environmental Management Programme Report in support of a Mining Right Application for a 23 Hectare Borrow Pit required for the Steelpoort Pumped Storage Scheme in the Mpumalanga Province. Client: Eskom Generation.
- Renewed Mining and Prospecting Activities on the farm Quaggaskop 215, Vanrhynsdorp, Western Cape, South Africa (2004): Environmental Consultant. This project involved the compilation of an Environmental Management Programme Report for the recommencement of mining and prospecting activities on the farm Quaggaskop 215 outside Vanrhynsdorp in Western Cape Province. Client: Minexpo.

Waste Management Projects

- Sasol Waste Management Environmental Management Programme (2019). Compilation of an operational Environmental Management Programme for the Sasol Waste Ash Facility, Charlie 1 Disposal Facility and the Waste Recycling Facility. Client: Sasol Secunda Operations.
- Proposed continuous Ashing at Majuba Power Station, Mpumalanga, South Africa (2012): Project Manager. This project entailed the compilation Environmental Impact Assessment and Waste Management License Application for the proposed continuous ashing project at the Majuba Power Station in Mpumalanga. Client: Eskom Holdings SOC Limited.
- Proposed continuous Ashing at Tutuka Power Station, Mpumalanga, South Africa (2012): Project Manager. This project entailed the compilation Environmental Impact Assessment and Waste Management License Application for the proposed continuous ashing project at the Tutuka Power Station in Mpumalanga. Client: Eskom Holdings SOC Limited.
- Proposed extension of Ash Dams at Hendrina Power Station, Mpumalanga, South Africa (2011): Project Manager. This project entailed the compilation

Environmental Impact Assessment and Waste Management License Application for the proposed extension of the ash dams at the Hendrina Power Station in Mpumalanga. Client: Hendrina Power Station.

- Phase 1 of the Environmental Impact Assessment for the Proposed Regional General and Hazardous Waste Processing Facility, Eastern Cape (2005). Project Manager. This project entailed the compilation Environmental Impact Assessment for the Proposed Regional General and Hazardous Waste Processing Facility in the Eastern Cape. Client: Coega Development Corporation.

Specialist Projects

- Strategic Environmental Assessment for the Development. Master Plan Greater Port Harcourt, Rivers State, Nigeria, Africa (2008): Senior Environmental Consultant. This project entailed the compilation of a Strategic Environmental Assessment for the City of Port Harcourt as part of the development of the Master Plan for the Greater Port Harcourt Area. Client: Port Harcourt Government
- Development of an Environmental Policy, Gauteng, South Africa (2006): Environmental Consultant. This project entailed the development and compilation of an environmental policy for the Ekurhuleni Metropolitan Municipality. Client: Ekurhuleni Metropolitan Municipality.
- Environmental Input into the National Transport Master Plan, South Africa (2007): Environmental Consultant. This project included the provision of strategic environmental input in to the Draft National Transport Plan. Client: Department of Transport.
- Development of the Development Corridors, Ekurhuleni, Gauteng, South Africa (2006): Environmental Consultant. This project included the provision of strategic environmental input in to the Ekurhuleni Metropolitan Municipalities Development Corridor Study. Client: Ekurhuleni Metropolitan Municipality.

Auditing

- Compliance Audits at South 32 (2016 – 2020): Project Manager. This project involved the environmental compliance audits of the Water Use Licenses for the BMK, Douglas, Klipfontein and Middelburg Mine North and South Sections at South 32 in Mpumalanga. Client: South 32.
- Compliance Audits at Middelburg Water Reclamation Plant (MWRP) (2016 – 2020): Project Manager. This project involved the environmental compliance audits of the Water Use License and Waste Management License for the MWRP at South 32 in Mpumalanga. Client: South 32.
- BioTherm Round 4 Lenders Technical Advisor (2018 - 2021). Project Manager – Environmental. Environmental monitoring of the construction of the Konkoonsies II and Aggeneys Photovoltaic Solar Plants against the IFC Performance Standards. Client: Nedbank.
- Water Use Licence Audits (2019): Lead Auditor: External compliance audits of the water use licences for the Delmas and Argent Powerlines in Mpumalanga. Client: Eskom Holdings SOC Limited.
- Sasol Alrode and Pretoria West Depot Audits (2016 - 2020): Lead Auditor. Environmental compliance audits for environmental authorisations and environmental management plans for the Sasol Alrode and Pretoria West Depots. Client: Sasol Oil (Pty) Ltd
- Sasol Regulation 34 Audits (2019): Lead Auditor. Environmental compliance audits for 13 authorisations for the Sasol Owned Petrol Filling Stations. Client: Sasol Oil (Pty) Ltd
- Regulation 34 Audits at Mogalakwena Mine (2019). Project Manager. Environmental compliance audits of the EMPR and various environmental

authorisations at the Mogalakwena Mine in the Limpopo Province. Client: Anglo American Platinum.

- Sasol Environmental Authorisations and Environmental Management Plans for the Secunda Operations (2019): Lead Auditor. Environmental compliance audits for 49 authorisations for the Sasol Secunda. Client: Sasol Secunda Operations
- Waste Management Licence Compliance Audit and PCB Plan Close Out Audit, Phalaborwa, Limpopo, South Africa (2019): Project Manager. Environmental compliance audit of a WML and the PCB Plan for the Palabora Mine. Client: Palabora Company
- Sasol Mining Water Use Licence Compliance, South Africa (2018): Project Manager. Environmental compliance audit of six WULs held by mining operations in Secunda. Client: Sasol Mining
- Waste Management License Audits for the Sasol Waste Ash Site, Secunda, Mpumalanga, South Africa (2014 - 2019): Lead Auditor. These projects involve the annual and biannual environmental compliance auditing of the Waste Management licenses for various waste facilities at the Secunda Site in Mpumalanga Province. Client: Sasol Chemical Industries: Secunda Synfuels Operations
- Legal Assessment at South 32 (2019): Project Manager and Lead Auditor. This project involved the assessment of legal compliance against the mine's legal register for the Klipfontein and Middelburg Mine North and South Sections at South 32 in Mpumalanga. Client: South 32
- InvestChem Annual Environmental Compliance Monitoring, Kempton Park, Gauteng, South Africa (2013 - 2019): Lead Auditor. This project involved the annual environmental compliance auditing for InvestChem's Sulphonation Plant in Kempton Park, Gauteng Province. The monitoring included InvestChem's compliance to various commitments contained in their environmental management programmes and conditions within their environmental authorisations (records of decision). Client: Investchem (Pty) Ltd.
- Compliance Audits at Sasol Alrode and Pretoria West Depots (2015-2019). Project Manager and Lead Auditor. Annual Environmental compliance auditing of the Environmental authorisations at the Alrode and Pretoria West Depots in Gauteng. Client: Sasol Oil (Pty) Ltd
- Water Use Licence for the Letabo Power Station (2018): Project Manager. Environmental compliance audit of the WUL held by Eskom Letabo Power Station, Free State, South Africa. Client: Eskom Holdings
- Compliance Audits at Kriel Colliery (2018): Project Manager. This project involved the environmental compliance audits of the Water Use Licenses held by Kriel Colliery in Mpumalanga. Client: Seriti Coal
- Legal Assessment at South 32 (2017): Project Manager and Lead Auditor. This project involved the assessment of legal compliance against the mine's legal register for the BMK, Douglas, Klipfontein and Middelburg Mine North and South Sections at South 32 in Mpumalanga. Client: South 32
- EMPR Performance Assessment Report at South 32 (2016): Project Manager. This project involved the formal assessment and verification of the Environmental Management Programme Report for the BMK, Douglas, Klipfontein and Middelburg Mine North and South Sections at South 32 in Mpumalanga. Client: South 32
- Compliance Audit for the Bokpoort Concentrating Solar Power (CSP) Facility, Groblershoop, Northern Cape, South Africa (2016): Lead Auditor. This project involved the environmental compliance auditing of the Waste Management License, Environmental Authorisation and Water Use License for the Bokpoort

CSP Facility near Groblershoop in the Northern Cape Province. Client: ACWA Power Solafrica Bokpoort CSP Power Plant (Pty) Ltd.

- EMPR Performance Assessment Report for the Landau Colliery, Mpumalanga, South Africa (2013): Auditor. This project involved the formal assessment and verification of the Landau Colliery Environmental Management Programme Report, conducted in accordance with Regulation 55 of the Mineral and Petroleum Resources Development Act (No. 28 of 2002). Client: Anglo Thermal Coal.
- Waste Management License Audit for the Slagment Operation, Vanderbijlpark, Gauteng, South Africa (2013): Lead Auditor. This project involved the annual environmental compliance auditing for AfriSam's Slagment Operation in Vanderbijlpark in Gauteng Province. The audit included AfriSam's compliance to the conditions of their waste management license. Client: AfriSam Southern Africa (Pty) Ltd.
- EMPR Performance Assessment Report for the New Vaal Colliery, Free State, South Africa (2006-2007): Auditor. This project involved the formal assessment and verification of the New Vaal Colliery Environmental Management Programme Report, conducted in accordance with Regulation 55 of the Mineral and Petroleum Resources Development Act (No. 28 of 2002). Client: Anglo American Thermal Coal.

Environmental Control Projects

- N14 rehabilitation between Sannieshof and Delareyville, North West, South Africa (2012): Environmental Control Officer. This project involved the monthly auditing of the contractor's compliance with the conditions of the approved Environmental Management Plan as well as ad hoc environmental advise to the Project Engineer and SANRAL. Client: SANRAL.
- Delmas and Bontleng Waste Water Treatment Works, Mpumalanga, South Africa (2009): Environmental Control Officer. This project involved a once off compliance audit of the above-mentioned Waste Water Treatment Works. Client: Victor Khanye Municipality.
- Nkonjaneni Water Borne Sewer Project in Piet Retief, Mpumalanga, South Africa (2009): Environmental Control Officer. This project involved the monthly auditing of the contractor's compliance with the conditions of the approved Environmental Management Plan as well as ad hoc environmental advise to the Project Engineer. Client: Mkhondo Local Municipality.
- Upgrading of the Waterval Water Care Works, Gauteng, South Africa (2005-2007): Environmental Control Officer. This project involved the monthly auditing of the contractor's compliance with the conditions of the approved Environmental Management Plan. Client: ERWAT.
- Lotus Gardens Ext 2 Township establishment, Gauteng, South Africa (2003): Environmental Control Officer. This project involved the monthly auditing of the contractor's compliance with the conditions of the approved Environmental Management Plan. Client: City of Tshwane.

Training

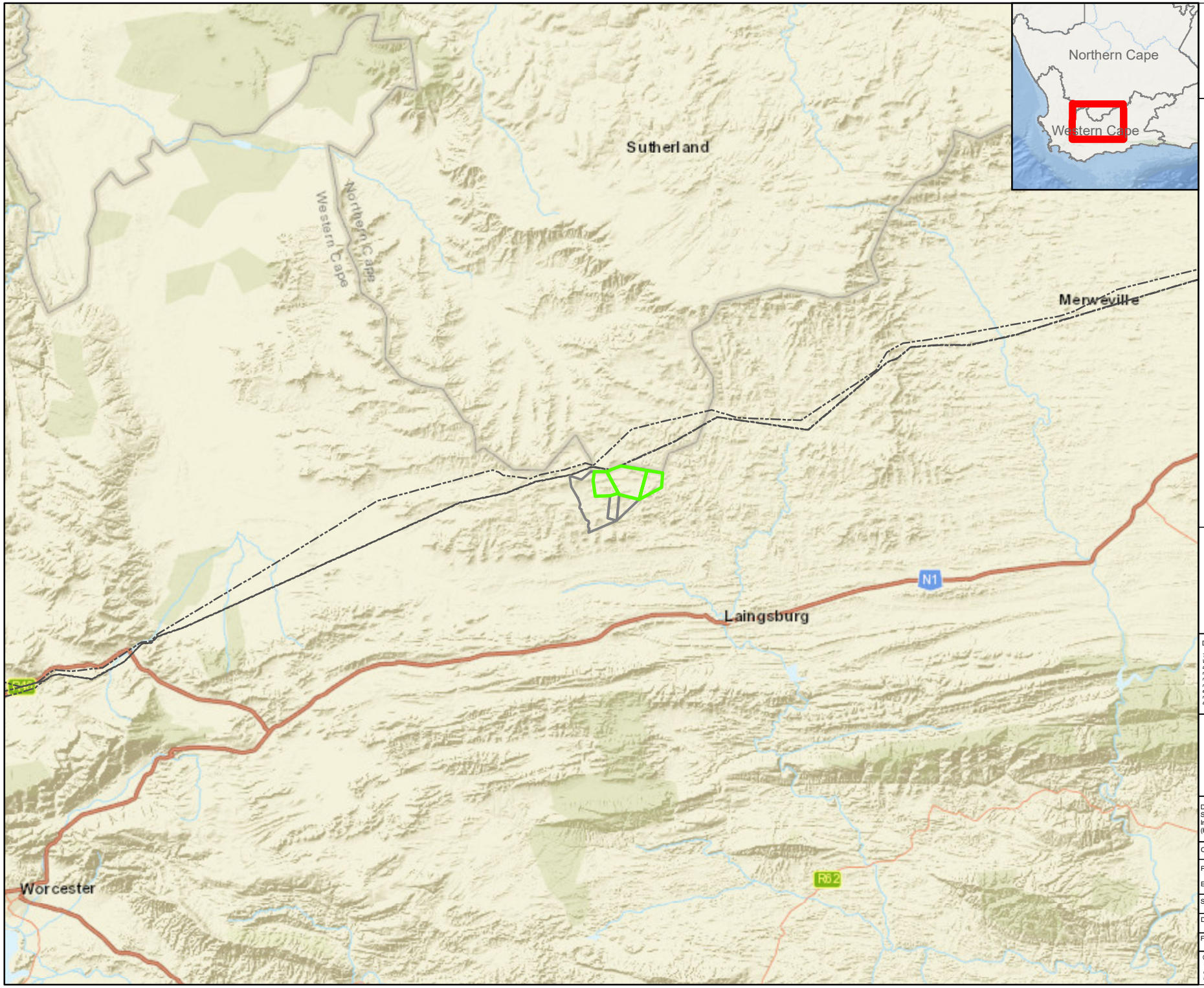
- N14 rehabilitation between Sannieshof and Delareyville, North West, South Africa (2012): Project Manager. This project involved the provision of training for the staff of the N14 rehabilitation project with regards to the contents of the environmental management plan. Client: SANRAL.
- Training in Environmental Aspects and Rehabilitation for the Small Scale Mining Division of Mintek, City, Province, South Africa (2004): Trainer. This project involved the provision of environmental awareness training for delegates involved in the small scale miner training programme run by the Mintek small scale mining division. Client: Mintek

- Training in Environmental Aspects and Impacts, Germiston, Gauteng, South Africa (2004): Trainer. This project involved the provision of environmental aspects and impacts training for the staff of Transwerk in Germiston. Client: Transwerk Germiston.

APPENDIX

B

A3 MAPS



ESIZAYO EXPANSION

LOCALITY

Legend

- Esizayo Expansion
- Esizayo Authorised
- Eskom Powerlines

N

0 4 400 8 800 13 200 17 600 22 000

Metres

DISCLAIMER

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DATA SOURCE:
Service Layer Credits: Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c)

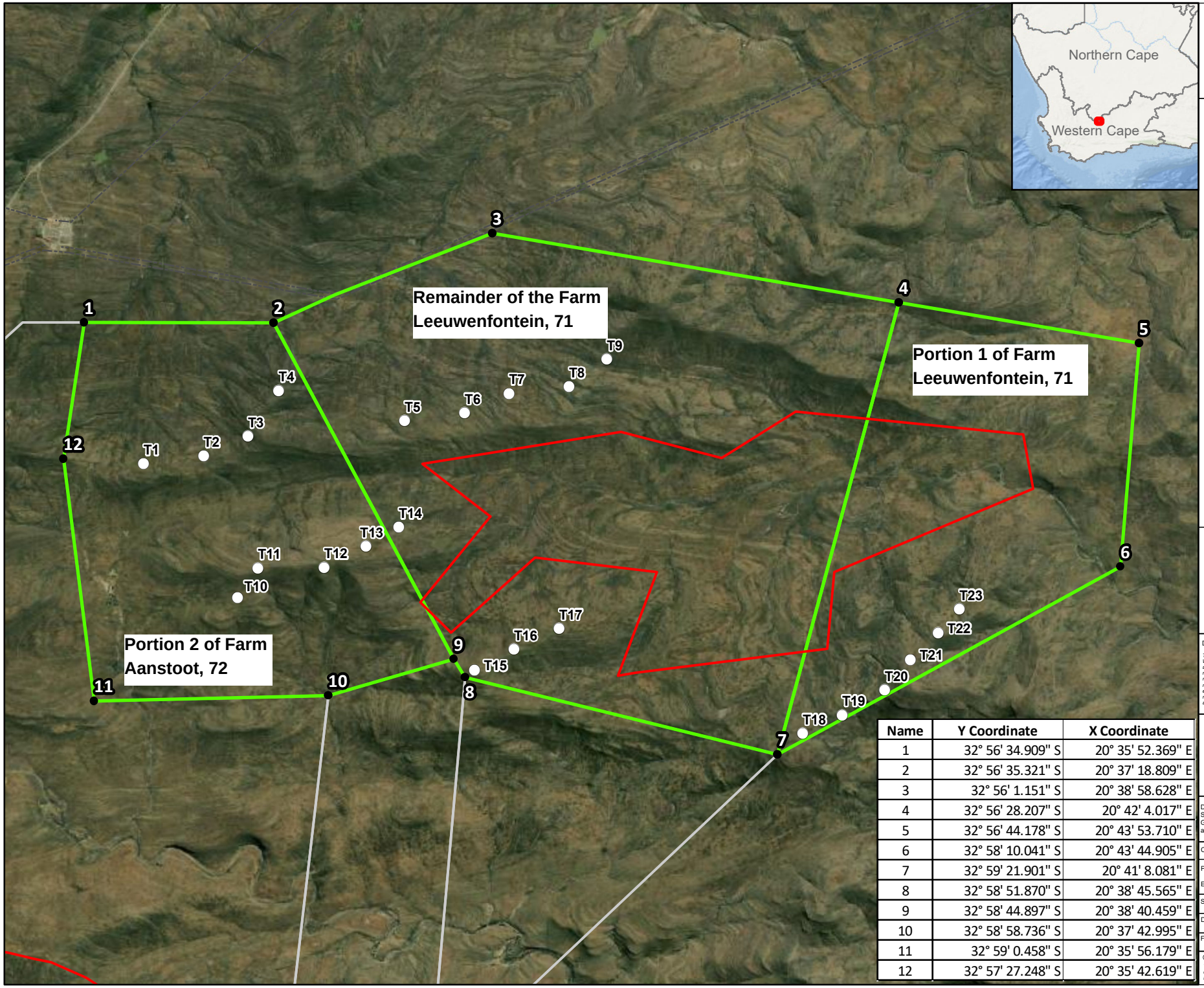
COORDINATE SYSTEM: WGS LO21

PROJECT TITLE:

ESIZAYO WEF BAR

SCALE: 1:900 000	DRAWN BY: TS
DATE: 2022/04/08	REVIEWED BY: AS

FIGURE NO:	PROJECT NO: 41103063	REV:



ESIZAYO EXPANSION

LOCALITY

Legend

- Property Corners
- Turbines
- Exclusion Area
- Esizayo Expansion
- Esizayo Authorised
- Eskom Powerlines

N

0 290 580 870 1 160 1 450

Metres

Name	Y Coordinate	X Coordinate
1	32° 56' 34.909" S	20° 35' 52.369" E
2	32° 56' 35.321" S	20° 37' 18.809" E
3	32° 56' 1.151" S	20° 38' 58.628" E
4	32° 56' 28.207" S	20° 42' 4.017" E
5	32° 56' 44.178" S	20° 43' 53.710" E
6	32° 58' 10.041" S	20° 43' 44.905" E
7	32° 59' 21.901" S	20° 41' 8.081" E
8	32° 58' 51.870" S	20° 38' 45.565" E
9	32° 58' 44.897" S	20° 38' 40.459" E
10	32° 58' 58.736" S	20° 37' 42.995" E
11	32° 59' 0.458" S	20° 35' 56.179" E
12	32° 57' 27.248" S	20° 35' 42.619" E

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DATA SOURCE:
Service Layer Credits: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

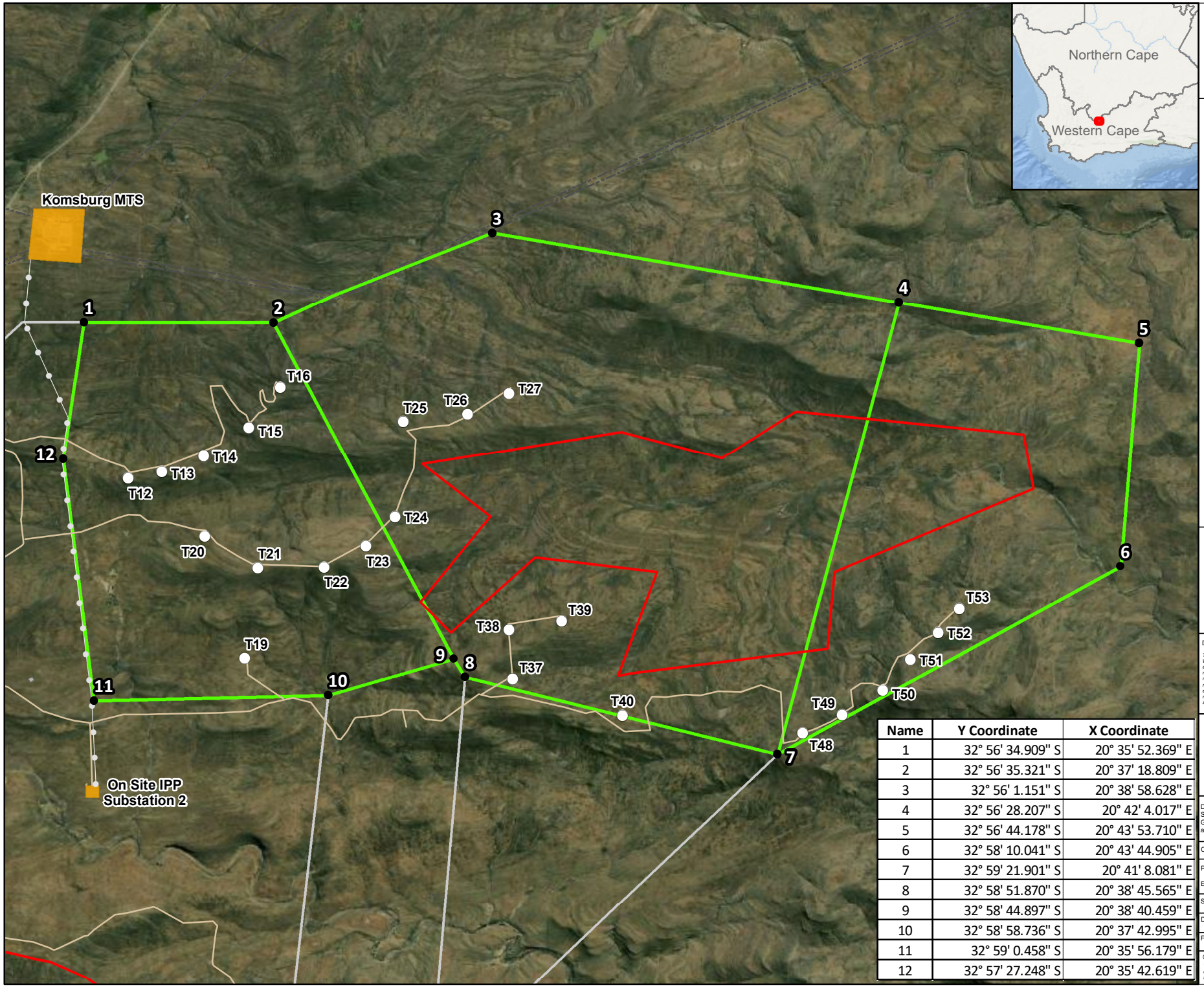
COORDINATE SYSTEM: WGS LO21

PROJECT TITLE:

ESIZAYO WEF BAR

SCALE: 1:58 000	DRAWN BY: TS
DATE: 2022/04/11	REVIEWED BY: AS

FIGURE NO:	PROJECT NO: 41103063	REV:



ESIZAYO EXPANSION

LOCALITY

Legend

- Property Corners
- Turbines
- Proposed Road
- Powerline
- O&M Buildings
- Potential Cement Batching Plant
- Substation
- Exclusion Area
- Esizayo Expansion
- Esizayo Authorised
- Eskom Powerlines

N

0 290 580 870 1 160 1 450

Metres

Name	Y Coordinate	X Coordinate
1	32° 56' 34.909" S	20° 35' 52.369" E
2	32° 56' 35.321" S	20° 37' 18.809" E
3	32° 56' 1.151" S	20° 38' 58.628" E
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8	32° 58' 51.870" S	20° 38' 45.565" E
9	32° 58' 44.897" S	20° 38' 40.459" E
10	32° 58' 58.736" S	20° 37' 42.995" E
11	32° 59' 0.458" S	20° 35' 56.179" E
12	32° 57' 27.248" S	20° 35' 42.619" E

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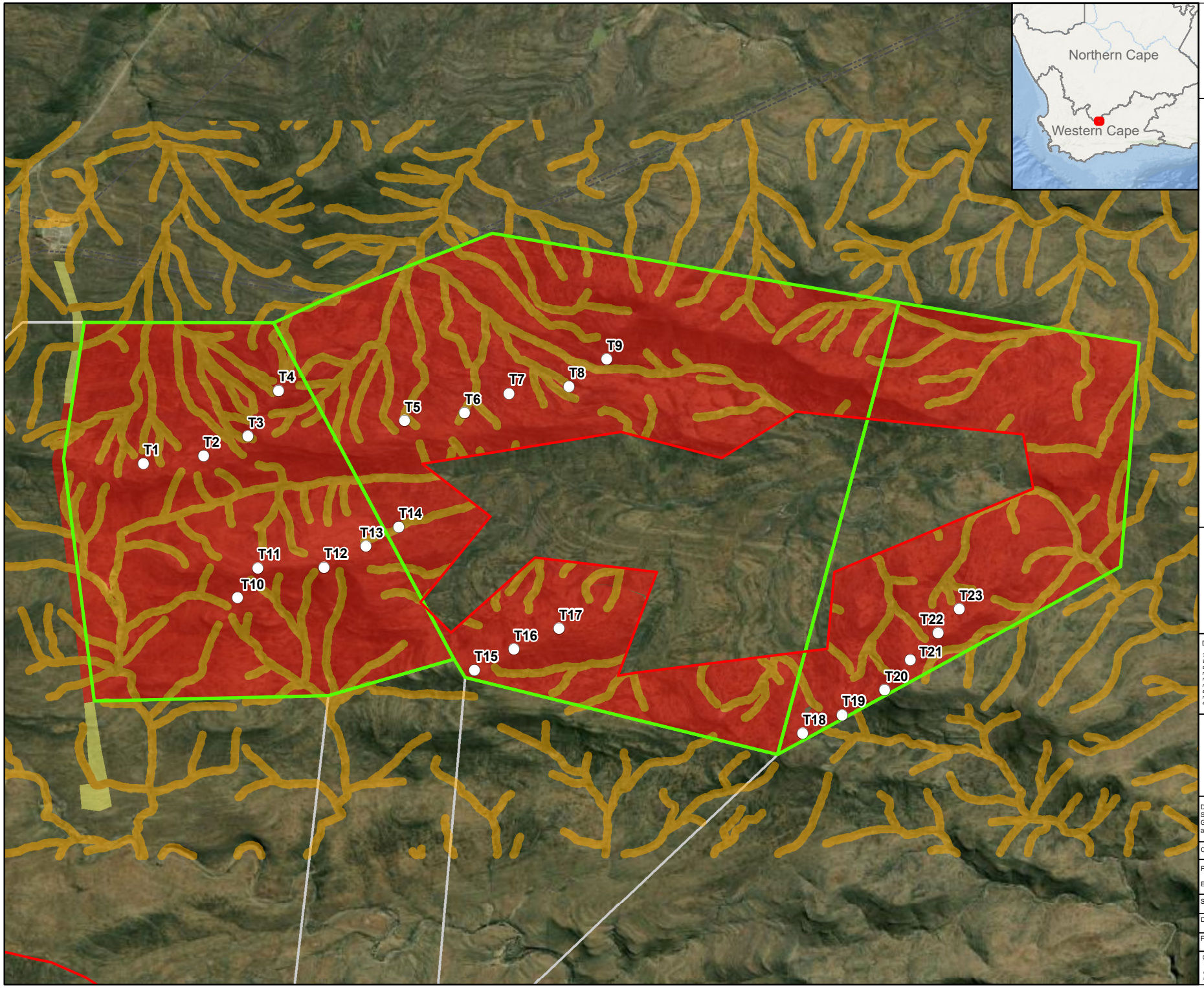
DATA SOURCE:
Service Layer Credits: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

COORDINATE SYSTEM: WGS LO21

PROJECT TITLE:
ESIZAYO WEF BAR

SCALE: 1:58 000	DRAWN BY: TS
DATE: 2022/04/28	REVIEWED BY: AS
FIGURE NO:	PROJECT NO: 41103063 REV:



ESIZAYO EXPANSION

SENSITIVITIES

Legend

- Turbines
- Exclusion Area
- Esizayo Expansion
- Esizayo Authorised
- Eskom Powerlines

Ecological Importance

- Medium
- High
- Very High

N

0 290 580 870 1 160 1 450

Metres

DISCLAIMER

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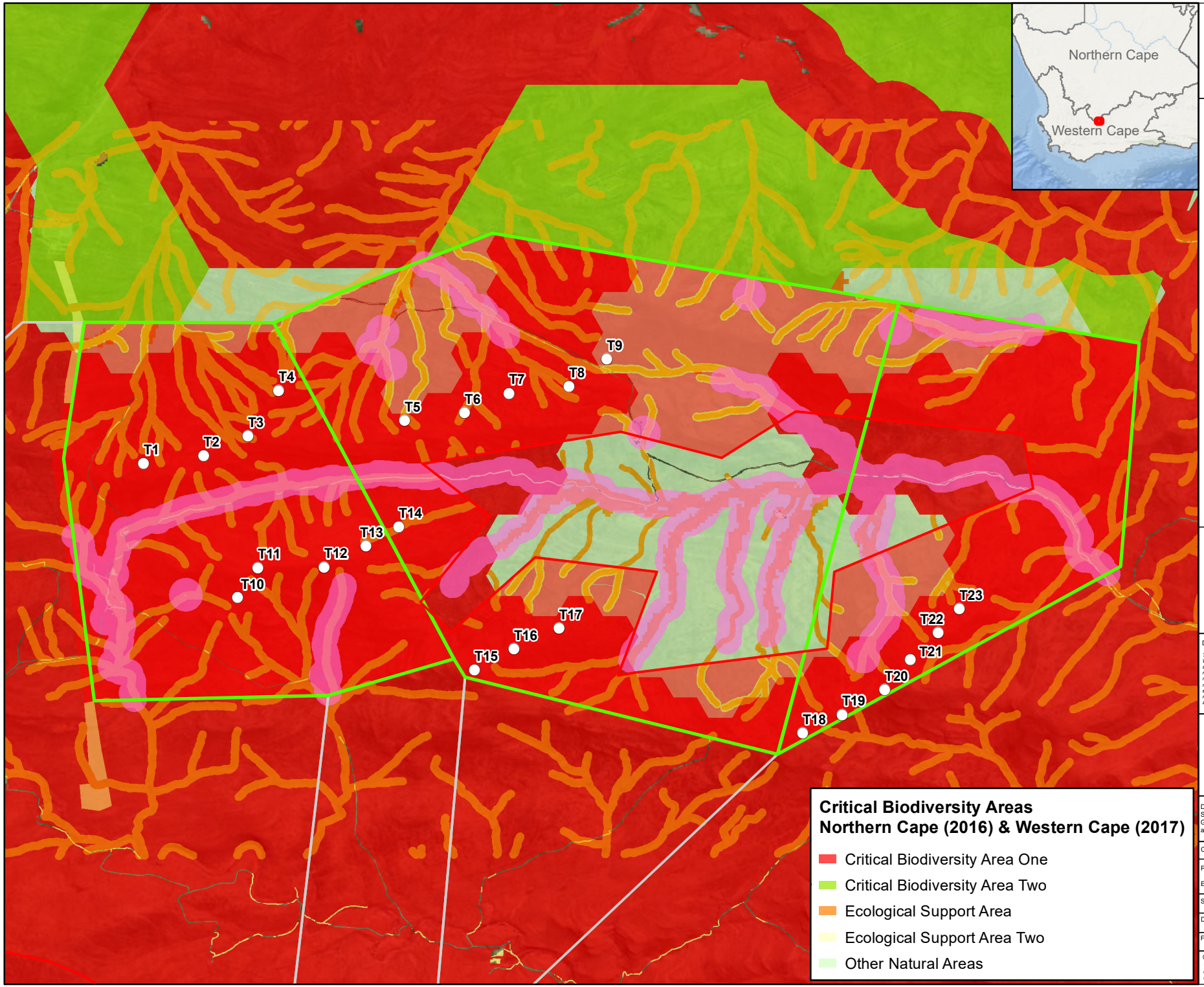
COORDINATE SYSTEM: HARTEBEESTHOEK94 LO21

PROJECT TITLE:

ESIZAYO WEF BAR

SCALE: 1:58 000	DRAWN BY: TS
DATE: 2022/04/11	REVIEWED BY: AS

FIGURE NO:	PROJECT NO: 41103063	REV:



ESIZAYO EXPANSION

SENSITIVITIES

Legend

- Turbines
- Exclusion Area
- Esizayo Expansion
- Esizayo Authorised
- Avifauna Sensitivity

Ecological Importance

- Medium
- High
- Very High
- Eskom Powerlines

N

0 290 580 870 1 160 1 450

Metres

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PROJECT TITLE:

ESIZAYO WEF BAR

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FIGURE NO:	PROJECT NO: 41103063	REV: