CAMDEN II WIND (RF) (PTY) LTD

CAMDEN II WIND ENERGY FACILITY

DRAFT ENVIRONMENTAL SCOPING REPORT

25 FEBRUARY 2022

DRAFT

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CAMDEN II WIND (RF) (PTY) LTD

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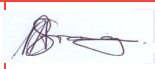
Signature	 Digitally signed by Strong, Ashlea (ZAAS02685) DN: cn=Strong, Ashlea (ZAAS02685), ou=Active, email=Ashlea.Strong@wsp.com Date: 2022.02.22 21:25:52 +02'00'		
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APPLICANT

Camden II Wind (RF) (Pty) Ltd

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Senior Environmental Consultant	Babalwa Mqokeli
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Traffic Specialist	Christo Bredenhann
Groundwater Specialist	Adam Sanderson

SPECIALISTS

Heritage Specialist	Jaco van der Walt (Beyond Heritage)
Agriculture Specialist	Johan Lanz
Ecology Specialist	David Hoare (David Hoare Consulting (Pty) Ltd
Aquatic Specialist	Brian Colloty (EnviroSci Pty Ltd)
Avifauna Specialist	Chris van Rooyen (Chris van Rooyen Consulting)
Bat Specialist	Werner Marais (Animalia Consultant (Pty) Ltd
Social Specialist	Tony Barbour (Tony Barbour Environmental Consulting)
Visual Specialist	Kerry Schwartz (SiVEST SA (Pty) Ltd / / SLR Consulting))
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1 INTRODUCTION

1.1 PURPOSE OF THIS REPORT

This Draft Scoping Report (DSR) documents the process and findings of the scoping phase of the Scoping and Environmental Impact Reporting (S&EIR) process for the proposed Camden II Wind Energy Facility (WEF), located approximately 25km south of Ermelo (near Camden) in the Mpumalanga Province of South Africa.

The DSR aims to provide stakeholders with information on the proposed development including location, layout and technological alternatives, the scope of the environmental assessment and key impacts to be addressed in the environmental assessment, and the consultation process undertaken through the environmental impact assessment (EIA) process.

1.2 BACKGROUND INFORMATION

The proponent is proposing the development of a Camden Renewable Energy Complex within the vicinity of the Camden Power Station in Mpumalanga. The Complex consists of eight subprojects referred to as:

- Camden I Wind Energy Facility (up to 200MW) (subject to a S&EIR process);
- Camden I Wind Grid Connection (up to 132kV) (subject to a Basic Assessment (BA) Process);
- Camden Grid Connection and Collector substation (up to 400kV) (subject to a S&EIR process);
- Camden I Solar (up to 100MW) (subject to a S&EIR process);
- Camden I Solar Grid Connection (up to 132kV) (subject to a BA Process);
- Camden II Wind Energy Facility (up to 200MW) (subject to a S&EIR process);
- Camden II Wind Energy Facility up to 132kV Grid Connection (subject to a BA Process); and
- Camden Green Hydrogen and Ammonia Facility, including grid connection infrastructure (subject to a S&EIR process).

The Complex (except for the Green Hydrogen and Ammonia project) is being developed in the context of the Department of Mineral Resources and Energy's (DMRE Integrated Resource Plan, and the Renewable Energy Independent Power Producer Procurement Programme (REIPPP).

The focus of this Scoping Report is the proposed Camden II WEF project.

The proposed project will be operated under a Special Purpose Vehicle (SPV), and the Project Applicant is Camden II Wind (RF) (Pty) Ltd. The proposed WEF will connect to the nearby Camden Collector substation through an up to 132kV single or double circuit powerline (subject to a separate BA process, as mentioned above) between the grid connection substation portion (immediately adjacent the Camden I WEF on-site Independent Power Producer (IPP) substation portion) and that of the Camden Collector substation. The broader Camden developments (i.e. seven of the abovementioned subprojects) will connect to the Camden Power Station substation through an up to 400kV powerline (either single or double circuit) (subject to a separate Scoping and EIA process).

In order for the proposed project to proceed, it will require an Environmental Authorisation (EA) from the Competent Authority (CA) (i.e. the National Department of Forestry, Fisheries and Environment, (DFFE)).

1.3 KEY ROLE PLAYERS

1.3.1 PROJECT PROPONENT

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

Table 1-1: Details of Project Proponent

PROPONENT:	**CAMDEN II WIND (RF) (PTY) LTD**
Contact Person:	Mercia Grimbeek
Postal Address	Suite 104, Albion Springs, 183 Main Road, Rondebosch, Cape Town, South Africa 7700
Telephone:	071 752 8033
Email:	Gideon.raath@enertrag.co.za

1.3.2 COMPETENT AUTHORITY

Section 24C(2)(a) of NEMA stipulates that the Minister of Forestry, Fisheries and the Environment ("the Minister") must be identified as the CA if the activity has implications for international environmental commitments or relations. GN 779 of 01 July 2016 identifies the Minister as the CA for the consideration and processing of environmental authorisations and amendments thereto for activities related the Integrated Resource Plan (IRP) 2010 – 2030.

The CA (i.e. DFFE) was confirmed during the Pre-Application Meeting held on **19 October 2021**.

Table 1-2 provides the relevant details of the competent authority on the Project.

Table 1-2: Competent Authority

ASPECT	**COMPETENT / COMMENTING AUTHORITY**	**CONTACT DETAILS**
Competent Authority: Environmental Authorisation	Department of Forestry, Fisheries, and the Environment (DFFE)	Case Officer: Makhosi Yeni Integrated Environmental Authorisations MYeni@dffe.gov.za Current Ref no: 2021-10-0008

1.3.3 COMMENTING AUTHORITIES

The following commenting authorities have been identified for this application:

- Department of mineral resources and Energy (DMRE);
- DFFE: Biodiversity and Conservation;
- Mpumalanga Department Agriculture, Rural Development, Land and Environmental Affairs (MDARDLEA);
- Department of Water and Sanitation (DWS);

- Vaal Water Management Area (WMA) Authority;
- South African Heritage Resource Agency (SAHRA);
- Mpumalanga Heritage Resources Authority (MHRA);
- Mpumalanga Tourism and Parks Agency (MTPA);
- Civil Aviation Authority (CAA);
- Air Traffic and Navigation Services (ATNS);
- Department of Defence (SA Army) (DD);
- Astronomy Management Authority (AMA);
- South African Weather Services (SAWS);
- South African National Roads Agency Limited (SANRAL);
- Gert Sibande District Municipality;
- Msukaligwa Local Municipality; and
- Dr Pixley Ka Seme Local Municipality.

1.3.4 ENVIRONMENTAL ASSESSMENT PRACTITIONER

WSP Group Africa (Pty) Ltd (WSP) has been appointed in the role of Independent Environmental Assessment Practitioner (EAP) to undertake the S&EIR processes for the development of the Project. The CV of the EAP is available in **Appendix A**. The EAP declaration of interest and undertaking is included in **Appendix B**. **Table 1-3** details the relevant contact details of the EAP. In order to adequately identify and assess potential environmental impacts, a number of specialists will support the EAP.

Table 1-3: Details of the Environmental Assessment Practitioner

ENVIRONMENTAL ASSESSMENT PRACTITIONER (EAP)	**WSP GROUP AFRICA (PTY) LTD**
Contact Person:	Ashlea Strong
Postal Address:	Building C, Knightsbridge, 33 Sloane Street, Bryanston, 2191, South Africa
Telephone:	011 361 1392
Fax:	011 361 1381
E-mail:	Ashlea.Strong@wsp.com

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.

1.3.5 SPECIALISTS

Specialist input was required in support of this application for EA. The details of the specialists are provided in **Table 1-4** below. The specialist declarations are included in **Appendix C**.

Table 1-4: Details of Specialists

ASSESSMENT	NAME OF SPECIALIST	COMPANY	SECTIONS IN REPORT
Agriculture	Johann Lanz	Independent consultant	Section 5.1.5 Section 6.4 Section 7.5.1
Avifauna	Chris van Rooyen	Chris van Rooyen Consulting	Section 5.2.6 Section 6.10 Section 7.5.4 **Appendix J**
Bats	Werner Marais	Animalia Consultants	Section 5.2.7 Section 6.11 Section 7.5.5 **Appendix K**
Terrestrial Ecology	David Hoare	David Hoare Consulting (Pty) Ltd	Section 5.2 Section 6.9 Section 7.5.2 **Appendix I**
Aquatic	Brian Colloty	EnviroSci Pty Ltd	Section 5.1.6 Section 6.5 Section 7.5.3 **Appendix H**
Groundwater	Adam Sanderson	WSP Group Africa (Pty) Ltd	Section 5.1.7 Section 6.6
Heritage and Palaeontology	Jaco van der Walt	Beyond Heritage	Section 5.3.4 Section 6.13 and 6.14 Section 7.5.7 **Appendix D**
Socio-economic	Tony Barbour	Tony Barbour Environmental Consulting	Section 5.3.6 Section 6.16 Section 7.5.10 **Appendix M**
Traffic	Christo Bredenhann	WSP Group Africa (Pty) Ltd	Section 5.3.3 Section 6.15 Section 7.5.8
Visual	Kerry Schwartz	SiVEST SA (Pty) Ltd / SLR Consulting (Pty) Ltd	Section 5.3.5 Section 6.12 Section 7.5.9 **Appendix L**
Noise	Kirsten Collett	WSP Group Africa (Pty) Ltd	Section 5.3.2 Section 6.2 Section 7.5.6

1.4 SCOPING TERMS OF REFERENCE

The 2014 Environmental Impact Assessment (EIA) Regulations (GNR 982), as amended, identifies the proposed Camden II WEF development as an activity being subject to an S&EIR process due to the applicability of the EIA Listing Notices 1 and 2 (GNR 983 and 984, as amended).

As defined in Appendix 2 of GNR 982, as amended, the objective of the scoping process is to, through a consultative process:

- Identify the relevant policies and legislation relevant to the activity;
- Motivate the need and desirability of the proposed activity, including the need and desirability of the activity in the context of the preferred location;
- Identify and confirm the preferred activity and technology alternative through an impact and risk assessment and ranking process;
- Identify and confirm the preferred site, through a detailed site selection process, which includes an impact and risk assessment process inclusive of cumulative impacts and a ranking process of all the identified alternatives focusing on the geographical, physical, biological, social, economic, and cultural aspects of the environment;
- Identify the key issues to be addressed in the assessment phase;
- Agree on the level of assessment to be undertaken, including the methodology to be applied, the expertise required as well as the extent of further consultation to be undertaken to determine the impacts and risks the activity will impose on the preferred site through the life of the activity, including the nature, significance, consequence, extent, duration and probability of the impacts to inform the location of the development footprint within the preferred site; and
- Identify suitable measures to avoid, manage or mitigate identified impacts and to determine the extent of the residual risks that need to be managed and monitored.

Public participation is a requirement of scoping; it consists of a series of inclusive interactions aimed at providing stakeholders with opportunities to express their views, so that these can be considered and incorporated into the S&EIR decision-making process. Effective public participation requires the prior disclosure of relevant and adequate project information to enable stakeholders to understand the risks, impacts, and opportunities of the Proposed Project. The objectives of the public participation process can be summarised as follows:

- Identify relevant individuals, organisations and communities who may be interested in or affected by the Proposed Project;
- Clearly outline the scope of the proposed Project, including the scale and nature of the existing and proposed activities;
- Identify viable proposed Project alternatives that will assist the relevant authorities in making an informed decision;
- Identify shortcomings and gaps in existing information;
- Identify key concerns, raised by Stakeholders that should be addressed in the subsequent specialist studies;
- Highlight the potential for environmental impacts, whether positive or negative; and
- To inform and provide the public with information and an understanding of the Proposed Project, issues and solutions.

1.5 DRAFT SCOPING REPORT STRUCTURE

Table 1-5 cross-references the sections within the DSR with the legislated requirements as per Appendix 2 of GNR 982.

Table 1-5: Legislated Report Requirements as detailed in GNR 982

APPENDIX 2	LEGISLATED REQUIREMENTS AS PER THE NEMA GNR 982	RELEVANT REPORT SECTION
(a)	Details of	
	the EAP who compiled the report; and	Section 1.3.4 and **Appendix A**
	the expertise of the EAP, including a Curriculum Vitae	**Appendix A**
(b)	The location of the activity, including-	
	The 21 digit Surveyor code for each cadastral land parcel;	Section 2.1
	Where available, the physical address and farm name	Section 2.1
	Where the required information in terms of (i) and (ii) is not available, the coordinates of the boundary of the property.	N/a
(c)	A plan which locates the proposed activities applied for at an appropriate scale, or, if it is-	
	A linear activity, a description of the corridor in which the proposed activity or activities is to be undertaken; or	N/A
	On land where the property has not been defined, the coordinates within which the activity is to be undertaken.	N/a
(d)	A description of the proposed activity, including-	
	All listed and specified activities triggered;	Section 3.1
	A description of the activities to be undertaken, including associated structures and infrastructure;	Section 2
(e)	A description of the policy and legislative context within which the development is proposed including an identification of all legislation, policies, plans, guidelines, spatial tools, municipal development planning frameworks and instruments that are applicable to this activity and are to be considered in the assessment process;	Section 3
(f)	A motivation for the need and desirability for the proposed development including the need and desirability of the activity in the context of the preferred location;	Section 2.5
(h)	A full description of the process followed to reach the proposed preferred activity, site and location within the site, including-	
	Details of all the alternatives considered;	Section 2.4
	Details of the public participation undertaken in terms of regulation 41 of the Regulations, including copies of the supporting documents and inputs;	Section 4.6
	a summary of the issues raised by interested and affected parties, and an indication of the manner in which the issues were incorporated, or the reasons for not including them;	To be included in the Final Scoping Report (FSR)
	the environmental attributes associated with the alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects;	Section 5 Section 7

APPENDIX 2	LEGISLATED REQUIREMENTS AS PER THE NEMA GNR 982	RELEVANT REPORT SECTION
	the impacts and risks identified for each alternative, including the nature, significance, consequence, extent, duration and probability of the impacts, including the degree to which these impacts- (aa) can be reversed; (bb) may cause irreplaceable loss of resources; and (cc) can be avoided, managed or mitigated;	Section 6
	the methodology used in determining and ranking the nature, significance, consequences, extent, duration and probability of potential environmental impacts and risks associated with the alternatives;	Section 4.5
	positive and negative impacts that the proposed activity and alternatives will have on the environment and on the community that may be affected focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects;	Section 6
	the possible mitigation measures that could be applied and level of residual risk;	Section 6
	the outcome of the site selection matrix;	Section 2.4
	if no alternatives, including alternative locations for the activity were investigated, the motivation for not considering such and	N/A
	a concluding statement indicating the preferred alternatives, including preferred location of the activity;	Section 2.4
(i)	A plan of study for undertaking the environmental impact assessment process to be undertaken, including-	
	a description of the alternatives to be considered and assessed within the preferred site, including the option of not proceeding with the activity;	Section 7.3
	a description of the aspects to be assessed as part of the environmental impact assessment process;	Section 7.4
	aspects to be assessed by specialists;	Section 7.5
	a description of the proposed method of assessing the environmental aspects, including a description of the proposed method of assessing the environmental aspects including aspects to be assessed by specialists;	Section 7.6
	a description of the proposed method of assessing duration and significance;	Section 7.7
	an indication of the stages at which the competent authority will be consulted;	Section 7.9
	particulars of the public participation process that be conducted during the environmental impact assessment process; and	Section 7.9
	a description of the tasks that will be undertaken as part of the environmental impact assessment process;	Section 7
	identify suitable measures to avoid, reverse, mitigate or manage identified impacts and to determine the extent of the residual risks that need to be managed and monitored.	Section 6 Section 7.7
(j)	An undertaking under oath or affirmation by the EAP in relation to-	
	the correctness of the information provided in the report;	**Appendix B**

APPENDIX 2	LEGISLATED REQUIREMENTS AS PER THE NEMA GNR 982	RELEVANT REPORT SECTION
	the inclusion of comments and inputs from stakeholders and interested and affected parties; and	
	any information provided by the EAP to interested and affected parties and any responses by the EAP to comments or inputs made by interested or affected parties;	
(k)	An undertaking under oath or affirmation by the EAP in relation to the level of agreement between the EAP and interested and affected parties on the plan of study for undertaking the environmental impact assessment;	**Appendix B**
(l)	Where applicable, any specific information required by the competent authority; and	N/A
(m)	Any other matter required in terms of section 24(4)(a) and (b) of the Act.	N/A

1.6 ASSUMPTION AND LIMITATIONS

General assumptions and limitations:

- The EAP hereby confirms that they have undertaken to obtain project information from the client that is deemed to be accurate and representative of the project;
- Site visits have been undertaken to better understand the project and ensure that the information provided by the client is correct, based on site conditions observed;
- The EAP hereby confirms their independence and understands the responsibility they hold in ensuring all comments received are accurately replicated and responded to within the EIA documentation;
- The comments received in response to the public participation process, will be representative of comments from the broader community; and
- Based on the Pre-Application meeting and subsequent minutes, the CA would not require additional specialist input, in order to make a decision regarding the application.

Aquatic Ecology:

- To obtain a comprehensive understanding of the dynamics of both the flora and fauna of communities within a study site, as well as the status of endemic, rare or threatened species in any area, assessments should always consider investigations at different time scales (across seasons/years) and through replication. However, due to time constraints these long-term studies are not feasible and are thus mostly based on instantaneous sampling. This limitation is common to many impact assessment type studies, but the findings are deemed adequate for the purposes of decision-making support regarding project acceptability in this Phase, unless otherwise stated.
- Due to the scope of the work presented in this report, a long-term investigation of the proposed site was not possible and as such not perceived as part of the Terms of Reference – Scoping Phase. However, a concerted effort was made to sample and assess as much of the potential site, as well as make use of any supporting literature, species distribution data and aerial photography.
- It should be emphasised that information, as presented in this document, only has reference to the study area as indicated on the accompanying maps. Therefore, this information cannot be applied to any other area without detailed investigation.

Avifauna:

This study made the basic assumption that the sources of information used are reliable and accurate. The following must be noted:

- The SABAP2 dataset is a comprehensive dataset which provides a reasonably accurate snapshot of the avifauna which could occur at the proposed site. For purposes of completeness, the list of species that could be encountered was supplemented with personal observations, general knowledge of the area, and the results of the pre-construction monitoring which was conducted over 12 months.

- Conclusions in this scoping report are based on experience of these and similar species at wind farm developments in different parts of South Africa. However, bird behaviour can never be predicted with absolute certainty.
- To date, only one peer-reviewed scientific paper has been published on the impacts wind farms have on birds in South Africa (Perold *et al*. 2020). The precautionary principle was therefore applied throughout. The World Charter for Nature, which was adopted by the UN General Assembly in 1982, was the first international endorsement of the precautionary principle. The principle was implemented in an international treaty as early as the 1987 Montreal Protocol and, among other international treaties and declarations, is reflected in the 1992 Rio Declaration on Environment and Development. Principle 15 of the 1992 Rio Declaration states that: "in order to protect the environment, the precautionary approach shall be widely applied by States according to their capabilities. Where there are threats of serious or irreversible damage, lack of full scientific certainty shall be not used as a reason for postponing cost-effective measures to prevent environmental degradation."
- According to the specifications received from the proponent, the 33kV medium-voltage lines will be buried where practically feasible. It was therefore assumed that there could be 33kV overhead lines which could pose an electrocution risk to priority species.
- The broader area refers to the area covered by the sixteen SABAP2 pentads.
- Priority species for wind development were identified from the updated list of priority species for wind farms compiled for the Avian Wind Farm Sensitivity Map (Retief *et al*. 2012).

Bats:

As with any environmental study, there are certain assumptions and limitations that exist around the current knowledge we possess regarding bats and their behaviour, movements and distribution. Some important points are discussed briefly below:

- Distribution maps of South African bat species still require further refinement, thus the bat species proposed to occur on the site (and not detected in the area yet) should be considered precautionary. If a species has a distribution marginal to the site, it was assumed to occur in the area.
- The migratory paths of bats are largely unknown, thus some uncertainty in this regard will remain until the end of operational monitoring of at least 2 years.
- The sensitivity map is based partially on satellite imagery and from detailed site visits, although given the large extent of the site, there is always the possibility that what has been mapped may differ slightly to what is on the ground.
- Results from the passive bat detection data will provide insight into possible mitigation measures by highlighting peak activity periods and species assemblages active on site

Ecology:

The following assumptions, limitations, uncertainties are listed regarding the ecological assessment of the Camden II site:

- The assessment is based on a single reconnaissance site visit from 3-7 February 2020 (summer season). The current study is based on an extensive site visit as well as a desktop study of the available information. The time spent on site was adequate for understanding general patterns across affected areas. If necessary, additional surveys will be recommended to compensate for any short-coming related to describing seasonal floristic patterns on site in detail.
- The vegetation was in good condition for sampling at the time of the field assessment, and the species lists obtained are considered reliable and relatively comprehensive.
- Compiling the list of species that could potentially occur on site is limited by the paucity of collection records for the area. The list of plant species that could potentially occur on site was therefore taken from a wider area and from literature sources that may include species that do not occur on site and may miss species that do occur on site. In order to compile a comprehensive site-specific list of the biota on site, studies would be required that would include different seasons, be undertaken over a number of years and include extensive sampling. Due to time constraints, this was not possible for this study.
- Rare and threatened plant and animal species are, by their nature, usually very difficult to locate and can be easily missed.

- The faunal component of the study relies primarily on existing information, as available in various spatial databases and published accounts. These databases are not intended for fine-scale use and the reliability and adequacy of these data sources relies heavily on the extent to which the area has been sampled in the past. Many remote areas have not been well sampled with the result that the species lists for an area do not always adequately reflect the actual fauna and flora present at the site. In order to counter the likelihood that the area has not been well sampled in the past and in order ensure a conservative approach, the species lists derived for the site from the literature were obtained from an area significantly larger than the study area and are likely to include a much wider array of species than actually occur at the site. This ensures that no species of potential conservation concern are missed ion the assessment. The study excludes Bats, Avifauna, Aquatic Ecology and Invertebrates

Social:

- Identification of social issues: The identification of social issues is based on the authors experience associated with undertaking in the region of 130 SIAs for renewable energy facilities and associated infrastructure (substations, transmission lines, roads etc.). Based on this the author is confident that the majority of social issues have been identified. As indicated above, a site visit will be undertaken during the Assessment Phase of the SIA.
- Technical suitability: It is assumed that the development site represents a technically suitable site for the establishment of the proposed development.
- Strategic importance of the project: The strategic importance of promoting renewable and other forms of energy is supported by the national and provincial energy policies.
- Fit with planning and policy requirements: Legislation and policies reflect societal norms and values. The legislative and policy context therefore plays an important role in identifying and assessing the potential social impacts associated with a proposed development. In this regard, a key component of the SIA process is to assess the proposed development in terms of its fit with key planning and policy documents. As such, if the findings of the study indicate that the proposed development in its current format does not conform to the spatial principles and guidelines contained in the relevant legislation and planning documents, and there are no significant or unique opportunities created by the development, the development cannot be supported.
- Demographic data: Some of the provincial documents do not contain data from the 2011 Census and or 2016 Household Community Survey. However, where required the relevant 2011 and 2016 data has been provided.
- Site visit: A site visit will be undertaken during the Assessment Phase of the SIA. The site visit will include interviews with key stakeholders and interested and affected parties. However, as indicted above, the author is confident that the key social issues have been identified.

Visual

This VIA is based on a combination of desktop-level assessment supported by field-based observation. The following assumptions and limitations are applicable:

- Wind turbines are very large structures and could impact on visual receptors that are located relatively far away, particularly in areas where the terrain is very flat. Given the nature of the receiving environment and the height of the proposed wind turbines, the study area or visual assessment zone is assumed to encompass an area of 10km from the proposed WEF – i.e. an area of 10km from the boundary of the WEF application site. The application of the 10km limit on the visual assessment zone relates to the fact that visual impacts decrease exponentially over distance. Thus although the WEF may still be visible beyond 10km, the degree of visual impact would diminish considerably. As such, the need to assess the impact on potential receptors beyond this distance would not be warranted.
- The identification of visual receptors involved a combination of desktop assessment as well as field-based observation. Initially Google Earth imagery was used to identify potential receptors within the study area. Where possible, these receptor locations were verified and assessed during a site visit which was undertaken in mid-September 2019. Due to the extent of the study area however and the number of receptors that could potentially be sensitive to the proposed development, it was not possible to visit or verify every potentially sensitive visual receptor location. As such, a number of broad assumptions have been made in terms of the likely sensitivity of the receptors to the proposed development.
- It should be noted that not all receptor locations would necessarily perceive the proposed development in a negative way. This is usually dependent on the use of the facility, the economic dependency of the

occupants on the scenic quality of views from the facility and on people's perceptions of the value of "Green Energy". Sensitive receptor locations typically include sites such as tourism facilities and scenic locations within natural settings which are likely to be adversely affected by the visual intrusion of the proposed development. Thus, the presence of a receptor in an area potentially affected by the proposed development does not necessarily mean that any visual impact will be experienced.

- The potential visual impact at each sensitive visual receptor location was assessed using a matrix developed for this purpose. The matrix is based on three main parameters relating to visual impact and, although relatively simplistic, it provides an indicative assessment of the degree of visual impact likely to be experienced at each receptor location as a result of the proposed development. It is however important to note the limitations of quantitatively assessing a largely subjective or qualitative type of impact and as such the matrix should be seen merely as a representation of the likely visual impact at a receptor location.
- As stated, the exact status of all the receptors could not be verified during the field investigation and as such the receptor impact rating was largely undertaken via desktop means. Where details of the levels of leisure / tourism activities on different sectors of the relevant farms are not known, the impact rating matrix for these receptors is based on the assumed location of the main accommodation complex on each property.
- Where receptors have been identified within the WEF project area, it has been assumed that the land owners or residents at these locations support the proposed WEF development and would not view the project in a negative light.
- Based on the project description provided by the proponent, all analysis for this VIA is based on a worst-case scenario where turbine heights are assumed to be 300 m at the blade tip. On-site substations, Battery Energy Storage (BESS) facilities and office building heights are assumed to be less than 25m in height.
- Due to the varying scales and sources of information; maps may have minor inaccuracies. Terrain data for this area, derived from the National Geo-Spatial Information (NGI)'s 25m Digital Elevation Model (DEM), is fairly coarse and somewhat inconsistent and as such, localised topographic variations in the landscape may not be reflected on the DEM used to generate the viewshed(s) and visibility analysis conducted in respect of the proposed development.
- In addition, the viewshed / visibility analysis does not take into account any existing vegetation cover or built infrastructure which may screen views of the proposed development. This analysis should therefore be seen as a conceptual representation or a worst-case scenario.
- No feedback regarding the visual environment has been received from the public participation process to date. Any feedback from the public during the review period of the Draft Scoping Report (DSR) for the WEF will however be incorporated into further drafts of this report, if relevant.
- At the time of undertaking the visual study no information was available regarding the type and intensity of lighting that will be required for the proposed WEF and therefore the potential impact of lighting at night has not been assessed at a detailed level. However, lighting requirements are relatively similar for all WEFs and as such, general measures to mitigate the impact of additional light sources on the ambiance of the nightscape have been provided.
- At the time of undertaking the visual study no detailed information was available regarding the design and layout of services and infrastructure associated with the proposed development. The potential visual impact of the typical infrastructure associated with a wind farm has therefore been assessed.
- In the light of the fact that the renewable energy industry is still relatively new in South Africa, this report draws on international literature and web material to describe the generic impacts associated with WEFs.
- Photomontages have not been compiled for all sensitive and potentially sensitive receptor locations. Instead, a range of locations was selected for modelling purposes to provide an indication of the possible impacts from different locations within the study area. It should be noted that these photomontages are specific to the location, and that even sites in close proximity to one another may be affected in different ways by the proposed WEF development. The visual models represent a visual environment that assumes that all vegetation cleared during construction will be restored to its current state after the construction phase. This is however an improbable scenario as some vegetation cover may be permanently removed which may reduce the accuracy of the models generated.
- At the request of the proponent, photomontages were compiled for this WEF in October 2019 at which time, the proposed project was still in the planning phase. As such, the photomontages are based on a turbine layout which has since changed. Accordingly, the photomontages presented in this report should be seen merely as indicative illustrations and not as an accurate representation of the proposed Camden II WEF turbine layouts.

- Although the on-site infrastructure associated with the WEF has not been included in the models, this is not considered to be a major limitation as the visual impact of associated infrastructure would be minor when considering the scale of the infrastructural elements in relation to wind turbines.
- This study includes an assessment of the potential cumulative impacts of other renewable energy and infrastructural / mining developments on the existing landscape character and on the identified sensitive receptors. This assessment is based on the information available at the time of writing the report and where information has not been available, broad assumptions have been made as to the likely impacts of these developments.
- It should be noted that the fieldwork for this study was undertaken in mid-September 2019, during late winter which is characterised by low levels of rainfall and reduced vegetation cover. In these conditions, increased levels of visual impact will be experienced from receptor locations in the surrounding area.
- The overall weather conditions in the study area have certain visual implications and are expected to affect the visual impact of the proposed development to some degree. In clear weather conditions, the wind turbines would present a greater contrast with the surrounding environment than they would on an overcast day. Although the field investigation was conducted during clear weather conditions however, localised pollution in the study area results in relatively hazy skies which would reduce the visibility of the turbines.

Heritage

- The study area was not subjected to a field survey and one will be conducted in the EIA phase. It is assumed that information obtained for the wider area is applicable to the study area and the authors acknowledge that the brief literature review is not exhaustive on the literature of the area. Due to the subsurface nature of cultural deposits, the possibility exists that some features or artefacts may not have been discovered/recorded during the survey, similarly the possible occurrence of graves and other cultural material cannot be excluded. This study did not assess the impact on medicinal plants and intangible heritage as it is assumed that these components would be highlighted through the public consultation process if relevant. It is possible that new information could come to light in future, which might change the results of this scoping report.

Notwithstanding these assumptions and limitations, it is the view of WSP that this DSR provides a good description of the issues associated with the project, and a reasonable plan of study for the EIA phase.

2 PROJECT DESCRIPTION

2.1 SITE LOCATION

The proposed Camden II WEF will have a project area of approximately 5000 hectares (ha). Within this project area the extent of the buildable area will be approximately 200 ha subject to finalisation based on technical and environmental requirements.

The proposed WEF is located south-west of Ermelo, in Mpumalanga and falls within the Msukaligwa Local Municipality and the Dr Pixley Ka Seme Local Municipality of the Gert Sibande District Municipality. The eight projects of the Camden Renewable Energy Complex are located adjacent each other and as such, the overall locality of the Camden Renewable Energy Complex is included in **Figure 2-1**. The Camden II WEF (*project under consideration for this DSR*) project site, including associated alternatives, is indicated in **Figure 2-2**. The details of the properties associated with the proposed Camden II WEF, including the 21-digit Surveyor General (SG) codes for the cadastral land parcels are outlined in **Table 2-1.**

Table 2-1: Camden II WEF Affected Farm Portions

FARM NAME	21 DIGIT SURVEYOR GENERAL CODE OF EACH CADASTRAL LAND PARCEL
Portion 0 of Adrianople Farm No. 296	T0IT00000000029600000
Portion 1 of Adrianople Farm No. 296	T0IT00000000029600001
Portion 2 of Adrianople Farm No. 296	T0IT00000000029600002
Portion 3 of Adrianople Farm No. 296	T0IT00000000029600003
Portion 3 of Buhrmansvallei Farm No. 297	T0IT00000000029700003
Portion 4 of Buhrmansvallei Farm No. 297	T0IT00000000029700004
Portion 5 of Buhrmansvallei Farm No. 297	T0IT00000000029700005
Portion 5 of Klipfontein Farm No. 326	T0IT00000000032600005
Portion 3 of De Emigratie Farm No. 327	T0IT00000000032700003
Portion 6 of De Emigrate Farm No. 327	T0IT00000000032700006

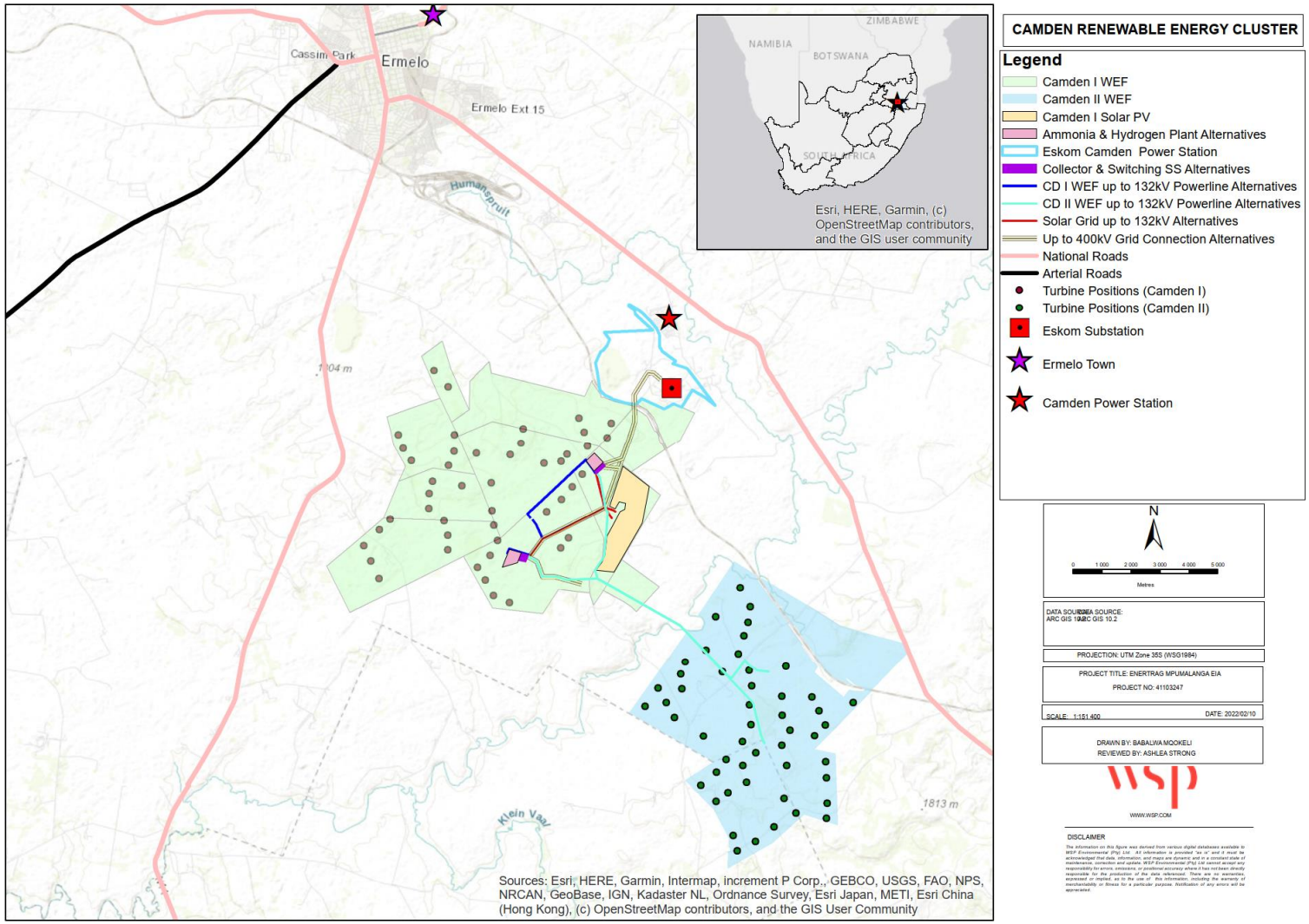


Figure 2-1: Locality map for the proposed Camden Renewable Energy Complex, near Camden in the Mpumalanga Province showing the location and proximity of the respective projects to each other

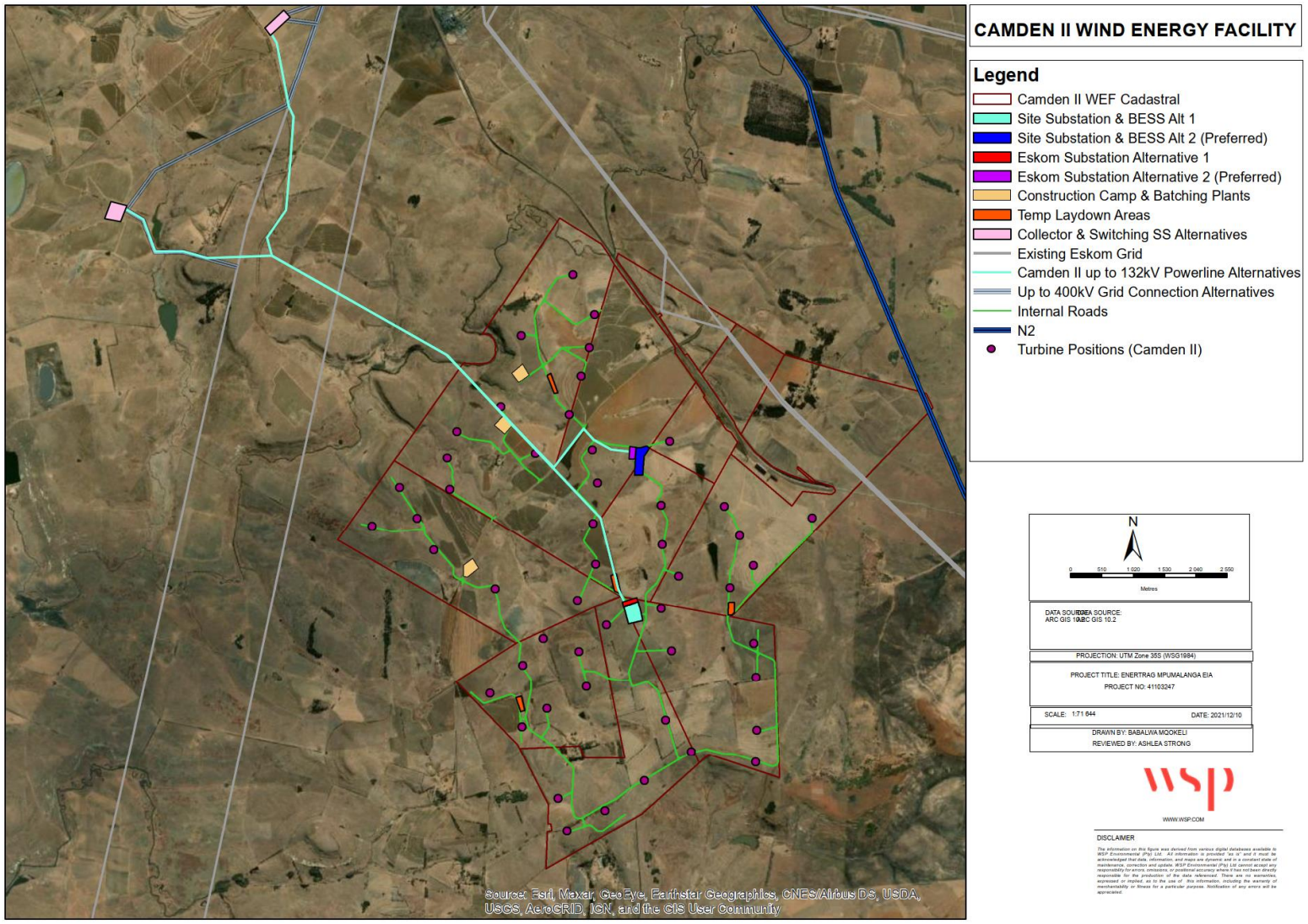


Figure 2-2: Proposed Camden II WEF and associated main components

2.2 WIND ENERGY POWER GENERATION PROCESS

Wind power is the conversion of wind energy into a useful form of energy, such as electricity, using modern and highly reliable wind turbines. Wind Power is non-dispatchable, meaning that for economic operation, all of the available output must be taken when it is available.

Wind turbines, like windmills, are mounted on a tower to harness wind energy at an increased level above the ground where wind is faster and less turbulent. The kinetic energy of the wind is used to turn the blades of the turbine to generate electricity. Wind turbines can operate at varying wind speeds, with the amount of energy the wind transfers to the rotor depending on the density of the air, the rotor area and the wind speed.

The electricity generated by the wind turbines is passed through the step-up transformer and then transmitted via either underground or overhead cables to a central substation, which connects the wind energy facility to a high voltage network. Wind turbines are designed to operate automatically with minimal maintenance for approximately 20-25 years.

Figure 2-3 illustrates the following main components of a wind turbine:

- The **rotor** consists of three **blades** which are attached to a **hub**. The blades collect energy from the wind and converts the wind energy into rotational shaft motion/energy to turn the generator;
- The **nacelle** houses the equipment at the top of the tower as well as a gearbox, a generator that converts the turning motion/mechanical energy of the blades into electricity and coupling and brake;
- The **tower** supports the nacelle and rotor and allows the blades to be distanced safely off the ground so as to reach the stronger winds found at higher elevations;
- Turbine **step-up transformer** which can be indoor or outdoor, depending on the turbine model whose function is to increase the voltage capacity of the electricity generated by the turbine to a higher, grid-equivalent.
- The **foundation** unit ensures the stability of the turbine structure.

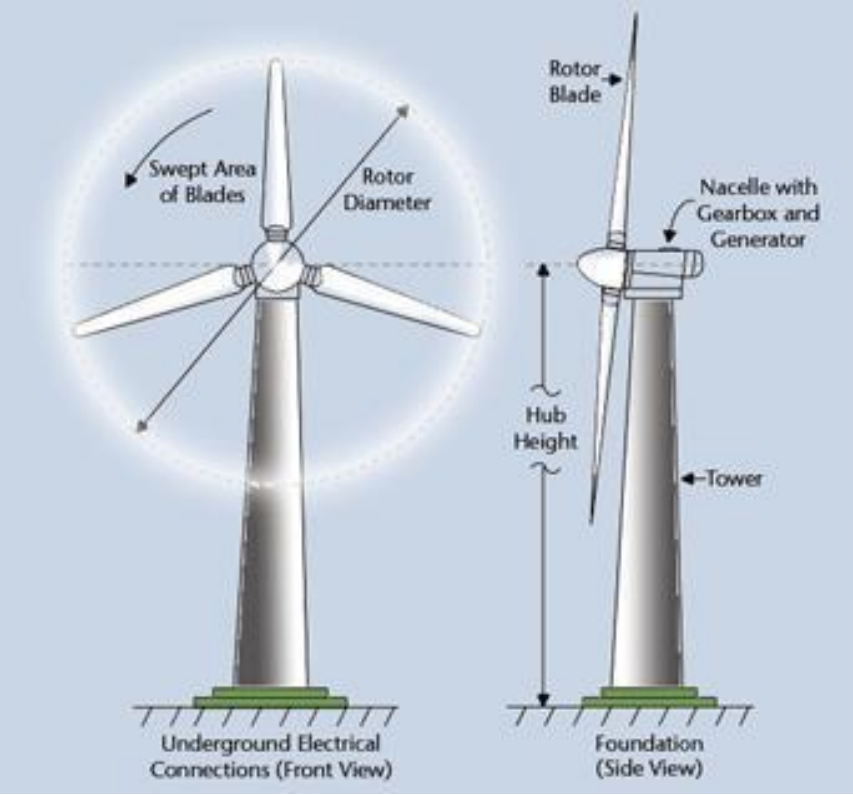


Figure 2-3: Illustration of the main components of a wind turbine

2.3 PROJECT INFRASTRUCTURE

The proposed Camden II WEF will be developed with an installed capacity of 210 megawatt (MW), thus allowing for up to 200 MW for export from the facility. The proposed Camden II WEF will comprise the following key components:

WIND TURBINES

- Up to 50 turbines, each with a foundation of approximately 25m^2 in diameter and approximately 3m depth;
- Turbine hub height of up to 200m;
- Rotor diameter up to 200m; and
- Permanent hard standing area for each wind turbine (approximately 4ha). **Figure 2-4** illustrates the typical hardstanding requirements for the construction of each turbine (it should be noted that the figure below is for illustration purposes only – the exact layout and specification of the hardstanding will be determined once the design phase has been completed)

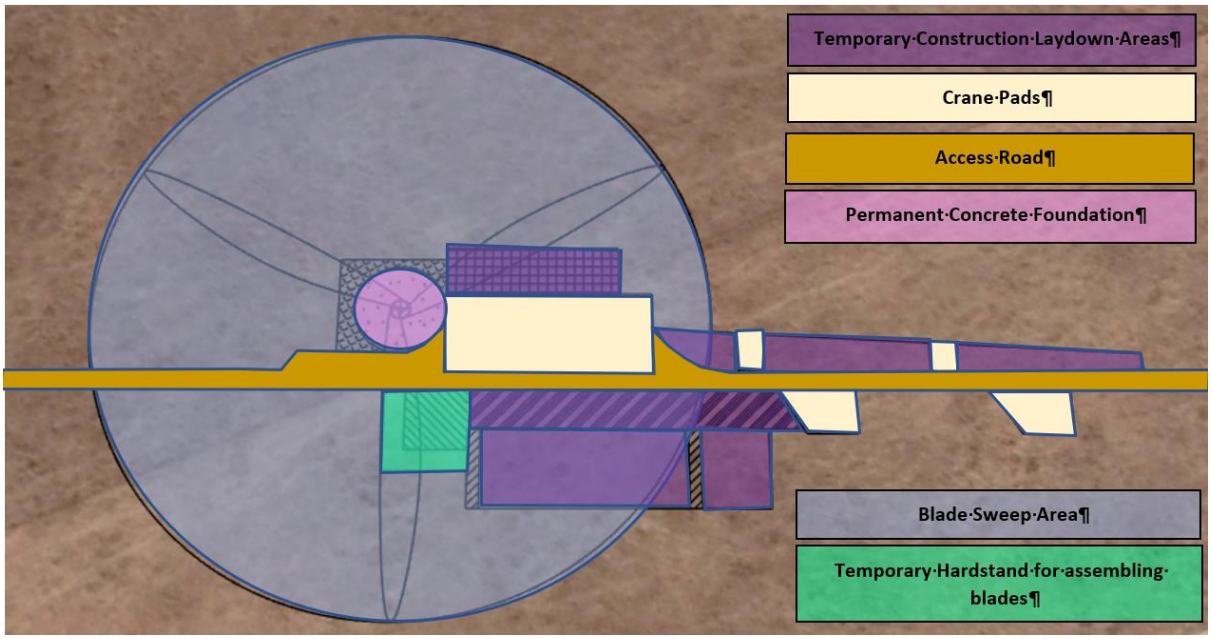


Figure 2-4: Typical Turbine Hard Standing Requirements (illustration purposes only)

SITE SUBSTATION AND BATTER ENERGY STORAGE SYSTEM (BESS)

- IPP portion site substation of approximately 1.5ha. The substation will consist of a high voltage substation yard to allow for multiple up to 132kV feeder bays and transformers, control building telecommunication, and other substation components as required; and
- The Battery Energy Storage System (BESS) footprint will be up to 5 ha. The BESS storage capacity will be up to 200MW/800 megawatt-hour (MWh) with up to four hours of storage. It is proposed that Lithium Battery Technologies, such as Lithium Iron Phosphate, Lithium Nickel Manganese Cobalt oxides or Vanadium Redox flow technologies will be considered as the preferred battery technology however the specific technology will only be determined following Engineering, Procurement, and Construction (EPC) procurement. The main components of the BESS include the batteries, power conversion system and transformer which will all be stored in various rows of containers.

OPERATION AND MAINTENANCE BUILDING INFRASTRUCTURE

- Operations and maintenance (O&M) building infrastructure will be required to support the functioning of the WEF and for services required by operations and maintenance staff. The O&M building infrastructure will be located in close proximity to the site substation and will include:
  - Operations building of approximately 200m^2;
  - Workshop and stores area of approximately 300m^2; and
  - Refuse area for temporary waste storage and conservancy tanks to service ablution facilities.

CONSTRUCTION CAMP LAYDOWN

- Temporary infrastructure includes:
  - a construction camp laydown and concrete batching plant (up to 5ha footprint);
  - temporary laydown area (up to 3ha); and
  - sewage: conservancy tanks and portable toilets.

ACCESS ROAD

- Access to the proposed Camden II WEF from the N11 is via two existing farm gravel roads; either via the D260 or the D1107 roads;
- Internal gravel roads of approximately 60km, linking the wind turbine locations, will be developed. The roads will be between 5m and 6m wide; and
- Where required for turning circle/bypass areas, access or internal roads may be up to 20m to allow for larger component transport.

ASSOCIATED INFRASTRUCTURE

- The medium voltage collector system will comprise of cables up to and including 33kV that run underground, except where a technical assessment suggest that overhead lines are required, within the facility connecting the turbines to the onsite substation; and
- Fencing of up to 4m high around the construction camp, O&M building and Site substation and BESS areas, including any other associated infrastructure.

The proposed development footprint (buildable area) is approximately 200ha (subject to finalisation based on technical and environmental requirements), and the extent of the project site is approximately 5000 ha. The development footprint includes the turbine positions and all associated infrastructures as outlined above.

2.4 GENERAL CONSTRUCTION ACTIVITIES

The construction process will follow industry standard methods and techniques. Key activities associated with the construction phase are described in **Table 2-2.**

Table 2-2: Construction Activities

ACTIVITY	DESCRIPTION
Site preparation and establishment	Site establishment will include clearing of vegetation and topsoil at the footprint of each turbine, for laydown area and access routes. The temporary laydown area will be constructed, including establishment of the construction camp (temporary offices, storage containers, concrete batching plant etc). Site establishment will also entail the installation and/or connection of services (sanitation, electricity etc).
Transport of components and equipment to site	Bulk materials (aggregate, steel etc.), infrastructure components (masts, blades, tower sections etc), lifting and construction equipment (excavators, trucks, compaction equipment etc.) will be sourced and transported to site via suitable National and provincial routes and designated access roads.

ACTIVITY	DESCRIPTION
	The infrastructure components may be defined as abnormal loads in terms of the Road Traffic Act (Act 29 of 1989) due to their large size and abnormal lengths and loads for transportation. A permit may be required for the transportation of these loads on public roads.
Excavation and earthworks	Subject to the determination of founding specifications, earthworks will be required. This is likely to entail: – Excavation of foundation holes to a depth of approximately 3m, and pouring of concrete foundations of approximately 500 – 650m^3 from the batching plant. Concrete foundations will be constructed at each turbine location – Levelling of the construction camp area, substation area, and O&M building area, and excavation of foundations prior to construction. – Excavation of trenches for the installation of underground cables.
Construction of wind turbines, site substation and BESS	A large lifting crane(s) will be required to lift the turbine sections (nacelle, blades) into place. The lifting crane/s will be brought on site and will be required to move between the turbine site. Cranes of varying sizes may be required depending on the size of the components. An IPP substation will be constructed on the site. The wind turbines will be connected to the IPP substation via underground or overhead (if required) up to 33kV electrical cables. The BESS will typically require the placement of multiple containers to house the BESS components.
Establishment of ancillary infrastructure	Ancillary infrastructure will include construction site office, temporary laydown area and workshop area for contractor's equipment.
Rehabilitation	Once all construction is completed on site and all equipment and machinery has been removed from the site, the site will be rehabilitated.

2.5 ALTERNATIVES

The EIA Regulations of 2014 (as amended) require that the S&EIA process must identify and describe alternatives to the proposed activity that were considered, or motivation for not considering alternatives. Different types or categories of alternatives could be considered including different locations, technology types, and project layouts. At the scoping level the evaluation of alternatives is provided at a high level in the absence of detailed environmental comparators for each alternatives; due to the two-staged nature of the S& EIA process it is more suitable to identify and describe the potential alternatives on a high level basis within scoping, and to perform a more detailed analysis of alternatives (with environmental comparators) in the EIA phase of the project. As such, the S&EIA will holistically assess the impacts and risks of each alternative in a comparative way, as suggested by Appendix 2 of the EIA Regulations of 2014 (as amended).

2.5.1 SITE ALTERNATIVES

The selection of the Camden site is the outcome of a feasibility assessment by the proponent, which *inter alia* served to identify site options that would be optimal for energy production and grid interconnection. The Camden site was selected because it is strategically located due to the following factors:

1) **Proximity to the Eskom grid** – The proposed WEF requires connection to the Eskom grid to transmit the generated electricity. As such, the location of the facility would benefit from being close to the Camden I WEF collector substation as well as an existing substation (Camden Power Station substation). The proposed project location is adjacent to the Camden Power Station substation, consequently reducing the length of the powerline that will be constructed for connection. In addition, further existing powerlines are located within close proximity to the site, allowing for potential direct connection to these existing lines where insufficient allocation may be available at the Camden substation, or where Eskom planning indicates different future use. Furthermore, the location and proximity of the site to the Camden Power Station reduces environmental impacts associated with long connection lines and reduces energy loss across the lines, ensuring a better production and project competitiveness.

2) **Land Availability** – The availability of land is a key feasibility criterion in the site selection process. The project site is of a suitable land size for the proposed development. The land available for the development of the Camden II WEF extends approximately 5000ha, providing a substantial amount of land for a 200ha development. Furthermore, this region is home to some of the biggest coal power stations in the country (Komati and Camden among many others), and most land parcels have been given mining rights for coal beneficiation to provide fuel stock supply these power stations. Thus, there is very limited land available for the development of renewable energy facilities. The proponent has however secured sufficient land for the development of the proposed WEF with landowners within the respective cadastral portions comprising the development footprint, indicating their support and willingness for the project to proceed to development via entering into agreement with the developer.

3) **Strategic Approach** – Five of Eskom's coal-fired power stations are targeted for decommissioning in the short term. These include the Komati, Camden, Grootvlei, Arnot, and Hendrina power stations. These power stations range between 50 - 60 years of age. According to the 2019 IRP, over a 11-year period Eskom are expected to decommission over 11GW of its coal fired capacity. The development site is therefore strategically located such that the power generated from the WEF can replace those generated by the Camden Power Station if Camden is decommissioned in the future.

4) **Road and labour pool accessibility** – The site near the N11 and N2 highways and the town of Ermelo, which will benefit construction logistics and provide a labour resource respectively. There is also an existing road that goes through the land parcels to allow for direct access to the project development area.

The site is considered suitable for the reasons provided. The investigation of an alternative site is not currently proposed within this S&EIA.

There is no Site alternative for the Camden II WEF.

2.5.2 TECHNOLOGY ALTERNATIVES

The Camden 1 WEF will utilize wind technology to generate power. Therefore, no technology alternatives are being considered for this project. The motivation for the use of wind technology for this project is provided below:

WIND RESOURCE

The Project site was also selected on the availability of wind resource in the Mpumalanga region. The availability of the wind resource is the main drivers of project viability. The Project site was identified by the proponent through a desktop pre-feasibility analysis based on the estimation of the wind energy resource. The average annual wind speed for the site was considered sufficient to ensure the economic viability of a wind energy facility. This viable wind resource ensures the best value for money is gained from the project, allowing for competitive pricing and maximum generation potential, with the resulting indirect benefits for the South African economy. Furthermore, near the proposed Project site, the proponent, has also identified a suitable area to develop a complementary wind facility that will assist to balance the supply of electricity.

TOPOGRAPHY

The surrounding landscape has a rolling hill topography which is suitable for the development of a wind project. The Project site itself is located on the highest lying ground near the Camden power station and thus has the greatest wind resource within the immediate area.

COMPETITION

With regards to renewable energy facilities, there is minimal competition in the area. Should the project proceed, it will be the first WEF in the province and will act as one of the pioneering developments and open opportunities for other renewable developments. It will also serve as a case study for wind resource in the province, showing that commercially viable wind energy facilities are suitable for certain parts of Mpumalanga Province.

2.5.3 LAYOUT ALTERNATIVES

A conceptual layout of the turbines on the landscape has been developed for the Camden II WEF and is included in **Figure 2-2.** The layout indicates 50 turbine positions and associated main WEF components. The layout and alignments are likely to be updated and refined as the project engineering progresses, as well depending on sensitivities and technical inputs during the EIA phase studies.

The developed of the Camden II WEF layout is not yet final.

2.5.4 'NO PROJECT' ALTERNATIVE

In the "no project" alternative, the Camden II WEF project will not be developed. In this scenario, there could be a missed opportunity to address the need for increase in renewable energy generation in an effort to mitigate against concerns of climate change and exploitation of non-renewable resources. The no-go alternative would not assist in responding to the growing electricity demand in South Africa and would not contribute to the reliability of electricity supply at a national scale. Conversely, negative environmental impacts of the project (as outlined in **Section 6**) associated with the development of the Camden II WEF would be avoided.

The "no project" alternative will be considered in the EIA phase as a baseline against which the impacts of the Camden II WEF project will be assessed.

2.6 NEED AND DESIRABILITY

South Africa is faced with significant increases in electricity demand and a shortage in electricity supply. South Africa is the seventh 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 Camden II WEF has been considered from an international, national, and regional perspective.

2.6.1 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 12$^{th\ of}$ 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.

2.6.2 NATIONAL PERSPECTIVE

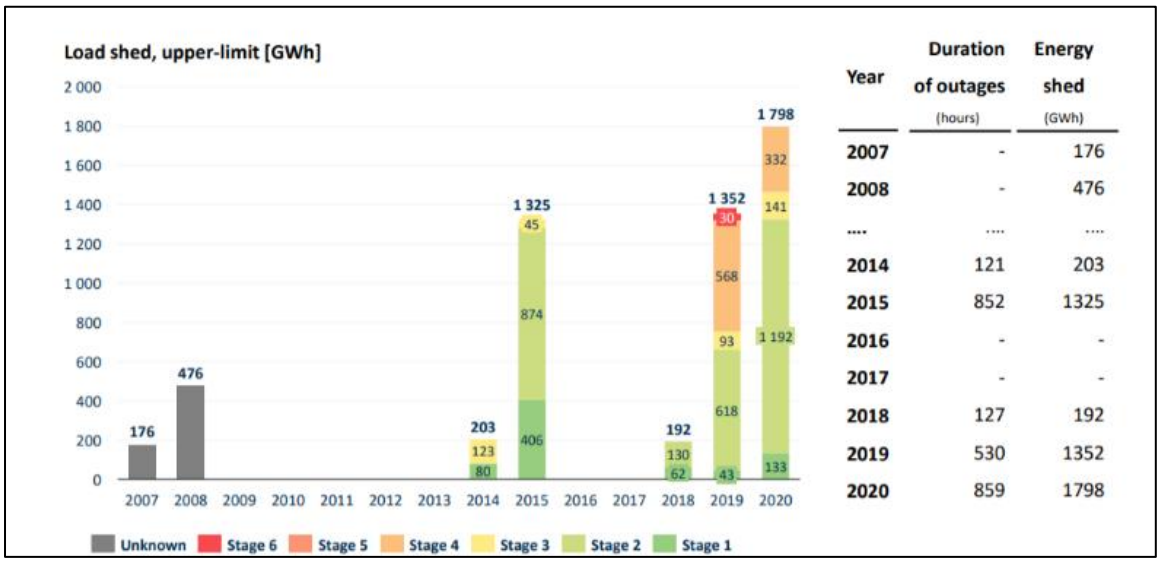
The South African Government, through the IRP, has set a target to secure 17 800 MW of renewable energy by 2030. This is an effort to diversify the country's energy mix in response to the growing electricity demand and promote access to clean sources of energy.

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 Camden II WEF 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 Camden Renewable Energy Complex, which includes the Camden II WEF, 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 Camden II WEF 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 Camden II WEF 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 2-5**. 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.



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 2-5: Load shedding hours over the years in South Africa

[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.

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.

2.6.3 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 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.

The transition towards renewable energy will improve the socio-economic conditions of the Gert Sibande District Municipality. The Gert Sibande District Municipality recorded an unemployment rate of 26.7% in 2017, with the majority of its employed in the trade and community services sectors. The Project will aid in solving two of the leading challenges faced by the Gert Sibande District Municipality, namely the cost of electricity and lack of adequate employment opportunities. The Project will be the first large-scale wind energy facilities being developed in Mpumalanga. The proponent foresees this project as being the catalyst to realizing a true Just Energy Transition for Mpumalanga. 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 2-6**.

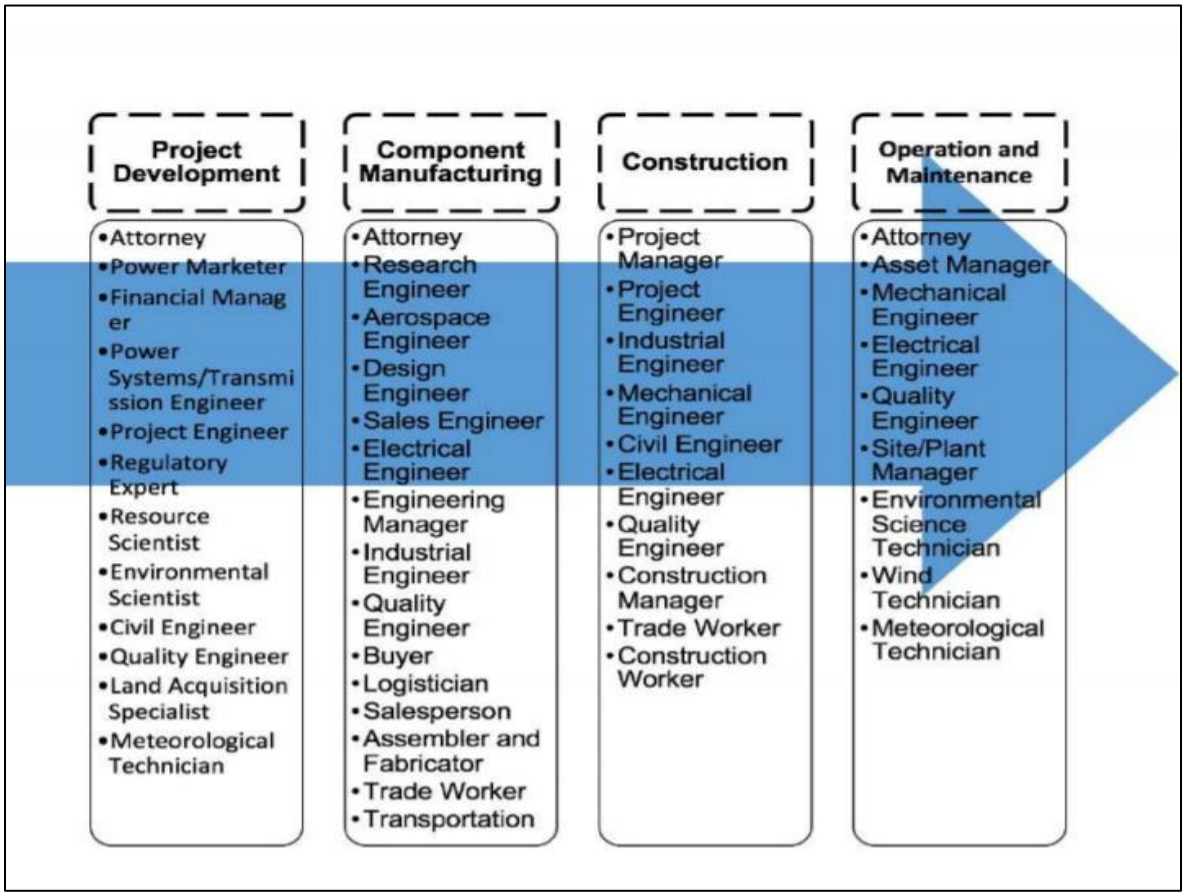


Figure 2-6: Career Opportunities presented by the Wind Industry (Source: https://www.res4africa.org/wp-content/uploads/2020/09/RES4Africa-Foundation-A-Just-Energy-Transition-in-South-Africa.pdf)

Figure 2-6 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. For these opportunities to arise, renewable energy projects need to be approved in Mpumalanga to ensure that the transition from fossil fuels to renewable energy happens gradually and takes off effectively.

MULTIPLE LAND USE

Unlike opencast coal mining within the broader Camden study area, the Project facilitates multiple land use functions within the development area. As wind turbines are spread out across the development area this allows multiple land use functions such as operating the wind farm in tandem with agricultural activities or even underground coal mining. This will boost the economic activities in the area which will in turn increase job opportunities in that area and help improve the local community's welfare without jeopardizing the environment.

DESIRABILITY OF THE PROJECT SITE

As mentioned previously, four of Eskom's coal-fired power stations have been targeted for decommissioning in the short term: Komati, Camden, Grootvlei, and Hendrina. Eskom is looking to decommission 5 400MW of electricity from coal generation by the year 2022, increasing to 10 500MW by 2030 and 35 000MW by 2050. Simultaneously Eskom has been looking at options for repurposing these power stations with the core aims of reusing existing power transmission infrastructure, developing new generation capacity, providing ancillary services, and mitigating socio-economic impact. The proposed Camden Renewable Energy Complex, inclusive of the Camden II WEF, is ideally located to form part of this proposed repurposing of the Camden power station and will help Eskom achieve its diversification goal.

3 GOVERNANCE FRAMEWORK

3.1 NATIONAL ENVIRONMENTAL LEGAL FRAMEWORK

The South African regulatory framework establishes well-defined requirements and standards for environmental and social management of industrial and civil infrastructure developments. Different authorities at both national and regional levels carry out environmental protection functions. The applicable legislation and policies are shown in **Table 3-1**.

Table 3-1: Applicable National Legislation

LEGISLATION	DESCRIPTION OF LEGISLATION AND APPLICABILITY
The Constitution of South Africa (No. 108 of 1996)	The Constitution cannot manage environmental resources as a stand-alone piece of legislation hence additional legislation has been promulgated in order to manage the various spheres of both the social and natural environment. Each promulgated Act and associated Regulations are designed to focus on various industries or components of the environment to ensure that the objectives of the Constitution are effectively implemented and upheld in an on-going basis throughout the country. In terms of Section 7, a positive obligation is placed on the State to give effect to the environmental rights.
National Environmental Management Act (No. 107 of 1998)	In terms of Section 24(2) of the NEMA, the Minister may identify activities, which may not commence without prior authorisation. The Minister thus published GNR 983 (as amended) (Listing Notice 1), GNR 984 (as amended) (Listing Notice 2) and GNR 985 (as amended) (Listing Notice 3) listing activities that may not commence prior to authorisation. The regulations outlining the procedures required for authorisation are published in the EIA Regulations of 2014 (GNR 982) (as amended). Listing Notice 1 identifies activities that require a BA process to be undertaken, in terms of the EIA Regulations, prior to commencement of that activity. Listing Notice 2 identifies activities that require an S&EIR process to be undertaken, in terms of the EIA Regulations, prior to commencement of that activity. Listing Notice 3 identifies activities within specific areas that require a BA process to be undertaken, in terms of the EIA Regulations, prior to commencement of that activity. WSP undertook a legal review of the listed activities according to the proposed project description to conclude that the activities listed in in this section are considered applicable to the development: A S&EIR process must be followed. An EA is required and will be applied for with the DFFE.
Listing Notice 1: GNR 983	***Activity 11(i)*** *The development of facilities or infrastructure for the transmission and distribution of electricity—* *(i) outside urban areas or industrial complexes with a capacity of more than 33 but less than 275 kilovolts; or* *(ii) inside urban areas or industrial complexes with a capacity of 275 kilovolts or more;* **Description:** The Facility is located outside urban areas. Furthermore, internal distribution electrical infrastructure required to connect the respective electrical components related to the Facility, and the onsite substation, including cabling (buried or overhead) will be between 33kV and 132kV. The onsite substation will be rated 33/132kV whereas internal cabling will be up to 33kV.
Listing Notice 1: GNR 983	***Activity 12(ii)(a)(c)*** *The development of—*

LEGISLATION	DESCRIPTION OF LEGISLATION AND APPLICABILITY
	(i) dams or weirs, where the dam or weir, including infrastructure and water surface area, exceeds 100 square metres; or *(ii) infrastructure or structures with a physical footprint of 100 square metres or more;* *where such development occurs—* *(a) within a watercourse;* *(b) in front of a development setback; or* *(c) if no development setback exists, within 32 metres of a watercourse, measured from the edge of a watercourse;* **Description:** The physical footprint of internal access roads and electrical cabling required to connect the various components of the Facility will exceed 100m2 within delineated watercourses on site, or within 32m of the outer extent of the delineated watercourses on site. The exact footprint will be confirmed once final designs have been provided.
Listing Notice 1: GNR 983	***Activity 14*** *The development and related operation of facilities or infrastructure, for the storage, or for the storage and handling, of a dangerous good, where such storage occurs in containers with a combined capacity of 80 cubic metres or more but not exceeding 500 cubic metres.* **Description:** The Battery Energy Storage System (BESS) components forming part of this Facility will require temporary storage and handling of dangerous goods (greater than 80m^3 but not exceeding 500m^3), should the BESS require onsite assembly. In addition, fuel, cement and chemical storage onsite will be greater than 80m^3 but not exceeding 500m^3.
Listing Notice 1: GNR 983	***Activity 19*** *The infilling or depositing of any material of more than 10 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 10 cubic metres from a watercourse;* **Description:** Internal access roads and stormwater control infrastructure, as well as electrical cabling required to connect the various components of the Facility will collectively require the excavation, infilling or removal of soil exceeding 10m3 from delineated watercourses on site. The exact values will be confirmed once final designs have been provided.
Listing Notice 1: GNR 983	***Activity 24(ii)*** *The development of a road—* *(i) for which an environmental authorisation was obtained for the route determination in terms of activity 5 in Government Notice 387 of 2006 or activity 18 in Government Notice 545 of 2010; or* *(ii) with a reserve wider than 13,5 meters, or where no reserve exists where the road is wider than 8 metres;* **Description:** Internal access roads required by the Facility will be between 5m and 6m wide, and exceed 1km in length. Where required for turning circle/bypass areas, however, access or internal roads may

LEGISLATION	DESCRIPTION OF LEGISLATION AND APPLICABILITY
	be up to 20m to allow for larger component transport. The exact values will be confirmed once final designs have been provided.
Listing Notice 1: GNR 983	***Activity 27*** *The clearance of an area of 1 hectares or more, but less than 20 hectares of indigenous vegetation* **Description:** The non-linear infrastructure components of the development footprint (buildable area) is approximately 200ha (subject to finalisation based on technical, final design and environmental requirements). As part of this buildable area, infrastructure such as the onsite substation, the turbine hard standings, the BESS facility etc. will have individual footprints of between 1 ha and 20ha.
Listing Notice 1: GNR 983	***Activity 28(ii)*** *Residential, mixed, retail, commercial, industrial or institutional developments where such land was used for agriculture, game farming, equestrian purposes or afforestation on or after 01 April 1998 and where such development:* *(i) will occur inside an urban area, where the total land to be developed is bigger than 5 hectares; or* *(ii) will occur outside an urban area, where the total land to be developed is bigger than 1 hectare;* **Description:** The Facility is considered a commercial and/or industrial development, and is located on several farm portions outside an urban area, used for agricultural purposes. In addition, the proposed development footprint (buildable area) is approximately 200ha (subject to finalisation based on technical, final design and environmental requirements).
Listing Notice 1: GNR 983	***Activity 30*** *Any process or activity identified in terms of section 53(1) of the National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004).* **Description:** The Facility infrastructure is located within, and will require vegetation clearance or disturbance of, Eastern Highveld Grassland and Chrissiesmeer Panveld, both ecosystems of which are listed in the National List of Ecosystems that are that are Threatened and in need of Protection (GNR 1002 of 9 December 2011), and subsequently listed in terms of the National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004).
Listing Notice 1: GNR 983	***Activity 48(i)(a)(c)*** *The expansion of—* *(i) infrastructure or structures where the physical footprint is expanded by 100 square metres or more; or* *(ii) dams or weirs, where the dam or weir, including infrastructure and water surface area, is expanded by 100 square metres or more;* *where such expansion occurs—* *(a) within a watercourse;*

LEGISLATION	DESCRIPTION OF LEGISLATION AND APPLICABILITY
	(b) in front of a development setback; or *(c) if no development setback exists, within 32 metres of a watercourse, measured from the edge of a watercourse;* **Description:** *Transport of large infrastructure components related to the facility will require the expansion of existing access and/or internal roads, culverts or similar drainage crossing infrastructure collectively exceeding 100m2 or more beyond existing road or road reserves located within delineated watercourses on site, or within 32m of the outer extent of the delineated watercourses on site. The exact values will be confirmed once final designs have been provided.*
Listing Notice 1: GNR 983	***Activity 56(i)(ii)*** *The widening of a road by more than 6 metres, or the lengthening of a road by more than 1 kilometre—* *(i) where the existing reserve is wider than 13,5 meters; or* *(ii) where no reserve exists, where the existing road is wider than 8 metres;* **Description:** *Transport of large infrastructure components related to the facility will require the widening of existing access and/or internal roads where no reserve exists and where such road is wider than 8 metres. The Facility is located within a rural area.*
Listing Notice 2: GNR 984	***Activity 1*** *The development of facilities or infrastructure for the generation of electricity from a renewable resource where the electricity output is 20 megawatts or more* **Description:** The project comprises a Wind Energy Facility with a contracted capacity of up to 200MW.
Listing Notice 2: GNR 984	***Activity 15*** *The clearance of an area of 20 hectares or more of indigenous vegetation* **Description:** The clearance required for the Facility will be approximately 200ha (subject to finalisation based on technical, final design and environmental requirements) of indigenous vegetation.
Listing Notice 3: GNR 985	*Activity 4(f)(i)(bb)(cc)(ee)(ff)(gg)* *The development of a road wider than 4 metres with a reserve less than 13,5 metres.* *f. Mpumalanga* *i. Outside urban areas:* *(aa) A protected area identified in terms of NEMPAA, excluding disturbed areas;* *(bb) National Protected Area Expansion Strategy Focus areas;* *(cc) Sensitive areas as identified in an environmental management framework as contemplated in chapter 5 of the Act and as adopted by the competent authority;*

LEGISLATION	DESCRIPTION OF LEGISLATION AND APPLICABILITY
	(dd) Sites or areas identified in terms of an international convention; *(ee) Critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans;* *(ff) Core areas in biosphere reserves; or* *(gg) Areas within 10 kilometres from national parks or world heritage sites or 5 kilometres from any other protected area identified in terms of NEMPAA or from the core areas of a biosphere reserve, excluding disturbed areas, where such areas comprise indigenous vegetation; or* *ii. Inside urban areas:* *(aa) Areas zoned for use as public open space; or* *(bb) Areas designated for conservation use in Spatial Development Frameworks adopted by the competent authority or zoned for a conservation purpose.* **Description:** Internal access roads required by the Facility will be between 5m and 6m wide, and exceed 1km in length. Where required for turning circle/bypass areas, however, access or internal roads may be up to 20m to allow for larger component transport. The exact values will be confirmed once final designs have been provided. In addition, the Facility is located in the Mpumalanga Province outside urban areas, partly within a National Protected Area Expansion Strategy Focus area and within 5km of Portion 1 & 2 of Farm No. 322 (Welgelegen), which are a declared Private Nature Reserve (Langcarel Private Nature Reserve) under the Game Ordinance, 1949 (No. 23 of 1949) and the Native Flora Protection Ordinance, 1940 (No. 9 of 1940). Furthermore, roads required for the Facility will be located within, and will require vegetation clearance or disturbance of, Eastern Highveld Grassland and Chrissiesmeer Panveld, both ecosystems of which are listed in the National List of Ecosystems that are Threatened and in need of Protection (GNR 1002 of 9 December 2011), and subsequently listed in terms of the National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004). Similarly, roads required for the Facility will be located within, and will require vegetation clearance or disturbance within Critical Biodiversity Areas (CBA) and Ecological Support Areas (ESA).
Listing Notice 3: GNR 985	***Activity 10(f)(i)(bb)(cc)(ee)(gg)(hh)*** *The development and related operation of facilities or infrastructure for the storage, or storage and handling of a dangerous good, where such storage occurs in containers with a combined capacity of 30 but not exceeding 80 cubic metres.* *f. Mpumalanga* *i. Outside urban areas:* *(aa) A protected area identified in terms of NEMPAA, excluding conservancies;* *(bb) National Protected Area Expansion Strategy Focus areas;* *(cc) Sensitive areas as identified in an environmental management framework as contemplated in chapter 5 of the Act and as adopted by the competent authority;* *(dd) Sites or areas identified in terms of an international convention;* *(ee) Critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans;* *(ff) Core areas in biosphere reserves;* *(gg) Areas within 10 kilometres from national parks or world heritage sites or 5 kilometres from any other protected area identified in terms of NEMPAA or from the core areas of a biosphere reserve, where such areas comprise indigenous vegetation; or*

LEGISLATION	DESCRIPTION OF LEGISLATION AND APPLICABILITY
	(hh) Areas within a watercourse or wetland, or within 100 metres of a watercourse or wetland; *ii. Inside urban areas:* *(aa) Areas zoned for use as public open space; or* *(bb) Areas designated for conservation use in Spatial Development Frameworks adopted by the competent authority or zoned for a conservation purpose.* **Description:** The Battery Energy Storage System (BESS) components forming part of this Facility will require temporary storage and handling of dangerous goods where combined capacity will not exceed 500m3 but individual component capacities will be between 30 - 80m^3, should the BESS require onsite assembly. In addition, fuel, cement and chemical storage onsite will not exceed a combined capacity of 500m^3, but individual component capacities will be between 30 - 80m^3. The storage contemplated above will all occur within the Mpumalanga Province outside urban areas, partly within a National Protected Area Expansion Strategy Focus area and within 5km of Portion 1 & 2 of Farm No. 322 (Welgelegen), which are a declared Private Nature Reserve (Langcarel Private Nature Reserve) under the Game Ordinance, 1949 (No. 23 of 1949) and the Native Flora Protection Ordinance, 1940 (No. 9 of 1940). Furthermore, storage contemplated above will be located within, and will require vegetation clearance or disturbance of, Eastern Highveld Grassland and Chrissiesmeer Panveld, both ecosystems of which are listed in the National List of Ecosystems that are Threatened and in need of Protection (GNR 1002 of 9 December 2011), and subsequently listed in terms of the National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004). Similarly, storage contemplated above will be located within, and will require vegetation clearance or disturbance within Critical Biodiversity Areas (CBA) and Ecological Support Areas (ESA) as well as being located within delineated watercourses on site, or within 32m of the outer extent of the delineated watercourses on site. The exact footprint will be confirmed once final designs have been provided.
Listing Notice 3: GNR 985	***Activity 12(f)(i)(ii)*** *The clearance of an area of 300 square metres or more of indigenous vegetation except where such clearance of indigenous vegetation is required for maintenance purposes undertaken in accordance with a maintenance management plan.* *f. Mpumalanga* *i. Within any critically endangered or endangered ecosystem listed in terms of section 52 of the NEMBA or prior to the publication of such a list, within an area that has been identified as critically endangered in the National Spatial Biodiversity Assessment 2004;* *ii. Within critical biodiversity areas identified in bioregional plans; or* *iii. On land, where, at the time of the coming into effect of this Notice or thereafter such land was zoned open space, conservation or had an equivalent zoning or proclamation in terms of NEMPAA.* **Description:** The clearance required for the Facility will be approximately 200ha (subject to finalisation based on technical, final design and environmental requirements) of indigenous vegetation. Such clearance will be in excess of 300m^2 and be partly located within Eastern Highveld Grassland and Chrissiesmeer Panveld, both ecosystems of which are listed in the National List of Ecosystems that are Threatened and in need of Protection (GNR 1002 of 9 December 2011), and subsequently listed in terms of the National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004).

LEGISLATION	DESCRIPTION OF LEGISLATION AND APPLICABILITY
	Similarly, vegetation clearance required for the Facility will be located within Critical Biodiversity Areas (CBA) and Ecological Support Areas (ESA), in excess of 300m^2.
Listing Notice 3: GNR 985	***Activity 14(ii)(a)(c)(f)(i)(bb)(dd)(ff)(hh)*** *The development of—* *(i) dams or weirs, where the dam or weir, including infrastructure and water surface area exceeds 10 square metres; or* *(ii) infrastructure or structures with a Physical footprint of 10 Square metres or more;* *where such development occurs—* *(a) within a watercourse;* *(b) in front of a development setback; or* *(c) if no development setback has been adopted,* *within 32 metres of a watercourse, measured from the edge of a watercourse;* *f. Mpumalanga* *i. Outside urban areas:* *(aa) A protected area identified in terms of NEMPAA, excluding conservancies;* *(bb) National Protected Area Expansion Strategy Focus areas;* *(cc) World Heritage Sites;* *(dd) Sensitive areas as identified in an environmental management framework ascontemplated in chapter 5 of the Act and as adopted by the competent authority;* *(ee) Sites or areas identified in terms of an international convention;* *(ff) Critical biodiversity areas or ecosystem service areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans;* *(gg) Core areas in biosphere reserves; or* *(hh) Areas within 10 kilometres from national parks or world heritage sites or 5 kilometres from any other protected area identified in terms of NEMPAA or from the core area of a biosphere reserve, where such areas comprise indigenous vegetation;* **Description:** The physical footprint of internal access roads, stormwater control infrastructure and electrical cabling required to connect the various components of the Facility will exceed 10m2 within delineated watercourses on site, or within 32m of the outer extent of the delineated watercourses on site. In addition, the Facility is located in the Mpumalanga Province outside urban areas, partly within a National Protected Area Expansion Strategy Focus area and within 5km of Portion 1 & 2 of Farm No. 322 (Welgelegen), which are a declared Private Nature Reserve (Langcarel Private Nature Reserve) under the Game Ordinance, 1949 (No. 23 of 1949) and the Native Flora Protection Ordinance, 1940 (No. 9 of 1940). Furthermore, the physical footprint of internal access roads, stormwater control infrastructure and electrical cabling required to connect the various components of the Facility will exceed 10m2 within delineated watercourses on site, or within 32m of the outer extent of the delineated watercourses on site, which infrastructure will be located within Eastern Highveld Grassland and Chrissiesmeer Panveld, both ecosystems of which are listed in the National List of Ecosystems that are Threatened and in need of Protection (GNR 1002 of 9 December 2011), and subsequently listed in terms of the National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004).

LEGISLATION	DESCRIPTION OF LEGISLATION AND APPLICABILITY
	Finally, the physical footprint of internal access roads, stormwater control infrastructure and electrical cabling required to connect the various components of the Facility will exceed 10m2 within delineated watercourses on site, or within 32m of the outer extent of the delineated watercourses on site, located within Critical Biodiversity Areas (CBA) and Ecological Support Areas (ESA). The exact footprint will be confirmed once final designs have been provided.
Listing Notice 3: GNR 985	***Activity 18(f)(i)(bb)(cc)(ee)(gg)*** *The widening of a road by more than 4 metres, or the lengthening of a road by more than 1 kilometre.* *f. Mpumalanga* *i. Outside urban areas:* *(aa) A protected area identified in terms of NEMPAA, excluding conservancies;* *(bb) National Protected Area Expansion Strategy Focus areas;* *(cc) Sensitive areas as identified in an environmental management framework as contemplated in chapter 5 of the Act and as adopted by the competent authority;* *(dd) Sites or areas identified in terms of an international convention;* *(ee) Critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans;* *(ff) Core areas in biosphere reserves; or* *(gg) Areas within 10 kilometres from national parks or world heritage sites or 5 kilometres from any other protected area identified in terms of NEMPAA or from the core area of a biosphere reserve, where such areas comprise indigenous vegetation;* **Description:** Transport of large infrastructure components related to the facility will require the widening of existing access and/or internal roads by more than 4 metres or in excess of 1km within the Mpumalanga Province and outside urban areas. Such widening will be occur partly within a National Protected Area Expansion Strategy Focus area and within 5km of Portion 1 & 2 of Farm No. 322 (Welgelegen), which are a declared Private Nature Reserve (Langcarel Private Nature Reserve) under the Game Ordinance, 1949 (No. 23 of 1949) and the Native Flora Protection Ordinance, 1940 (No. 9 of 1940). Furthermore, such widening will occur within Eastern Highveld Grassland and Chrissiesmeer Panveld both ecosystems of which are listed in the National List of Ecosystems that are Threatened and in need of Protection (GNR 1002 of 9 December 2011), and subsequently listed in terms of the National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004). Finally, such widening will be located within Critical Biodiversity Areas (CBA) and Ecological Support Areas (ESA). The exact footprint will be confirmed once final designs have been provided.
Listing Notice 3: GNR 985	***Activity 23(ii)(a)(c)(f)(i)(bb)(cc)(ee)(gg)*** *The expansion of—* *(i) dams or weirs where the dam or weir is expanded by 10 square metres or more; or* *(ii) infrastructure or structures where the physical footprint is expanded by 10 square metres or more;* *where such expansion occurs —* *(a) within a watercourse;*

LEGISLATION	DESCRIPTION OF LEGISLATION AND APPLICABILITY
	(b) in front of a development Setback adopted in the prescribed manner; or *(c) if no development setback has been adopted,* *within 32 metres of a watercourse, measured* *from the edge of a watercourse;* *f. Mpumalanga* *i. Outside urban areas:* *(aa) A protected area identified in terms of NEMPAA, excluding conservancies;* *(bb) National Protected Area Expansion Strategy Focus areas;* *(cc) Sensitive areas as identified in an environmental management framework as contemplated in chapter 5 of the Act and as adopted by the competent authority;* *(dd) Sites or areas identified in terms of an international convention;* *(ee) Critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans;* *(ff) Core areas in biosphere reserves;* *(gg) Areas within 10 kilometres from national parks or world heritage sites or 5 kilometres from any other protected area identified in terms of NEMPAA or from the core area of a biosphere reserve, where such areas comprise indigenous vegetation;* **Description:** The physical footprint of internal access roads, stormwater control infrastructure and electrical cabling required to connect the various components of the Facility will exceed 10m2 within delineated watercourses on site, or within 32m of the outer extent of the delineated watercourses on site. In addition, the Facility is located in the Mpumalanga Province outside urban areas, and partly within a National Protected Area Expansion Strategy Focus area and within 5km of Portion 1 & 2 of Farm No. 322 (Welgelegen), which are a declared Private Nature Reserve (Langcarel Private Nature Reserve) under the Game Ordinance, 1949 (No. 23 of 1949) and the Native Flora Protection Ordinance, 1940 (No. 9 of 1940). Furthermore, the physical footprint of the infrastructure contemplated above will be located within Eastern Highveld Grassland and Chrissiesmeer Panveld, both ecosystems of which are listed in the National List of Ecosystems that are Threatened and in need of Protection (GNR 1002 of 9 December 2011), and subsequently listed in terms of the National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004). Finally, the physical footprint of the infrastructure contemplated above will be located within Critical Biodiversity Areas (CBA) and Ecological Support Areas (ESA). The exact footprint will be confirmed once final designs have been provided.
National Environmental Management: Waste Act (59 of 2008) (NEM:WA)	This Act provides for regulating waste management in order to protect health and the environment by providing reasonable measures for the prevention of pollution and ecological degradation. The Act also provides for the licensing and control of waste management activities through GNR. 921 (2013): List of Waste Management Activities that Have, or are Likely to Have, a Detrimental Effect on the Environment. The proposed project does not constitute a Listed Activity requiring a Waste Management Licence (WML) as defined in GNR 921. However, the contents of this Scoping Report will include reasonable measures for the prevention of pollution and good international industry practice (GIIP).
National Environmental	The National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004) (NEMBA) was promulgated in June 2004 within the framework of NEMA to provide for the

LEGISLATION	DESCRIPTION OF LEGISLATION AND APPLICABILITY
Management: Biodiversity Act, 2004 (Act No. 10 of 2004)	management and conservation of national biodiversity. The NEMBA's primary aims are for the protection of species and ecosystems that warrant national protection, the sustainable use of indigenous biological resources, the fair and equitable sharing of benefits arising from bioprospecting involving indigenous biological resources. In addition, the NEMBA provides for the establishment and functions of a South African National Biodiversity Institute (SANBI). SANBI was established by the NEMBA with the primary purpose of reporting on the status of the country's biodiversity and conservation status of all listed threatened or protected species and ecosystems. The biodiversity assessment identifies CBAs which represent biodiversity priority areas which should be maintained in a natural to near natural state. The CBA maps indicate the most efficient selection and classification of land portions requiring safeguarding in order to meet national biodiversity objectives. Based on the preliminary desktop assessment and the terrestrial ecology report, a significant part of the Project Area falls within CBA (Irreplaceable and Optimal) and a large wetland area adjacent and to the north of the Vaal River (near the southern part of the site) is mapped as an Ecological Support Area (ESA). According to the description for the MBSP Terrestrial Assessment categories, CBAs are areas that are required to meet biodiversity targets (for biodiversity pattern and ecological process features). The management approach is that they should remain in a natural state. CBAs are areas of high biodiversity value which are usually at risk of being lost and usually identified as important in meeting biodiversity targets, except for Critically Endangered Ecosystems or Critical Linkages. CBAs in the Province can be divided into two sub-categories: – Irreplaceable (parts of the site are within this sub-category), and – Optimal (northern parts of the site are within this sub-category). Supplementary baseline terrestrial ecology studies will be undertaken during the EIA phase to inform the assessment of impacts and will include flora surveys of the project footprint to determine the presence of flora species of concern (SoC), and bird surveys of the area to define the potential risks to bird SoC. The Conservation of Agricultural Resources Act (No. 43 of 1983) (CARA) Regulations with regards to alien and invasive species have been superseded by the National Environmental Management: Biodiversity Act, 2004 (Act no. 10 of 2004) – Alien and Invasive Species (AIS) Regulations which became law on 1 October 2014. Specific management measures for the control of alien and invasive plants will be included in the Environmental Management Programme (EMPr).
National Environmental Management Protected Areas Act (No. 57 of 2003)	The purpose of the National Environmental Management Protected Areas Act (No. 57 of 2003) (NEMPAA) is to, inter alia, provide for the protection and conservation of ecologically viable areas representative of South Africa's biological diversity and its natural landscapes and seascapes. To this end, it provides for the declaration and management of various types of protected areas. According to the National Parks Area Expansion Strategy (NPAES), the south-eastern parts of the site fall within areas that have been identified as priority areas for inclusion in future protected areas. The project footprint is therefore partly within a NPAES focus area.
The National Water Act (No. 36 Of 1998)	The National Water Act, 1998 (Act No. 36 of 1998) (NWA) provides the framework to protect water resources against over exploitation and to ensure that there is water for social and economic development, human needs and to meet the needs of the aquatic environment. The Act defines water source to include watercourses, surface water, estuary or aquifer. A watercourse is defined in the Act as a river or spring, a natural channel in which water flows regularly or intermittently, a wetland, lake or dam into which or from which water flows, and any collection of water that the Minister may declare a watercourse. Section 21 of the Act outlines a number of categories that require a water user to apply for a Water Use License (WUL) and Section 22 requires water users to apply for a General Authorisation (GA) with the Department of Water and Sanitation (DWS) if they are under certain

LEGISLATION	DESCRIPTION OF LEGISLATION AND APPLICABILITY
	thresholds or meet certain criteria. The list of water uses applicable to the proposed Project include: *a) Taking water from a water resource;* *c) Impeding or diverting the flow of water in a watercourse;* *g) Disposing of waste in a manner which may detrimentally impact on a water resource;* *i) Altering the bed, banks, course or characteristics of a watercourse;* The DWS will make the final decision on water uses that are applicable to the project through a pre-application meeting after which a Water Use Authorisation Application (WUA) as determined by the risk assessment will be undertaken in compliance with procedural regulations published by the DWS within General Notice 267 (GN267). These regulations specify required information per water use and the reporting structure of required supporting technical information.
The National Heritage Resources Act (No. 25 Of 1999)	The National Heritage Resource Act (Act No. 25 of 1999) (NHRA) serves to protect national and provincial heritage resources across South Africa. The NHRA provides for the protection of all archaeological and palaeontological sites, the conservation and care of cemeteries and graves by the South African Heritage Resources Agency (SAHRA), and lists activities that require any person who intends to undertake to notify the responsible heritage resources agency and furnish details regarding the location, nature, and extent of the proposed development. Part 2 of the NHRA details specific activities that require a Heritage Impact Assessment (HIA) that will need to be approved by SAHRA. Parts of Section 35, 36 and 38 apply to the proposed project, principally: — Section 35 (4) - No person may, without a permit issued by the responsible heritage resources authority- — destroy, damage, excavate, alter, deface or otherwise disturb any archaeological or palaeontological site or any meteorite; — destroy, damage, excavate, remove from its original position, collect or own any archaeological or palaeontological material or object or any meteorite. — Section 38 (1) Subject to the provisions of subsections (7), (8) and (9), any person who intends to undertake a development categorised as- — any development or other activity which will change the character of a site— (i) exceeding 5 000 m^2 in extent, must at the very earliest stages of initiating such a development, notify the responsible heritage resources authority and furnish it with details regarding the location, nature and extent of the proposed development. In terms of Section 38(8), approval from the heritage authority is not required if an evaluation of the impact of such development on heritage resources is required in terms of any other legislation (such as NEMA), provided that the consenting authority ensures that the evaluation of impacts fulfils the requirements of the relevant heritage resources authority in terms of Section 38(3) and any comments and recommendations of the relevant resources authority with regard to such development have been taken into account prior to the granting of the consent. However, should heritage resources of significance be affected by the proposed Camden II WEF, a permit is required to be obtained prior to disturbing or destroying such resources as per the requirements of Section 48 of the NHRA, and the SAHRA Permit Regulations (GN R668). A desktop Heritage Scoping Report (**Appendix D**) has been carried out by a suitably qualified specialist, revealing: — no Stone Age or Iron Age archaeological sites are on record within the immediate study area but this could be due to a lack of focused research in the area. — no grave sites are indicated on archival maps or the genealogical society database within the impact areas, but burial sites can occur across the landscape and can be expected. — The study area is of low to moderate to high paleontological sensitivity and according to the South African Heritage Resources Information System (SAHRIS) palaeontological sensitivity map must be subjected to a palaeontological assessment in the impact assessment phase.

LEGISLATION	DESCRIPTION OF LEGISLATION AND APPLICABILITY
	– the study area forms part of a landscape characterised by wide scale cultivation and industrial facilities like power plants and mines. – the project area has been cultivated from prior to 1968 as indicated on historical maps and has remained under cultivation until present these activities would have impacted on surface indicators of heritage sites if any were ever present in the area. The proposed project will be loaded onto the SAHRIS portal for comment by SAHRA.
Mineral and Petroleum Resources Development Act (No. 28 of 2002)	The aim of the Mineral and Petroleum Resources Development Act (No. 28 of 2002) (MPRDA) is to make provision for equitable access to and sustainable development of the nation's mineral and petroleum resources. Section 53(1) of the MPRDA provides that any person who intends to use the surface of any land in any way that may be contrary to any object of the MPRDA, or which is likely to impede any such object, must apply to the Minister of Mineral Resources (the Minister) for approval. Section 53 of the MPRDA provides a mechanism for ensuring that, inter alia, the mining of mineral resources is not detrimentally affected through the use of the surface of land and which may, for example, result in the sterilisation of a mineral resource. A Section 53 approval will be required due to the fact that the project is located on various mining right areas. The Amendment Regulations (GNR 420 of 27 March 2020) introduced a template for section 53 applications (Form Z) and the specific information that applicants will need to provide as part of a section 53 application.
Noise Control Regulations in terms of the Environmental Conservation, 1989 (Act 73 of 1989)	In South Africa, environmental noise control has been in place for three decades, beginning in the 1980s with codes of practice issued by the South African National Standards (formerly the South African Bureau of Standards, SABS) to address noise pollution in various sectors of the country. Under the previous generation of environmental legislation, specifically the Environmental Conservation Act 73 of 1989 (ECA), provisions were made to control noise from a National level in the form of the Noise Control Regulations (GNR 154 of January 1992). In later years, the ECA was replaced by the National Environmental Management Act 107 of 1998 (NEMA) as amended. The National Environmental Management: Air Quality Act 39 of 2004 (NEMAQA) was published in line with NEMA and contains noise control provisions under Section 34: *(1) The minister may prescribe essential national standards –* *(a) for the control of noise, either in general or by specific machinery or activities or in specified places or areas; or* *(b) for determining –* *(i) a definition of noise; and* *(ii) the maximum levels of noise.* *(2) When controlling noise, the provincial and local spheres of government are bound by any prescribed national standards.* Under NEMAQA, the Noise Control Regulations were updated and are to be applied to all provinces in South Africa. The Noise Control Regulations give all the responsibilities of enforcement to the Local Provincial Authority, where location specific by-laws can be created and applied to the locations with approval of Provincial Government. Where province-specific regulations have not been promulgated, acoustic impact assessments must follow the Noise Control Regulations. Furthermore, NEMAQA prescribes that the Minister must publish maximum allowable noise levels for different districts and national noise standards. These have not yet been accomplished and as a result all monitoring and assessments are done in accordance with the South African National Standards (SANS) 10103:2008 and 10328:2008.

LEGISLATION	DESCRIPTION OF LEGISLATION AND APPLICABILITY
Conservation of Agricultural Resources Act (No. 43 of 1983)	The Conservation of Agricultural Resources Act (Act 43 of 1983) (CARA) provides for the implementation of control measures for soil conservation works as well as alien and invasive plant species in and outside of urban areas. In terms of the amendments to the regulations under the CARA, landowners are legally responsible for the control of alien species on their properties. Various Acts administered by the DFFE and the DWS, as well as other laws (including local by-laws), spell out the fines, terms of imprisonment and other penalties for contravening the law. Although no fines have yet been placed against landowners who do not remove invasive species, the authorities may clear their land of invasive alien plants and other alien species entirely at the landowners' cost and risk. The CARA Regulations with regards to alien and invasive species have been superseded by NEMBA Alien and Invasive Species (AIS) Regulations which became law on 1 October 2014.
Civil Aviation Act (No. 13 of 2009)	Civil aviation in South Africa is governed by the Civil Aviation Act (Act 13 of 2009). This Act provides for the establishment of a stand-alone authority mandated with controlling, promoting, regulating, supporting, developing, enforcing and continuously improving levels of safety and security throughout the civil aviation industry. This mandate is fulfilled by South African Civil Aviation Authority (SACAA) as an agency of the Department of Transport (DoT). SACAA achieves the objectives set out in the Act by complying with the Standards and Recommended Practices (SARPs) of the International Civil Aviation Organisation (ICAO), while considering the local context when issuing the South African Civil Aviation Regulations (SA CARs). As of the 1st of May 2021, Air Traffic and Navigation Services (ATNS) has been appointed as the new Obstacle application Service Provider for Windfarms and later Solar Plants. Their responsibility would pertain to the assessments, maintenance, and all other related matters in respect to Windfarms and in due time Power Plant assessments. The DEA Screening Tool Report identified Civil Aviation as having low sensitivity for the proposed Camden II WEF, and as being located between 8 and 15km of other civil aviation arerodrome. An Application for the Approval of Obstacles will also be submitted to ATNS. SACAA will be included on the project stakeholder database. They will be informed of the proposed Project, and comment will be sought from these authorities as applicable.
Occupational Health and Safety Act (No. 85 of 1993)	The National Occupational Health and Safety Act (No. 85 of 1993) (OHSA) and the relevant regulations under the Act are applicable to the proposed project. This includes the Construction Regulations promulgated in 2014 under Section 43 of the Act. Adherence to South Africa's OHSA and its relevant Regulations is essential.
National Energy Act (No. 34 of 2008)	The National Energy Act aims to ensure that diverse energy resources are available, in sustainable quantitates, and at affordable prices, to the South African economy in support of economic growth and poverty alleviation, taking into account environmental management requirements and interactions amongst economic sectors. The main objectives of the Act are to: — Ensure uninterrupted supply of energy to the Republic; — Promote diversity of supply of energy and its sources; — Facilitate effective management of energy demand and its conservation; — Promote energy research; — Promote appropriate standards and specifications for the equipment, systems and processes used for producing, supplying and consuming energy; — Ensure collection of data and information relating to energy supply, transportation and demand; — Provide for optimal supply, transformation, transportation, storage and demand of energy that are planned, organised and implemented in accordance with a balanced consideration of security of supply, economics, consumer protection and a sustainable development; — Provide for certain safety, health and environment matters that pertain to energy;

LEGISLATION	DESCRIPTION OF LEGISLATION AND APPLICABILITY
	— Facilitate energy access for improvement of the quality of life of the people of Republic; — Commercialise energy-related technologies; — Ensure effective planning for energy supply, transportation, and consumption; and — Contribute to sustainable development of South Africa's economy. In terms of the act, the Minister of Energy is mandated to develop and, on an annual basis, review and publish the Integrated Energy Plan (IEP) in the Government Gazette. The IEP analyses current energy consumption trends within different sectors of the economy (i.e. agriculture, commerce, industry, residential and transport) and uses this to project future energy requirements, based on different scenarios. The IEP and the Integrated Resource Plan are intended to be updated periodically to remain relevant. The framework is intended to create a balance between energy demand and resource availability so as to provide low-cost electricity for social and economic development, while taking into account health, safety and environmental parameters.
Electricity Regulation Act (No. 4 of 2006)	The Electricity Regulation Act (No. 4 of 2006) (ERA) aims to: — Achieve the efficient, effective, sustainable and orderly development and operation of electricity supply infrastructure in South Africa; — Ensure that the interests and needs of present and future electricity customers and end users are safeguarded and met, having regard to the governance, efficiency. effectiveness and long-term sustainability of the electricity supply industry within the broader context of economic energy regulation in the Republic: — Facilitate investment in the electricity supply industry; — Facilitate universal access to electricity; — Promote the use of diverse energy sources and energy efficiency; — Promote competitiveness and customer and end user choice; and — Facilitate a fair balance between the interests of customers and end users, licensees, investors in the electricity supply industry and the public. The Act establishes a National Energy Regulator as the custodian and enforcer of the National Electricity Regulatory Framework. The Act also provides for licenses and registration as the manner in which generation, transmission, distribution, trading and the import and export of electricity are regulated.

3.2 POLICIES AND PLANS

Table 3-2 summarised key policies and plans as an outline of the governance framework for the project.

Table 3-2: Applicable Regional Policies and Plans

APPLICABLE POLICY	DESCRIPTION OF POLICY
National Development Plan	The National Development Plan aims to eliminate poverty and reduce inequality by 2030. The NDP identifies a number of enabling milestones. Of relevance to the proposed development the NDP refers to the need to produce sufficient energy to support industry at competitive prices and ensure access for poor households, while reducing carbon emissions per unit of power by about one-third. In this regard the infrastructure is not just essential for faster economic growth and higher employment. It also promotes inclusive growth, providing citizens with the means to improve their own lives and boost their incomes. Infrastructure is essential to development. Chapter 3, Economy and Employment, identifies some of the structural challenges specific to South Africa, including an energy constraint that will act as a cap on growth and on options for industrialisation. The NDP notes that from an environmental perspective South Africa faces several related challenges. The reduction of greenhouse gas emissions and shift to a green low-carbon economy, is one of these challenges.

APPLICABLE POLICY	DESCRIPTION OF POLICY
	In terms of implementation the NDP identifies three phases. The first two are of specific relevance to the proposed project. The first phase (2012–2017) notes that ensuring the supply of energy and water is reliable and sufficient for a growing economy. The second phase (2018–2023) involves building on the first phase to lay the foundations for more intensive improvements in productivity. The provision of affordable and reliable energy is a key requirement for this to take place. Chapter 4, Economic infrastructure, notes that economic infrastructure provides the foundation for social and economic development. In this regard South Africa must invest in a strong network of economic infrastructure designed to support the country's medium- and long-term economic and social objectives. The plan envisages that, by 2030, South Africa will have an energy sector that promotes: – Economic growth and development through adequate investment in energy infrastructure. The sector should provide reliable and efficient energy service at competitive rates, while supporting economic growth through job creation. – Environmental sustainability through efforts to reduce pollution and mitigate the effects of climate change. More specifically, South Africa should have adequate supply security in electricity and in liquid fuels, such that economic activity, transport, and welfare are not disrupted. The plan sets out steps that aim to ensure that, in 20 years, South Africa's energy system looks very different to the current situation. In this regard coal will contribute proportionately less to primary-energy needs, while gas and renewable energy resources, will play a much larger role.
Integrated Resource Plan 2010 – 2030	The IRP is an electricity capacity plan which aims to provide an indication of the country's electricity demand, how this demand will be supplied and what it will cost. On 6 May 2011, the then Department of Energy (DoE) released the Integrated Resource Plan 2010-2030 (IRP 2010) in respect of South Africa's forecast energy demand for the 20-year period from 2010 to 2030. The promulgated IRP 2010–2030 identified the preferred generation technology required to meet expected demand growth up to 2030. It incorporated government objectives such as affordable electricity, reduced greenhouse gas (GHG) emissions, reduced water consumption, diversified electricity generation sources, localisation and regional development. The IRP recognises that Solar photovoltaic (PV), wind and concentrated solar power (CSP) with storage present an opportunity to diversify the electricity mix, to produce distributed generation and to provide off-grid electricity. Renewable technologies also present huge potential for the creation of new industries, job creation and localisation across the value chain.
New Growth Path	Government released the New Economic Growth Path Framework on 23 November 2010. The aim of the framework is to enhance growth, employment creation and equity. The policy's principal target is to create five million jobs over the next 10 years and reflects government's commitment to prioritising employment creation in all economic policies. The framework identifies strategies that will enable South Africa to grow in a more equitable and inclusive manner while attaining South Africa's developmental agenda. Central to the New Growth Path is a massive investment in infrastructure as a critical driver of jobs across the economy. In this regard the framework identifies investments in five key areas namely: energy, transport, communication, water, and housing.
National Infrastructure Plan	The South African Government adopted a National Infrastructure Plan (NIP) in 2012. The NIP aims to transform the South African economic landscape while simultaneously creating significant numbers of new jobs and strengthening the delivery of basic services. It outlines the challenges and enablers which needs to be addressed in the building and developing of infrastructure. The Presidential Infrastructure Coordinating Commission (PICC) was established by the Cabinet to integrate and coordinate the long-term infrastructure build. The plan also supports the integration of African economies. In terms of the plan Government will invest R827 billion over the next three years to build new and upgrade existing infrastructure. The aim of the investments is to improve access by South Africans to healthcare facilities, schools, water, sanitation, housing and electrification. The plan also

APPLICABLE POLICY	DESCRIPTION OF POLICY
	notes that investment in the construction of ports, roads, railway systems, ***electricity plants***, hospitals, schools and dams will contribute to improved economic growth.
Integrated Energy Plan	The development of a National IEP was envisaged in the White Paper on the Energy Policy of the Republic of South Africa of 1998 and, in terms of the National Energy Act, 2008 (Act No. 34 of 2008), the Minister of Energy is mandated to develop and, on an annual basis, review and publish the IEP in the Government Gazette. The purpose of the IEP is to provide a roadmap of the future energy landscape for South Africa which guides future energy infrastructure investments and policy development. The IEP notes that South Africa needs to grow its energy supply to support economic expansion and in so doing, alleviate supply bottlenecks and supply-demand deficits. In addition, it is essential that all citizens are provided with clean and modern forms of energy at an affordable price. As part of the Integrated Energy Planning process, eight key objectives are identified, namely: — Objective 1: Ensure security of supply. — Objective 2: Minimise the cost of energy. — Objective 3: Promote the creation of jobs and localisation. — Objective 4: Minimise negative environmental impacts from the energy sector. — Objective 5: Promote the conservation of water. — Objective 6: Diversify supply sources and primary sources of energy. — Objective 7: Promote energy efficiency in the economy. — Objective 8: Increase access to modern energy. The IEP provides an assessment of current energy consumption trends within different sectors of the economy (i.e., agriculture, commerce, industry, residential and transport) and uses this information to identify future energy requirements, based on different scenarios. The scenarios are informed by different assumptions on economic development and the structure of the economy and also take into account the impact of key policies such as environmental policies, energy efficiency policies, transport policies and industrial policies, amongst others. Based on this information the IEP then determines the optimal mix of energy sources and technologies to meet those energy needs in the most cost-effective manner for each of the scenarios. The associated environmental impacts, socio-economic benefits and macroeconomic impacts are also analysed. The IEP is therefore focused on determining the long-term energy pathway for South Africa, taking into account a multitude of factors which are embedded in the eight objectives. As part of the analysis four key scenarios were developed, namely the Base Case, Environmental Awareness, Resource Constrained and Green Shoots scenarios: — The Base Case Scenario assumes that existing policies are implemented and will continue to shape the energy sector landscape going forward. It assumes moderate economic growth in the medium to long term. — The Environmental Awareness Scenario is characterised by more stringent emission limits and a more environmentally aware society, where a higher cost is placed on externalities caused by the supply of energy. — The Resource Constrained Scenario in which global energy commodity prices (i.e. coal, crude oil and natural gas) are high due to limited supply. — The Green Shoots Scenario describes an economy in which the targets for high economic growth and structural changes to the economy, as set out in the National Development Plan (NDP), are met. The IEP notes that South Africa should continue to pursue a diversified energy mix which reduces reliance on a single or a few primary energy sources. In terms of existing electricity generation capacity, the IEP indicates that existing capacity starts to decline notably from 2025, with significant plant retirement occurring in 2031, 2041 and 2048. By 2050 only 20% of the current electricity generation capacity remains. As a result, large investments are

APPLICABLE POLICY	DESCRIPTION OF POLICY
	required in the electricity sector in order to maintain an adequate supply in support of economic growth. By 2020, various import options become available, and some new coal capacity is added along with new wind, solar and gas capacity. The mix of generation capacity technologies by 2050 is considerably more diverse than the current energy mix, across all scenarios. The main differentiating factors between the scenarios are the level of demand, constraints on emission limits and the carbon dioxide externality costs. In all scenarios the energy mix for electricity generation becomes more diverse over the period to 2050, with coal reducing its share from about 85% in 2015 to 15–20% in 2050 (depending on the scenario). Solar, wind, nuclear, gas and electricity imports increase their share. The Environmental Awareness and Green Shoots scenarios take on higher levels of renewable energy. An assessment of each scenario against the eight objectives with reference to renewable energy notes while all scenarios seek to ensure that costs are minimised within the constraints and parameters of each scenario, the Base Case Scenario presents the least cost followed by the Environmental Awareness, Resource Constrained and Green Shoots scenarios respectively when total energy system costs are considered. In terms of promoting job creation and localisation potential the Base Case Scenario presents the greatest job creation potential, followed by the Resource Constrained, Environmental Awareness and Green Shoots scenarios respectively. In all scenarios, approximately 85% of total jobs are localisable. For electricity generation, most jobs result from solar technologies followed by nuclear and wind, with natural gas and coal making a smaller contribution. The Environmental Awareness Scenario, due to its stringent emission constraints, shows the lowest level of total emissions over the planning horizon. This is followed by the Green Shoots, Resource Constrained and Base Case scenarios. These trends are similar when emissions are considered cumulatively and individually by type.
National Protected Area Expansion Strategy, 2010	The National Protected Area Expansion Strategy 2010 (NPAES) areas were identified through a systematic biodiversity planning process. They present the best opportunities for meeting the ecosystem-specific protected area targets set in the NPAES and were designed with strong emphasis on climate change resilience and requirements for protecting freshwater ecosystems. These areas should not be seen as future boundaries of protected areas, as in many cases only a portion of a particular focus area would be required to meet the protected area targets set in the NPAES. They are also not a replacement for fine scale planning which may identify a range of different priority sites based on local requirements, constraints and opportunities (NPAES, 2010). According to the NPAES, there are no areas within the study area that have been identified as priority areas for inclusion in future protected areas. The study area is therefore **outside the NPAES focus area**.

3.3 PROVINCIAL AND MUNICIPAL LEGAL AND REGULATORY FRAMEWORK

Table 3-3: Provincial Plans

APPLICABLE PLAN	DESCRIPTION OF PLAN
Mpumalanga Growth and Development Path	The primary objective of the Mpumalanga Economic Growth and Development Path (MEGDP) (2011) is to foster economic growth that creates jobs, reduce poverty and inequality in the Province. The MEGDP identifies supporting the development of clean forms of energy such as wind and hydro power generation opportunities, as well as opportunities including gas production from landfill and organic waste, as one of the key interventions to facilitate growth and job creation in the manufacturing sector. A focal point of the MEGDP is massive investments in infrastructure as a key driver of job creation across the economy, with alternative energy production identified as one of the key opportunities in the Mpumalanga Economic sectors.

APPLICABLE PLAN	DESCRIPTION OF PLAN
Mpumalanga Spatial Development Framework (MSDF), 2019	The Mpumalanga Spatial Development Framework (SDF) (2019) identifies that tourism is an important economic sector and has emerged as a robust driver of growth for emerging economies. The SDF also notes that a significant portion of Mpumalanga's land area is classified as Moderate to High-Very High agricultural potential which can be utilised for agricultural production. However, there are other factors affecting the agricultural sector including loss of agricultural land to other activities, availability of water, contamination of the water used for irrigation by other economic activities, and access to the market. The SDF further notes that mining is the largest economic sector in the province and has assisted other sectors such as manufacturing and power generation, to grow in the province. However, the mining sector has posed some key challenges, including soil and water contamination and environmental pollution, development of mines on good agricultural soil thus threatening food security, restriction of animal movement due to open cast mining thus affecting the ecosystem etc. It also notes that Mpumalanga's manufacturing plants and coal fired power plants are the key polluters of air, with climate change also identified as a key challenge in the province. Therefore, the province must carefully design interventions that provide a gradual shift from mining oriented sectors to the sustainable economic sectors to maintain sustained growth of the provincial economy. The SDF notes that a significant amount of the country's electricity comes from coal-fired stations in Mpumalanga. It also observes that there is a steady increase in the demand for electricity in the province, mostly attributed to residential, commercial and industrial development, including mining and heavy industry. The Provincial SDF also notes that the abundance of coal has led to the development of many coal-fired power stations in the province, however these coalfields are depleting, therefore making it necessary to consider renewable power sources in Mpumalanga. The SDF also recognises that Mpumalanga's Coal Mining and Coal Fired Power Plant region (mainly the Highveld area) will be under immense pressure for environmental considerations and as a result, the region will witness a possible decline in demand of coal and large-scale employment. The SDF proposes to diversify the regional economy and facilitate the gradual transition of economic activities in the region.
Mpumalanga Industrial Development Plan	In terms of industry, the purpose of the Mpumalanga Industrial Development Plan (MIDP) (2015) is to promote the establishment of new industries and promote growth of existing industries in the province. It is however noted that the Msukaligwa Municipality (within which the project falls under) is not directly impacted by the 2025 MIDP and its proposed priority hubs

Table 3-4: District and Local Municipality Plans

APPLICABLE PLAN	DESCRIPTION OF PLAN
Gert Sibande Municipality Integrated Development Plan	According to the Municipal Systems Act (Act 32 of 2000) (MSA), all municipalities have to undertake an Integrated Development Plan (IDP) process. The IDP is a legislative requirement thus it has legal status and supersedes all other plans that guide development at local government level. The Gert Sibande Municipality (GSM) IDP Review(2019/ 2020) and Final IDP (2020/2021) has identified the following development priorities: — Municipal Transformation and Organisational Development — Basic Service Delivery and Infrastructure Development — Local Economic Development — Municipal Financial Viability and Management — Good Governance and Public Participation — Spatial Development Analysis and Rationale The main goal and strategic objective of the Basic Service Delivery and Infrastructure Development priority is a reliable and sustainable service. One of the main strategic

APPLICABLE PLAN	DESCRIPTION OF PLAN
	objectives for reaching the goal is the provision of basic services such as water and electricity to an approved minimum level of standards in a sustainable manner; as per the national guidelines.
Msukaligwa Local Municipality IDP	The Msukaligwa Local Municipality Revised IDP (2020/2021) has identified the following key Municipal priorities: — Revenue collection. — Access to basic services by communities. — Job creation and economic development. — Infrastructure maintenance and upgrading. — Community participation in the affairs of the municipality. — Fight against fraud and corruption. — Capable and responsive organizational structure. — Capabilities of the municipal ICT. — Integrated human settlements One of the main strategic objectives for the access to basic services priority is to provide sustainable and reliable services to communities. Most of the basic services are rendered within the municipality, however some rural areas are still faced with some challenges in the provision water, sanitation and electricity. The Municipality, through the IDP, aims to facilitate the provision of electricity, with a number of key projects planned to be implemented over the period of five years linked to the Municipal IDP.
Msukaligwa Spatial Development Framework	The Msukaligwa SDF is informed by a number of spatial objectives, including: — Providing a spatial structure that facilitates access to services for all communities. — Protecting strategic water sources and sensitive eco-systems. — Providing space for the diversification of the local economy. — Eliminating past spatial settlement patterns. The provision of space of the diversification of the local economy is of specific relevance to the proposed development. The SDF highlights the key role and spatial extent of mining in the Msukaligwa Municipality, including reference to the Camden coal-fired power station located in proximity to the proposed development. Over the longer term the rehabilitation of mining areas and a range of alternative peri-urban uses should be considered for the impacted areas in view of the decrease reliance on coal. Commercial Agriculture also represents a key economic activity in the Municipality.
Dr Pixley ka Seme Local Municipality IDP	The Dr Pixley ka Seme Local Municipality IDP (2017 - 2022) has identified the following key development priorities: — Enhancement of Local Economic Development — Improvement of Revenue collection — Eradication of backlogs - Water ,Sanitation& Electricity — Land for Human Settlements — Waste Management — Maintenance of Infrastructure — Improvement of the Road Infrastructure — Education — Health In order to achieve the identified priorities for Dr. Pixley Ka Isaka Seme Local Municipality, the following development objectives have been identified: — To provide access to Basic Service Delivery to the community.

APPLICABLE PLAN	DESCRIPTION OF PLAN
	— To provide effective, efficient and transformed Human Resource. — To create & promote a conducive environment for socio- economic development. — To provide sound Financial Management & compliance with legislation. — To deepen democracy through public participation and promote good governance. — To ensure integrated rural and urban planning

3.4 INTERNATIONAL ENVIRONMENTAL AND SOCIAL STANDARDS

3.4.1 IFC PERFORMANCE STANDARDS

The International Finance Corporation (IFC) is an international financial institution that offers investment, advisory, and asset management services to encourage private sector development in developing countries. The IFC is a member of the World Bank Group (WBG) and is headquartered in Washington, D.C., United States. It was established in 1956 as the private sector arm of the WBG to advance economic development by investing in strictly for-profit and commercial projects that purport to reduce poverty and promote development.

The IFC's stated aim is to create opportunities for people to escape poverty and achieve better living standards by mobilizing financial resources for private enterprise, promoting accessible and competitive markets, supporting businesses and other private sector entities, and creating jobs and delivering necessary services to those who are poverty-stricken or otherwise vulnerable. Since 2009, the IFC has focused on a set of development goals that its projects are expected to target. Its goals are to increase sustainable agriculture opportunities, improve health and education, increase access to financing for microfinance and business clients, advance infrastructure, help small businesses grow revenues, and invest in climate health.

The IFC is owned and governed by its member countries but has its own executive leadership and staff that conduct its normal business operations. It is a corporation whose shareholders are member governments that provide paid-in capital and which have the right to vote on its matters. Originally more financially integrated with the WBG, the IFC was established separately and eventually became authorized to operate as a financially autonomous entity and make independent investment decisions. It offers an array of debt and equity financing services and helps companies face their risk exposures, while refraining from participating in a management capacity. The corporation also offers advice to companies on making decisions, evaluating their impact on the environment and society, and being responsible. It advises governments on building infrastructure and partnerships to further support private sector development.

The IFC’s Sustainability Framework articulates the Corporation’s strategic commitment to sustainable development and is an integral part of IFC’s approach to risk management. The Sustainability Framework comprises IFC’s Policy and Performance Standards on Environmental and Social Sustainability, and IFC’s Access to Information Policy. The Policy on Environmental and Social Sustainability describes IFC’s commitments, roles, and responsibilities related to environmental and social sustainability. IFC’s Access to Information Policy reflects IFC’s commitment to transparency and good governance on its operations and outlines the Corporation’s institutional disclosure obligations regarding its investment and advisory services. The Performance Standards (PSs) are directed towards clients, providing guidance on how to identify risks and impacts, and are designed to help avoid, mitigate, and manage risks and impacts as a way of doing business in a sustainable way, including stakeholder engagement and disclosure obligations of the client in relation to project-level activities. In the case of its direct investments (including project and corporate finance provided through financial intermediaries), IFC requires its clients to apply the PSs to manage environmental and social risks and impacts so that development opportunities are enhanced. IFC uses the Sustainability Framework along with other strategies, policies, and initiatives to direct the business activities of the Corporation to achieve its overall development objectives. The PSs may also be applied by other financial institutions (FIs).

The Project is considered a Category B project in terms of the IFC Policy on E&S Sustainability (2012), having the potential to cause 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.

The objectives and applicability of the eight PSs are outlined in **Table 3-5.**

Table 3-5: IFC Performance Standards Applicability to the Project

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. – 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 Scoping and EIA 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 will be compiled during the EIA phase of the project.
	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.		

REFERENCE	REQUIREMENTS		PROJECT SPECIFIC APPLICABILITY
	— 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 — Non- Discrimination and Equal Opportunity — Retrenchment — Grievance Mechanism	The construction activities will require contractors for completion. A safe working environment and fair contractual agreements must be in place. The operational phase will have permanent employees for day-to-day activities as well as contractors who will all need a safe working environment and fair contractual agreements. Whilst PS2 will be applicable to the Project, it is not intended to be addressed in detail at the ESIA stage. Recommendations are provided concerning development of a detailed Human Resources (HR) and Occupational Health and Safety (OHS) system by the developer and its partners as the Project moves towards implementation. In addition, measures to address the Interim Advice for IFC Clients on Supporting Workers in the Context of COVID-19 are referenced. The EMPr will incorporate the requirements for compliance with local and international Labour and Working legislation and good practice on the part of the contractors.
	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 are assessed in **Section 6** of this report. There are no material resource efficiency issues associated with the Project. The EMPr will include 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, the Camden II WEF seeks to facilitate resource efficiency and pollution prevention by contributing to the South African green economy. Dust air pollution in the construction phase will be addressed in the EMPr.
	3.2	— Pollution Prevention — Air Emissions — Stormwater — Waste Management — Hazardous Materials Management	

REFERENCE	REQUIREMENTS		PROJECT SPECIFIC APPLICABILITY
		— Pesticide use and Management	The Project will not result in the release of industrial effluents. Potential pollution associated with sanitary wastewater is low and mitigation measures will be included in the 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 will be included in EMPr. Hazardous materials are not a key issue; small quantities of construction materials (oil, grease, diesel fuel etc.) are the only wastes expected to be associated with the project. The EMPr will take these anticipated hazardous materials into account and recommend 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 will be addressed in the S&EIA process and the development of the EMPr. During the construction phase there will be an increase in vehicular traffic along public roads, largely due to the need for importation of construction material. Pedestrian and road safety risks will be qualitatively evaluated in the S&EIA process and the clients' standard safety and security measures, as well as potential additional measures recommended by WSP, will be detailed 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.		

REFERENCE	REQUIREMENTS		PROJECT SPECIFIC APPLICABILITY
Aspects	5.1	— Displacement — Physical Displacement — Economic Displacement — Private Sector Responsibilities under Government Managed Resettlement	PS5 is not applicable to the proposed Camden II WEF as no physical or economic displacement or livelihood restoration will be required. The proposed Camden II WEF is located on privately owned land that is utilised for agriculture by the landowners. The significance of all potential agricultural impacts is kept low by the very small proportion of the land that is impacted.
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	A significant part of the Project Area falls within CBAs (Irreplaceable and Optimal) and a large wetland area adjacent and to the north of the Olifants River (near the southern part of the site) is mapped as an ESA. A Biodiversity Impact Assessment as well as an Avifaunal Impact Assessment and Freshwater Ecology Impact Assessment have been included in the proposed scope. The methodologies for the specialist assessments include 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 will be determined and mitigation and management measures will be included in the 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	

REFERENCE	REQUIREMENTS		PROJECT SPECIFIC APPLICABILITY
		— 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. The Project does not involve displacement. PS7 will not be triggered.
	7.2	Circumstances Requiring Free, Prior, and Informed Consent — 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	A desktop Heritage Scoping Report (**Appendix D**) has been carried out by a suitably qualified specialist, revealing that archaeological sites (Stone Age and Historic Archaeological), cultural heritage sites, burial grounds or isolated artifacts are unlikely to be present on the affected landscape. A Chance Find Procedure will be included in the EMPr during the EIA phase of the project.

3.4.2 WORLD BANK GROUP ENVIRONMENTAL HEALTH AND SAFETY GUIDELINES

In support of the Performance Standards, the World Bank Group (WBG) has published a number of Environmental Health and Safety (EHS) Guidelines. The EHS Guidelines are technical reference documents that address IFC's expectations regarding the industrial pollution management performance of its projects. They are designed to assist managers and decision makers with relevant industry background and technical information. This information supports actions aimed at avoiding, minimising, and controlling EHS impacts during the construction, operation, and decommissioning phase of a project or facility. The EHS Guidelines serve as a technical reference source to support the implementation of the IFC Performance Standards, particularly in those aspects related to PS3: Pollution Prevention and Abatement, as well as certain aspects of occupational and community health and safety.

Where host country regulations differ from the levels and measures presented in the EHS Guidelines, projects seeking international funding may be expected to achieve whichever is more stringent. If less stringent levels or

measures are appropriate in view of specific project circumstances, a full and detailed justification for any proposed alternatives is required.

The following IFC / WBG EHS Guidelines have been generally consulted during the preparation of the EIA in order to aid the identification of EHS aspects applicable to the project:

- *Wind Energy (August 2015)* - The EHS Guidelines for wind energy include information relevant to environmental, health, and safety aspects of onshore and offshore wind energy facilities. It should be applied to wind energy facilities from the earliest feasibility assessments, as well as the environmental impact assessment, and continue to be applied throughout the construction and operation phases

  The guidelines list issues associated with wind energy facilities which need to be considered. These include:

  - Environmental impacts associated with the construction, operation, and decommissioning of wind energy facilities activities may include, among others, impacts on the physical environment (such as noise or visual impact) and biodiversity (affecting birds and bats, for instance).
  - Due to the typically remote location of wind energy facilities, the transport of equipment and materials during construction and decommissioning may present logistical challenges (e.g., transportation of long, rigid structures such as blades, and heavy tower sections).
  - Environmental issues specific to the construction, operation, and decommissioning of wind energy projects and facilities include the following:
    - Landscape, Seascape, and Visual impacts;
    - Noise;
    - Shadow Flicker; and
    - Water Quality.
- *Electric Power Transmission and Distribution (2007)* - 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
- *General EHS Guidelines* – this includes a section on a range of environmental, occupational health and safety, community health and safety, and construction activities that would apply to the project. The guideline also contains recommended guidelines adopted form the World Health Organisation (WHO) for ambient air and water quality, which are referred to in the relevant impact assessment sections in the ESIA report.

3.4.3 EQUATOR PRINCIPLES

The Equator Principles (EPs) is a risk management framework, adopted by financial institutions, for determining, assessing, and managing environmental and social risk in projects and is primarily intended to provide a minimum standard for due diligence to support responsible risk decision-making.

The EPs apply globally to all industry sectors and to five financial products 1) Project Finance Advisory Services, 2) Project Finance, 3) Project-Related Corporate Loans, 4) Bridge Loans and 5) Project-Related Refinance and Project-Related Acquisition Finance. The relevant thresholds and criteria for application is described in detail in the Scope section of the EP. Currently 125 Equator Principles Financial Institutions (EPFIs) in 37 countries have officially adopted the EPs, covering the majority of international project finance debt within developed and emerging markets. EPFIs commit to implementing the EPs in their internal environmental and social policies, procedures and standards for financing projects and will not provide Project Finance or Project-Related Corporate Loans to projects where the client will not, or is unable to, comply with the EPs.

While the EPs are not intended to be applied retroactively, EPFIs apply them to the expansion or upgrade of an existing project where changes in scale or scope may create significant environmental and social risks and impacts, or significantly change the nature or degree of an existing impact. The EPs have greatly increased the attention and focus on social/community standards and responsibility, including robust standards for indigenous peoples, labour standards, and consultation with locally affected communities within the Project Finance market.

The EPs have also helped spur the development of other responsible environmental and social management practices in the financial sector and banking industry and have supported member banks in developing their own Environmental and Social Risk Management Systems.

The requirements and applicability of the EPs are outlined in **Table 3-6**.

It should be noted that Principles 8 and 10 relate to a borrower's code of conduct and are therefore not considered relevant to the S&EIA process and have not been included in this discussion.

Table 3-6: 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; – 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.	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.
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	This document is the first draft deliverable (i.e. Draft Scoping Report) from the S&EIA process undertaken for the proposed Project. The impact assessment will be undertaken during the next phase of the S&EIA process. The assessment will comprehensively assess the key environmental and social impacts and complies with the requirements of the South African EIA Regulations. In addition, an EMPr will also be compiled.

REQUIREMENT		PROJECT SPECIFIC APPLICABILITY
	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.	
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 S&EIA 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 Action Plan (EPAP). The EPAP is intended to outline gaps and commitments to meet EPFI requirements in line with the applicable standards.	A formal project specific ESMS will be compiled in the event that the project is developed in the future. Management and monitoring plans outlines in the EMPr will serve as the basis for an ESMS for the proposed Project.
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	The S&EIA 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. The stakeholder engagement process is detailed in **Section 4.6.**

REQUIREMENT		PROJECT SPECIFIC APPLICABILITY
	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.	
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 will include 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.
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 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.	This principle will only become applicable in the event that that the project is developed in the future.

4 SCOPING METHODOLOGY

The scoping process was initiated in accordance with Appendix 2 of GNR 982, as amended, pertaining to applications subject to an S&EIR process.

4.1 S&EIR PROCESS AND PHASING

The S&EIR process consists of various phases with associated timelines as defined in GNR 982. The process can generally be divided into four main phases, namely; (i) a Pre-application Phase, (ii) an Application and Scoping Phase (current phase), (iii) an Impact Assessment Phase and (iv) Authorisation and Appeal Phase. The S&EIR process is shown in **Figure 4-1**.

The main objectives of the phases can be described as follows:

- Pre-Application Phase:
  - Undertake consultation meetings with the relevant authorities to confirm the required process, the general approach to be undertaken and to agree on the public participation plan;
  - Identify stakeholders, including neighbouring landowners/residents and relevant authorities;
- Application and Scoping Phase:
  - Compile and submit application forms to the CA and pay the relevant application fees;
  - Compile a Draft Scoping Report (DSR) describing the affected environment and present an analysis of the potential environmental issues and benefits arising from the proposed project that may require further investigation in the Impact Assessment Phase;
  - Develop draft terms of reference for the specialist studies to be undertaken in the Impact Assessment Phase; and
  - Inform stakeholders of the proposed project, feasible alternatives and the S&EIR process and afford them the opportunity to register and participate in the process and identify any issues and concerns associated with the proposed project.
  - Incorporate comments received from stakeholders during the DSR comment period;
  - Should significant amendments be required, release the updated DSR for a 30-day comment period to provide stakeholders with the opportunity to review the amendments as well as provide additional input if required; and
  - Submit the Final Scoping Report (FSR), following the consultation period, to the relevant authorities, in this case the DFFE, for acceptance/rejection.
- Impact Assessment Phase:
  - Continue to inform and obtain contributions from stakeholders, including relevant authorities, stakeholders, and the public and address their relevant issues and concerns;
  - Assess in detail the potential environmental and socio-economic impacts of the project as defined in the DSR;
  - Identify environmental and social mitigation measures to avoid and/or address the identified impacts;
  - Develop and/or amend environmental and social management plans based on the mitigation measures developed in the Environmental Impact Assessment Report (EIAR);
  - Submit the EIAR and the associated EMPr to the CA to undertake the decision making process;
  - Authorisation and Appeal Phase;
  - The DFEE to provide written notification of the decision to either grant or refuse EA for the proposed project; and
  - Notify all registered stakeholders of the decision and right to appeal.

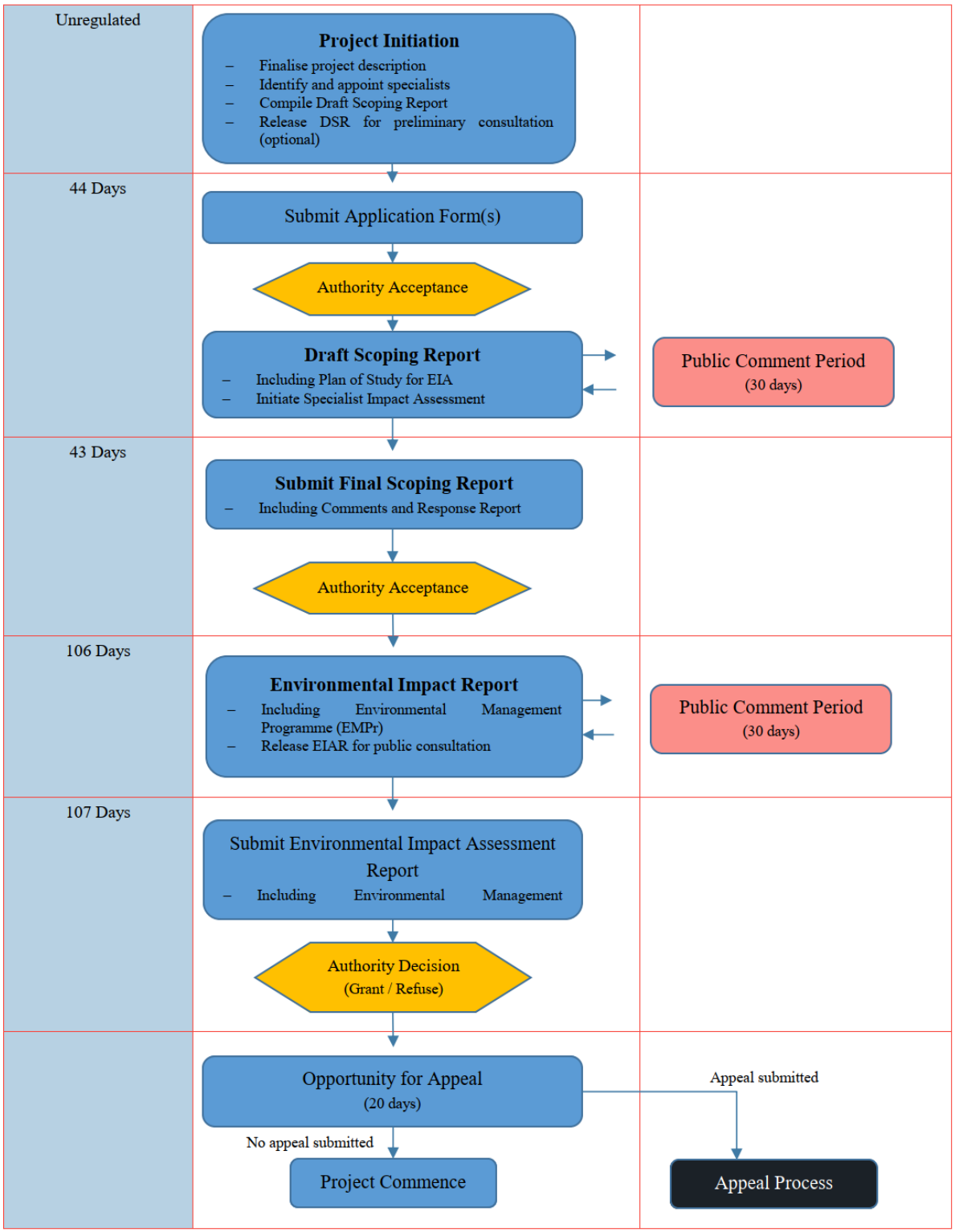


Figure 4-1: S&EIR Process

4.2 DFFE WEB-BASED ENVIRONMENTAL SCREENING TOOL

DFFE has developed the National Web-based Environmental Screening Tool in order to flag areas of potential environmental sensitivity related to a site as well as a development footprint and produces the screening report required in terms of regulation 16 (1)(v) of the EIA Regulations (2014, as amended). The *Notice of the requirement to submit a report generated by the national web-based environmental screening tool in terms of section 24(5)(h) of the NEMA, 1998 (Act No 107 of 1998) and regulation 16(1)(b)(v) of the EIA regulations, 2014, as amended* (GN 960 of July 2019) states that the submission of a report generated from the national web-based environmental screening tool, as contemplated in Regulation 16(1)(b)(v) of the EIA Regulations, 2014, published under Government Notice No. R982 in Government Gazette No. 38282 of 4 December 2014, as amended, is compulsory when submitting an application for environmental authorisation in terms of regulation 19 and regulation 21 of the EIA Regulations, 2014 as of 04 October 2019.

The Screening Report generated by the National Web-based Environmental Screening Tool contains a summary of any development incentives, restrictions, exclusions or prohibitions that apply to the proposed development footprint as well as the most environmentally sensitive features on the footprint based on the footprint sensitivity screening results for the application classification that was selected.

A screening report for the proposed Camden II WEF was generated on 14 September 2021 and is attached as **Appendix E**. The Screening Report for the project identified various sensitivities for the site. The report also generated a list of specialist assessments that should form part of the BA based on the development type and the environmental sensitivity of the site. Assessment Protocols in the report provide minimum information to be included in a specialist report to facilitate decision-making.

Table 4-1 below provides a summary of the sensitivities identified for the development footprint.

Table 4-1: Sensitivities identified in the screening report

THEME	VERY HIGH SENSITIVITY	HIGH SENSITIVITY	MEDIUM SENSITIVITY	LOW SENSITIVIY
Agricultural Theme	✓			
Animal Species Theme		✓		
Aquatic Biodiversity Theme	✓			
Archaeological and Cultural Heritage Theme				✓
Avian Theme				✓
Bats Theme		✓		
Civil Aviation Theme			✓	
Defence Theme				✓
Flicker Theme	✓			
Landscape	✓			

THEME	VERY HIGH SENSITIVITY	HIGH SENSITIVITY	MEDIUM SENSITIVITY	LOW SENSITIVIY
Palaeontology Theme	✓			
Noise Theme	✓			
Plant Species Theme			✓	
RFI Theme		✓		
Terrestrial Biodiversity Theme	✓			

Based on the selected classification, and the environmental sensitivities of the proposed development footprint, the following list of specialist assessments have been identified for inclusion in the assessment report as determined by the screening tool (please refer to Section 4.2.1 below for the EAP motivation applicable to this list):

- Agricultural Impact Assessment
- Archaeological and Cultural Heritage Impact Assessment
- Palaeontology Impact Assessment
- Landscape/Visual Impact Assessment
- Terrestrial Biodiversity Impact Assessment
- Freshwater Impact Assessment
- Avifauna Impact Assessment
- Bat Impact Assessment
- Social Impact Assessment
- Noise Impact Assessment
- A Geotechnical Assessment
- Civil Aviation Impact Assessment
- RFI Assessment
- Plant Species Assessment
- Animal Species Assessment

4.2.1 MOTIVATION FOR SPECIALIST STUDIES

The report recognises that "it is the responsibility of the EAP to confirm this list and to motivate in the assessment report, the reason for not including any of the identified specialist study including the provision of photographic evidence of the footprint situation."

As summarised in **Table 1-4** above, the following specialist assessments have been commissioned for the project based on the environmental sensitivities identified by the Screening Report:

- Soils and Agricultural Potential Assessment;
- Archaeological and Cultural Heritage Assessment;
- Palaeontology Impact Assessment;

- Visual Impact Assessment[2] ;
- Biodiversity Impact Assessment (inclusive of terrestrial biodiversity, plant species and animal species);
- Freshwater Assessment;
- Avifauna Impact Assessment;
- Bat Impact Assessment;
- Environmental Acoustic (Noise) Impact Assessment;
- Social Impact Assessment;
- Qualitative Risk Assessment (specific to the BESS);
- Desktop Geotechnical Assessment; and
- Desktop Traffic Assessment.

Four of the identified specialist studies will not be undertaken as part of the S&EIA process for the proposed Camden II WEF. Motivation for the exclusion of these specialist studies is provided below:

- **Detailed Geotechnical**

  A desktop Geotechnical Assessment has been commissioned and has been incorporated into the DSR. However, a detailed Geotechnical Assessment will not be undertaken as part of the S&EIA Process as this will be undertaken during the detailed design phase.

- **RFI Assessment**

  A Radio Frequency Interference (RFI) Study will not be undertaken. The proposed development area is not located within any Astronomy Advantage Area. The South African Weather Service (SAWS) and relevant telecommunications stakeholders will be engaged with as part of the Public Participation Process..

- **Civil Aviation**

  According to the DFFE Screening Tool Report, civil aviation is regarded as having low sensitivity. The proposed development site is located between 8 and 15 km of civil aviation aerodromes. A formal Civil Aviation Assessment will not be undertaken as part of the S&EIA Process. Nevertheless, the relevant Authorities will be included on the project stakeholder database. As of the 1st of May 2021, Air Traffic and Navigation Services (ATNS) has been appointed as the new Obstacle application Service Provider for Windfarms and later Solar Plants. Their responsibility would pertain to the assessments, maintenance, and all other related matters in respect to Windfarms and in due time Power Plant assessments. An Application for the Approval of Obstacles will also be submitted to ATNS. The South African Civil Aviation Authority (SACAA) will be included on the project stakeholder database. They will be informed of the proposed Project, and comment will be sought from these authorities as applicable.

- **Defence**

  The Department of Defence will be included on the project stakeholder database. They will be informed of the proposed Project, and comment will be sought from this authority as applicable.

4.3 APPLICATION

The application phase consists of the completion of the appropriate application form by the EAP and the Proponent as well as the subsequent submission and registration of the application for EA with DFFE.

A request for a pre-application meeting was submitted to DFFE on 11 October 2021. DFFE responded with the allocation of an assessing officer and reference number (2021-10-0008). A virtual pre-application meeting was held on **19 October 2021**with the DFFE to discuss the proposed Camden renewable Energy Complex (inclusive of this Camden II WEF project). The minutes of the meeting and the public participation plan were approved on 18 November and 22 November 2021 respectively and are included in **Appendix F**.

[2] The Visual Impact Assessment will consider the impact of flicker associated with the Camden II WEF development.

4.4 BASELINE ENVIRONMENTAL ASSESSMENT

The description of the baseline environment has been compiled through a combination of site investigations, desktop reviews, georeferenced data and information obtained from the specialist assessments.

An understanding of the receiving environment is critical in order to identify aspects that may be affect by the project and in turn how the surrounding environment may affect project design considerations.

4.5 IDENTIFICATION AND EVALUATION OF POTENTIALLY SIGNIFICANT IMPACTS

The potential impacts associated with the proposed development were determined at both a desktop level based on existing information, as well as the field assessment. The following methodology was used:

- Identify potential sensitive environments and receptors that may be impacted on by the proposed development;
- Identify the type of impacts that are most likely to occur (including cumulative impacts);
- Determine the nature and extent of the potential impacts during the various developmental phases, including, construction, operation and decommissioning;
- Identify potential No-Go areas (if applicable); and
- Summarise the potential impacts that will be considered further in the EIA phase through detailed specialist studies.

Appendix 2 of GNR 982, as amended, requires the identification of the significance of potential impacts during scoping. To this end, an impact screening tool has been used in the scoping phase. The screening tool is based on two criteria, namely probability; and, consequence (

Table 4-4), where the latter is based on general consideration to the intensity, extent, and duration.

The scales and descriptors used for scoring probability and consequence are detailed in **Table 4-2** and

Table 4-3 respectively.

Table 4-2: Significance Screening Tool

	CONSEQUENCE SCALE				
PROBABILITY SCALE		**1**	**2**	**3**	**4**
	1	**Very Low**	**Very Low**	**Low**	**Medium**
	2	**Very Low**	**Low**	**Medium**	**Medium**
	3	**Low**	**Medium**	**Medium**	**High**
	4	**Medium**	**Medium**	**High**	**High**

Table 4-3: Probability Scores and Descriptors

SCORE	DESCRIPTOR
4	**Definite**: The impact will occur regardless of any prevention measures
3	**Highly Probable**: It is most likely that the impact will occur

2	**Probable**: There is a good possibility that the impact will occur
1	**Improbable:** The possibility of the impact occurring is very low

Table 4-4: Consequence Score Descriptions

SCORE	NEGATIVE	POSITIVE
4	Very severe: An irreversible and permanent change to the affected system(s) or party(ies) which cannot be mitigated.	Very beneficial: A permanent and very substantial benefit to the affected system(s) or party(ies), with no real alternative to achieving this benefit.
3	Severe: A long term impacts on the affected system(s) or party(ies) that could be mitigated. However, this mitigation would be difficult, expensive or time consuming or some combination of these.	Beneficial: A long term impact and substantial benefit to the affected system(s) or party(ies). Alternative ways of achieving this benefit would be difficult, expensive or time consuming, or some combination of these.
2	Moderately severe: A medium to long term impacts on the affected system(s) or party (ies) that could be mitigated.	Moderately beneficial: A medium to long term impact of real benefit to the affected system(s) or party(ies). Other ways of optimising the beneficial effects are equally difficult, expensive and time consuming (or some combination of these), as achieving them in this way.
1	Negligible: A short to medium term impacts on the affected system(s) or party(ies). Mitigation is very easy, cheap, less time consuming or not necessary.	Negligible: A short to medium term impact and negligible benefit to the affected system(s) or party(ies). Other ways of optimising the beneficial effects are easier, cheaper and quicker, or some combination of these.

The nature of the impact must be characterised as to whether the impact is deemed to be positive (+ve) (i.e. beneficial) or negative (-ve) (i.e. harmful) to the receiving environment/receptor. For ease of reference, a colour reference system (**Table 4-5**) has been applied according to the nature and significance of the identified impacts.

Table 4-5: Impact Significance Colour Reference System to Indicate the Nature of the Impact

Negative Impacts (-ve)	Positive Impacts (+ve)
Negligible	**Negligible**
Very Low	**Very Low**
Low	**Low**
Medium	**Medium**
High	**High**

4.6 STAKEHOLDER ENGAGEMENT

Stakeholder engagement (public participation) is a requirement of the S&EIA process. It consists of a series of inclusive and culturally appropriate interactions aimed at providing stakeholders with opportunities to express their views, so that these can be considered and incorporated into the S&EIA decision-making process. Effective engagement requires the prior disclosure of relevant and adequate project information to enable stakeholders to understand the risks, impacts, and opportunities of the proposed project. The objectives of the stakeholder engagement process can be summarised as follows:

- Identify relevant individuals, organisations and communities who may be interested in or affected by the proposed project;
- Clearly outline the scope of the proposed project, including the scale and nature of the existing and proposed activities;
- Identify viable proposed project alternatives that will assist the relevant authorities in making an informed decision;
- Identify shortcomings and gaps in existing information;
- Identify key concerns, raised by Stakeholders that should be addressed in the specialist studies;
- Highlight the potential for environmental impacts, whether positive or negative; and
- To inform and provide the public with information and an understanding of the proposed project, issues, and solutions.

It is important to note that since the proposed individual projects associated with the Camden Renewable Energy Complex, subject to a S&EIA Process, are located within the same geographical area, an integrated stakeholder engagement process (public participation) will be undertaken for these projects. A Stakeholder Engagement Report (SER) will be compiled and included in the FSR detailing the projects' compliance with Chapter 6 of the NEMA EIA Regulations 2014, as amended.

4.6.1 PUBLIC PARTICIPATION PLAN

As part of the pre-application consultation meeting held with DFFE on 19 October 2021, the proposed plan for public participation was discussed. A public participation plan was subsequently submitted to DFFE, along with the meeting minutes, for approval. The public participation plan was approved by DFFE on **22 November 2021**. The approved public participation plan is included in **Appendix F**.

4.6.2 STAKEHOLDER IDENTIFICATION

Stakeholders were identified and will continue to be identified through several mechanisms. These include:

- Utilising existing databases from other projects in the area;
- Networking with local business owners, non-governmental agencies, community based organisations, and local council representatives;
- Field work in and around the project area;
- Advertising in the press;
- Placement of community notices;
- Completed comment sheets; and
- Attendance registers at meetings.

All Stakeholders identified to date have been registered on the project stakeholder database. The EAP endeavoured to ensure that individuals/organisations from referrals and networking were notified of the Proposed Project. Stakeholders were identified at the horizontal (geographical) and vertical extent (organisations level).

A list of stakeholders captured in the project database is included in **Appendix G-1**.

4.6.3 STAKEHOLDER NOTIFICATION

DIRECT NOTIFICATION

Notification of the proposed Project will be issued to potential Stakeholders, via direct correspondence (i.e. site notices and e-mail) on **25 February 2022**. The notification letter to be circulated is included in **Appendix G-2** of this report. Proof of notification will be included in the FSR.

NEWSPAPER ADVERTISEMENTS

In accordance with the requirements of GNR 982, as amended, the proposed project was advertised in two local newspapers. The purpose of the advertisement was to notify the public about the proposed project and to invite them to register as stakeholders. A copy of the advertisements are included in **Appendix G-3**. The relevant scoping phase advertisement dates are listed in **Table 4-6**.

Table 4-6: Dates on which the Adverts were published

NEWSPAPER	PUBLICATION DATE	LANGUAGE
Standerton Advertiser	25 February 2022	English and Zulu
Highvelder	25 February 2022	Afrikaans

SITE NOTICES

The official site notices will be erected as per GNR 982, as amended, on the boundary fence of the proposed site. In addition, general project notices, announcing the Proposed Project and inviting stakeholders to register, will be placed at various locations in and around the project area. A copy of the site notice is included in **Appendix G-4.**

4.6.4 PUBLIC REVIEW

The DSR will be placed on public review for a period of 30 days from **25 February 2022** to **28 March 2022**, at the following public places:

- Gert Sibande District Municipality;
- Ermelo Public Library;
- Thusiville Public Library;
- Msukaligwa Local Municipality Ermelo Office;
- WSP website (https://www.wsp.com/en-ZA/services/public-documents); and
- Datafree Website (https://wsp-engage.com/).

4.6.5 COMMENT AND RESPONSE REPORT

All concerns, comments, viewpoints and questions (collectively referred to as ‘issues’) received during the comment period will be documented and responded to adequately in a Comment and Response Report (CRR) to be included in the FSR. Where comments are project specific, this will be noted in the Comments and Response Report (CRR). The CRR records the following:

- List of all issues raised;
- Record of who raised the issues;
- Record of where the issues were raised;
- Record of the date on which the issue was raised; and
- Response to the issues.

4.6.6 WAY FORWARD

FINAL SCOPING REPORT SUBMISSION

All issues raised during the scoping phase of the proposed project will be incorporated into the FSR and will be addressed during the EIR Phase.

The DFFE will be allocated 43 days to review the FSR. The FSR will be placed on stakeholder review for a reasonable time period during the DFFE's final review and decision-making process. The delegated CA must within this specified timeframe issue a decision on whether to proceed onto the next phase, the EIR phase

ONGOING CONSULTATION AND ENGAGEMENT

In addition to the public documents distributed to stakeholders, there will be ongoing communication between the proponent, the WSP and stakeholders throughout the S&EIR process. These interactions include the following:

- In addition to the project announcement letters, a letter will be sent out to all registered stakeholders providing them with an update of the proposed project once the FSR has been approved;
- Interactions with stakeholders will take place in English, Afrikaans and Zulu;
- Feedback to stakeholders, individually and collectively;
- Written responses (email, faxes or letters) will be provided to stakeholders acknowledging issues and providing information requested (dependent on availability); and
- As per the GNR 982, as amended, particular attention will be paid to landowners, and neighbouring communities, specifically where literacy levels and language barriers may be an issue.

5 DESCRIPTION OF BASELINE ENVIRONMENT

5.1 PHYSICAL ENVIRONMENT

5.1.1 CLIMATE AND METEOROLOGY

LOCAL METEOROLOGY OVERVIEW

According to the Köppen-Geiger Classification, the Camden/Ermelo area is classified as having a temperate climate with summer rainfall and dry winters. Meteorological variables, including hourly temperature, rainfall, humidity, wind speed and wind direction, were sourced for the South African Weather Service (SAWS) Ermelo ambient air quality monitoring (AAQM) station as well as Eskom's ambient air quality monitoring station (AQMS)[3] located ~6 km to the northeast. The datasets were analysed for the period January 2018 – December 2020 (i.e. three calendar years as required by the Regulations Regarding Air Dispersion Modelling[4], hereafter referred to as 'the Modelling Regulations'). The Ermelo AAQM station is located approximately 20 km to the northwest of the project site. Station details and data recovery information for the assessed period is given in **Table 5-1**.

Table 5-1 Details of the Ermelo AAQMI station

STATION NAME	LATITUDE (^{O}S)	LONGITUDE (^{O}E)	ALTITUDE (M)	DATA RECOVERY		
				Temperature	Rainfall	Wind
Ermelo	-26.497000°	29.983000°	1752	97%	98%	98%
Camden	-26.622600°	30.106000°	1646	97%	97%	96%

TEMPERATURE AND RAINFALL

Figure 5-1 and **Figure 5-2** presents average monthly temperature, rainfall and humidity as recorded at the Ermelo and Camden stations respectively. Both stations exhibit seasonal trends typical for the eastern half of South Africa. Higher rainfall occurs during the warmer summer months (December, January and February), with drier conditions during cooler winter months (June, July and August). Summer temperatures for the region average at 17.8°C while winter temperatures average at 11.0°C. Ermelo received 1 806 mm of rainfall over the three-year period, with approximately 49% of that received during the summer months and 3% during the winter months.

[3] This station's main function is the measurement of ambient air pollution, however, the station also measures an array of meteorological parameters. The nearest standalone SAWS meteorological station is Witbank (over 50 km to the north-northwest of the development site) and thus not representative of site conditions.

[4] Department of Environmental Affairs (2014): Regulations Regarding Air Dispersion Modelling (No. R. 533), Government Gazette, 11 July 2014, (No. 37804).

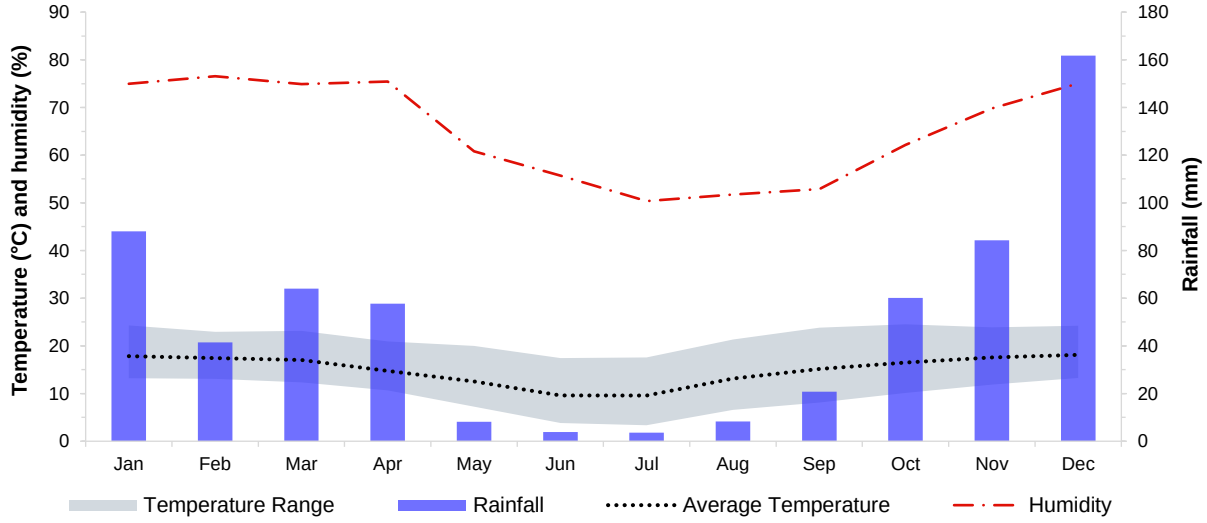


Figure 5-1 Meteorological summary for Ermelo (January 2018 - December 2020)

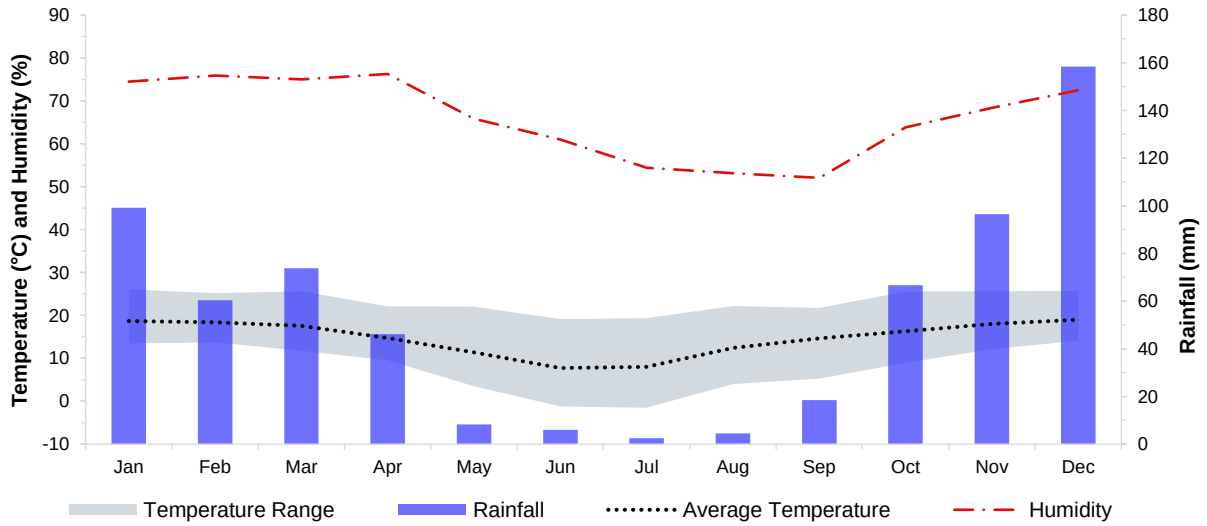


Figure 5-2: Meteorological summary for Camden (January 2018 - December 2020)

WIND

Wind roses summarize wind speed and directional frequency at a location. Calm conditions are defined as wind speeds less than 1.0 m/s (i.e. based on the typical sensitivity of the wind sensor installed at SAWS stations). Each directional branch on a wind rose represents wind originating from that direction. Each directional branch is divided into segments of colour, each representative of different wind speeds.

Typical wind fields are analysed for the full period (January 2018 – December 2020); diurnally for early morning (00h00–06h00), morning (06h00–12h00), afternoon (12h00–18h00) and evening (18h00–00h00); and seasonally for summer (December, January and February), autumn (March, April and May), winter (June, July and August) and Spring (September, October and November). Typical wind fields have been analysed using Lakes Environmental WRPlot Freeware (Version 7.0.0)

Wind roses for Ermelo are presented in **Figure 5-3**.

- Calm conditions (wind speeds <1.0 m/s) occurred 1.40% of the time;
- Moderate to strong easterlies and east-southeasterlies prevailed in the region;
- Peak (14 m/s) wind speeds occurred from the north-northwest;
- Winds from the east-northeast and north prevailed during the early morning (00h00 – 06h00);

- Easterly winds with components from the north-westerly quadrant prevailed during the morning (06h00 – 12h00);
- Winds from the west, west-northwest, northwest, east-southeast and east prevailed in the afternoon (12h00 – 18h00). Diurnal peak (12.9 m/s) wind speeds occurred during the afternoon;
- Easterlies prevail during the night (18h00 – 00h00);
- Winds from the east prevailed during the spring, summer and autumn months;
- Westerlies and north-north westerlies prevail during winter with higher directional variability noted for this period; and
- Highest average wind speeds of 4.9 m/s were observed during the spring months, with peak seasonal wind speeds of 12.9 m/s observed during winter.

Wind roses for Camden are presented in **Figure 5-4**.

- Calm conditions (wind speeds <1 m/s) occurred 14.13% of the time;
- Gentle to strong breezes from the east prevailed in the region;
- Peak (13.8 m/s) and highest average (5.5 m/s) wind speeds occurred from the west;
- Easterly winds prevail throughout the day and night with northwesterly components noted during the early morning (00h00-06h00), morning (06h00-12h00) and night-time (18h00-00h00) hours, as well as westerly components noted during the afternoon (12h00-18h00);
- Diurnal peak (13.3 m/s) and highest average (5.0 m/s) wind speeds occurred during the afternoon;
- Winds from the east prevailed during the spring and autumn months;
- Winds from the northwest, west-northwest, west and east prevailed during winter;
- Winds from the east and northwest prevailed during spring; and
- Seasonal peak (13.3 m/s) wind speeds occur during winter and highest average (4.0 m/s) wind speeds occur during spring

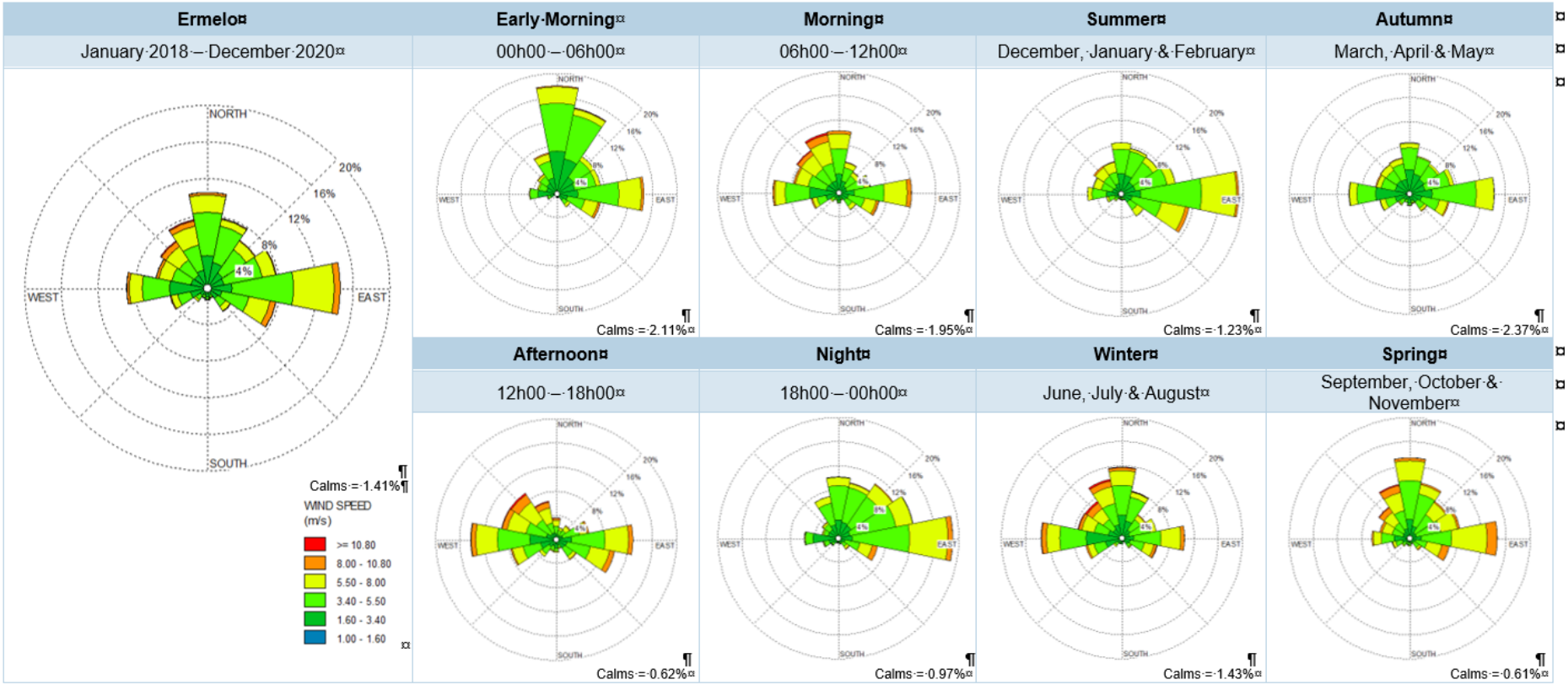


Figure 5-3: Local Wind Conditions at Ermelo

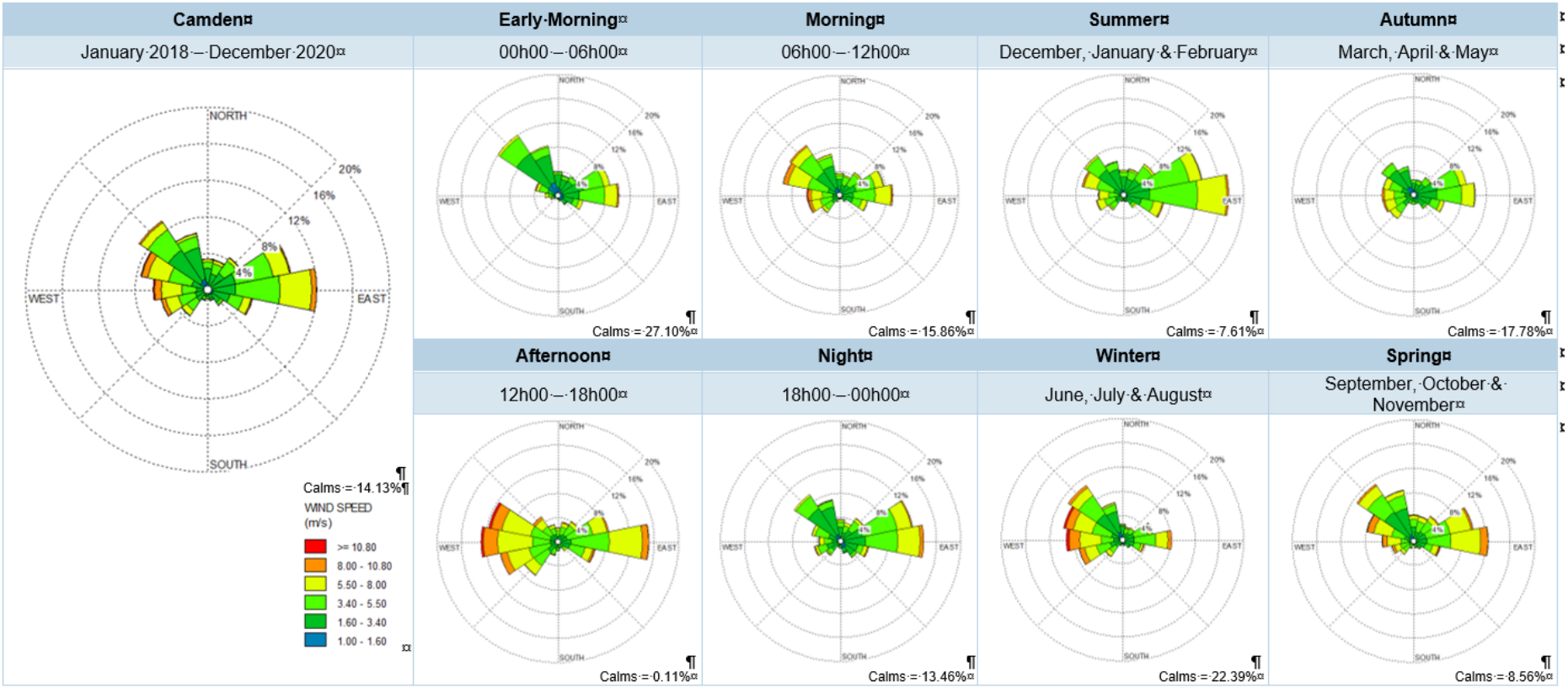


Figure 5-4: Local Wind Conditions at Camden

5.1.2 BACKGROUND AIR QUALITY

An evaluation of the existing air pollution situation provides an understanding of the potential risk for health impacts. The DFFE has identified District and Metropolitan Municipalities of concern with respect to air quality based on the prevalence of sources of emissions for each source category[5]. The National Framework for Air Quality Management in the Republic of South Africa[6] (hereafter referred to as '*The National Framework*') has rated the Gert Sibande District Municipality, as having "poor" air quality. The District area is thus identified as being in either the upper range of prevalence for one or more emission source categories[7] or middle range in two or more categories relative to other Districts. Municipalities that are classified as having poor air quality require priority attention in terms of air quality management planning.

The development site falls within one of South Africa's key air quality regions known as the Highveld Priority Area (HPA). The Highveld area is associated with poor air quality and elevated concentrations of criteria pollutants due to the high volume of both industrial and non-industrial emission sources. The HPA was declared on 23 November 2007, covers an area of 31,106 km2 and encompasses multiple municipal jurisdictions including a single metropolitan municipality and nine local municipalities across the Gauteng and Mpumalanga provinces.

The Air Quality Management Plan (AQMP) for the HPA[8] identifies the Gert Sibande District Municipality as one of the HPA's nine air quality hot spot areas. This classification is based on atmospheric dispersion modelling outputs verified by ambient air quality monitoring data. The Camden area is identified in the AQMP for modelled O3 exceedances. Modelled ambient NOx and monitored NO2 concentrations were relatively low, but exceedances of the 8-hour O3 standard were recorded in Camden and Ermelo. It is highlighted that the HPA AQMP's assessment is limited to criteria pollutants (specifically, SO2, NO2, PM10 and O3) none of which are relevant to the proposed renewable energy complex.

The nearest AAQM station to the study site is the Ermelo station owned and managed by SAWS, approximately 19 km to the north-west of the study site. Pollutants measured by this station include PM10, PM2.5, CO, NO2, SO2 and O3. None of these pollutants are relevant to the proposed renewable energy complex. Since the SAWS monitoring station does not measure NH3 and is located too far away for ambient air quality measurements to be considered representative of ambient pollution concentrations at site, this data is not considered further.

5.1.3 TOPOGRAPHY

The Project area is largely characterised by a mix of undulating plains and greater relief in the form of higher lying plateaus intersected by river valleys. Slopes across the study area are relatively gentle to moderate, with steeper slopes being largely associated with eastern edge of the study area where the land drops quite steeply to the lower plains. The main water course in the study area is the Vaal River which bisects the study area to the north of the Camden II project area.

The study area undulates over a wide elevation range from a minimum of around 1 630m above mean sea level (amsl) within the west to a maximum of approximately 1 755m amsl in the north, with an overall topographic fall from north to south.

The topography and slopes within and in the immediate vicinity of the Camden II WEF area are indicated in **Figure 5-5** and **Figure 5-6** respectively.

[5] Source categories include listed activities, domestic fuel burning, vehicle emissions and mining emissions
[6] Department of Environmental Affairs (2018): The 2017 National Framework for Air Quality Management in the Republic of South Africa (No.R.1144 of 2018) Government Gazette, 26 October 2018 (No. 41996).
[7] Emission source categories include listed activities, domestic fuel burning, traffic emissions and mining emissions (The National Framework, pg 50)
[8] DEA (2011): Highveld Priority Area Air Quality Management Plan (URL: https://screening.environment.gov.za/ScreeningDownloads/DevelopmentZones/HIGHVELD_PRIORITY_AREA_AQMP.pdf)

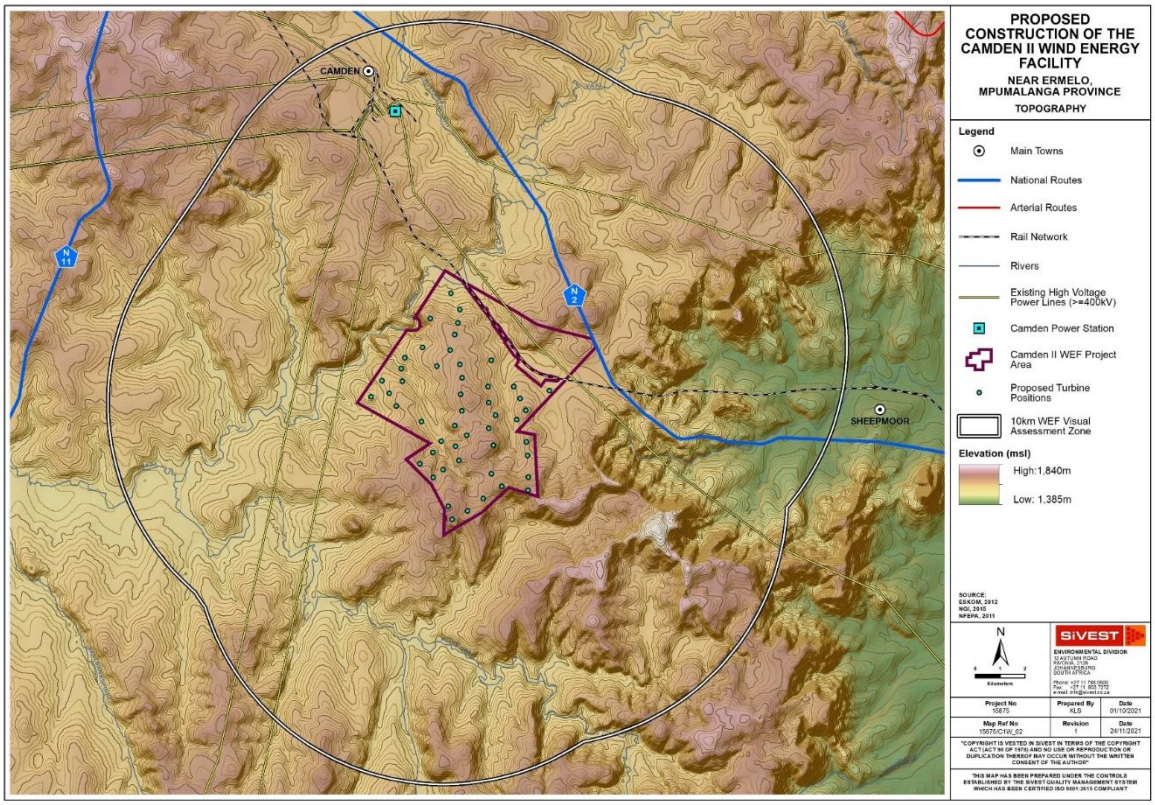


Figure 5-5: Topographical Map of Project Area (SiVest, 2021)

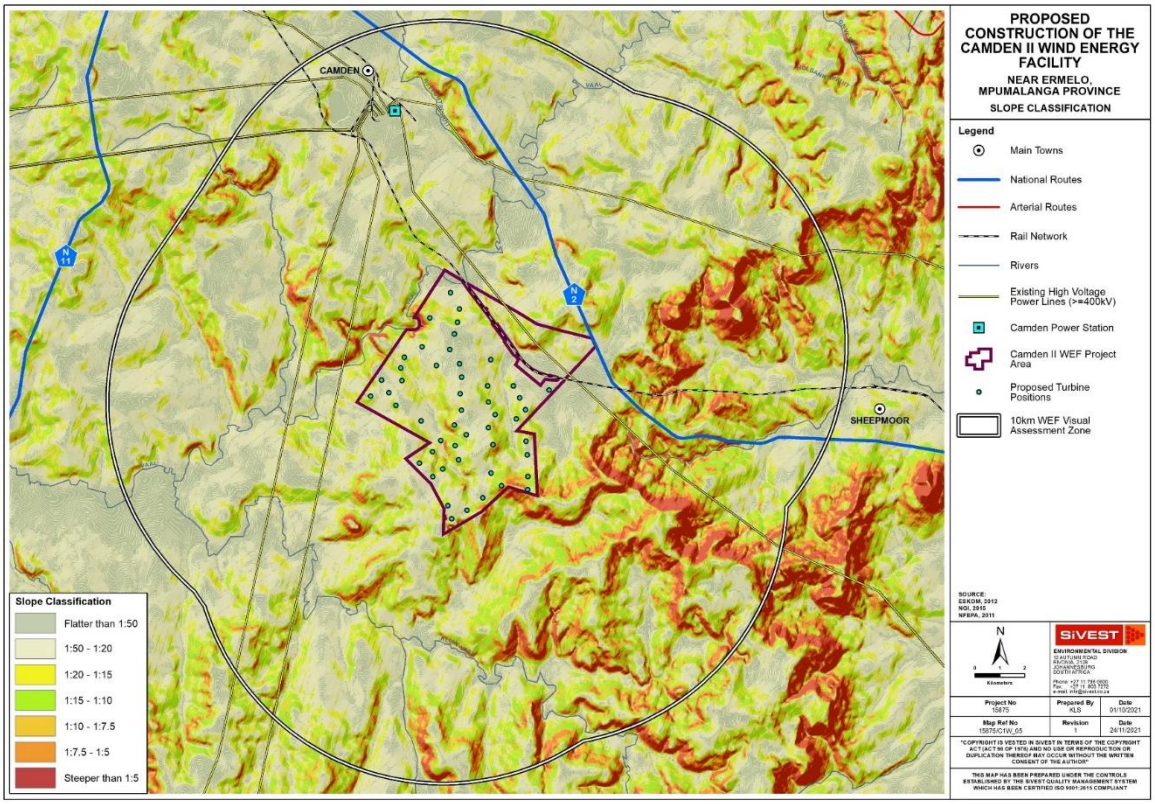


Figure 5-6: Slope classification of Project Area (SiVest, 2021)

5.1.4 GEOLOGY

A desktop review of the geology indicates the site is underlain predominantly by the Vryheid Formation of the Ecca Group (1:250 000, 2630). The Vryheid Formation consists of sandstone, shale, siltstone and coal seam that underlie the project area. The Vryheid Formation is intruded by late Triassic to Middle Jurassic Karoo dolerite dykes and sills which influence the regional hydrogeology.

5.1.5 SOILS AND AGRICULTURAL POTENTIAL

Based on the Land Type information, the site is located in Land Types Ca3 and BA51. Soils within the area are characterised by a Plinthic catena: undifferentiated, upland duplex and/or margalitic soils common, as well as dystrophic and/or mesotrophic; red soils widespread, upland duplex and margalitic soils rare.

Parts of the site are used for cultivation and parts are used for the grazing of both cattle and sheep. Cultivated crops within the study area include maize, soya beans and the fodder crop, weeping love grass, *Eragrostis curvula*. The area exceeds the national average in terms of agricultural productivity. The site contains cultivation lands that make an important contribution to national food security, within the South African context of a considerable scarcity of arable land. Mpumalanga is the province that produces the second highest amount of maize after the Free State. The area produces long term average maize and soya bean yields that, according to verbal information supplied by farmers in the area, are above average for commercial farmers in South Africa. The long-term grazing capacity across the site is 4 - 5 hectares per large stock unit (Department of Agriculture, Forestry and Fisheries, 2018), which is also high in a South African context.

5.1.6 SURFACE WATER

HYDROLOGICAL CACHMENT

In terms of surface water, the study area is located within the western portion of C11B Quaternary Catchment (Vaal River) of the Highveld Ecoregion in the Vaal Water Management Area (WMA), with the lowest point of the site situated on the northern boundary, where the main drainage line exits the site, to enter directly into the Vaal River immediately to the north.

Most of the aquatic features and unknown tributary of the Vaal River within the study area and are located within the riverine valleys and upper catchment areas (pans) of this quaternary catchment (**Figure 5-7**).

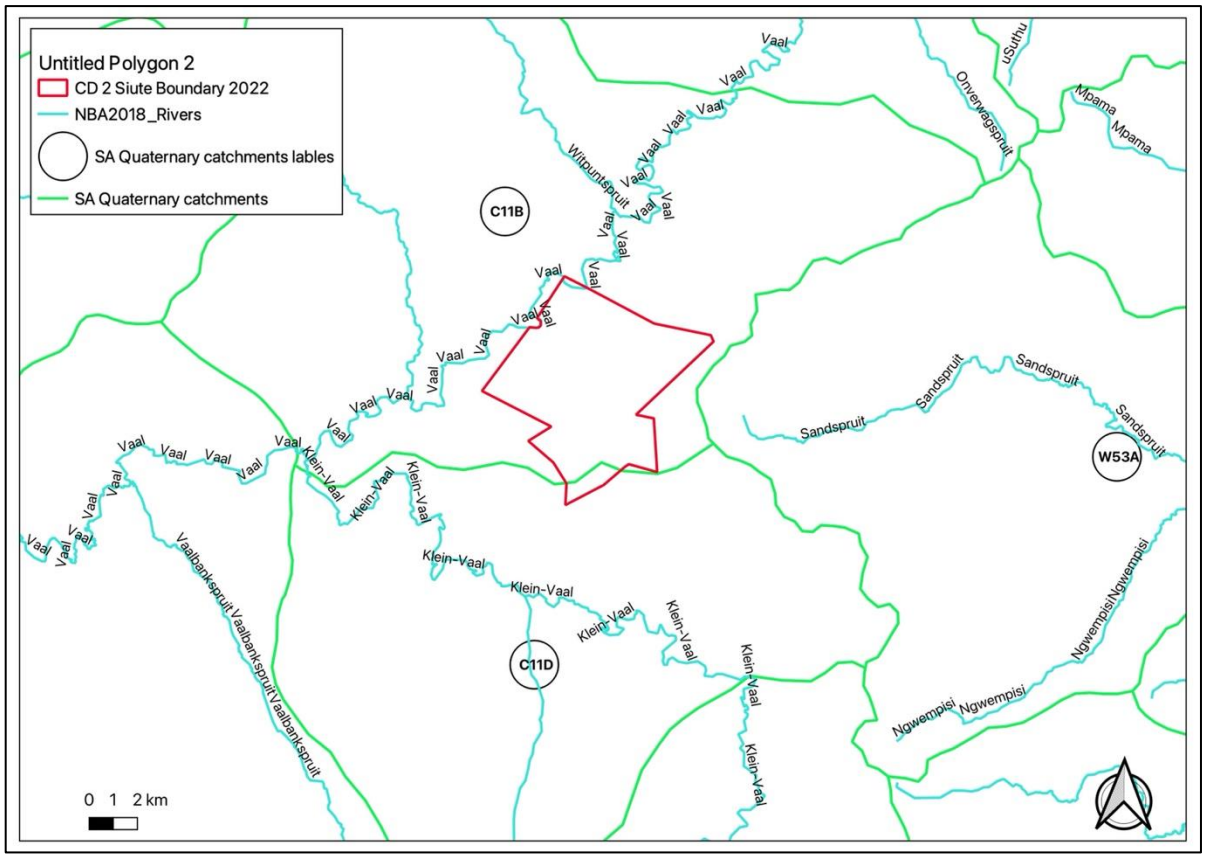


Figure 5-7: Mainstream rivers associated with the Project Area (EnviroSci, 2021)

LOCAL AQUATIC FEATURES

According to the Scoping Phase Aquatic Assessment Report (EnviroSci, 2021) (**Appendix H**), the study area is dominated by a variety of aquatic features, characterised as follows:

- Mainstem Rivers - Floodplain dominated systems with oxbow wetlands (**Figure 5-8**). A few reaches did contain very narrow riparian zones, consisting mostly of a single row of willow trees associated with the unknown tributary of the Vaal River
- Valley Bottom Wetlands (Channelled and Unchannelled) (**Figure 5-9**)
- Endorheic pans (**Figure 5-10**)
- Seep wetlands (**Figure 5-11**)

Figure 5-8: Wetlands associated with the unknown tributary within the study area

Figure 5-9: Channelled Valley Bottom wetland

Figure 5-10: Endorheic Pan, one of three such large systems within the study area

Figure 5-11: A medium sized seep wetland within the central portion of the site

The DFFE identified the aquatic environment for the study area as having a Very High Sensitivity, based on the fact the following criteria are present within the site or the associated catchment, namely:

- Presence of Wetlands
- Aquatic Critical Biodiversity Areas (CBA)
- Freshwater Ecosystem Priority Area quinary catchments (NFEPA)
- Wetland clusters
- Eastern Highveld Grassland a listed Threatened Ecosystem under NEMA.

The presence of these Very High Sensitivity features, although to a finer mapping scale were confirmed during this assessment. The study area is however not located a Strategic Water Resource Area.

This ground-truthed delineations were then compared to current wetland inventories (van Deventer *et al*., 2020), 1: 50 000 topocadastral surveys mapping and the site. These inventories include wetland spatial data based on landcover 2007 data, previous assessments and wetland information retained by the Provincial authorities, combined into one database that formed part of the updated National Spatial Biodiversity Assessment, 2018.

A baseline map was then developed and refined using the August 2020 survey data, noting that due to the complex nature of the topography and geology, the features were digitised at a scale of 1:4000 **(Figure 5-12**).

Coupled to the aquatic delineations, information was collected on potential species that could occur within the wetlands and water courses, especially any areas that would contain open water for long periods and or conservation worthy species (Listed or Protected).

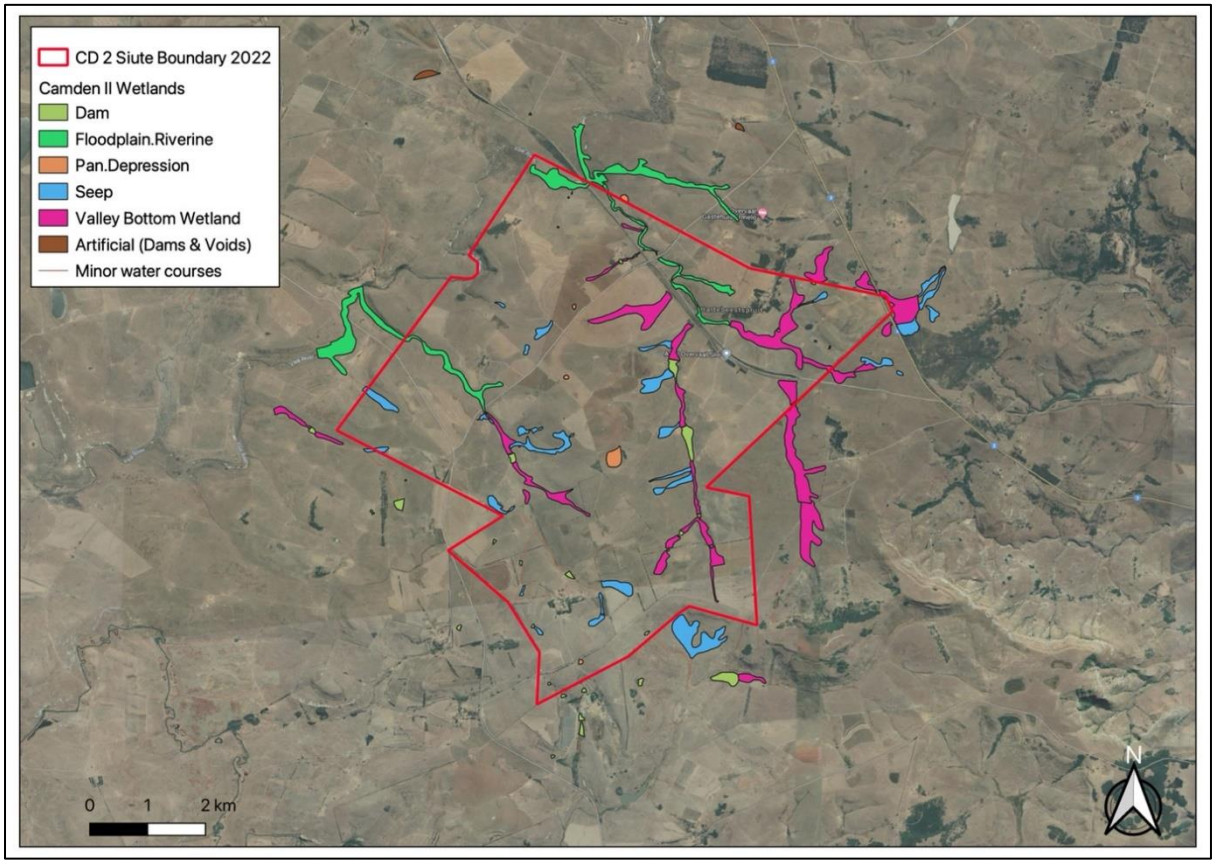


Figure 5-12: Delineated Wetlands within Project footprint based on ground-truthing information collected

PRESENT ECOLOGICAL STATE AND CONSERVATION IMPORTANCE

The Present Ecological State (PES) of a river, watercourse or wetland represents the extent to which it has changed from the reference or near pristine condition (Category A) towards a highly impacted system where there has been an extensive loss of natural habit and biota, as well as ecosystem functioning (Category E).

The PES scores have been revised for the country and based on the new models, aspects of functional importance as well as direct and indirect impacts have been included (DWS, 2014). The new PES system incorporates Ecological Importance (EI) and Ecological Sensitivity (ES) separately as opposed to Ecological Importance and Sensitivity (EIS) in the old model, although the new model is still heavily centred on rating rivers using broad fish, invertebrate, riparian vegetation and water quality indicators. The Recommended Ecological Category (REC) is still contained within the new models, with the default REC being B, when little or no information is available to assess the system or when only one of the above-mentioned parameters are assessed or the overall PES is rated between a C or D.

All of the systems assessed by DWS (2014) on a Subquaternary level within the study area were rated as PES = C or Moderately Modified and PES = D or Largely Modified. While these were also rated as High in terms of Ecological Sensitivity and Ecological Importance respectively.

Based on the information collected during the field investigations, these ratings are verified and upheld for the riverine / wetland systems. The natural wetlands were however rated independently and achieved PES scores of C and D, while the EIS was rated as HIGH. The High EIS rating for both natural water courses and wetlands, is further substantiated by the fact that the affected catchments are included in both the National Freshwater Priority Atlas and the provincial Biodiversity Spatial Plan Critical Biodiversity Area spatial layers (**Figure 5-13** and **Figure 5-14**). These areas are also highlighted as important ecological support areas along the Vaal River.

Overall, these catchment areas and subsequent rivers / watercourses are largely in a natural state with localised impacts in some areas, which include the following:

- Erosion and sedimentation associated with road crossings;
- Impeded water flow due to several in channel farm dams; and
- Sedimentation and scour of channels due to undersized culverts within present day road crossings.

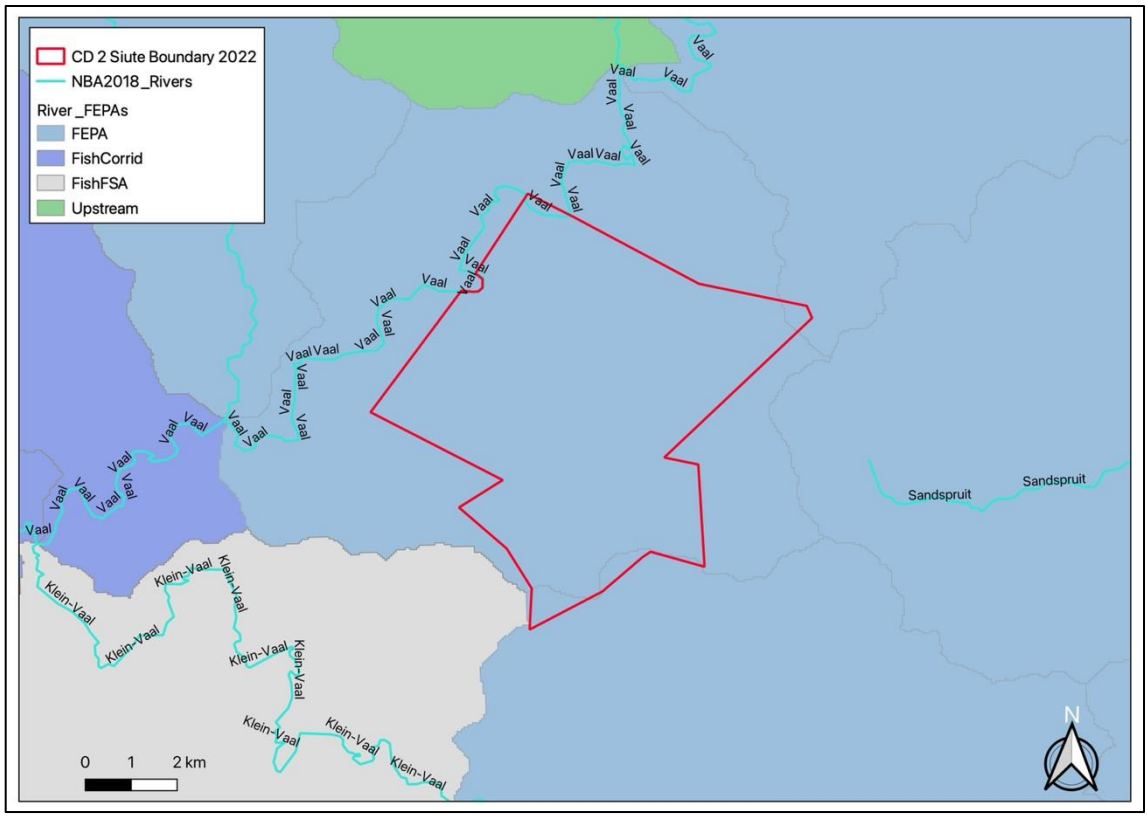


Figure 5-13: The Freshwater Ecosystem Priority Areas for the study site (Nel et al, 2011)

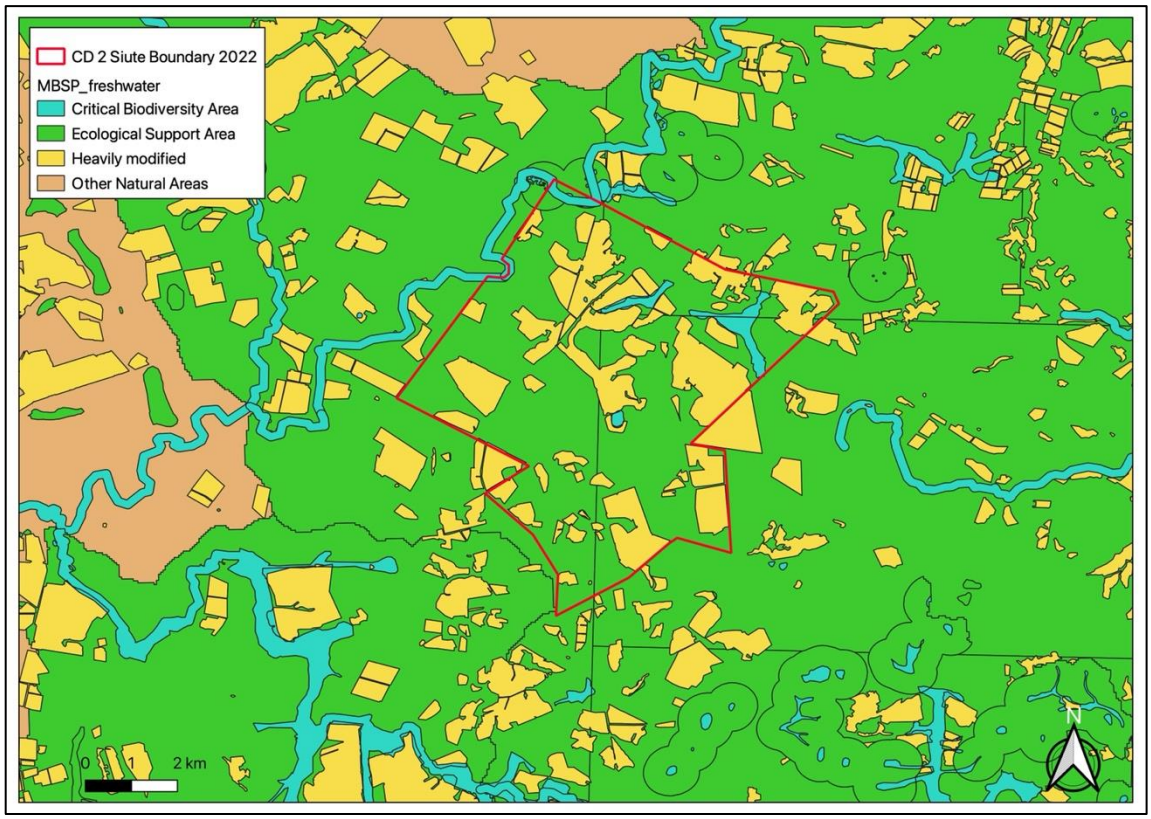


Figure 5-14: The Critical Biodiversity Areas as per the Mpumalanga Biodiversity Spatial Plan (Nel et al, 2011) issued 2014

SITE SENSITIVITY

Using the baseline description and field data while considering the current disturbances and site characteristics, the following features were identified, then categorised into one of number pre-determined sensitivity categories to provide protect and/or guide the layout planning and design processes of the corridor and a suitable alignment for the grid within. **Table 5-2** outlines the Aquatic sensitivity mapping categories used to categorise features or areas (with their buffers).

Table 5-2: Sensitivity Categories

No Go	Legislated "no go" areas or setbacks and areas or features that are considered of such significance that impacting them may be regarded as fatal flaw or strongly influence the project impact significance profile Therefore areas or features that are considered to have a high sensitivity or where project infrastructure would be highly constrained and should be avoided as far as possible. Infrastructure located in these areas are likely to drive up impact significance ratings and mitigations
Medium	Buffer areas and or areas that are deemed to be of medium sensitivity but should still be avoid as this would minimise impacts and or the need for additional Water Use Authorisation
Low	Areas of low sensitivity or constraints, such as artificial systems
Neutral	Unconstrained areas (left blank in mapping)

Table 5-3 below provides an overview of the sensitivity of various aquatic features (with buffers distances included) as it relates to the main project component types for the project. The features are shown spatially in **Figure 5-15**. The sensitivity ratings of No go, Medium and Low were determined through an assessment of the aquatic habitat sensitivity and related constraints. However, these No-Go areas (with buffers) relate in general

terms to the project and there are areas where encroachment on these areas would occur (i.e. existing road crossings within wetlands) but this is considered acceptable since these areas have already been impacted.

These proposed constraints / buffers do not include bird and or bat specialist buffers / constraints as theirs buffers along aquatic features are at times far larger around aquatic features, than those required for the known aquatic species within this region.

Table 5-3: Results of the sensitivity rating / constraints assessment

DEVELOPMENT COMPONENT	WATERBODY TYPE	SENSITIVITY RATING OF THE RESPECTIVE WATERBODY TYPE AGAINST THE DEVELOPMENT TYPE AND THE REQUIRED BUFFER	SENSITIVITY RATING OVERRIDE, IF AN IMPACT SUCH AS A ROAD ALREADY OCCURS WITHIN THE PROPOSED FOOTPRINT
WTG	Riverine Floodplains with Riparian Vegetation or wetland areas	No-Go with 95m buffer	
	Valley Bottom Wetlands	No-Go with 65m buffer	
	Endorheic Pans	No-Go with 105m buffer	
	Seepage Wetlands	No-Go with 62m buffer	
	Artificial dams or mine works		
Buildings / Substations & BESS	Riverine Floodplains with Riparian Vegetation or wetland areas	No-Go with 95m buffer	
	Valley Bottom Wetlands	No-Go with 65m buffer	
	Endorheic Pans	No-Go with 105m buffer	
	Seepage Wetlands	No-Go with 62m buffer	
	Artificial dams or mine works		
Roads & Hardstands	Riverine Floodplains with Riparian Vegetation or wetland areas	No-Go with 95m buffer	Moderate if an existing crossing / road or impact is already present, that must then be included in the potential road network. However if the road network can't be aligned with existing impacted areas, then any such crossings must be evaluated on a case by case basis, by the aquatic specialist, preferably with the engineers and a site visit.
	Valley Bottom Wetlands	No-Go with 65m buffer	
	Endorheic Pans	No-Go with 105m buffer	
	Seepage Wetlands	No-Go with 62m buffer	
	Artificial dams or mine works		
Overhead Lines	Riverine Floodplains with Riparian Vegetation or wetland areas	Assumption is that the overhead lines could span these areas, but the towers/pylons should adhere to the buffer distances as indicated as far as possible but where areas are too large to span (buffers) then these tower positions must be evaluated on a case by case basis.	
	Valley Bottom Wetlands		
	Endorheic Pans		
	Seepage Wetlands		
	Artificial dams or mine works		

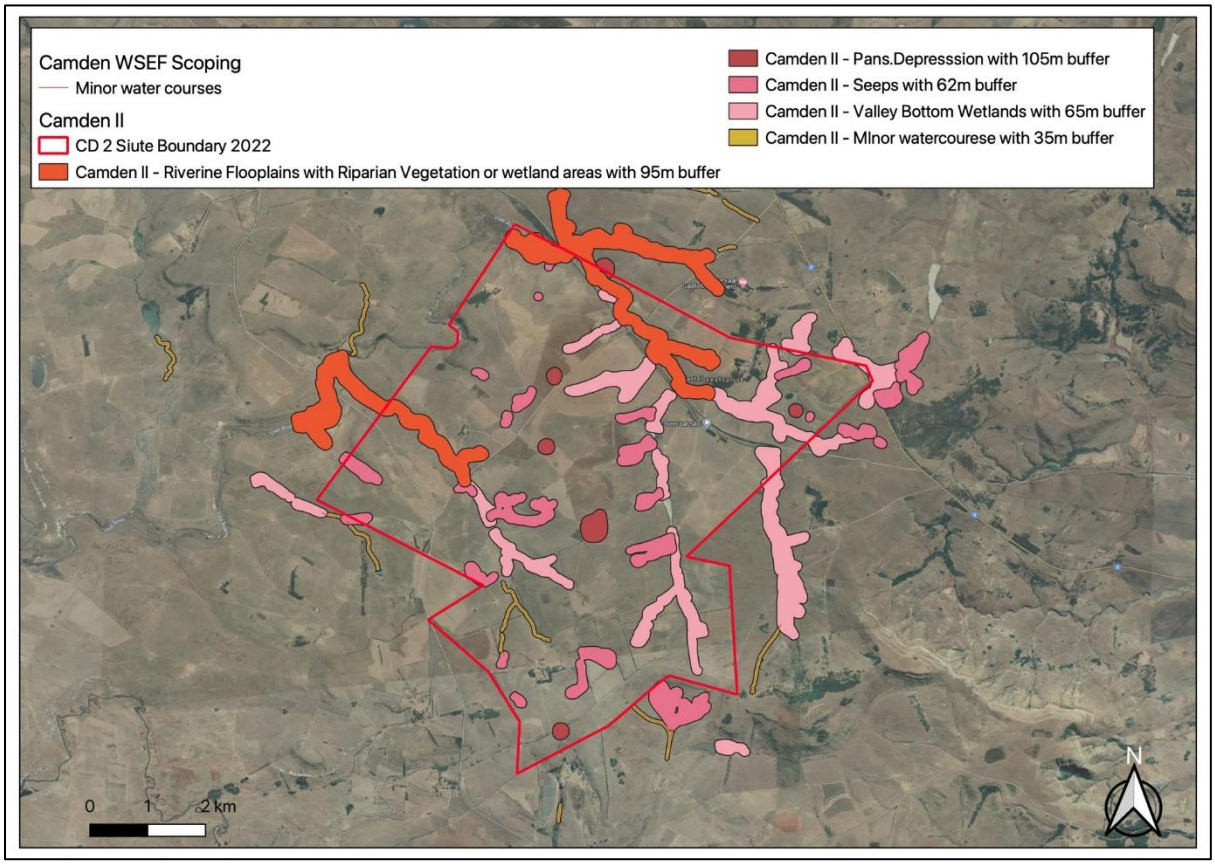


Figure 5-15: The delineated waterbodies inclusive of the respective buffer distances

5.1.7 GROUNDWATER

According to Aquifer Classification of South Africa (DWAF, 2012), the area is underlain by a Minor Aquifer with groundwater occurrence controlled by presence of fractures, faults and weathered zones within Karoo sediments, and dominated within the upper and lower contacts of the dolerite dykes and sills. Groundwater in the area is moderately vulnerable to contaminants when continuously discharged or leached (DWAF, 2013). The regional groundwater is of good quality with electrical conductivity typically <70mS/m (DWAF, 2012). With reference to GHT Consulting Scientists (GHT) Geohydrological Impact Assessment: Proposed Ash Dam Extension at Eskom Camden Power Station (2012) three aquifer types may be anticipated, as follows:

- **Shallow**: unconfined within the highly weathered Karoo sediments and/or alluvial deposits, and when underlain by less permeable material. Within the vicinity of the ash dam this reportedly ranges from approximately 0.2–1.3m below ground level (bgl)
- **Intermediate**: semi-confined within horizontal bedding interfaces between different lithologies or when connected through geological structures (joints, fractures, or dolerite dyke contacts)
- **Deep**: confined within basement lithologies

Groundwater flow directions are expected to somewhat mimic topography and regional drainage and largely be towards the north, in the direction of the Vaal River. This will, however, be complicated around the natural drainage lines where the topography will be expected to induce localised flows, particularly within the shallow aquifer, that will deviate from this general direction, with flow from elevated areas towards to lower lying drainage channels.

5.2 BIOLOGICAL ENVIRONMENT

5.2.1 REGIONAL VEGETATION

Based on the preliminary desktop and site specific field study Terrestrial Ecology Scoping Report (David Hoare Consulting, November 2021) (**Appendix I**), three regional vegetation type occurring in the study area, namely Eastern Highveld Grassland, Wakkerstroom Montane Grassland and Amersfoort Highveld Clay Grassland (**Figure 5-16**), the last of which does not occur within the boundaries of the site, but close enough that floristic elements may occur on site. Another vegetation type, and Eastern Temperate Freshwater Wetlands occurs in nearby areas, as well as on site, but not at a scale that has been mapped in the vegetation map for the country. It is probable that terrestrial vegetation patterns reflect the major vegetation types, namely Eastern Highveld Grassland and Wakkerstroom Montane Grassland. The vegetation types that occur in the study area and nearby areas are briefly described below.

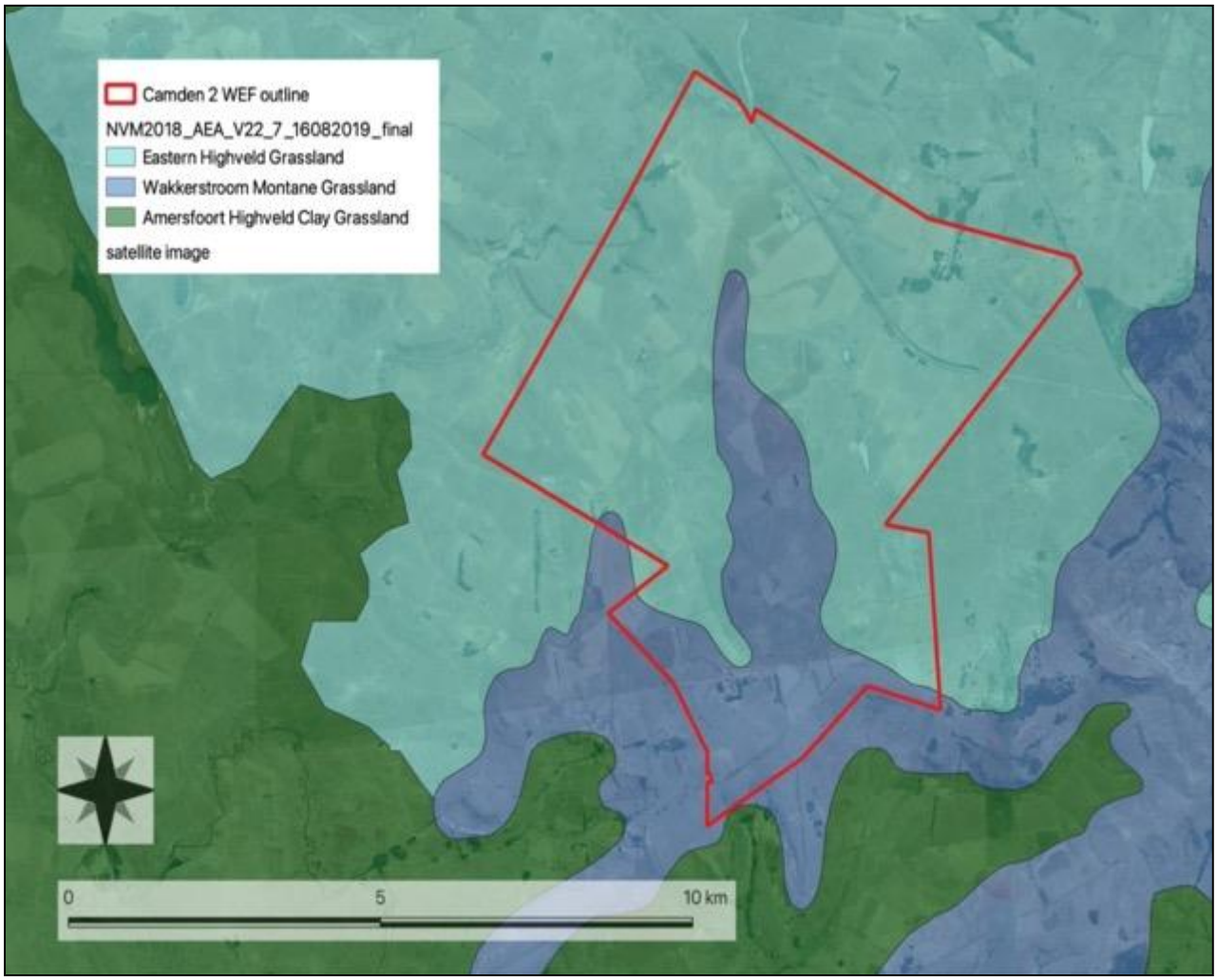


Figure 5-16: Regional Vegetation Types of the Study Area

EASTERN HIGHVELD GRASSLAND

DISTRIBUTION

Found in Mpumalanga and Gauteng Provinces, on the plains between Belfast in the east and the eastern side of Johannesburg in the west and extending southwards to Bethal, Ermelo and west of Piet Retief. The vegetation type occurs at an altitude of between 1 520–1 780 m.

VEGETATION & LANDSCAPE FEATURES

The vegetation occurs on slightly to moderately undulating plains, including some low hills and pan depressions. The vegetation is short dense grassland dominated by the usual highveld grass composition (*Aristida*, *Digitaria*, *Eragrostis*, *Themeda*, *Tristachya*, etc.) with small, scattered rocky outcrops with wiry, sour grasses and some woody species (*Acacia caffra*, *Celtis africana*, *Diospyros lycioides* subsp *lycioides*, *Parinari capensis*, *Protea caffra*, *P. welwitschii* and *Searsia magalismontanum*).

GEOLOGY & SOILS

Red to yellow sandy soils of the Ba and Bb land types found on shales and sandstones of the Madzaringwe Formation (Karoo Supergroup). Land types Bb (65%) and Ba (30%).

CLIMATE

Strongly seasonal summer rainfall, with very dry winters. MAP 650–900 mm (overall average: 726 mm), MAP relatively uniform across most of this unit, but increases significantly in the extreme southeast. The coefficient of variation in MAP is 25% across most of the unit, but drops to 21% in the east and southeast. Incidence of frost from 13–42 days, but higher at higher elevations.

IMPORTANT TAXA

Low Shrubs	*Anthospermum rigidum* subsp. *pumilum*, *Stoebe plumosa*..
Herbs	*Berkheya setifera* (d), *Haplocarpha scaposa* (d), *Justicia anagalloides* (d), *Pelargonium luridum* (d), *Acalypha angustata*, *Chamaecrista mimosoides*, *Dicoma anomala*, *Euryops gilfillanii, E. transvaalensis* subsp. *setilobus, Helichrysum aureonitens*, *H. caespititium*, *H. callicomum*, *H. oreophilum*, *H. rugulosum*, *Ipomoea crassipes*, *Pentanisia prunelloides* subsp. *latifolia*, *Selago densiflora*, *Senecio coronatus*, *Vernonia oligocephala*, *Wahlenbergia undulata*.
Geophytic Herbs	*Gladiolus crassifolius*, *Haemanthus humilis* subsp. *hirsutus*, *Hypoxis rigidula* var. *pilosissima*, *Ledebouria ovatifolia*.
Succulent Herbs	*Aloe ecklonis*
Graminoids	*Aristida aequiglumis* (d), *A. congesta* (d), *A. junciformis* subsp. *galpinii* (d), *Brachiaria serrata* (d), *Cynodon dactylon* (d), *Digitaria monodactyla* (d), *D. tricholaenoides* (d), *Elionurus muticus* (d), *Eragrostis chloromelas* (d), *E. curvula* (d), *E. plana* (d), *E. racemosa* (d), *E. sclerantha* (d), *Heteropogon contortus* (d), *Loudetia simplex* (d), *Microchloa caffra* (d), *Monocymbium ceresiiforme* (d), *Setaria sphacelata* (d), *Sporobolus africanus* (d), *S. pectinatus* (d), *Themeda triandra* (d), *Trachypogon spicatus* (d), *Tristachya leucothrix* (d), *T. rehmannii* (d), *Alloteropsis semialata* subsp. *eckloniana*, *Andropogon appendiculatus*, *A. schirensis*, *Bewsia biflora*, *Ctenium concinnum*, *Diheteropogon amplectens*, *Eragrostis capensis*, *E. gummiflua*, *E. patentissima*, *Harpochloa falx*, *Panicum natalense*, *Rendlia altera*, *Schizachyrium sanguineum*, *Setaria nigrirostris*, *Urelytrum agropyroides*.

WAKKERSTROOM MONTANE GRASSLAND

DISTRIBUTION

KwaZulu-Natal and Mpumalanga Provinces: Occurring from the Escarpment just north of Sheepmoor (north), to southeast of Utrecht, and then from the vicinity of Volksrust in the west to Mandhlangampisi Mountain near Luneburg in the east. Altitude 1 440–2 200 m.

VEGETATION & LANDSCAPE FEATURES

This unit is a less obvious continuation of the Escarpment that links the southern and northern Drakensberg escarpments. It straddles this divide and is comprised of low mountains and undulating plains. The vegetation comprises predominantly short montane grasslands on the plateaus and the relatively flat areas, with short forest

and *Leucosidea* thickets occurring along steep, mainly east-facing slopes and drainage areas. *L. sericea* is the dominant woody pioneer species that invades areas as a result of grazing mismanagement.

GEOLOGY & SOILS

The mudstones, sandstones and shale of the Madzaringwe and Volksrust Formations (Karoo Supergroup) were intruded by voluminous Jurassic dolerite dykes and sills. Ac land type dominant, while Fa and Ca are of subordinate importance.

CLIMATE

Rainfall peaks in midsummer. Rainfall 800–1 250 mm per year (MAP 902 mm). This unit experiences an orographic effect which results in a locally higher precipitation than the adjacent areas. Winters very cold and summers mild (MAT 14ºC).

IMPORTANT TAXA

Small trees	*Canthium ciliatum*, *Protea subvestita*
Tall Shrubs	*Buddleja salviifolia* (d), *Leucosidea sericea* (d), *Buddleja auriculata*, *Diospyros lycioides* subsp. *guerkei*, *Euclea crispa* subsp. *crispa*, *Rhus montana*, *R. rehmanniana*, *R. transvaalensis*.
Low shrubs	*Asparagus devenishii* (d), *Cliffortia linearifolia* (d), *Helichrysum melanacme* (d), *H. splendidum* (d), *Anthospermum rigidum* subsp. *pumilum*, *Clutia natalensis*, *Erica oatesii*, *Felicia filifolia* subsp. *filifolia*, *Gymnosporia heterophylla*, *Helichrysum hypoleucum*, *Hermannia geniculata*, *Inulanthera dregeana*, *Metalasia densa*, *Printzia pyrifolia*, *Rhus discolor*, *Rubus ludwigii* subsp. *ludwigii*.
Graminoids	*Andropogon schirensis* (d), *Ctenium concinnum* (d), *Cymbopogon caesius* (d), *Digitaria tricholaenoides* (d), *Diheteropogon amplectens* (d), *Eragrostis chloromelas* (d), *E. plana* (d), *E. racemosa* (d), *Harpochloa falx* (d), *Heteropogon contortus* (d), *Hyparrhenia hirta* (d), *Microchloa caffra* (d), *Themeda triandra* (d), *Trachypogon spicatus* (d), *Tristachya leucothrix* (d), *Alloteropsis semialata* subsp. *eckloniana*, *Aristida junciformis* subsp. *galpinii*, *Brachiaria serrata*, *Diheteropogon filifolius*, *Elionurus muticus*, *Eragrostis capensis*, *Eulalia villosa*, *Festuca scabra*, *Loudetia simplex*, *Rendlia altera*, *Setaria nigrirostris*.
Herbs	*Berkheya onopordifolia* var. *glabra* (d), *Cephalaria natalensis* (d), *Pelargonium luridum* (d), *Acalypha depressinerva*, *A. peduncularis*, *A. wilmsii*, *Aster bakerianus*, *Berkheya setifera*, *Euryops transvaalensis* subsp. *setilobus*, *Galium thunbergianum* var. *thunbergianum*, *Geranium ornithopodioides*, *Helichrysum cephaloideum*, *H. cooperi*, *H. monticola*, *H. nudifolium* var. *nudifolium*, *H. oreophilum*, *H. simillimum*, *Pentanisia prunelloides* subsp. *latifolia*, *Plectranthus laxiflorus*, *Sebaea leiostyla*, *S. sedoides* var. *sedoides*, *Selago densiflora*, *Vernonia hirsuta*, *V. natalensis*, *Wahlenbergia cuspidata*.
Geophytic Herbs	*Hypoxis costata* (d), *Agapanthus inapertus* subsp. *intermedius*, *Asclepias aurea*, *Cheilanthes hirta*, *Corycium dracomontanum*, *C. nigrescens*, *Cyrtanthus tuckii* var. *transvaalensis*, *Disa versicolor*, *Eriospermum cooperi* var. *cooperi*, *Eucomis bicolor*, *Geum capense*, *Gladiolus ecklonii*, *G. sericeovillosus* subsp. *sericeovillosus*, *Hesperantha coccinea*, *Hypoxis rigidula* var. *pilosissima*, *Moraea brevistyla*, *Rhodohypoxis baurii* var. *confecta*.
Semiparasitic herb	*Striga bilabiata* subsp. *bilabiata*.

BIOGEOGRAPHICALLY IMPORTANT TAXA ([L]Low Escarpment endemic, [N]Northern sourveld endemic)

Low shrubs	*Bowkeria citrina*[L], *Lotononis amajubica*[L], *Protea parvula*[N].

Succulent herb	*Aloe modesta*[N]

ENDEMIC TAXA

Herbs	*Helichrysum aureum* var. *argenteum*, *Selago longicalyx*
Geophytic herbs	*Kniphofia* sp. nov. (‘*laxiflora* Form C’), *Nerine platypetala*.
Woody climber	*Asparagus fractiflexus*

REMARKS

Overgrazing leads to invasion of *Seriphium plumosum*. Parts of this unit were once cultivated and now lie fallow and have been left to re-vegetate with pioneer species. These transformed areas are not picked up by satellite for transformation coverage and the percentage of grasslands still in a natural state may be underestimated

AMERSFOORT HIGHVELD CLAY GRASSLAND

DISTRIBUTION

Mpumalanga and KwaZulu-Natal Provinces: This unit extends in a north-south band from just south of Ermelo, down through Amersfoort to the Memel area in south. Altitude 1 580–1 860 m.

VEGETATION & LANDSCAPE FEATURES

Comprised of undulating grassland plains, with small scattered patches of dolerite outcrops in areas. The vegetation is comprised of a short closed grassland cover, largely dominated by a dense *Themeda triandra* sward, often severely grazed to form a short lawn.

GEOLOGY & SOILS

Restricted to vertic clay soils derived from dolerite that is intrusive in the Karoo sediments of the Madzaringwe Formation in the north and the Volksrust Formation and the Adelaide Subgroup in the south. Dominant land type Ca, while Ea land type is of subordinate importance.

CLIMATE

Rainfall mainly in early summer, from 620 mm in the west to 830 mm in the east (MAP 694 mm). MAT 14ºC, with temperatures higher in the west than the east. Winters are cold and summers are mild. Incidence of frost very high.

IMPORTANT TAXA

Graminoids	*Andropogon appendiculatus (d), Brachiaria serrata (d), Digitaria monodactyla (d), D. tricholaenoides (d), Elionurus muticus (d), Eragrostis capensis (d), E. chloromelas (d), E. plana (d), E. racemosa (d), Harpochloa falx (d), Heteropogon contortus (d), Microchloa caffra (d), Panicum natalense (d), Setaria nigrirostris (d), S. sphacelata (d), Themeda triandra (d), Trichoneura grandiglumis (d), Tristachya leucothrix (d), Abildgaardia ovata, Andropogon schirensis, Aristida bipartita, A. congesta, A. junciformis subsp. galpinii, A. stipitata subsp. graciliflora, Bulbostylis contexta, Chloris virgata, Cymbopogon caesius, C. pospischilii, Cynodon dactylon, Digitaria diagonalis, D. ternata, Diheteropogon amplectens, Eragrostis curvula, Koeleria capensis, Panicum coloratum, Setaria incrassata.*
Herbs	*Berkheya setifera (d), Vernonia natalensis, V. oligocephala (d), Acalypha peduncularis, A. wilmsii, Berkheya insignis, B. pinnatifida, Crabbea acaulis, Cynoglossum hispidum, Dicoma anomala, Haplocarpha scaposa, Helichrysum caespititium, H. rugulosum, Hermannia coccocarpa, H. depressa, H. transvaalensis, Ipomoea crassipes, I. oblongata, Jamesbrittenia silenoides, Pelargonium luridum, Pentanisia prunelloides subsp. latifolia, Peucedanum magalismontanum, Pseudognaphalium luteo-album, Rhynchosia effusa, Salvia repens, Schistostephium crataegifolium, Sonchus nanus, Wahlenbergia undulata.*

Herbaceous climber	*Rhynchosia totta.*
Geophytic Herbs	*Boophone disticha, Eucomis autumnalis subsp. clavata, Hypoxis villosa var. obliqua, Zantedeschia albomaculata subsp. macrocarpa.*
Tall Shrubs	*Diospyros austro-africana, D. lycioides subsp. guerkei.*
Low shrubs	*Anthospermum rigidum subsp. pumilum (d), Helichrysum melanacme (d), Chaetacanthus costatus, Euphorbia striata var. cuspidata, Gnidia burchellii, G. capitata, Polygala uncinata, Rhus discolor.*
Succulent shrubs	*Euphorbia clavarioides var. truncata.*

REMARKS

Overgrazing leads to increase in cover of *Seriphium plumosum* (an indigenous species that has low grazing value). Parts of this unit were once cultivated and now lie fallow and have been left to re-vegetate with pioneer species. These transformed areas are not picked up by satellite for transformation coverage and the percentage of grasslands still in a natural state may be underestimated.

EASTERN TEMPERATE FRESHWATER WETLANDS

DISTRIBUTION

Northern Cape, Eastern Cape, Free State, North-West, Gauteng, Mpumalanga and KwaZulu-Natal Provinces as well as in neighbouring Lesotho and Swaziland: Around water bodies with stagnant water (lakes, pans, periodically flooded vleis, edges of calmly flowing rivers) and embedded within the Grassland Biome. Altitude ranging from 750–2 000 m.

VEGETATION & LANDSCAPE FEATURES

Flat landscape or shallow depressions filled with (temporary) water bodies supporting zoned systems of aquatic and hygrophilous vegetation of temporarily flooded grasslands and ephemeral herblands.

GEOLOGY & SOILS

Found on younger Pleistocene to recent sediments overlying fine-grained sedimentary rocks of the Karoo Supergroup (on sediments of both Ecca and Beaufort Groups due to the large extent of the area of occurrence) as well as of the much older dolomites of the Malmani Subgroup of the Transvaal Supergroup in the northwest. Especially the areas built by Karoo Supergroup sediments are associated with the occurrence of Jurassic Karoo dolerite dykes having a profound influence on run-off. Soils are peaty (Champagne soil form) to vertic (Rensberg soil form). The vleis form where flow of water is impeded by impermeable soils and/or by erosion resistant features, such as dolerite intrusions. Many vleis and pans of this type of freshwater wetlands are inundated and/or saturated only during the summer rainfall season, and for some months after this into the middle of the dry winter season, but they may remain saturated all year round. Surface water inundation may be present at any point while the wetland is saturated and some plant species will be present only under inundated conditions, or under permanently saturated conditions. The presence of standing water should not be taken as a sign of permanent wet conditions.

CLIMATE

Exclusively summer-rainfall region (MAP range 421–915 mm). Cool-temperate pattern with MAT ranging between 12.6°C and 16.7°C. Due to high elevation, frost is a frequent phenomenon

IMPORTANT TAXA

Megagraminoids	*Cyperus congestus* (d), *Phragmites australis* (d), *Schoenoplectus corymbosus* (d), *Typha capensis* (d), *Cyperus immensus*..

Graminoids	*Agrostis lachnantha* (d), *Carex acutiformis* (d), *Eleocharis palustris* (d), *Eragrostis plana* (d), *E. planiculmis* (d), *Fuirena pubescens* (d), *Helictotrichon turgidulum* (d), *Hemarthria altissima* (d), *Imperata cylindrica* (d), *Leersia hexandra* (d), *Paspalum dilatatum* (d), *P. urvillei* (d), *Pennisetum thunbergii* (d), *Schoenoplectus decipiens* (d), *Scleria dieterlenii* (d), *Setaria sphacelata* (d), *Andropogon appendiculatus*, *A. eucomus*, *Aristida aequiglumis*, *Ascolepis capensis, Carex austro-africana*, *Carex cernua, C. schlechteri*, *Cyperus cyperoides*, *C. distans*, *C. longus*, *C. marginatus*, *Echinochloa holubii*, *Eragrostis micrantha*, *Ficinia acuminata*, *Fimbristylis complanata*, *F. ferruginea*, *Hyparrhenia dregeana*, *H. quarrei, Ischaemum fasciculatum*, *Kyllinga erecta*, *Panicum schinzii*, *Pennisetum sphacelatum*, *Pycreus macranthus*, *P. nitidus*, *Setaria pallide-fusca*, *Xyris gerrardii*.
Herbs	*Centella asiatica* (d), *Ranunculus multifidus* (d), *Berkheya radula*, *B. speciosa*, *Berula erecta* subsp. *thunbergii*, *Centella coriacea*, *Chironia palustris*, *Equisetum ramosissimum*, *Falckia oblonga, Haplocarpha lyrata, Helichrysum difficile*, *H. dregeanum*, *H. mundtii*, *Hydrocotyle sibthorpioides, H. verticillata*, *Lindernia conferta*, *Lobelia angolensis, L. flaccida*, *Marsilea farinosa* subsp. *farinosa, Mentha aquatica*, *Monopsis decipiens*, *Pulicaria scabra*, *Pycnostachys reticulata*, *Rorippa fluviatilis* var. *fluviatilis*, *Rumex lanceolatus*, *Senecio inornatus*, *S. microglossus*, *Sium repandum*, *Thelypteris confluens*, *Wahlenbergia banksiana*.
Carnivorous herb	*Utricularia inflexa*.
Geophytic Herbs	*Cordylogyne globosa*, *Crinum bulbispermum*, *Gladiolus papilio*, *Kniphofia ensifolia*, *K. fluviatilis*, *K. linearifolia*, *Neobolusia tysonii, Nerine gibsonii* (only in Eastern Cape), *Satyrium hallackii* subsp. *hallackii*
Aquatic Herbs	*Aponogeton junceus*, *Ceratophyllum demersum*, *Lagarosiphon major*, *L. muscoides*, *Marsilea capensis*, *Myriophyllum spicatum, Nymphaea lotus*, *N. nouchali* var. *caerulea*, *Nymphoides thunbergiana*, *Potamogeton thunbergii*.
ENDEMIC TAXA	
Herbs	*Disa zuluensis, Kniphofia flammula* (northern KwaZulu-Natal), *Nerine platypetala*
Succulent herb	*Crassula tuberella*

REMARKS

Vegetation patterning in the form of concentric belts ('rings') is often found in pans. Pan size and depth may be a factor limiting vegetation, as large water bodies with shallow water may experience wave action. This limits the presence of species with floating leaves as well as some submerged and marginal macrophytes. The situation is more complex in vleis as these often have variable microtopography and soil types within a single wetland. It is possible for seasonally inundated zones to occur embedded inside the permanently inundated zone of a vlei, if this zone is present.

CONSERVATION STATUS OF THE REGIONAL VEGETATION TYPES

On the basis of a scientific approach used at national level by SANBI (Driver *et al*., 2005), vegetation types can be categorised according to their conservation status which is, in turn, assessed according to the degree of transformation relative to the expected extent of each vegetation type. The status of a habitat or vegetation type is based on how much of its original area still remains intact relative to various thresholds. The original extent of a vegetation type is as presented in the most recent national vegetation map (Mucina, Rutherford & Powrie 2005) and is the extent of the vegetation type in the absence of any historical human impact. On a national scale the thresholds are as depicted in **Figure 5-17**, as determined by best available scientific approaches (Driver *et*

al., 2005). The level at which an ecosystem becomes Critically Endangered differs from one ecosystem to another and varies from 16% to 36% (Driver *et al*., 2005).

According to scientific literature (Driver *et al*., 2005; Mucina *et al*., 2006), as shown in **Table 5-4**, Eastern Highvbeld Grassland is listed as Endangered, Amersfoort Highveld Clay Grassland as Vulnerable and Eastern Temperate Freshwater Wetlands as Least Threatened.

Determining ecosystem status (Driver *et al*., 2005). *BT = biodiversity target (the minimum conservation requirement).

Habitat remaining (%)			
80–100	least threatened	LT
60–80	vulnerable	VU
*BT–60	endangered	EN
0–*BT	critically endangered	CR

Figure 5-17: Ecosystem Status (Driver et al. 2005)

Table 5-4: Conservation status of different vegetation types occurring in the study area

VEGETATION TYPE	TARGET (%)	CONSERVED (%)	TRANSFORMED (%)	CONSERVATION STATUS	
				DRIVER *ET AL.* 2005; MUCINA *ET AL.*, 2006	NATIONAL ECOSYSTEM LIST (NEM:BA)
Eastern Highveld Grassland	24	0.3	44	Endangered	Vulnerable
Wakkerstroom Montane Grassland	24	5.6	7	Vulnerable	Not listed
Chrissiesmeer Panveld					Endangered

The National List of Ecosystems that are Threatened and need of protection (GN1002 of 2011), published under the National Environmental Management: Biodiversity Act (Act No. 10, 2004), lists national vegetation types, and other ecosystems defined in the Act, that are afforded protection on the basis of rates of transformation. The thresholds for listing in this legislation are higher than in the scientific literature, which means there are fewer ecosystems listed in the National Ecosystem List versus in the scientific literature. Eastern Highveld Grassland and Eastern Temperate Freshwater Wetlands are both listed as Vulnerable in the National List of Ecosystems that are Threatened and need of protection (GN1002 of 2011). Eastern Highveld Grassland covers the eastern two-thirds of the site (**Figure 5-16**). Eastern Temperate Freshwater Wetlands are not mapped as occurring on site, but the mapping is at a poor (regional) resolution and all pans and wetlands on site fall within this ecosystem type.

There is an additional listed ecosystem defined under the National Ecosystem List, called Chrissiesmeer Panveld, which is listed as Endangered. This covers more than two-thirds of the site (**Figure 5-18**). It spatially co-incides partially with Eastern Highveld Grassland, but is defined on different criteria.

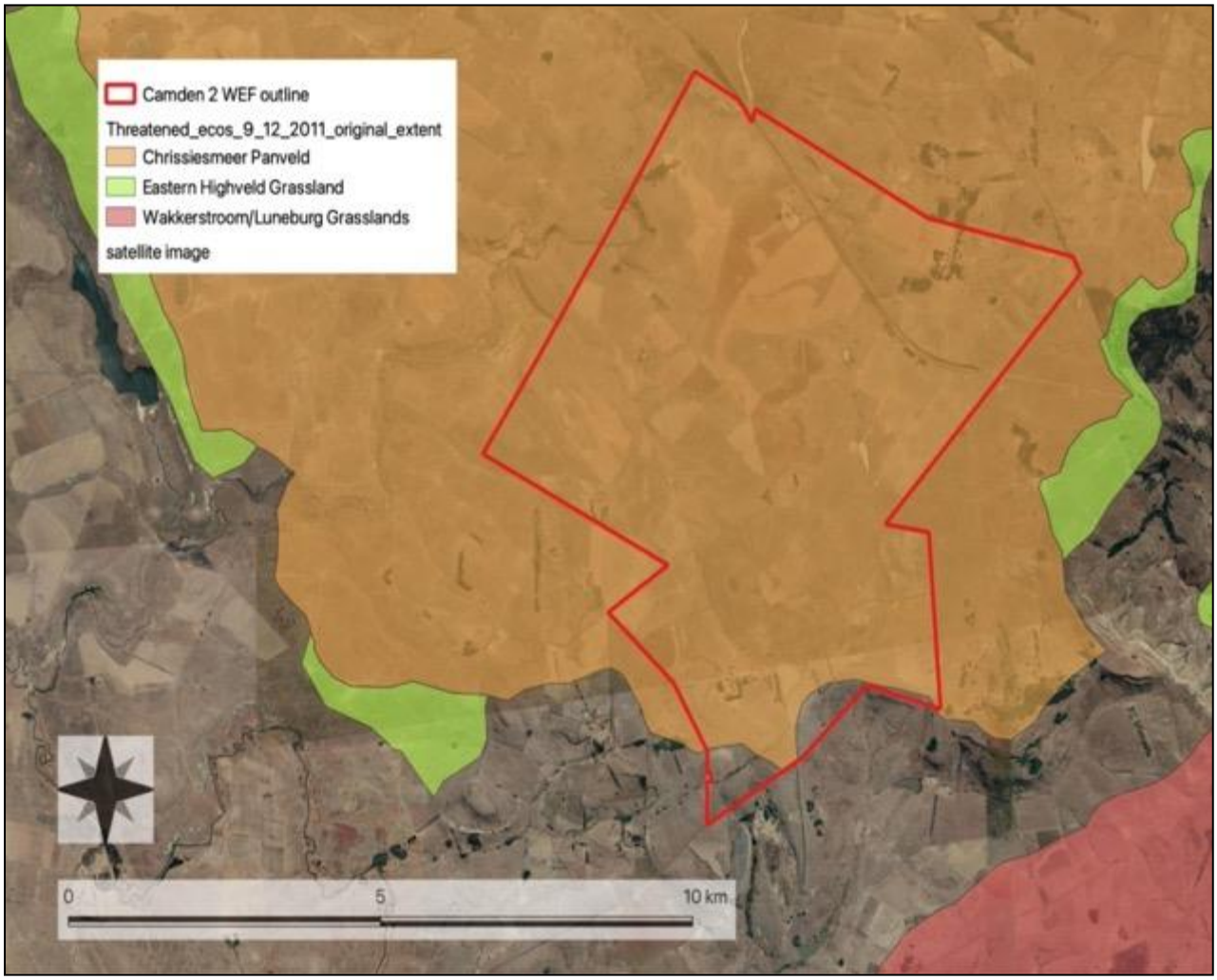


Figure 5-18: Distribution of listed ecosystems relative to the site

5.2.2 BIODIVERSITY CONSERVATION PLANS

The Mpumalanga Biodiversity Sector Plan (MBSP) (Mpumalanga Parks and Tourism Agency 2014) classifies the natural vegetation of the Province according to the following categories:

- Protected Areas (sub-divided into three categories);
- Critical Biodiversity Areas (sub-divided into "Irreplaceable" and "Optimal");
- Other natural areas;
- Ecological Support Area (sub-divided into four categories); and
- Modified (sub-divided into Heavily or Moderately modified

Figure 5-19 shows the features in the study area within five of the classes listed above:

- Protected Areas: (National Parks and Nature Reserves): On the boundary on the northern side of the site is shown as a protected area. This is, however, incorrect (see discussion below).
- Critical Biodiversity Areas (CBA): Irreplaceable: A significant part of the site is within a "CBA: Irreplaceable" area. These categorized areas are associated with all natural areas in the northern two-thirds of the site.
- Critical Biodiversity Areas (CBA): Optimal: A small spot in the centre of the site is within a "CBA: Optimal" area. These categorized areas are associated with natural areas.

- Ecological Support Area: (Protected Area Buffer): There is a 1 km buffer around the designated protected area, shown faded in Figure 8 in order to show the underlying categories.
- Other Natural Areas (ONA): There are patches throughout the southern part of the site mapped as ONA.
- Heavily or moderately modified: Remaining areas on site, associated primarily with cultivation

The part of the site shown as a Protected Area occupies the parts of the site on the Farm Welgelegen 322 IT (green area in **Figure 5-19**). According to the land owner (Mr L. Reyneke), the farm is NOT a protected area and he is not aware of it ever being so. The 1:50 000 topocadastral maps do not indicate the farm as a protected area. A map of National (formal and informal) protected areas obtained from the SANBI BGIS website does not indicate the area to be a protected area. A GIS spatial layer indicating proposed protected area expansion areas (the National Parks Area Expansion Strategy layer) does not indicate the area as protected and nor does it indicate proposed expansion of the protected area network into this area. On the basis of these various data sources, it is assumed that the designation of the area as protected in the Mpumalanga Biodiversity Sector Plan (MBSP) is an error.

In the absence of any other information to the contrary (the MBSP layer does not provide an indication of the classification of areas within the "Protected Area", in terms of CBA1, CBA2, ESA or ONA), it is assumed that any areas of natural habitat within the "Protected Area" (i.e. excluding any modified areas) would have been designated as CBA1, the next-highest category. This is on the basis that these areas are within two different listed ecosystems (Chrissiesmeer Panveld, listed as Endangered, and Eastern Highveld Grassland, listed as Vulnerable) and it is likely that the conservation planning process would have counted these areas as secured before searching for additional "Irreplaceable" sites.

According to the description for the MBSP Terrestrial Assessment categories, Critical Biodiversity Areas are areas that are required to meet biodiversity targets (for biodiversity pattern and ecological process features). The policy is that they should remain in a natural state. CBAs are areas of high biodiversity value which are usually at risk of being lost and usually identified as important in meeting biodiversity targets, except for Critically Endangered Ecosystems or Critical Linkages. CBAs in the Province can be divided into two sub-categories, which are described in more detail below:

- Irreplaceable (parts of the site are within this sub-category), and
- Optimal (northern parts of the site are within this sub-category

According to the National Parks Area Expansion Strategy (NPAES), the south-eastern parts of the site fall within areas that have been identified as priority areas for inclusion in future protected areas (**Figure 5-20**). The NPAES focus area in question extends southwards from here through the Mpumalanga-KwaZulu-Natal escarpment region, linking the eastern Escarpment to the Drakensberg. It is therefore part of a broad focus area that attempts to conserve the escarpment area. The study area is on the northern edge of this broad area and is therefore partly within the NPAES focus area.

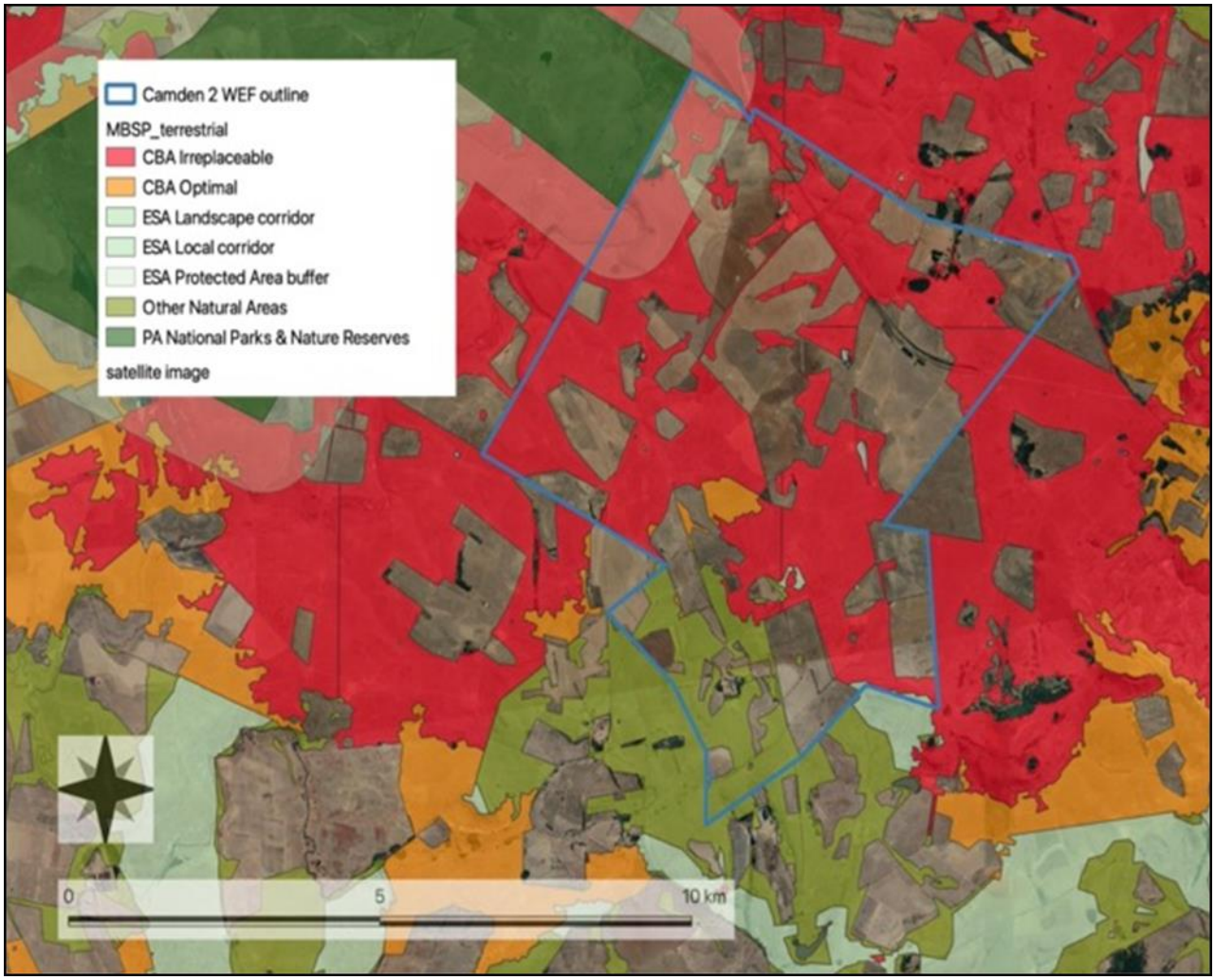


Figure 5-19: Biodiversity Map of the Project Area according to the MBSP (David Hoare Consulting, 2021)

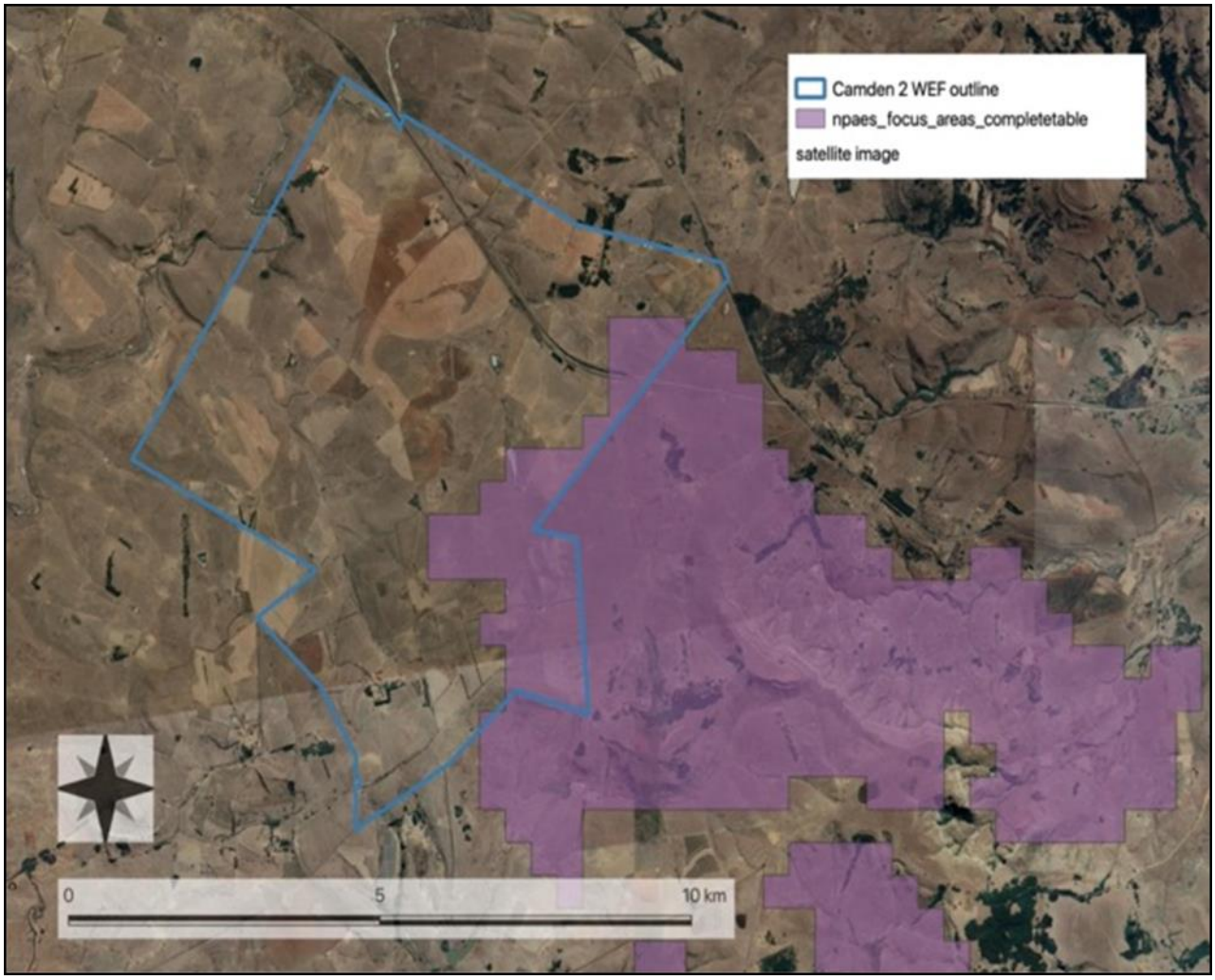


Figure 5-20: National Protected Area Expansion Strategy focus areas

5.2.3 PLANT SPECIES

Lists of plant species previously recorded in the study area were obtained from the South African National Biodiversity Institute (SANBI) website (http://newposa.sanbi.org/). These are listed in Appendix 3 of the Ecological Scoping Report (**Appendix I**). In order to ensure that all possible species were considered for the area, a much larger area was searched for potential species of concern and the total Red and Orange list flora of Mpumalanga was considered here. Despite this broader search, there are a relatively small number of species that were identified of conservation concern that could potentially occur in the broad area that includes the project area.

The list contains 18 species listed in an IUCN threat category (Critically Endangered, Endangered or Vulnerable) or Near Threatened category of which 10 have a high possibility of occurring in the general area and in the type of habitats available in the study area. A further five could possibly occur there. This does not mean that they will occur there, only that the review has identified that these are species that should be assessed as possibly occurring in the area. None of these species were encountered on site, but a more detailed survey of specific habitats would be required to detect them, if they occurred there.

Plant species protected under the National Environmental Management: Biodiversity Act, 2004 (Act 10 of 2004) are listed in Appendix 6 of the Ecological Scoping Report (**Appendix I**). None of the species on this list were encountered on site and none are considered likely to occur there, although some have a geographical distribution that includes the study area.

All plant species protected under the Northern Cape Nature Conservation Act, 2009 (Act 9 of 2009) are listed in Appendix 5 of the Ecological Scoping Report (**Appendix I**). A number of species were found on site that are protected according to the Mpumalanga Nature Conservation Act, 2009 (Act 9 of 2009). From the field survey, this includes the following: *Aloe ecklonis, Boophone disticha, Brunsvigia radulosa*, and *Gladiolus papilio*. Note that these plants were recorded during a general reconnaissance survey. It is likely that other individuals of these species, as well as individuals potentially from other protected species could potentially occur on site. Despite not being threatened, any impacts on these species will require a permit from the relevant authorities.

Tree species protected under the National Forest Act are listed in Appendix 2 of the Ecological Scoping Report (**Appendix I**). There are none with a geographical distribution that includes the region in which the proposed project is located. There are five species that have a geographical distribution that ends south of the study area, namely *Boscia albitrunca, Curtisia dentata, Elaeodendron croceum, Prunus africana* and *Pittosporum viridiflorum*.

No trees or woody plants of significant size were found on site, with the exception of the exotic Eucalyptus trees in two groves on site, and scattered *Salix babylonica* along the banks of the Olifants River. For all five species listed here, there was a distribution gap associated with the southern Highveld part of Mpumalanga, even if the species occurred in all surrounding areas. This partially reflects an absence of indigenous forest patches in this area, the habitat in which many of these protected trees occur.

In summary, no species of protected trees were found or are likely to occur in the geographical area that includes the site.

5.2.4 TERRESTRIAL FAUNA SPECIES

Vertebrate species (mammals, reptiles, amphibians) with a geographical distribution that includes the study area are listed in Appendix 4 of the Ecological Scoping Report (**Appendix I**). All threatened (Critically Endangered, Endangered or Vulnerable) or near threatened vertebrate animals that could occur in the study area and have habitat preference that includes habitats available in the study area, are discussed further below.

MAMMALS

There are 81 mammal species that have a geographical distribution that includes the study area, of which fourteen are listed in a conservation category of some level (see Appendix 3 of the Ecological Scoping Report - **Appendix I**). This is a relatively moderate diversity of mammals compared to other parts of South Africa. Based on the natural state of the study area and surrounding areas, it is considered likely that some of these species could occur on site.

Of the species currently listed as threatened or protected (see Appendix 5 of the Ecological Scoping Report - **Appendix I** for list of protected species), eight of those listed in **Table 5-5** are considered to have a medium to high probability of occurring on site and being potentially negatively affected by proposed activities associated with the proposed projects.

Table 5-5: Mammal species of conservation concern with a likelihood of occurring on site

SCIENTIFIC NAME	COMMON NAME	STATUS	LIKELIHOOD OF OCCURRENCE
Ourebia ourebi	Oribi	Endangered	Low
Pelea capreolus	Grey Rhebok	Near Threatened, protected	Medium
Felis nigripes	Black-footed Cat	Vulnerable, protected	High
Panthera pardus	Leopard	Vulnerable, protected	Low
Aonyx capensis	Cape Clawless Otter	Near Threatened, protected	Medium

SCIENTIFIC NAME	COMMON NAME	STATUS	LIKELIHOOD OF OCCURRENCE
Hydrictus maculicollis	Spotted-necked Otter	Vulnerable, protected	Medium
Poecilogale albinucha	African Striped Weasel	Near Threatened	Medium
Parahyaena brunnea	Brown hyaena	Near Threatened	Low
Atelerix frontalis	South African Hedgehog	Near Threatened, protected	High
Crocidura maquassiensis	Maquassie Musk Shrew	Vulnerable	Low
Crocidura mariquensis	Swamp Musk Shrew	Near Threatened	High
Amblysomus septentrionalis	Highveld Golden Mole	Near Threatened	Medium
Mystromys albicaudatus	White-tailed Rat	Vulnerable	Low
Otomys auratus	Vlei Rat	Near Threatened	High

REPTILES

A total of 60 reptile species have a geographical distribution that includes the study area in which the project site is found (Alexander & Marais 2007, Bates *et al*. 2014, Branch 1988, Marais 2004, Tolley & Burger 2007). This is a moderate diversity compared to average diversity in other parts of the country. Of the reptile species that could potentially occur in the study area, four have been listed in a threat category (**Table 5-6**). There are three reptile species of conservation concern that could potentially occur in the study area and that may therefore be affected by the proposed projects.

Table 5-6: Reptile species of conservation concern with a likelihood of occurring on site.

SCIENTIFIC NAME	COMMON NAME	STATUS	LIKELIHOOD OF OCCURRENCE
Chamaesaura aenea	Coppery grass lizard	Near Threatened	Medium to High
Chamaesaura macrolepis	Large-scaled Grass Lizard	Near Threatened	Low
Tetradactylus breyeri	Breyer's Long-tailed Seps	Vulnerable	Low
Homoroselaps dorsalis	Striped Harlequin Snake	Near Threatened	Medium to High

AMPHIBIANS

A total of 24 frog species have a geographical distribution that includes the general study area in which the project site is found (Du Preez & Carruthers 2009). Some of these species are only marginally present in the study area due to the fact that their distribution range ends close to the study area. Of the frog species that could potentially occur in the study area, none are listed in a threat category, but one species is listed as protected, according to National legislation, the Giant Bullfrog.

It is concluded that the site contains habitat that is suitable for various frog species, although only one species of conservation concern is likely to occur in the study area. One frog species of concern is therefore potentially likely to be affected by development in the study area, as shown in **Table 5-7**.

Table 5-7: Amphibian species of conservation concern with a likelihood of occurring on site.

SCIENTIFIC NAME	COMMON NAME	STATUS	LIKELIHOOD OF OCCURRENCE
Pyxicephalus adspersus	Giant Bullfrog	Protected	Medium

PROTECTED ANIMALS

There are a number of animal species protected according to the National Environmental Management: Biodiversity Act (Act No. 10 of 2004) (see Appendix 6 of the Ecological Scoping Report - **Appendix I**). According to this Act, "*a person may not carry out a restricted activity involving a specimen of a listed threatened or protected species without a permit issued in terms of Chapter 7*". Such activities include any that are "*of a nature that may negatively impact on the survival of a listed threatened or protected species*". This implies that any negative impacts on habitats in which populations of protected species occur or are dependent upon would be restricted according to this Act.

Those species protected according to the National Environmental Management: Biodiversity Act (Act No. 10 of 2004) that have a geographical distribution that includes the site are listed in Appendix 4 of the Ecological Scoping Report (**Appendix I)**, marked with the letter "N". This includes the following species:

- Black Wildebeest (doesn't occur on site),
- Oribi (unlikely to occur on site),
- White Rhinoceros (doesn't occur on site),
- Black-footed Cat,
- Serval,
- Leopard (probably does not occur on site),
- Cape Clawless Otter,
- Spotted-necked Otter,
- Cape Fox,
- Honey Badger,
- South African Hedgehog,
- Brown Hyena,and
- Giant Bullfrog.

There are additional species protected under the Mpumalanga Nature Conservation Act (Act No. 10 of 1998) (see Appendix 5 of the Ecological Scoping Report - **Appendix I**). These include the following that have a geographical distribution that includes the site:

- Giant Bullfrog,
- South African Hedgehog,
- Honey Badger,
- Aardwolf,
- Brown Hyaena,
- Mountain Reedbuck,
- Black Wildebeest,
- Klipspringer,
- Orbi,
- Steenbok,
- Eland,
- Cape Clawless Otter

- Spotted-necked Otter,
- All species of reptiles, except the water leguaan, rock leguaan and all species of snakes, of which the following have a geographical distribution that includes the site:
  - Marsh terrapin
  - Leopard tortoise
  - Common dwarf gecko
  - Spotted dwarf gecko
  - Van Son's gecko
  - Delalande's sandveld lizard
  - Burchell's sand lizard
  - (Spotted sand lizard)
  - Coppery grass lizard
  - Cape grass lizard
  - Large-scaled grass lizard
  - Common girdled lizard
  - Common crag lizard
  - Yellow-throated plated lizard
  - Breyer's long-tailed seps
  - Short-headed legless skink
  - Thin-tailed legless skink
  - Wahlberg's snake-eyed skink
  - Cape skink
  - Red-sided skink
  - Speckled rock skink
  - Variable skink
  - Montane dwarf burrowing skink
  - Common flap-necked chameleon
  - Eastern ground agama
  - Southern rock agama.

5.2.5 HABITATS

The site is within an area of natural grassland interspersed with areas of cultivation, old land, secondary grassland and degraded (built up) areas. A general view over the site is given in Figure 10. The grassland contains variation due to changes in topography, slope inclination, surface rockiness and the influence of water-flow and water retention in the landscape. A broad classification of the natural habitat units on site, which also reflects relatively uniform plant species compositional units, is as follows:

- Grassland (open grassland on undulating plains);
- Wetlands (seasonal wetlands in drainage valleys);
- Floodplain grasslands (flat areas of grassland on the river floodplain);
- Pans (seasonally inundated areas on the river floodplain);
- Secondary wetlands (cultivated or previously cultivated wetland areas);
- Secondary grassland ((secondary grasslands on old lands);
- Cultivation (areas currently cultivated and fallow lands);
- Exotic trees (stands of exotic trees); and
- Degraded areas (disturbed areas with weeds or waste ground).

A preliminary map of habitats within the study area and adjacent areas is provided in **Figure 5-21**.

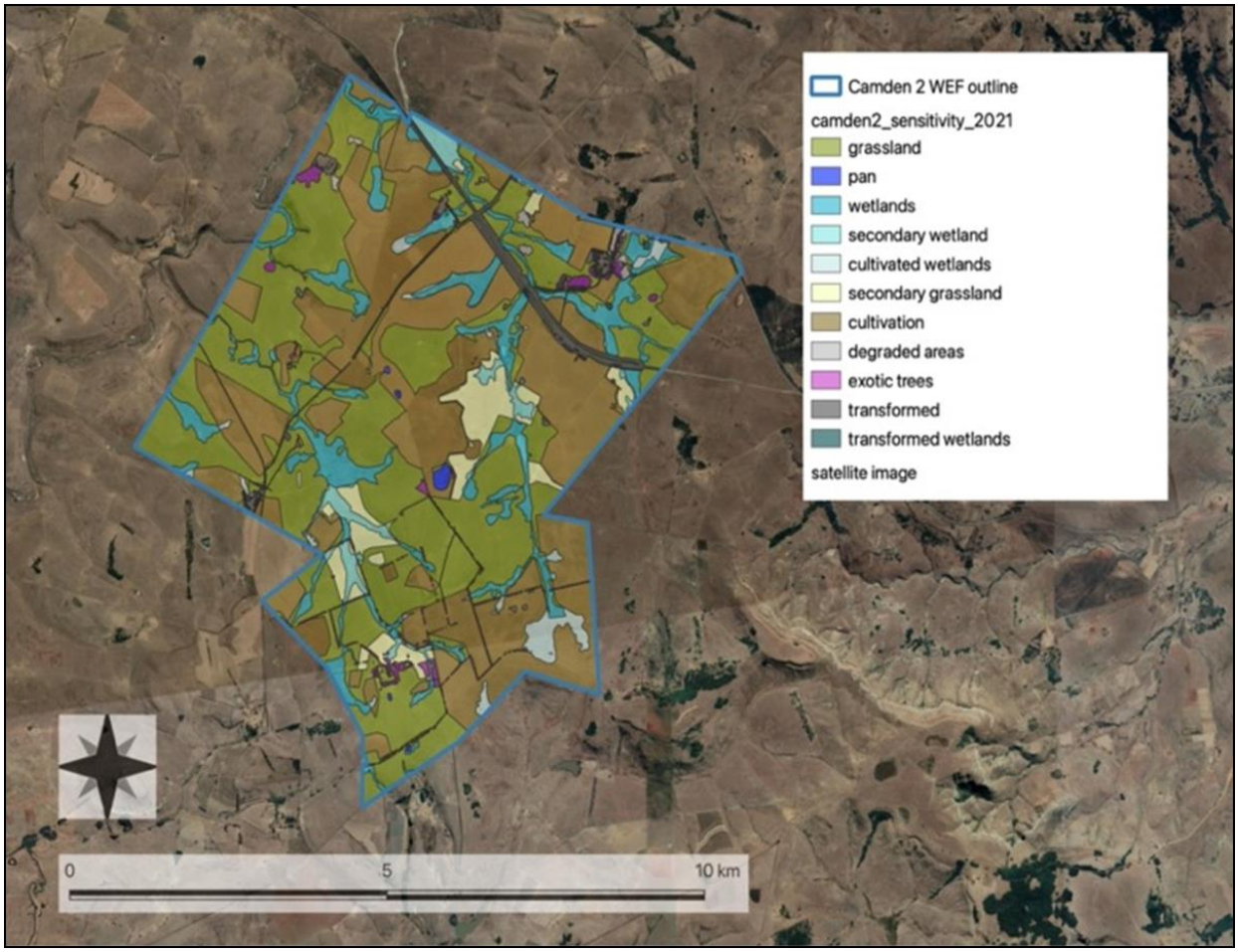


Figure 5-21: Main habitats of the study area (David Hoare Consulting, 2021)

To determine ecological sensitivity in the study area, local and regional factors were taken into account. There are some habitats in the study area that have been described as sensitive in their own right, irrespective of regional assessments. This includes primarily the stream beds and associated riparian zones and adjacent floodplains.

At a regional level, the CBA map for Mpumalanga indicates various parts of the study area as being important for conservation. There are large parts of the study area that fall within CBAs. Much of the remainder of the study area is heavily modified. The CBA map therefore corresponds with the distribution of remaining natural habitat on site.

In terms of other species of concern, including both plants and animals, the preferred habitat of each of these can be determined or has been described. They are, however, distributed amongst different habitats on site, which means that no single habitat is primarily important as habitat for species of concern.

A summary of sensitivities that occur on site and that may be vulnerable to damage from the proposed project are as follows:

- **CBA "Irreplaceable" areas**: The Mpumalanga Biodiversity Sector Plan (MBSP) (Mpumalanga Parks and Tourism Agency 2014) shows areas on site within various conservation planning categories, including areas designated as "CBA: Irreplaceable". These are areas that are required to meet biodiversity targets (for biodiversity pattern and ecological process features), the implication being that there are no other areas that meet the biodiversity criteria for meeting these conservation planning objectives. The Provincial policy is that they should remain in a natural state. Where possible, impacts on these areas should be minimised.
- **Wetlands**: These are described here only in terms of being a unique botanical habitat and not in the sense of a formal wetland delineation, which is normally assessed in a separate specialist study. The wetlands

must be delineated according to “DWAF, 2003: A Practical Guideline Procedure for the Identification and Delineation of Wetlands and Riparian Zones”. Restrictions in terms of infrastructure within these areas should be according to the National Water Act (Act 36 of 1998), except where the wetlands fall within a CBA “Irreplaceable” area, in which case they should be considered to be “No-Go” areas.

- **Listed ecosystems**: Chrissiesmeer Panveld is listed as Endangered, and Eastern Highveld Grassland and Eastern Temperate Freshwater Wetlands are both listed as Vulnerable in the National List of Ecosystems that are Threatened and need of protection (GN1002 of 2011). However, the first two are included almost entirely within a CBA: Irreplaceable area on site, so is already discussed in point 1 above. The second is a wetland vegetation type and is covered in point 2 above.
- **Grasslands**: Grassland vegetation, in a general sense has been identified as threatened nationally as a habitat type. Indications are that loss of any grassland habitat is permanent in an ecological and biodiversity sense, and it is not possible to restore grassland to a natural state after they have been disturbed. They should therefore be treated as sensitive and all efforts made to minimize impacts on any area of grassland. If possible, the footprint of any proposed infrastructure should be kept to a minimum within any natural grasslands, especially those in a moderate to good condition.
- **Plant species of concern**: There are a number of listed plant species that could potentially occur on site. The key habitats are grasslands and wetlands. There are also various protected species that could potentially occur on site

Based on this information, a map of habitat sensitivity on site is provided in **Figure 5-22**. This shows main habitat sensitivity classes on site, as follows:

- LOW for all transformed areas.
- MEDIUM-LOW for secondary grasslands in previously cultivated areas.
- MEDIUM for cultivated wetlands.
- MEDIUM-HIGH for all remaining natural habitat on site.
- HIGH for remaining natural habitat within “CBA: Irreplaceable” and “CBA: Optimal” areas.
- VERY HIGH for intact natural wetlands

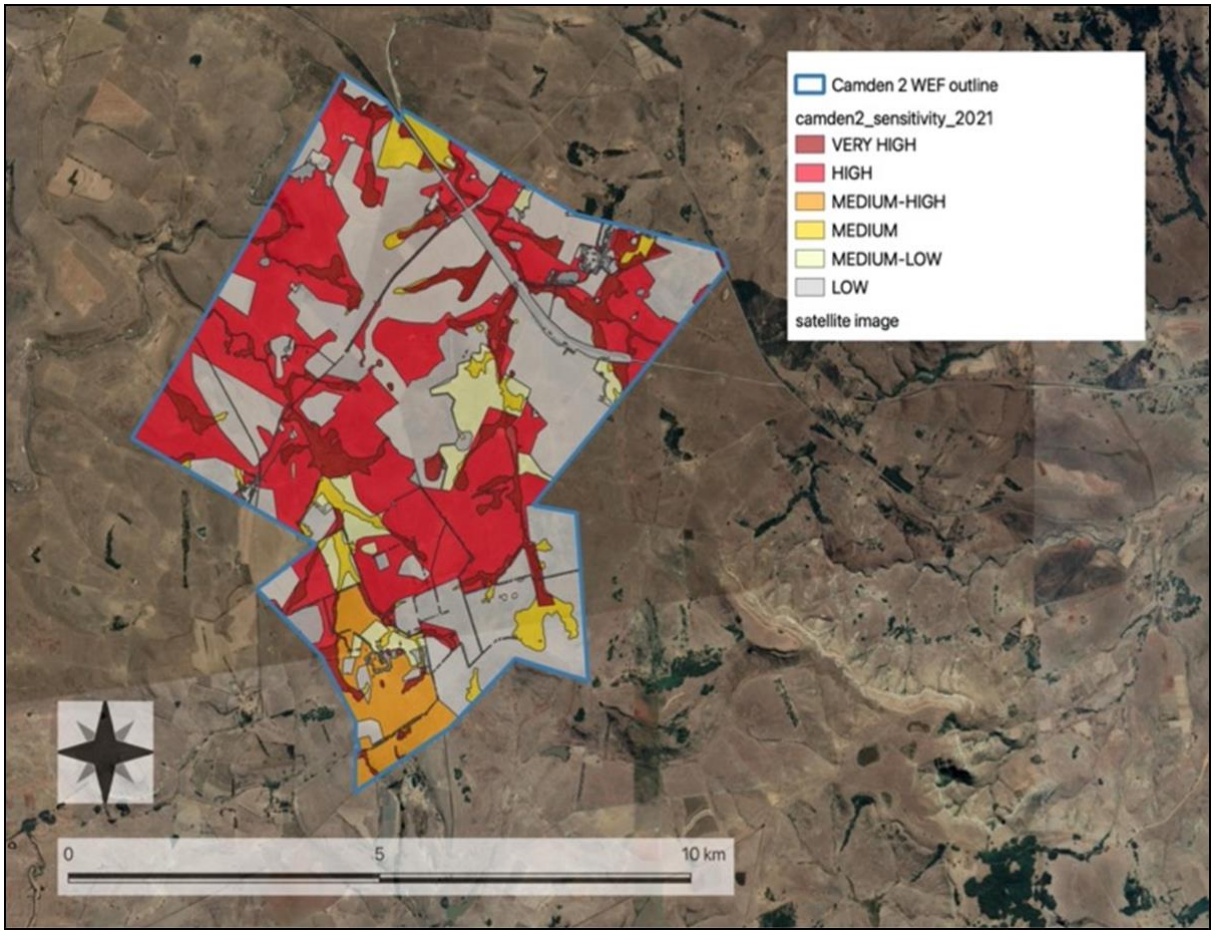


Figure 5-22: Habitat Sensitivity of the Study Area, including CBAs

5.2.6 AVIFAUNA

IMPORTANT BIRD AREAS

The project site is located between two Important Bird Area (IBAs), overlapping slightly with one. The closest IBA to the project site is the Grasslands IBA SA020, which is located on the eastern border of the site, with one land parcel overlapping with the IBA. The Amersfoort-Bethal-Carolina SA018 is located 13km to the east of the site. The Chrissies Pans IBA SA019 is located 20km to the north-east of the site. Due to the close proximity of the site to the IBAs, it is possible that some highly mobile priority species which are also IBA trigger species, and which occur either permanently or sporadically in the IBAs, might be impacted by the project when they leave to forage or breed beyond the borders of the IBA. Species that were recorded in the broader areas but not necessarily within the Camden development area) and fall within this category are the following:

- Secretarybird
- Pied Avocet
- Denham's Bustard
- Blue Crane
- Grey Crowned Crane
- Wattled Crane
- White-backed Duck
- Yellow-billed Duck
- Martial Eagle
- Lanner Falcon

- Greater Flamingo
- Lesser Flamingo
- Black-necked Grebe
- Little Grebe
- African Marsh Harrier
- Black Harrier
- Southern Bald Ibis
- African Grass Owl
- Southern Pochard
- Cape Shoveler
- White-winged Tern

BIRD HABITAT

Whilst much of the distribution and abundance of the bird species in the project site can be explained by the dominant biomes and vegetation types, it is also important to examine the modifications which have changed the natural landscape, and which may have an effect on the distribution of avifauna. These are sometimes evident at a much smaller spatial scale than the biome or vegetation types, and are determined by a host of factors such as topography, land use and man-made infrastructure.

The following bird habitat classes were identified in the project site:

GRASSLAND

The majority of the habitat in the project site comprises natural grassland. The grassland varies from dense stands of relatively high grass to areas of heavily grazed short grass. The priority species which could potentially use the natural grassland in the project site on a regular basis are the following:

- Secretarybird
- White-bellied Bustard
- Common Buzzard
- Jackal Buzzard
- Buff-streaked Chat
- Blue Crane
- Grey Crowned Crane
- Black-chested Snake Eagle
- Long-crested Eagle
- Spotted Eagle-Owl
- Amur Falcon
- Lanner Falcon
- Grey-winged Francolin
- African Harrier-Hawk
- Southern Bald Ibis
- Black-winged Kite
- Blue Korhaan
- Black-winged Lapwing
- African Grass Owl
- Marsh Owl
- Black Sparrowhawk
- White Stork

The priority species which could occasionally use the natural grassland in the project site are the following:

- Black-bellied Bustard
- Denham's Bustard
- Brown Snake Eagle
- Martial Eagle
- Peregrine Falcon
- African Marsh Harrier
- Black Harrier
- Montagu's Harrier
- Northern Black Korhaan
- Cape Vulture

DRAINAGE LINES AND WETLANDS

There are a number of wetlands in the project site, most of which are associated with drainage lines. The priority species which could potentially use the wetlands in the project site on a regular basis are the following:

- Blue Crane
- Grey Crowned Crane
- African Grass Owl
- Marsh Owl

The priority species which could occasionally use the wetlands in the project site are the following:

- African Marsh Harrier
- Montagu's Harrier
- Wattled Crane

AGRICULTURAL LANDS

The project site contains a patchwork of agricultural fields, where maize, soya beans and pastures are cultivated. Some fields are lying fallow or are in the process of being re-vegetated by grass. The priority species which could potentially use the agricultural fields in the project site on a regular basis are the following:

- Blue Crane
- Grey Crowned Crane
- Common Buzzard
- Spotted Eagle-Owl
- Amur Falcon
- Lanner Falcon
- Southern Bald Ibis
- Black-winged Kite

The priority species which could occasionally use the agricultural lands in the project site are the following:

- Peregrine Falcon
- African Marsh Harrier
- Montagu's Harrier
- Wattled Crane
- Black Harrier
- Black-bellied Bustard
- Denham's Bustard
- Brown Snake Eagle
- Martial Eagle
- Northern Black Korhaan
- Cape Vulture

ALIEN TREES

The project site contains few trees. Most trees are alien species, particularly Eucalyptus, Australian Acacia (Wattle), and Salix (Willow) species. Trees are often planted as wind breaks next to agricultural lands and around homesteads. Some of the drainage lines also have trees growing in them. The priority species which could potentially use the alien trees in the project site on a regular basis are the following:

- Grey Crowned Crane
- Common Buzzard
- Spotted Eagle-Owl
- Amur Falcon
- Lanner Falcon
- Southern Bald Ibis
- Black-winged Kite
- Jackal Buzzard
- Black-chested Snake Eagle
- Long-crested Eagle
- African Harrier-Hawk
- Black Sparrowhawk
- African Fish Eagle

The priority species which could occasionally use the alien trees in the project site are the following:

- Peregrine Falcon
- Brown Snake Eagle
- Martial Eagle
- Cape Vulture
- Southern Bald Ibis

DAMS

There are numerous ground dams at the project site, located in drainage lines. The priority species which could potentially use the dams in the project site on a regular basis are the following:

- African Fish Eagle

The priority species which could occasionally use the dams in the project site are the following:

- Western Osprey

PANS

The project site contains one large pan, and another large pan is located approximately one kilometre south of the site. These pans are a potential drawcard for many priority species. Lesser and Greater Flamingos could use these pans for foraging and roosting. Large raptors and vultures could use the pans for bathing and drinking, and Blue Cranes could roost there on occasion. The priority species which could potentially use the pans in the project site on a regular basis are the following:

- Common Buzzard
- Jackal Buzzard
- Blue Crane
- Black-chested Snake Eagle
- Long-crested Eagle
- Lanner Falcon
- Greater Flamingo
- Lesser Flamingo
- African Harrier-Hawk

The priority species which could occasionally use the pans in the project site are the following:

- Brown Snake Eagle
- Martial Eagle
- Peregrine Falcon
- African Marsh Harrier
- Montagu's Harrier
- Black Harrier
- Cape Vulture
- Black-bellied Bustard
- Denham's Bustard
- Wattled Crane
- Northern Black Korhaan
- Western Osprey

PRIORITY SPECIES

The South African Bird Atlas Project 2 (SABAP2) data indicates that a total of 234 bird species could potentially occur within the broader area. Appendix 1 of the Avifauna Scoping Report (**Appendix J**) provides a comprehensive list of all the species. Of these, 37 species are classified as priority species (see definition of priority species in section 4) and 16 of these are South African Red List species. Of the priority species, 25 are likely to occur regularly in the development area.

Table 5-8 lists all the priority species that are likely to occur regularly and the possible impact on the respective species by the proposed wind farm. The following abbreviations and acronyms are used:

- NT = Near threatened
- VU = Vulnerable
- EN = Endangered

Table 5-8: Priority species potentially occurring at the development area (Red List species are shaded)

SPECIES	TAXONOMIC NAME	SABAP2 REPORTING RATE		CONSERVATION STATUS			RECORDED DURING	LIKELIHOOD OF REGULAR	HABITAT FEATURE						POTENTIAL IMPACT				
		FULL PROTOCOL REPORTING RATE	AD HOC PROTOCOL REPORTING RATE	GLOBAL STATUS	REGIONAL STATUS	IBA TRIGGER SPECIES			GRASSLAND	DRAINAGE LINES	ALIEN TREES	PANS	AGRICULTURE	DAMS	COLLISIONS WITH	DISPLACEMENT:	DISPLACEMENT:	ELECTROCUTION:	COLLISIONS: MV
African Fish Eagle	*Haliaeetus vocifer*	12.12	0.88	-	-		x	H			x			x	x			x	
African Grass Owl	*Tyto capensis*	2.42	0.00	-	VU	x	x	M	x	x					x	x	x	x	
African Harrier-Hawk	*Polyboroides typus*	11.52	1.76	-	-		x	M	x		x	x			x			x	
African Marsh Harrier	*Circus ranivorus*	0.61	0.00	-	EN	x		L	x	x		x			x			x	
Amur Falcon	*Falco amurensis*	29.09	6.61	-	-		x	H	x		x		x		x				
Black Harrier	*Circus maurus*	0.00	0.88	EN	EN	x		L	x			x			x			x	
Black Sparrowhawk	*Accipiter melanoleucus*	12.12	0.88	-	-		x	M	x		x				x			x	
Black-bellied Bustard	*Lissotis melanogaster*	0.61	0.00	-	-			L	x						x	x	x		
Black-chested Snake Eagle	*Circaetus pectoralis*	3.03	0.44	-	-		x	M	x		x	x			x			x	
Black-winged Kite	*Elanus caeruleus*	60.61	12.78	-	-		x	H	x		x		x		x			x	
Black-winged Lapwing	*Vanellus melanopterus*	14.55	0.00	-	-		x	H	x						x	x			
Blue Crane	*Grus paradisea*	11.52	0.44	VU	NT	x	x	H	x	x		x	x		x	x	x		
Blue Korhaan	*Eupodotis caerulescens*	6.06	0.00	NT	LC	x	x	M	x						x	x	x		
Brown Snake Eagle	*Circaetus cinereus*	1.82	0.00	-	-			L	x		x	x			x			x	
Buff-streaked Chat	*Campicoloides bifasciatus*	5.45	0.44	-	-	x		M	x							x	x		
Cape Vulture	*Gyps coprotheres*	0.00	0.00	EN	EN		x	L	x		x	x			x			x	x
Common Buzzard	*Buteo buteo*	27.88	9.25	-	-		x	H	x		x	x	x		x			x	

SPECIES	TAXONOMIC NAME	SABAP2 REPORTING RATE		CONSERVATION STATUS			RECORDED DURING	LIKELIHOOD OF REGULAR	HABITAT FEATURE						POTENTIAL IMPACT				
		FULL PROTOCOL REPORTING RATE	AD HOC PROTOCOL REPORTING RATE	GLOBAL STATUS	REGIONAL STATUS	IBA TRIGGER SPECIES			GRASSLAND	DRAINAGE LINES	ALIEN TREES	PANS	AGRICULTURE	DAMS	COLLISIONS WITH	DISPLACEMENT:	DISPLACEMENT:	ELECTROCUTION:	COLLISIONS: MV
Denham's Bustard	*Neotis denhami*	1.82	0.00	NT	VU	x		L	x						x	x	x		
Greater Flamingo	*Phoenicopterus roseus*	3.64	4.41	-	NT	x	x	M				x			x				
Long-crested Eagle	*Lophaetus occipitalis*	6.67	9.25	-	-		x	M	x		x	x			x			x	
Marsh Owl	*Asio capensis*	5.45	0.44	-	-		x	H	x	x					x	x	x	x	
Martial Eagle	*Polemaetus bellicosus*	2.42	0.00	EN	EN	x	x	L	x		x	x			x			x	
Montagu's Harrier	*Circus pygargus*	1.21	0.00	-	-			L	x	x		x			x			x	
Northern Black Korhaan	*Afrotis afraoides*	0.61	0.00	-	-			L	x						x	x	x		
Peregrine Falcon	*Falco peregrinus*	1.21	0.00	-	-		x	L	x		x	x	x		x			x	
Secretarybird	*Sagittarius serpentarius*	13.33	0.00	EN	VU	x	x	H	x						x	x			
Southern Bald Ibis	*Geronticus calvus*	23.03	3.08	VU	VU	x	x	H	x		x		x		x			x	
Spotted Eagle-Owl	*Bubo africanus*	9.09	0.88	-	-		x	H	x		x		x		x		x	x	
Wattled Crane	*Grus carunculata*	0.61	0.00	VU	CR	x		L		x					x				
Western Osprey	*Pandion haliaetus*	0.61	0.00	-	-			L						x	x			x	
White Stork	*Ciconia ciconia*	7.27	1.32	-	-		x	M	x						x				
White-bellied Bustard	*Eupodotis senegalensis*	7.88	0.00	-	VU	x	x	M	x						x	x	x		

AVIFAUNA SENSITIVITY

The following specific environmental sensitivities have been identified from an avifaunal perspective:

- **100m all infrastructure exclusion zone (barring essential roads and gridline crossings) around drainage lines, pans and associated wetlands.** Wetlands and pan edges are important breeding, roosting and foraging habitat for a variety of Red List priority species, most notably for African Grass Owl (SA status Vulnerable), Grey Crowned Crane (SA status Endangered) and African Marsh Harrier (SA status Endangered). Where unavoidable, road and grid line crossings across these features should be restricted to the immediate footprint of the infrastructure only.
- **High sensitivity grassland - Limited infrastructure zone.** Development in the remaining high sensitivity grassland must be limited as far as possible. Where possible, infrastructure must be located near margins, with shortest routes taken from the existing roads. The grassland is vital breeding, roosting and foraging habitat for a variety of Red List priority speciesThe grassland is vital breeding, roosting and foraging habitat for a variety of Red List priority species. These include Blue Crane (SA status near-threatened), Blue Korhaan (Global status near -threatened), White-bellied Bustard (SA Status Vulnerable), Denham's Bustard (SA Status Vulnerable).

The avifaunal sensitivities identified from a wind energy perspective for the Camden II WEF are shown in **Figure 5-23**.

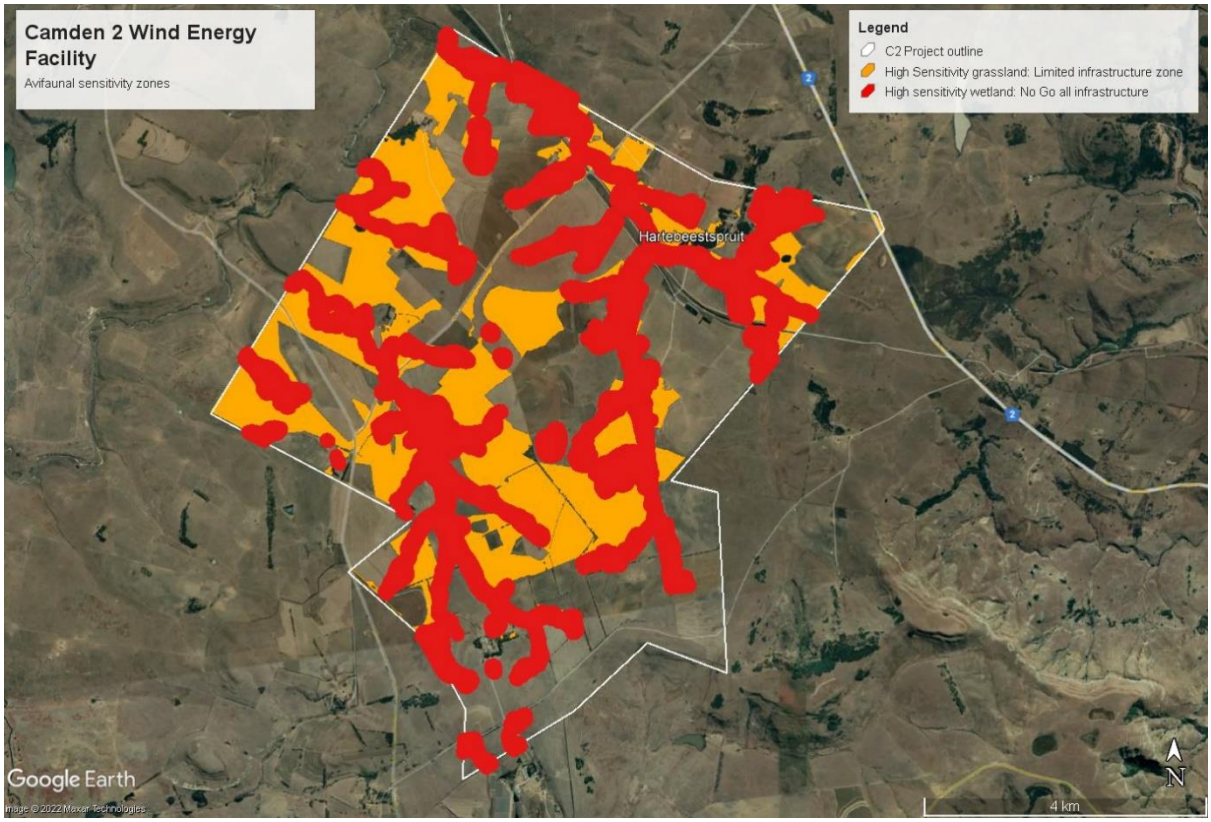


Figure 5-23: Proposed avifaunal exclusion zones at the Camden II WEF (Chris van Rooyen Consulting, 2021).

5.2.7 BATS

Table 5-9 indicates the species of bat which have been confirmed to occur on site, those unconfirmed species which may potentially occur on site, as well as those occurring in the broader area of the site based on literature review. For each species, the risk of impact by wind energy infrastructure was assigned by MacEwan et al. (2020) based on their distributions, altitudes at which they fly, and foraging ecology.

There are several bat species in the vicinity of the site that occur commonly in the area. Some of these species are of special importance based on their likelihood of being impacted by the proposed WEF, due to high abundances and certain behavioural traits. They have also been dominating records of fatalities at wind energy facilities in South Africa. The relevant species are discussed below.

TADARIDA AEGYPTIACA

The Egyptian free-tailed bat, *Tadarida aegyptiaca*, is a Least Concern species (SANBI Red List 2016) as it has a wide distribution and high abundance throughout South Africa, and is part of the free-tailed bat family (Molossidae). It occurs from the Western Cape of South Africa, north through to Namibia and southern Angola; and through Zimbabwe to central and northern Mozambique (Monadjem et al. 2020). This species is protected by national legislation in South Africa (ACR 2020).

Egyptian free-tailed bats roost communally in small (dozens) to medium-sized (hundreds) groups in caves, rock crevices, under exfoliating rocks, in hollow trees and behind the bark of dead trees. It has also adapted to roosting in buildings, in the roofs of houses in particular (Monadjem et al. 2020). Thus, man-made structures and large trees on the site would be important roosts for this species.

Tadarida aegyptiaca forages over a wide range of habitats, flying above the vegetation canopy. It appears that the vegetation has little influence on foraging behaviour as the species forages over desert, semi-arid scrub, savannah, grassland and agricultural lands. Its presence is strongly associated with permanent water bodies due to concentrated densities of insect prey (Monadjem et al. 2020).

After a gestation of four months, a single pup is born, usually in November or December, when females give birth once a year. In males, spermatogenesis occurs from February to July and mating occurs in August. Maternity colonies are apparently established by females in November.

The Egyptian free-tailed bat is considered to have a high risk of fatality on wind energy facilities due to turbine collisions (MacEwan et al. 2020). Due to the high abundance and widespread distribution of this species, high mortality rates due to wind turbines would be a cause for concern as these species have more significant ecological roles than the rarer bat species, and are currently displaying moderate to high numbers of mortalities at nearby operating wind farms.

LAEPHOTIS CAPENSIS

Laephotis capensis is commonly called the Cape serotine (formerly *Neoromicia capensis*) and has a conservation status of Least Concern (SANBI Red List 2016) as it is found in high numbers and is widespread over much of Sub-Saharan Africa. High mortality rates of this species due to wind turbines would be a cause for concern as precisely because of its abundance. As such, it has a more significant role to play within local ecosystems than the rarer bat species.

The Cape serotine roosts individually or in small groups of two to three bats in a variety of shelters, such as under the bark of trees, at the base of aloe leaves, and under the roofs of houses. They will use most man-made structures as day roosts which can be found throughout the site and surrounding areas (Monadjem et al. 2020). They do not undertake migrations and thus are considered residents of the site.

Mating takes place from the end of March until the beginning of April. Spermatozoa are stored in the uterine horns of the female from April until August, when ovulation and fertilisation occur. They give birth to twins during late October and November, but single pups, triplets and quadruplets have also been recorded (van der Merwe 1994 and Lynch 1989).

They are tolerant of a wide range of environmental conditions as they survive and prosper across arid and semi-arid areas to montane grasslands, forests, and savannas; indicating that they may occupy several habitat types across the site, and are amenable towards habitat changes. They are however clutter-edge foragers, meaning they prefer to hunt on the edge of vegetation clutter, but can occasionally forage in open spaces. They are thought to have a medium to high likelihood of fatality due to wind turbines (MacEwan et al. 2020) and are currently displaying moderate to high numbers of mortalities at operational wind farms in South Africa.

MINIOPTERUS NATALENSIS

Miniopterus natalensis, commonly referred to as the Natal long-fingered bat, occurs widely across the country but mostly within the southern and eastern regions, and is listed as Least Concern (Monadjem et al. 2020). This bat is a cave-dependent species and identification of suitable roosting sites may be more important in

determining its presence in an area than the presence of surrounding vegetation. It occurs in large numbers when roosting in caves with approximately 260 000 bats observed making seasonal use of the De Hoop Guano Cave in the Western Cape, South Africa. Culverts and mines have also been observed as roosting sites for either single bats or small colonies. Separate roosting sites are used for winter hibernation activities and summer maternity behaviour, with the winter hibernacula generally occurring at higher altitudes in more temperate areas and the summer hibernacula occurring at lower altitudes in warmer areas of the country (Monadjem et al. 2020).

Mating and fertilisation usually occur during March and April and is followed by a period of delayed implantation until July/August. Birth of a single pup usually occurs between October and December as the females congregate at maternity roosts (Monadjem et al. 2020 & van de Merwe 1979).

The Natal long-fingered bat undertakes short migratory journeys between hibernaculum and maternity roosts. Due to this migratory behaviour, they are considered to be at high risk of fatality from wind turbines if a wind farm is placed within a migratory path (MacEwan et al. 2020). The mass movement of bats during migratory periods could result in mass casualties if wind turbines are positioned over a mass migratory route and such turbines are not effectively mitigated. Very little is known about the migratory behaviour and paths of M. natalensis in South Africa with migration distances exceeding 150 kilometres. If the site is located within a migratory path, the bat detection systems should detect higher numbers and activity of the Natal long-fingered bat in spring and autumn; this will be examined over the course of the 12-month monitoring survey.

A study by Vincent et al. (2011) on the activity and foraging habitats of Miniopteridae found that the individual home ranges of lactating females were significantly larger than that of pregnant females. It was also found that the bats predominately made use of urban areas (54%) followed by open areas (19.8%), woodlands (15.5%) orchards and parks (9.1%) and water bodies (1.5%) when selecting habitats. Foraging areas were also investigated with the majority again occurring in urban areas (46%), however a lot of foraging also occurred in woodland areas (22%), crop and vineyard areas (8%), pastures, meadows and scrubland (4%) and water bodies (4%).

MacEwan et al. (2020) advise that *M. natalensis* faces a medium to high risk of fatality due to wind turbines. This evaluation was based on broad ecological features and excluded migratory information. The species is currently displaying low to moderate numbers of mortalities at operational wind farms in South Africa

Table 5-9: Species currently confirmed on site, previously recorded in the area, or potentially occurring. Roosting and foraging habitats in the study area, conservation status and risk of impact are also briefly described per species (Monadjem et al. 2020)

SPECIES	COMMON NAME	OCCURRENCE IN AREA*	CONSERVATION STATUS (SANBI & EWT, 2016)	POSSIBLE ROOSTING HABITAT ON SITE	POSSIBLE FORAGING HABITAT UTILISED ON SITE	RISK OF IMPACT (MACEWAN ET AL. 2020 FOR WIND)
Tadarida aegyptiaca	Egyptian free-tailed bat	Confirmed on site	Least Concern (2016 Regional Listing)	Hollows in trees, and behind the bark of dead trees. The species has also taken to roosting in roofs of buildings.	It forages over a wide range of habitats; its preferences of foraging habitat seem independent of vegetation. It seems to forage in all types of habitats.	High
Mops midas	Midas free-tailed bat	Confirmed in 100km radius	Least Concern (2016 Regional Listing)	Hollows in trees, and behind the bark of dead trees. The species has also taken to roosting in roofs of buildings.	It forages over a wide range of habitats; its preferences of foraging habitat seem independent of vegetation. It seems to forage in all types of habitats.	High
Mops (Chaerephon) pumilus	Little free-tailed bat	Confirmed in 100km radius	Least Concern (2016 Regional Listing)	Hollows in trees, and behind the bark of dead trees. The species has also taken to roosting in roofs of buildings.	It forages over a wide range of habitats; its preferences of foraging habitat seem independent of vegetation. It seems to forage in all types of habitats.	High
Laephotis (Neoromicia) capensis	Cape serotine	Confirmed on site	Least Concern (2016 Regional Listing)	Roosts in the roofs of houses and buildings, and also under the bark of trees.	It appears to tolerate a wide range of environmental conditions from arid semi-desert areas to montane grasslands, forests, and savannahs. Predominantly a medium height clutter edge forager on site.	High
Laephotis zuluensis	Zulu serotine	Confirmed in 100km radius	Least Concern (2016 Regional Listing)	Roosts under the bark of trees, and possibly roofs of buildings.	Predominantly a medium height clutter edge forager on site.	Medium – High

SPECIES	COMMON NAME	OCCURRENCE IN AREA*	CONSERVATION STATUS (SANBI & EWT, 2016)	POSSIBLE ROOSTING HABITAT ON SITE	POSSIBLE FORAGING HABITAT UTILISED ON SITE	RISK OF IMPACT (MACEWAN ET AL. 2020 FOR WIND)
Laephotis nanus	Banana bat	Confirmed in 100km radius	Least Concern (2016 Regional Listing)	Roosts under the bark of trees, and in the folded leaves of banana trees in the larger area.	Predominantly a medium height clutter edge forager on site.	Medium – High
Pipistrellus hesperidus	Dusky pipistrelle	Confirmed in 100km radius	Least Concern (2016 Regional Listing)	Roosts under the bark of trees, and possibly roofs of buildings.	Prefers vegetation edges and clutter with open water sources.	Medium – High
Miniopterus natalensis	Natal long-fingered bat	Confirmed on site	Least Concern (2016 Regional Listing)	Caves and mine tunnels present in the larger area, may also take residence in suitable hollows such as culverts under roads.	Clutter-edge forager. May forage in more open terrain during suitable weather.	High
Miniopterus fraterculus	Lesser long-fingered bat	Confirmed in 100km radius	Least Concern (2016 Regional Listing)	Caves and mine tunnels present in the larger area.	Clutter-edge forager. May forage in more open terrain during suitable weather.	High
Eptesicus hottentotus	Long-tailed serotine	Confirmed in 100km radius	Least Concern (2016 Regional Listing)	It is a crevice dweller roosting in rock crevices in the larger area, as well as other crevices in buildings.	It generally seems to prefer woodland habitats, and forages on the clutter edge. But may still forage over open terrain occasionally.	Medium – High
Myotis tricolor	Temmink's myotis	Confirmed in 100km radius	Least Concern (2016 Regional Listing)	Caves and mine tunnels present in the larger area, may also take residence in suitable hollows such as culverts under roads.	Clutter-edge forager. May forage in more open terrain during suitable weather.	Medium – High
Rhinolophus blasii	Blasius's horseshoe bat	Confirmed in 100km radius	Near Threatened (2016 Regional Listing)	Caves and mine tunnels present in the larger area.	Vegetation clutter forager, clumps of trees on site.	Low

SPECIES	COMMON NAME	OCCURRENCE IN AREA*	CONSERVATION STATUS (SANBI & EWT, 2016)	POSSIBLE ROOSTING HABITAT ON SITE	POSSIBLE FORAGING HABITAT UTILISED ON SITE	RISK OF IMPACT (MACEWAN ET AL. 2020 FOR WIND)
Rhinolophus clivosus	Geoffroy's horseshoe bat	Confirmed in 100km radius	Least Concern (2016 Regional Listing)	Caves and mine tunnels present in the larger area.	Vegetation clutter forager, clumps of trees on site.	Low
Rhinolophus swinnyi	Swinny's horseshoe bat	Confirmed in 100km radius	Vulnerable (2016 Regional Listing)	Caves and mine tunnels present in the larger area.	Vegetation clutter forager, clumps of trees on site.	Low
Rhinolophus simulator	Bushveld horseshoe bat	Confirmed in 100km radius	Least Concern (2016 Regional Listing)	Caves and mine tunnels present in the larger area.	Vegetation clutter forager, clumps of trees on site.	Low
Scotophilus dinganii	Yellow-bellied house bat	Confirmed in 100km radius	Least Concern (2016 Regional Listing)	Roofs of buildings and other suitable hollows.	Clutter-edge forager. May forage in more open terrain during suitable weather.	High
Cloeotis percivali	Percival's short-eared trident bat	Confirmed in 100km radius	Endangered (2016 Regional Listing)	Caves and mine tunnels present in the larger area.	Vegetation clutter forager, clumps of trees on site.	Low
Epomophorus wahlbergi	Wahlberg's epauletted fruit bat	Confirmed in 100km radius	Least Concern (2016 Regional Listing)	Roosts in dense foliage of large, leafy trees in the larger area, and may travel several kilometres each night to reach fruiting trees.	Feeds on fruit, nectar, pollen and flowers. If and where available on or near site.	High
Eidolon helvum	African straw-coloured fruit bat	Possible as migrant	Least Concern (2016 Regional Listing) (Globally Near threatened)	Non-breeding migrant with sparse scattered records.	Feeds on fruit, nectar, pollen and flowers, if and where available on site.	High

BAT SENSITIVITY

Google Earth satellite imagery and verifications during site visits were used to spatially demarcate areas of the site with high and medium sensitivities relating to bat species ecology and habitat preferences, where high sensitivities and their buffers are no-go zones for turbines and turbine blade overhang (**Table 5-10** and **Table 5-11**).

In other words, no turbine blades may intrude into high sensitivity buffers. Medium sensitivities indicate areas of probable increased risk due to seasonal fluctuations in bat activity, but turbines are allowed to be constructed in medium sensitivity areas..

Figure 5-24 depicts the sensitive areas of the site, based on features identified to be important for foraging and roosting of the species that are most likely to occur on site.

Table 5-10: Description of parameters used in the development of the sensitivity map

LAST REVISION	**NOVEMBER 2021**
High sensitivities and 200m buffers	Valley bottom wetlands
	Pans and depressions
	Dams
	Drainage lines capable of supporting riparian vegetation which in turn increases localised insect abundance
	Other water bodies and other sensitivities such as manmade structures, buildings, houses, barns, sheds, stands of tall trees.
Moderate sensitivities and 150m buffers	Seasonal wetlands
	Seasonal drainage lines

Table 5-11: The significance of sensitivity map categories for each infrastructure component for the Camden II WEF

SENSITIVITY	TURBINES	ROADS AND CABLES	INTERNAL OVERHEAD TRANSMISSION LINES	BUILDINGS (INCLUDING SUBSTATION, BATTERY STORAGE FACILITY AND CONSTRUCTION CAMP/YARDS)
High Sensitivity	These areas are 'no-go' zones and turbines may not be placed in these areas. Turbine blades (blade overhang) may not intrude into these areas.	Preferably keep to a minimum within these areas where practically feasible.	Allowed inside these areas.	Avoid these areas.
High Sensitivity buffer	These areas are 'no-go' zones and turbines may not be placed in these areas. Turbine blades (blade overhang) may not intrude into these areas.	Allowed inside these areas.	Allowed inside these areas.	Preferably keep to a minimum within these areas where practically feasible.
Moderate Sensitivity	Turbines within these areas may require priority (not excluding all other turbines) during post-construction studies, and in some instances, there is a higher likelihood that mitigation measures may need to be applied to them.	Allowed inside these areas.	Allowed inside these areas.	Allowed inside these areas.
Moderate Sensitivity buffer	Turbines within these areas may require priority (not excluding all other turbines) during post-construction studies, and in some instances, there is a higher likelihood that mitigation measures may need to be applied to them.	Allowed inside these areas.	Allowed inside these areas.	Allowed inside these areas.

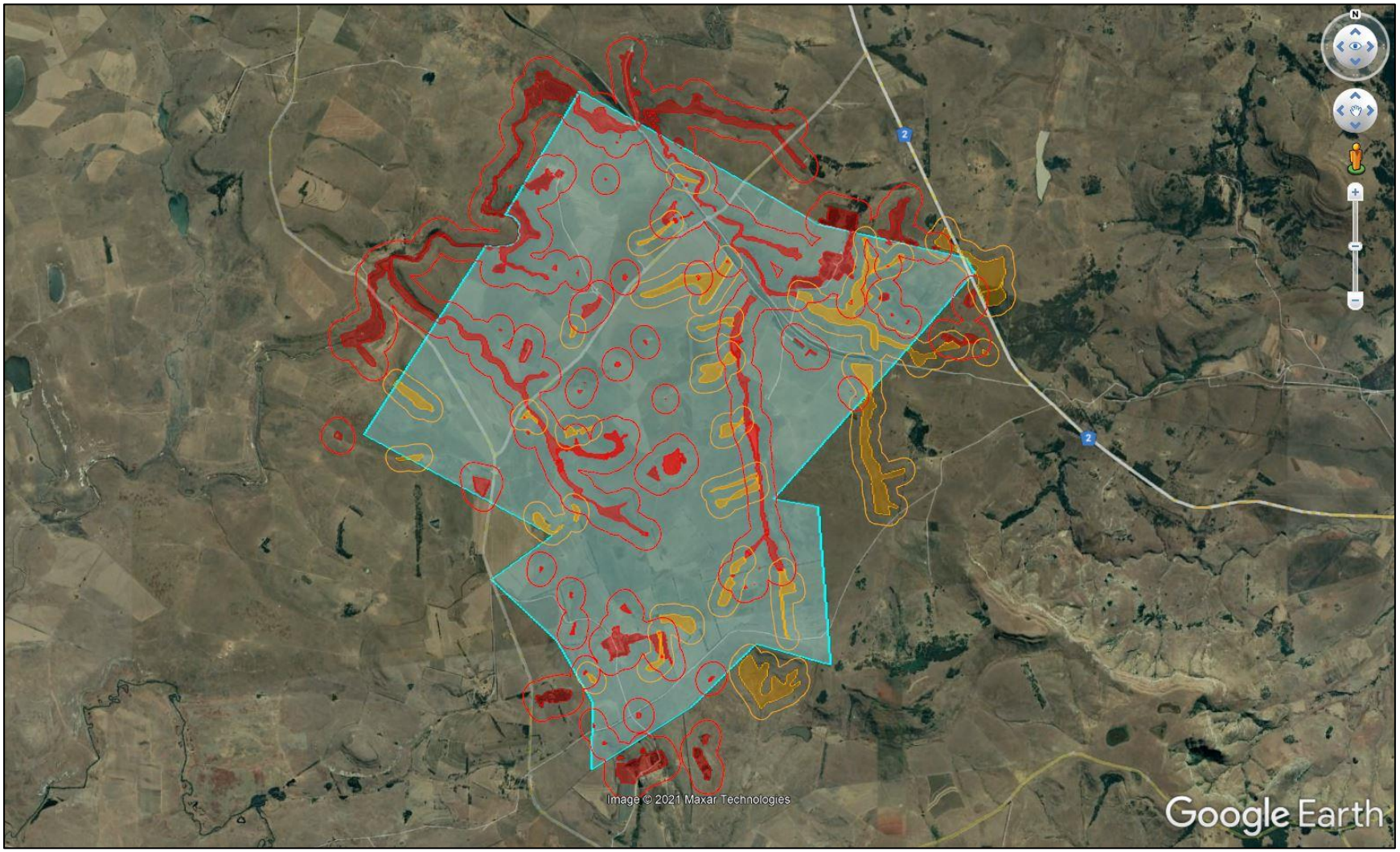


Figure 5-24: Bat sensitivity map of the site. Site area indicated in a dark blue boundary. Sensitivity polygons are provided in .kml format with this report. Shaded red = high sensitivity; Red line = 200m high sensitivity buffer; Shaded orange = medium sensitivity; Orange line = 150m medium sensitivity buffer

5.3 SOCIAL ENVIRONMENT

5.3.1 LAND USE

DEVELOPMENT SITE

The site is used for cultivation and for the grazing of both cattle and sheep. Cultivated crops include maize, soya beans and the fodder crop, weeping love grass, *Eragrostis curvula*.

In terms of the South African National Land Cover dataset, the site is classified as Grassland interspersed with cultivation areas, small sections of forested land and numerous wetlands/water bodies throughout the project site (**Figure 5-25**).

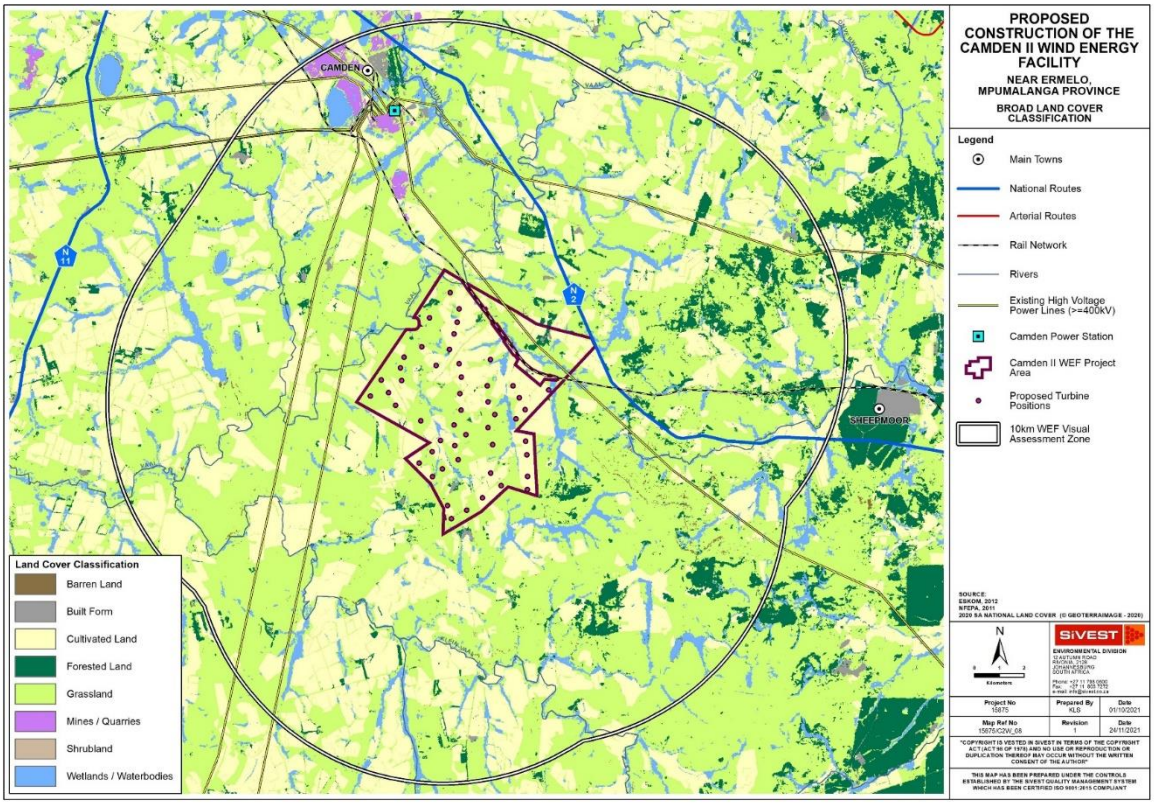


Figure 5-25: Broad land cover classification (SiVest 2021)

SURROUNDING AREAS

The study area is located approximately 10km south east of the town of Ermelo. The only other settlement in the area is the rural settlement of Sheepmore located approximately 20 km to the east of the proposed project site.

Commercial agriculture is the dominant activity in the study area, with the main focus being maize cultivation and livestock grazing. There are multiple farm portions in the study area, resulting in a relatively moderate density of rural settlement with many scattered farmsteads in evidence. Built form in much of the study area comprises farmsteads, ancillary farm buildings and workers' dwellings, gravel access roads, telephone lines, fences and windmills.

High levels of human influence are however visible in the northern / north-eastern sector of the study area. Much of the town of Ermelo encroaches into the study area and peri-urban areas stretching southwards from

Ermelo along the N2 national route are dominated by mining activity and associated infrastructure, including Mooiplaats and Vunene Collieries. Also located in this area is the Camden Power Station with associated high voltage power lines, and the adjacent Camden residential area.

Other evidence of significant human influence includes a sizeable quarry (Rietspruit Crushers) located to the west of the N11 national route, as well as road, rail, telecommunications and high voltage electricity infrastructure.

5.3.2 NOISE CLIMATE

The existing noise climate surrounding the Camden II WEF is predominantly rural with very low baseline noise levels anticipated. Noise sources may include birds, insects, livestock and activities of resident farmers. Anthropogenic influences may include traffic on local roads and on the nearby N2 National road as well as train activity along the railway line located just northeast of the study area.

Sensitive receptors are identified as areas that may be impacted negatively due to noise associated with the proposed WEF. Examples of receptors include, but are not limited to, schools, shopping centres, hospitals, office blocks and residential areas. Being such a remotely located site, dominant receptors in the area surrounding the site include small farmsteads and farmhouses. The specific sensitive receptors (farmhouses) considered in this study are presented in **Figure 5-26**.

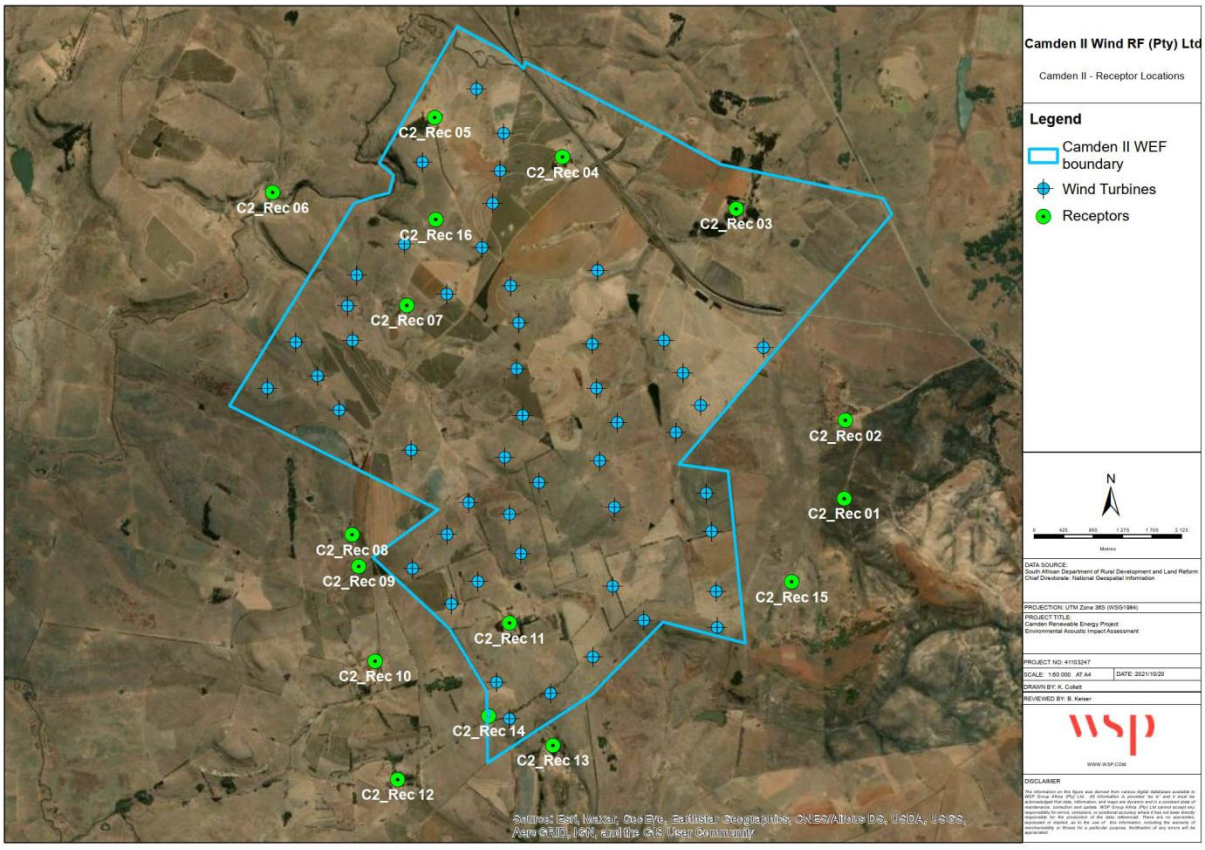


Figure 5-26: Sensitive receptors surrounding the Camden II WEF

Noise from wind turbines can be classified into two categories, namely mechanical noise generated from the turbine's mechanical components and aerodynamic noise, produced by flow of air over the turbine blades. Based on the close proximity of some of the turbines to the sensitive receptors in the region, such impacts may be anticipated, however, these can only be confirmed during the preliminary modelling exercise to be carried out in the EIA phase.

MECHANICAL NOISE

The mechanical noise generated by a wind turbine is predominantly tonal (dominated by a narrow range of frequencies), but may also be broadband in character, displaying a wide range of frequencies (Council of Canadian Academics, 2015). Such noise is produced by the physical movement of the following components:

- Gearbox;
- Generator;
- Yaw drives;
- Cooling fans; and
- Auxiliary equipment.

Over time, appropriate design and manufacturing have reduced the mechanical noise produced from wind turbines. As such, the aerodynamic noise from the blades has become the dominant source of noise for modern turbines, however, low frequency tones associated with mechanical sources are audible for some turbines (Hau, 2006; Manwell et al., 2009; Oerlemans, 2011).

AERODYNAMIC NOISE

Aerodynamic noise is typically broadband in nature and is generated by the interaction between air flow and different parts of the turbine blades. These interactions depend on the speed and turbulence of the wind; the shape of the blade; the angle between the blade and relative wind velocity flowing over the blade; and the distance from the hub. The noise levels produced are relative to the velocity of the air flow, with higher rotor speeds resulting in higher noise levels. Specifically, parts of the blade closer to the tips move faster than those closer to the hub, resulting in faster relative air velocities and create higher aerodynamic noise levels. As such, most of the aerodynamic noise is produced near (but not at) the blade tips. This is partly why turbines with longer blades have a higher sound power level (Oerlemans, 2011).

Aerodynamic noise from wind turbines also has a strong directional component, projecting primarily downward, upward, or even perpendicular depending on the dominant mechanism (Oerlemans, 2011). As such, noise levels measured at a particular location can vary depending on the direction, speed and turbulence of the prevailing wind. Furthermore, as the rotor turns, the orientation of each blade changes in relation to a stationary receiver. As such, the noise levels at the receiver will vary as the blades rotate, resulting in periodic regular changes in noise levels over time (Renewable UK, 2013).

As wind speed increases, the aerodynamic noise of the turbines also increases. At low speeds the noise created is generally low and increases to a maximum at a certain speed (around 10 m/s) where it either remains constant or can even slightly decrease.

LOW FREQUENCY NOISE AND INFRASOUND

In addition to the noise discussed above, wind turbines also produce some steady, deep, low frequency sounds (between 1 – 100 Hz), particularly under turbulent wind conditions. Sound waves below 20 Hz are called infrasound. These infrasound levels are only audible at very high sound pressure levels. Older wind turbines that had downwind rotors created noticeable amounts of infrasound. Levels produced by modern-day, up-wind style turbines are below the hearing threshold for most people (Jakobsen, 2005).

The human ear is substantially less sensitive to sound at very low or very high frequencies. For most people, a very low pitch sound (20 Hz) must have a sound pressure level of 70 dB to be audible. Levels of infrasound near modern commercial wind turbines are far below this level and are generally not perceptible to people (Leventhall, 2006).

Low frequency sound, like all other sound, decreases as it travels away from the source. Siting wind turbines further away from sensitive receptors will therefore decrease the risk of infrasound. It is, however, important to note that in flat terrain, low frequency sound can travel more effectively than high frequency sound. Most environmental sound measurements and noise regulations are based on the A-weighed decibel scale (dB(A)), which under-weights low frequency sounds in order to mimic the human ear. Thus, noise limits based on the dB(A) levels do not fully regulate infrasound. The dB(C) scale offers an alternative of measuring sound that provides more weight to lower frequencies (Jakobsen, 2005; Bolin et al., 2011).

SANS 10103 proposes a methodology to identify whether low frequency noise could be an issue. The method suggests that if the difference between LAeq and LCeq is greater than 10 dB, then a predominant low frequency component may be present. However, in all cases the existing acoustic energy in low frequencies associated with wind must be considered.

SUBSTATION AND TRANSFORMER NOISE

In addition to the noise from wind turbines, wind farms require a substation and transformers, which produce a characteristic "hum" or "crackle" noise. Utility companies have experience with building and siting such sources to minimise their impact. Substation-related noise is relatively easy to mitigate should this be required, based on the use of acoustic shielding and careful planning regarding placement away from sensitive receptors. As such, noise associated with this source is not considered in this assessment.

5.3.3 TRANSPORT NETWORK

The local road network consists of the N2 to the north and north east of the project site, and the N11 to the west and south of the site. The Richards Bay railway line traverse the site to the south of the Camden Power station site. There are 3 landing strips within Msukaligwa municipality one municipal landing strip in Ermelo with tarred runaway for various activities, one at Warburton and Woodstock farms respectively used for fire-fighting purposes by forestry companies.

5.3.4 HERITAGE AND CULTURAL RESOURCES

The Camden power station and associated small town is situated 16km south from Ermelo in Mpumalanga. The archaeological record for the greater study area consists of the Stone Age and Iron Age.

STONE AGE

The Stone Age of southern Africa starts when hominins (ancestral to modern-day humans) first started to produce crude tools made with stone. The Earlier Stone Age (2 million - 200 000 years ago) is associated with hominins such as Homo habilis and Homo erectus (Dusseldorp et al. 2013). Mpumalanga currently does not have an extensive ESA archaeological record, at Maleoskop on the farm Rietkloof, only a few ESA artefacts have been found and stone tools consisted of choppers (Oldowan), hand axes, and cleavers (Acheulean) (Esterhuysen & Smith 2007) and some surface scatters have been recorded near Piet Retief (Nel & Karodia 2013).

Middle Stone Age artefacts represents archaic and modern humans that occupied the landscape between 300 000 to 40 000 before present. Later Stone Age occupational sequences reflect San and Khoisan communities from 40 000 years ago until recently (Dusseldorp et al. 2013). Although the MSA and LSA has not been extensively studied in Mpumalanga, evidence for these periods has been excavated from Bushman Rock Shelter in the Ohrigstad District (Esterhuysen & Smith 2007; Lombard et al. 2012) and it is known that San communities lived near Lake Chrissie as recently as the 1950s (e.g., Schlebusch et al. 2016). MSA and LSA surface scatters have also been investigated in the vicinity of Piet Retief, and De Wittekrans nearby Camden is a Later Stone Age archaeological rock art site complex (Nel & Karodia 2013).

IRON AGE

The archaeology of farming communities of southern Africa encompasses three phases. The Early Iron Age (200-900 CE) represents the arrival of Bantu-speaking farmers in southern Africa. Living in sedentary settlements often located next to rivers, these farmers cultivated sorghum, beans, cowpeas, and kept livestock. The Middle Iron Age (900-1300 CE) is mostly confined to the Limpopo Valley in southern Africa with Mapungubwe Hill probably representing the earliest 'state' in this region (Huffman 2007).

The Late Iron Age (1300-1840s CE) marks the arrival and spread of ancestral Eastern Bantu-speaking Nguni and Sotho-Tswana communities into southern Africa. The location of Late Iron Age settlements is usually on or near hilltops for defensive purposes. The Late Iron Age as an archaeological period ended by 1840 CE, when the Mfecane caused major socio-political disruptions in southern Africa (Huffman 2007).

Dates from Early Iron Age sites indicated that by the beginning of the 5th century CE Bantu-speaking farmers had settled in the Mpumalanga lowveld. Subsequently, farmers continued to move into and between the lowveld and highveld of Mpumalanga. Iron Age sites such as Welgelegen Shelter, Robertsdrift and Tafelkop situated 50-100 km west of Camden dates from the 12th to the 18th century (Derricourt & Evers 1973; Esterhuysen & Smith 2007).

During the mid-17th century Europeans started to settle in modern-day Cape Town. During and after the conflict caused by the Mfecane (1820-1840), during the reign of king kaSenzangakhona Zulu, known as Shaka, Dutch-speaking farmers started to migrate to the interior regions of South Africa. A period that is marked by various skirmishes and battles between the local inhabitants, Dutch settlers and the British (Giliomee & Mbenga 2007).

HISTORICAL CONTEXT OF CAMDEN

Camden power station was commissioned in 1967 (Gaigher 2011; Matenga 2020). However, the nearby town of Ermelo has a rich history. The earliest record for settlers in Ermelo is from 1860, when the area was under the jurisdiction of Zulu-speaking Nhlapo communities (Nhlapo 1945). The construction of the town of Ermelo was initiated by the Dutch Reform Church, which purchased the eastern part of the farm Nooitgedacht on 26 May 1879. The town was officially proclaimed on 12 February 1880 by William Owen Lanyon, the Administrator of the Transvaal (Greyling 2017).

BATTLEFIELDS AND WAR HISTORY

Due to the proximity of Ermelo to the Nederlandsche Zuid-Afrikaansche Spoorweg-Maatskappij railway line linking Pretoria with Lourenço Marques (Maputo), the area was subject to various skirmishes during the Anglo-Boer War of 1899-1902. At the time there were about 100 families residing in the town and many women and children were sent to British concentration camps. In 1901, British troops burnt the town down due to their scorched earth policy, and Ermelo was rebuilt in 1903 (Moody 1977; Pretorius 2000; Van Schalkwyk 2012; Greyling 2017).

GRAVES AND BURIAL SITES

No graves are indicated by the Genealogical Society of the South Africa for the study area. The Klipbank cemetery with 21 graves is indicated 3,6 km to the south of the Project.

CULTURAL LANDSCAPE

The greater area is mostly cultivated, and forms part of a landscape characterised by wide scale cultivation and mining activities. Development in the study area is limited to farming infrastructure such as access roads, fences, and agricultural developments.

5.3.5 VISUAL CHARATER AND SENSITIVITY

VISUAL CHARACTER AND CULTURAL VALUE

The physical and land use-related characteristics of the study area as described above contribute to its overall visual character. Visual character largely depends on the level of change or transformation from a natural baseline in which there is little evidence of human transformation of the landscape. Varying degrees of human transformation of a landscape would engender differing visual characteristics to that landscape, with a highly modified urban or industrial landscape being at the opposite end of the scale to a largely natural, undisturbed landscape. Visual character is also influenced by the presence of built infrastructure including buildings, roads and other objects such as telephone or electrical infrastructure. The visual character of an area largely determines the sense of place relevant to the area. This is the unique quality or character of a place, whether natural, rural or urban which results in a uniqueness, distinctiveness or strong identity.

The predominant land use in the area (maize cultivation) has significantly transformed the natural landscape across much of the study area. In addition, the landscape becomes progressively more transformed towards the northern boundary of the study area where Camden Power Station and mining activities have resulted in a high degree of visual degradation. The more industrial character of the landscape is an important factor in this context, as the introduction of the proposed WEF would result in less visual contrast where other anthropogenic

elements are already present, especially where the scale of those elements is similar to that of the proposed development.

The scenic quality of the landscape is also an important factor that contributes to the visual character or inherent sense of place. Visual appeal is often associated with unique natural features or distinct variations in form. As such, the pastoral landscape and rolling hills in parts of the study area are important features that could increase the visual appeal and visual interest in the area.

Cultural landscapes are becoming increasingly important concepts in terms of the preservation and management of rural and urban settings across the world. The concept of 'cultural landscape' is a way of looking at a place that focuses on the relationship between human activity and the biophysical environment (Breedlove, 2002). In this instance, the rural / pastoral landscape represents how the environment has shaped the predominant land use and economic activity practiced in the area, as well as the patterns of human habitation and interaction. The presence of small towns, such as Ermelo, engulfed by an otherwise rural / pastoral environment, form an integral part of the wider landscape.

In light of this, it is important to assess whether the introduction of a WEF into the study area would be a degrading factor in the context of the prevailing character of the cultural landscape. Broadly speaking, visual impacts on the cultural landscape in the area around the proposed development would be reduced by the fact that the visual character in much of the area has been significantly transformed and degraded by mining and infrastructural development.

VISUAL SENSITIVITY

Visual sensitivity can be defined as the inherent sensitivity of an area to potential visual impacts associated with a proposed development. It is based on the physical characteristics of the area (i.e. topography, landform and land cover), the spatial distribution of potential receptors, and the likely value judgements of these receptors towards a new development (Oberholzer: 2005). A viewer's perception is usually based on the perceived aesthetic appeal of an area and on the presence of economic activities (such as recreational or nature-based tourism) which may be based on this aesthetic appeal. The areas identified as visually sensitive to WEF development are shown in **Figure 5-27**. It is important to note that receptors identified within the WEF project are landowners and supportive of the development proceeding.

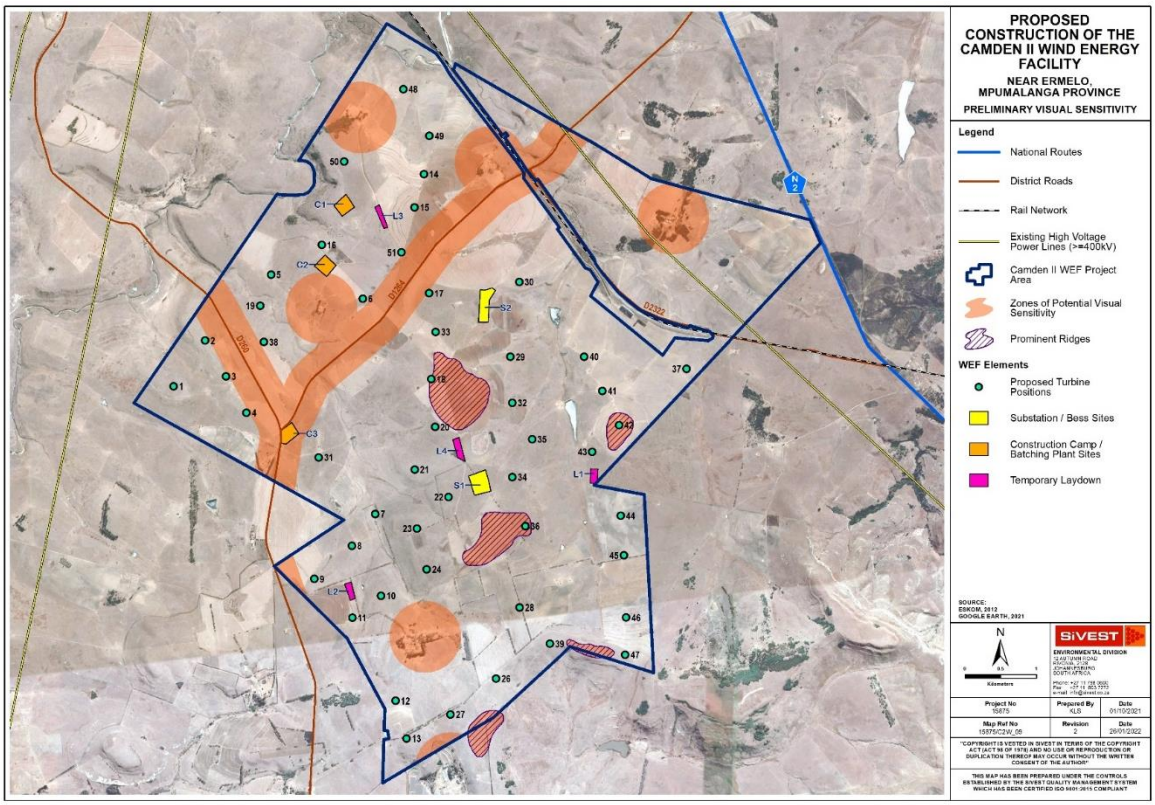


Figure 5-27: Visual sensitivity on the Camden II WEF Site

5.3.6 SOCIO-ECONOMIC

SOCIAL OVERVIEW OF THE STUDY AREA

The study area is located ~ 10 km to the south-east of the town of Ermelo, which is the administrative centre of the Msukaligwa Local Municipality. Ermelo is also known as the garden city of Mpumalanga and the gateway to the province. The only other settlement in the area is the rural settlement of Sheepmore located ~ 20 km to the east of the site.

Three national highways, namely the N2, N11 and the N17 intersect at Ermelo. The N2 freeway connects Ermelo with Richards Bay on the KwaZulu Natal coastline. The N11 South connects the town to Newcastle to the south and then onto the Ladysmith before linking up with the N3 to Durban. The N11 north connects to Middelburg and the N4 freeway west to Pretoria. The N17 West connects the town to the southern suburbs of Johannesburg and N17 East to eSwatini.

Ermelo is also a major railway junction between Mpumalanga and KwaZulu-Natal. The rail junction connects to Machadodorp which is on the Pretoria and Maputo railway line. The town also lies on the railway line that connects the Mpumalanga coalfields with the export Port of Richards Bay on the Indian Ocean.

The study area is flanked by the N2 to the north and north-east of the site, and the N11 to the west and south west of the site. The Richards Bay railway line traverse the site to the south of the Camden Power station site (**Figure 5-28**). The Eskom Camden Coal Power station is located immediately to the north and north east of the site. Construction of the 1600 MW power station commenced in November/December 1962 and the first turbo-generator was commissioned in April 1967. The last of the eight units was commissioned in 1969. The Camden Power station became the starting point of the national power grid, consisting of a series of 400 kV lines which today interconnect the entire country. The power station has six 111.86m high cooling towers and four 154m high chimney (smoke stacks) that serve 8 boilers.

Between 1990 and 2006 the station was mothballed, but South Africa's energy crisis in the early 21st century prompted Eskom to recommission the station, starting with unit 6 in July 2005 and completing with unit 1 in July 2008.

The development of the Camden Power station also involved the construction of 356 permanent houses to the north of the power station to accommodate administration, operating and maintenance personnel. Community facilities including a community hall, sports facilities, included four tennis courts, a bowling green, swimming bath, shooting range, rugby, hockey, soccer, and cricket fields and jukskei, and the associated clubhouses and changerooms were also established. Several parks, situated throughout the residential property, provided playgrounds for some 500 children at Camden. Schooling was provided in Ermelo for these children, with a regular bus service operating between Camden and Ermelo[9].

The other land uses in the study area include coal mining and commercial agriculture. Commercial agriculture in the area between the N2 and N11 to the south and west of the Camden Power Station includes livestock and grain farming. There are a number of farmsteads associated with the farming operations in the area, some of which are no longer inhabited. The number of occupied farmsteads will be confirmed during the site visit undertaken during the assessment phase. A guest farm, the Drinkwater Guest Farm, is located adjacent to and east of the N11, ~ 14 km south west of the Camden Power Station.

The social environment can therefore be described is a working agricultural / industrial (power related) environment. With the exception of the Drinkwater Guest Farm there do not appear to be any other tourist related activities located in the study area. Therefore, from a social perspective there appear to be a limited number of sensitive social receptors.

[9] https://www.eskom.co.za/sites/heritage/Pages/Camden.aspx

Figure 5-28: Camden Power Station

ADMINISTRATIVE CONTEXT

The study area is located within the Msukaligwa Local Municipality and the Dr Pixley ka Semem Local Municipality within the Mpumalanga Province. The Msukaligwa Local Municipality is one of the seven Local Municipalities that make up the Gert Sibande District Municipality (**Figure 5-29**). The town of Ermelo is the administrative seat of the Msukaligwa Local Municipality and therefore, this municipality is the focus of the social context of the project.

Figure 5-29: Location of Msukaligwa Municipality within the Gert Sibande District Municipality and Mpumalanga Province

DEMOGRAPHIC OVERVIEW

POPULATION

The population of the Msukaligwa Local Municipality in 2016 was 164 608 (Community Household Survey 2016). Of this total, 35.4% were under the age of 18, 60.4% were between 18 and 64, and the remaining 4.1% were 65 and older. The MM therefore had a high percentage of the population that fall within the economically active group of 18-65. The figures are higher than the figures for the GSDM and Mpumalanga (57.7% and 56.6% respectively). This is likely to be due to the employment opportunities associated with the mining and manufacturing activities in the Msukaligwa Local Municipality.

The dependency ratio is the ratio of non-economically active dependents (usually people younger than 15 or older than 64) to the working age population group (15-64). The higher the dependency ratio the larger the percentage of the population dependent on the economically active age group. This in turn translates to reduced revenue for local authorities to meet the growing demand for services. The traditional approach is based people younger than 15 or older than 64. The information provided provides information for the age group under 18. The total number of people falling within this age group will therefore be higher than the 0-15 age group. However, most people between the age of 15 and 17 are not economically active (i.e., they are likely to be at school).

Using information on people under the age of 18 is therefore likely to represent a more accurate reflection of the dependency ratio. Based on these figures, the dependency ratios for the Msukaligwa Local Municipality, the GSDM and Mpumalanga in 2016 were 65.4%, 73.5% and 77% respectively. The high dependency ratios reflect the limited employment and economic opportunities in the area and the province as a whole. As indicated above, a high dependency ratio also places pressure on local authorities in terms of service delivery.

In terms of race groups, Black Africans made up 91.6% of the population on the MM, followed by Whites, 6.9% and Asian or Indians, 0.9%, and Coloureds, 0.6%. This figures for the GSDM are similar. The main first language spoken in the Msukaligwa Local Municipality was isizulu, 79.1%, followed by Siswati, 7.3% and Afrikaans, 6.2%.

HOUSEHOLDS AND HOUSE TYPES

The total number of households in the Msukaligwa Local Municipality in 2016 was 51 090, which constituted approximately 20% of the total number of households in the GSDM. Of these 66.2% were formal houses, 9.1% flats in backyards, 6.6% traditional dwellings, and 9.4% shacks or informal dwellings. The figures for the GSDM were 67.2%, 4.6%, 6.7% and 13.4% respectively. The majority of dwellings in the Msukaligwa Local Municipality are therefore formal structures. A relatively large percentage of the properties in the MM (43.3%), while 5.9% were owned and in the process of being paid off. 22.1% of the households rented their properties, while 10.6% occupied their properties rent free. The rent-free figure is likely to be associated with farm workers. The relatively high number of properties that are owned and or in the process of being paid off reflects a relatively stable and established community.

In terms of household heads, approximately 38.9% of the households in the Msukaligwa Local Municipality and 39.1% of the households in the GSDM were headed by women. These figures similar to the provincial figure of 39.71%. The high percentage of households headed by women reflects the likelihood that the men have left the area in search of employment opportunities in Gauteng. Women headed households tend to be more vulnerable.

HOUSEHOLD INCOME

Based on the data from the 2011 Census, 12.6% of the population of the Msukaligwa Local Municipality had no formal income, 4.1% earned less than R 4 800, 7.1% earned between R 5 000 and R 10 000 per annum, 17.7% between R 10 000 and R 20 000 per annum and 20.9% between R 20 000 and 40 000 per annum (2016). The poverty gap indicator produced by the World Bank Development Research Group measures poverty using information from household per capita income/consumption. This indicator illustrates the average shortfall of the total population from the poverty line. This measurement is used to reflect the intensity of poverty, which is based on living on less than R3 200 per month for an average sized household (~ 40 000 per annum). Based on this measure, in the region of 62.4% of the households in the Msukaligwa Local Municipality and 65.2% in the GSDM live close to or below the poverty line.

The low-income levels reflect the rural nature of the local economy and the limited formal employment opportunities outside in the urban areas. This is also reflected in the high unemployment rates. The low-income levels are a major concern given that an increasing number of individuals and households are likely to be dependent on social grants. The low-income levels also result in reduced spending in the local economy and less

tax and rates revenue for the Msukaligwa Local Municipality. This in turn impacts on the ability of the Msukaligwa Local Municipality to maintain and provide services.

Household income levels are likely to have been impacted by the COVID-19 pandemic. The number of households in the Msukaligwa Local Municipality and GSDM that live close to or below the poverty line is likely to have increased over the last 18 months. This, coupled with the high dependency ratio, is a major cause of concern for the area.

EMPLOYMENT

The official unemployment rate in the Msukaligwa Local Municipality in 2016 was 15.6%, while 42.6% were employed, and 36.4% were regarded as not economically active. However, the COVID-19 pandemic is likely to have resulted in an increase in unemployment rates in both the ULM and Ward 3. Recent figures released by Stats South Africa also indicate that South Africa's unemployment rate is in the region of 36%, the highest formal unemployment rate in the world.

EDUCATION

In terms of education levels, the percentage of the population over 20 years of age in the Msukaligwa Local Municipality and GSDM with no schooling was 10.6% (2016), compared to 10.8% and 11.3% for the GSDM and Mpumalanga Cape Province. The percentage of the population over the age of 20 with matric was 34.12%, compared to 34.3% and 36.1% for the GSDM and Mpumalanga. The education levels for the Msukaligwa Local Municipality are therefore similar to the DM and Provincial figures.

MUNICIPAL SERVICES

ELECTRICITY

Based on 2016 survey, 87% of households in the Msukaligwa Local Municipality had access to electricity, compared to 90% for the GSDM and 93% for Mpumalanga.

ACCESS TO WATER

Based on the 2016 survey information, 81.7% of households in the Msukaligwa Local Municipality were supplied by a service provider, while 5.8% relied on their own service or natural sources (4%). The reliance on own services or natural sources reflects the rural nature of large parts the Msukaligwa Local Municipality.

SANITATION

72.3% of the households in the Msukaligwa Local Municipality had access to flush toilets (2016), while 18.8% relied on pit toilets and 3.2% had no access to formal sanitation. The high percentage of households that rely on pit toilets is linked to the relatively high percentage (9.4%) of households that live in shacks.

REFUSE COLLECTION

Only 59.4% of the households in the Msukaligwa Local Municipality had access to regular refuse removal service, while 16.5% disposed of their waste at their own dump and 7.1% had not access to facilities. The low percentage of households that have access to regular refuse removal services is linked to the relatively high percentage (9.4%) of households that live in shacks. The relatively higher percentage that dispose of their waste at their own dump reflects the rural nature of the area and the difficulty of providing municipal services to areas located at a distance from the main towns in the area.

HEALTH, EDUCATION AND COMMUNITY FACILITIES

HEALTH SERVICES

The Msukaligwa Local Municipality IDP indicates that there is 1 government and 1 private hospital in the Msukaligwa Local Municipality, 10 primary health care clinics, and 4 mobile clinics (**Table 5-12**).

Table 5-12: Health services in Msukaligwa Local Municipality

FACILITIES	NUMBER
Private Hospitals	1
Primary Health Care Clinics	10

FACILITIES	NUMBER
Mobile Clinics	4
Government hospitals	1
Infectious Hospital (TB)	1
Dentists	4
Gynaecologist	1
Social Workers	12
Private Doctors	20

EDUCATIONAL FACILITIES

The Msukaligwa Local Municipality IDP indicates that there are 71 primary schools, 6 high schools, 12 combined schools and 11 secondary schools in the Msukaligwa Local Municipality . There is 1 FET College, but no tertiary facility (**Table 5-13**). The IDP notes that given the growth in the area there is a need for at least a tertiary institution within the GSDM. Development within Ermelo has also created a need for more primary and high schools.

Table 5-13: Educational Facilities in Msukaligwa Local Municipality

FACILITY	NUMBER
No. of Primary Schools	71
No. of High School	6
No. of Combined Schools	12
No. of Secondary Schools	11
No. of Tertiary Education Facilities	0
No. of FET Colleges	1
No. of Training Centres/Adult Education	9
No. of Private Schools	3
Day Care Centres	40

COMMUNITY FACILITIES

Table 5-14 lists the community facilities in the Msukaligwa Local Municipality. As indicated in the table, Ermelo as the administrative centre is relatively well catered for in terms of community facilities, including police stations, sports facilities, libraries, community halls and pension pay out points. However, Sheepmore, which is the closest rural settlement to the development area does not have a library and the sports facility is an informal soccer field.

Table 5-14: Community facilities

AREA / TOWN	POLICE STATION	PUBLIC SPORT FACILITIES	PUBLIC LIBRARIES	COMMUNITY HALLS	MPCC/TSC	POST OFFICE	PENSION PAY POINTS	COMMENTS
Breyton / KwaZanele	1	4	2	2	1	1	1	There is one informal soccer field at Breyton
Ermelo, Wesselton, Cassim Park and Thusiville	2	9	4	5	-	1	2	There are five informal soccer fields at Wesselton. The Thusiville library is completed but not yet operating
Chrissiesmeer / Kwachibikhulu	1	1	1	1	-	1	1	There is one informal soccer field as Chrissiesmeer
Davel / Kwadela	1	2	1	1	-	1	1	There is one informal soccer field at KwaDela. There is a complaint that the existing library at Davel is far from the majority of users who reside at KwaDela
Lothair / Silindile	1	1	1	1	1	1	1	The TSC is almost completed and postal services run by agency at Lothair
Sheepmoor	1	1	-	1	-	1	1	There is one informal soccer field at Sheepmoor. No library at Sheepmoor
Warburton / Nganga	-	1	-	-	-	1	-	Postal services run at agency at Warburton. The sport facility is an informal soccer field. No library at Warburton

ECONOMIC OVERVIEW

The economic growth rate for Msukaligwa Local Municipality was at 3.0% per annum on average over the period 1996 to 2017 and forecasted average annual GDP growth for 2017-2022 relatively low at 1.3%. The contribution of Msukaligwa Local Municipality to the Mpumalanga economy was around 4.3%, making it the fifth largest local economy in the province. It is the second largest economy in the District, contributing around 15.5%.21

The key economic sectors in the Msukaligwa Local Municipality in 2017 in terms of contribution to GDP were mining (20.3%), community services (18.5%), trade (including industries such as tourism) (18.2%) and finance (14.2%) (**Table 5-15**). Despite the importance of agriculture, it only contributed 6% to GDP in 2017. The IDP notes that the Msukaligwa Local Municipality has a comparative advantage in economic sectors such as agriculture, transport, and mining.

Table 5-15: Contribution of sectors to Msukaligwa Local Municipality GDP

ECONOMIC SECTOR	2014	2017	CHANGE
Agriculture	5,3%	6,0%	0,7%
Community Services	18,4%	18,5%	0,1%
Construction	2,7%	2,7%	0,0%
Finance	13,3%	14,2%	0,9%

ECONOMIC SECTOR	2014	2017	CHANGE
Manufacturing	5,1%	5,1%	0,0%
Mining	20,8%	20,3%	-0,5%
Trade	18,5%	18,2%	-0,3%
Transport	11,3%	11,3%	0,0%
Utilities	4,5%	3,8%	-0,7%

Finance and Agriculture achieved the highest, although slight, growth in contribution from 2014 to 2017. The contribution of utilities, mining and trade declined slightly. In terms of employment, the trade sector (20.6%) was the most important sector in terms of employment, followed by community services (15.3%), mining (12.8%), finance (11.6%) and manufacturing (10.1%) (**Table 5-16**).

Table 5-16: Contribution to employment of sectors in Msukaligwa Local Municipality

EMPLOYMENT SECTOR	2014	2017	CHANGE
Agriculture	6%	6,3%	0,3%
Community Services	14,5%	15,3%	0,8%
Construction	7,9%	8,5%	0,6%
Finance	11,2%	11,6%	0,4%
Manufacturing	9,9%	10,1%	0,2%
Mining	14,7%	12,8%	-1,9%
Trade	21,1%	20,6%	-0,5%
Transport	4,5%	4,7%	0,2%
Utilities	2,5%	2,4%	-0,1%

In terms of unemployment, the Msukaligwa Local Municipality unemployment rate was the 6th lowest among all the municipal areas of Mpumalanga. The unemployment rate deteriorated slightly from 23.1% in 2014 to 24.1% in 2017. Unemployment rates are higher for females at 29.8% and for males at 24.1%. However, youth unemployment at 34.5% is a key concern.

The IDP notes that in terms of future economic development, coal mining can be expected to remain an important sector for the short to medium term. However, the role of this sector is expected to decline in the medium to long term due to limited coal resources, and a move away from a coal-based economy locally and globally due the impact on climate. The current transport and logistics sector is also likely to be impacted on by a decline in coal mining.

6 IDENTIFICATION OF POTENTIAL IMPACTS

The scoping phase of a S&EIR process is aimed to identify potential impacts that are most likely to be significant and which need to be assessed. The determination of anticipated impacts associated with the proposed development is a key component to the S&EIR process. This Chapter identifies the anticipated environmental and social impacts associated with the proposed project.

The issues identified stem from those aspects presented in **Section 5: Description of Baseline Environment** and the description of project components and phases as outlined in **Section 2: Project Description**. Each significant issue identified is to be investigated further during the S&EIR process. Non-significant issues will be scoped out of the study with reasonable consideration given within the Scoping Report.

6.1 AIR QUALITY

Receptors are identified as areas that may be impacted negatively due to emissions from the proposed development. Examples of receptors include, but are not limited to, schools, shopping centres, hospitals, office blocks and residential areas. Due to the remote location of the site, dominant receptors in the area include small farmsteads and farmhouses. A 2km radius / area of influence proposed for the project includes preliminary receptors identified farmsteads within 2km of the nearest turbine and/or associated infrastructure.

Construction Phase Impacts	**Dust Emissions** Construction is a source of dust emissions that can have a temporary impact on the local air quality situation. Emissions during construction are associated with land clearing, drilling, and blasting, ground excavation and cut and fill operations. Dust emissions vary substantially on a daily basis, depending on the level of activity, the specific operations and the prevailing meteorological conditions. A large portion of dust emissions results from movement of equipment and traffic over temporary roads at the construction site. The use of project-related vehicles and machinery can also result in an increase of gaseous emissions and potentially contributing to reduced ambient air quality.
Operational Phase Impacts	No impacts anticipated.
Mitigation Considerations	Implementation of standard construction phase mitigation measures (such as wet suppression) to be outlined in the EMPr will assist in controlling dust emissions and minimising impacts.
Recommended EIA Phase Studies	No further studies are recommended.

6.2 NOISE AND VIBRATIONS

Construction Phase Impacts	**Noise and Vibration Emissions** The following construction-related activities are likely to generate vibrations and additional noise into the environment: — Presence of workforce — Land clearing — Drilling, blasting and piling

- Cut and fill operations
- Vehicle activities associated with transport of equipment
- Use of equipment and machinery
- Concrete mixers and cranes

Vibrations and audible increase in noise can lead to the disturbance and nuisance to sensitive receptors. A receptor is defined by the WBG (April 2007) as "any point on the premises occupied by persons where extraneous noise and/or vibration are received". Being such a remotely located site, dominant receptors in the area surrounding the site include small farmsteads and farmhouses.

Operational Phase Impacts

Noise Emissions

Principal sources of noise in wind energy facilities include mechanical noise generated from the turbine's mechanical components and aerodynamic noise produced by flow of air over the turbine blades. Mechanical noise is produced by the physical movement of components such as gearbox, generator, yaw drives, cooling fans and auxillary equipment. Over time, appropriate design and manufacturing have reduced the mechanical noise produced from wind turbines. As such, the aerodynamic noise from the blades has become the dominant source of noise for modern turbines. Aerodynamic noise is typically broadband in nature and is generated by the interaction between air flow and different parts of the turbine blades.

In addition to the noise from wind turbines, wind farms require a substation and transformers, which produce a characteristic "hum" or "crackle" noise. Utility companies have experience with building and siting such sources to minimise their impact. Substation-related noise is relatively easy to mitigate should this be required, based on the use of acoustic shielding and careful planning regarding placement away from sensitive receptors. As such, noise associated with this source is not considered in this assessment.

Cumulative Impacts

Cumulative impacts might occur due to the additional Camden I WEF proposed in proximity to the study area. The footprint of these two developments will likely be cumulative.

Mitigation Considerations

- Implementation of standard construction phase mitigation measures to be outlined in the EMPr will assist in controlling noise emissions and minimising impacts.
- The following measures are outlined by the IFC / WBG Wind Energy EHS Guideline (August 2015) as having potential to assist to prevent, minimize, and control noise impacts
  - Operating turbines in reduced noise mode.
  - Building walls/appropriate noise barriers around potentially affected buildings (only an option in hilly terrain, due to the height of turbines).
  - Curtailing turbine operations above the wind speed at which turbine noise becomes unacceptable in the project-specific circumstances.

Recommended EIA Phase Studies

An Environmental Acoustic Impact Assessment will be undertaken during the EIA phase including findings of the preliminary modelling, associated impacts, any inputs into micro-siting, as well as detailed recommendations, including mitigation measures if deemed necessary. Refer to **Section 7** of this Report for the Plan of Study for the Environmental Acoustic Impact Assessment.

6.3 TOPOGRAPHY AND GEOLOGY

Construction Phase Impacts

Furthermore, excavation, drilling and blasting activities have the potential to result in slope instability. It is anticipated that minor impacts to the topography will occur during construction and the impact will be limited to localised areas that is within the turbine positions and associated infrastructure.

Operational Phase Impacts

No impacts anticipated.

Mitigation Considerations

- Implementation of erosion management measures in line with the Erosion Management Plan and Rehabilitation Plan to be included in the EMPr.
- All cleared areas must be revegetated with indigenous vegetation.
- Implement an effective stormwater runoff control system, including runoff control features to direct and dissipate water flow from roads and other hardened surfaces.
- Progressive rehabilitation will be essential to reduce the potential for soil erosion and sedimentation.

Recommended EIA Phase Studies

No further studies are recommended.

6.4 SOILS, LAND CAPABILITY AND AGRICULTURAL POTENTIAL

Construction Phase Impacts

Loss of agricultural potential by soil degradation

During the construction phase there is potential for soil degradation. Soil can be degraded by impacts of erosion; impeded drainage; topsoil loss; and contamination. Erosion can occur because of the alteration of the land surface run-off characteristics, which can be caused by construction related land surface disturbance, vegetation removal, and the establishment of hard surface areas including roads. Compacted roads and crane platforms can impede natural, lateral drainage through the soil and result in water logging. Loss of topsoil can result from poor topsoil management during construction related excavations. Hydrocarbon spillages from construction activities can contaminate soil. Soil degradation will reduce the ability of the soil to support agricultural production.

Loss of agricultural potential by occupation of land

Agricultural land directly occupied by the development infrastructure, which includes roads and crane platforms, will become unavailable for agricultural use.

Operational Phase Impacts

Enhanced agricultural potential through increased financial security for farming operations

Reliable income will be generated by the farming enterprises through the lease of the land to the energy facility. This is likely to increase their cash flow and financial security and thereby could improve farming operations.

Prevention of crop spraying by aircraft over land occupied by turbines.

Interference with farming operations

Construction (and decommissioning) activities have some nuisance impact for farming operations but are highly unlikely to have an impact on agricultural production

Cumulative Impacts

Cumulative impacts might occur due to the additional Camden I WEF proposed in proximity to the study area. The footprint of these two developments will likely be cumulative.

Mitigation Considerations

- Implementation of erosion management measures in line with the Erosion Management Plan and Rehabilitation Plan to be included in the EMPr.
- All cleared areas must be revegetated with indigenous vegetation.
- Implement an effective stormwater runoff control system, including runoff control features to direct and dissipate water flow from roads and other hardened surfaces.
- Progressive rehabilitation will be essential to reduce the potential for soil erosion and sedimentation.
- Areas of construction should be (practically) limited in extent, and activities outside of the project area should be kept to a minimum.
- Vegetation removal should be kept to a minimum and limited to the area of development.
- Impacts that are expected to lead to long term degradation of soil quality (i.e. soil contamination) need to be limited through appropriate on-site management measures. This includes the proper handling and storage of hazardous materials, the use of hardstanding in areas where spillages are possible, the use of bunding around storage of hazardous materials and proper upkeep of machinery and vehicles.

Recommended EIA Phase Studies

A detailed Agricultural Agro-Ecosystem Specialist Assessment would need to be undertaken during the EIA phase of the assessment. Refer to **Section 7** of this Report for the Plan of Study for the Agricultural Agro-Ecosystem Specialist Assessment.

6.5 SURFACE WATER

Construction Phase Impacts

The construction of the project components will result in clearing of vegetation, levelling, and excavation / trenching. The removal of vegetation can result in exposure of bare soil to wind and rainfall leading to an increase in erosion potential. Generation of excess excavation material will require spoiling / stockpiling which can also lead to an increased risk of soil erosion. Rainfall on unconsolidated sediment has the potential to cause an indirect impact as runoff with higher sediment load entering surrounding drainage lines leading to sedimentation of watercourses and reduced water quality (due to increased turbidity). This has the potential to result in negative secondary impacts on receiving environments and ecosystem functioning. Surface water impacts associated with the proposed WEF relate to:

- Loss of aquatic species of special concern
- Damage or loss of riparian and wetlands systems and disturbance of the waterbodies during construction
- Potential impact on localised surface water quality
- Impact on habitat change and fragmentation related to hydrological regime changes

Operational Phase Impacts

Impact on aquatic systems through the possible increase in surface water runoff on form and function - Increase in sedimentation and erosion.

Mitigation Considerations

Prevention of soil erosion and uncontrolled flow of water across the site is an essential design requirement. The project will include stormwater management infrastructure (drainage and containment) to protect project assets and control surface water flow. Additional measures to protect watercourses and aquatic ecology typically include:

- Presenting a layout that avoids all sensitive habitats that were rated as HIGH, with the exception of making use of areas that are already disturbed e.g. upgrade road crossings.

- Where these crossings are upgraded the following must be considered:
  - The final design should take cognisance of typical baseflows and should not create any impedance of flows
  - Natural river levels upstream and downstream of the site should be maintained, thus allowing for continuity within the riverbed, i.e. not create any obstruction limiting any fauna from moving up or downstream.
  - Vehicle movement within the watercourse should be limited to the works area to prevent undue any compaction of soils
  - Bed and bank erosion protection should be included in the designs to prevent bank instability and sedimentation.
- With regard the prevention of water quality changes to the aquatic environment the following must be monitored / implemented:
  - Chemicals used for construction must be stored safely on site and surrounded by bunds. Chemical storage containers must be regularly inspected so that any leaks are detected early.
  - Littering and contamination of water sources during construction must be prevented by effective construction camp management.
  - Emergency plans must be in place in case of spillages onto road surfaces and water courses.
  - No stockpiling should take place within a water course.
  - All stockpiles must be protected from erosion, stored on flat areas where run-off will be minimised, and be surrounded by bunds.
  - Stockpiles must be located away from river channels.
  - The construction camp and necessary ablution facilities meant for construction workers must be beyond the proposed buffers.
- A stormwater management plan (SWMP) must be developed in the preconstruction phase, detailing the stormwater structures and management interventions that must be installed to manage the increase of surface water flows directly into any natural systems. Effective stormwater management will include effective stabilisation (gabions and Reno mattresses) of exposed soil and the re-vegetation of any disturbed riverbanks. The effectiveness of the stormwater / energy dissipation structures will then be inspected on an annual basis and maintained / improved as required during this the operational phase, especially where any erosion or sedimentation has become evident in the operational phase.

Recommended EIA Phase Studies

A detailed Aquatic Impact study, including wetland assessment, would need to be undertaken during the EIA phase of the assessment. This will include the associated potential impacts and corresponding mitigation measures. Following comments from the relevant stakeholders, the final report will be updated and submitted with the final EIA report. Refer to **Section 7** of this Report for the Plan of Study for the Aquatic Impact study.

6.6 GROUNDWATER

Construction Phase Impacts

Ground contamination

During the construction phase there is potential for soil contamination associated with potential release of environmental contaminants and hazardous substances (typically sewage/ portable toilet chemicals, cement, oil grease and fuel).

Operational Phase Impacts

No impacts anticipated.

Mitigation Considerations

- Chemicals, hydrocarbon materials and hazardous substances maintained onsite must be managed in accordance with the Hazardous Substances Act (No. 15 of 1973) and its relevant regulations.
- All machinery and equipment should be inspected regularly for faults and possible leaks; these should be serviced off-site or in appropriately bunded areas.
- Spill kits must be available at all locations where hazardous substances are stored, handled or used, and spills must be cleaned up immediately in accordance with an established protocol applicable to the material.

Recommended EIA Phase Studies

No further studies are recommended.

6.7 HAZARDOUS SUBSTANCES AND POLLUTANTS

Construction Phase Impacts

Soil, groundwater and surface water contamination

Potential exists for soil, groundwater and surface water contamination associated with potential releases of small quantities of environmental contaminants and hazardous substances. Sources of pollutants and release mechanisms include:

- Leakages of hydrocarbons (diesel and oil) from construction vehicles and heavy machinery (e.g. excavators and bulldozers).
- Loss of containment and accidental spillage associated with storage and handling of hydrocarbons, chemicals, and concrete.

Runoff creates a preferential pathway and exposure of the above contaminants into the subsurface and water resources leading to a deterioration in water quality and secondary health impacts on aquatic ecosystems and water users.

Operational Phase Impacts

No impacts anticipated.

Mitigation Considerations

- Chemicals, hydrocarbon materials and hazardous substances maintained onsite must be managed in accordance with the Hazardous Substances Act (No. 15 of 1973) and its relevant regulations.
- All machinery and equipment should be inspected regularly for faults and possible leaks; these should be serviced off-site or in appropriately bunded areas.
- Spill kits must be available at all locations where hazardous substances are stored, handled or used, and spills must be cleaned up immediately in accordance with an established protocol applicable to the material.

Recommended EIA Phase Studies

No further studies are recommended.

6.8 WASTE MANGAEMENT

Construction Phase Impacts

Generation of General Waste

The table below provides a summary of the typical general waste types that are likely to be generated on site during construction. The presence of construction workers has the potential to increase litter on site in the absence of adequate waste receptacles. This results in an unsightly working environment and possible entry into surrounding environment.

Furthermore, waste materials may attract pest species / vectors into working areas leading to potential health implications for construction staff and community members.

Spoil material unsuitable for reuse as backfill and bedding material has the potential to disrupt land use and habitats if inappropriately manage or disposed illegally.

Waste generation (domestic waste, mixed industrial and metal waste) and a lack of appropriate separation, temporary storage and recycling (i.e. not aligned with the Waste Hierarchy) has the potential to result in unnecessary waste material to landfill.

Waste Category	*Waste Type*	*Typical Constituents*
General Waste	Domestic Waste	Paper and cardboard packaging, empty plastic and metal containers (non-hazardous original contents) etc.
	Organic Waste	Canteen, food and cooking waste
	Mixed Industrial	Wood, plastic, packaging etc.
	Metal Waste	Ferrous and non-ferrous scrap and stainless steel, metal cuttings, electrode stubs from welding.
	Spoil Material	Excavations, trenching and terracing will result in the generation of spoil material
	Building rubble	Wasted flooring material, paint containers, wall tiles, timber, piping etc.
	Biomass	Cleared vegetation

Generation of Hazardous Waste

The table below provides a summary of the typical hazardous waste types that are likely to be generated on site during construction. Hazardous waste generation and inappropriate management and disposal has the potential to lead to contamination of soil, groundwater and surface water.

Waste Category	*Waste Type*	*Typical Constituents*
Hazardous Waste	Oily Waste	Used lubricant and hydraulic oils and hydrocarbon-based solvents
	Oil Contaminated Waste	Solid material (rags etc.) that has come into contact with and contains traces of oil or grease
	Hazardous Chemical Containers	From temporary storage and use of chemicals on site
	Sanitary Waste	Sewerage / faecal matter generated at the contractor's camp

Sanitation Waste

Sanitation services are required to accommodate workers on site, contractor's yard and at site camps along the route. Temporary ablution facilities (chemical toilets) are proposed to appropriately contain and treat waste for offsite disposal. The incorrect siting of chemical toilets (i.e. within 100m of a watercourse or stream) and loss of containment could lead to pollution of the receiving environment (soil, groundwater and surface water), leading to secondary health impact to ecosystems and communities (ground and surface water users).

Sanitary waste, if not correctly contained, has the potential to enter surface water via runoff and increase organic matter loading in water systems.

Operational Phase Impacts

Generation of General Waste

The table below provides a summary of the typical general waste types that are likely to be generated on site during operation. Waste generation (domestic waste and mixed industrial) and a lack of appropriate separation, temporary storage and recycling (i.e. not aligned with the Waste Hierarchy) has the potential to result in unnecessary waste material to landfill. However, it is noted that only small volumes of waste are anticipated to be generated by the facility during operations.

Waste Category	*Waste Type*	*Typical Constituents*
General Waste	Domestic Waste	Paper and cardboard packaging, empty plastic and metal containers (non-hazardous original contents) etc.
	Organic Waste	Canteen, food and cooking waste
	Mixed Industrial	Wood, plastic, packaging etc.

Generation of Hazardous Waste

The table below provides a summary of the typical hazardous waste types that are likely to be generated on site during construction. Hazardous waste generation and inappropriate management and disposal has the potential to lead to contamination of soil, groundwater and surface water.

Waste Category	*Waste Type*	*Typical Constituents*
Hazardous Waste	Oily Waste	Used lubricant and hydraulic oils and hydrocarbon based solvents
	Oil Contaminated Waste	Solid material (rags etc.) that has come into contact with and contains traces of oil or grease

Sanitation Waste

Sewage and other wastewater generated from washrooms, etc. are similar to domestic wastewater. It is anticipated that the sewage will be discharged into conservancy tank.

Mitigation Considerations

- Despite the modest volumes of waste anticipated to be generated by the Project, recycling opportunities should be sought in order to reduce the volume of waste to landfill and harness commercial benefits for both the project team and local community.
- Provisions of suitable waste receptacles for temporary storage of general and hazardous waste (in compliance with Material Safety Data Sheets).
- Collection and disposal of hazardous waste at appropriately licences landfills and proof of disposal to be retained by contractors and facility operators.

Recommended EIA Phase Studies

No further studies are recommended.

6.9 BIODIVERSITY

The key activities associated with development activities that may affect the ecology of the area include vegetation clearance for turbines and associated infrastructure, roads and other hard infrastructure. A map of the proposed infrastructure in relation to sensitivities developed by the Ecology Specialist indicates the following:

- The wind turbine positions are located within grassland and cultivated areas. They therefore affect areas either with HIGH sensitivity (within CBA1 areas), MEDIUM-HIGH sensitivity (outside CBA1 areas), or areas with LOW sensitivity (within cultivated lands).
- Construction camp and batching plants are located within a natural grassland area. It therefore affects an area with HIGH sensitivity.

- Substation and BESS alternatives occur within natural grassland areas where there is a small amount of wetland. Therefore affecting areas with HIGH and VERY HIGH sensitivity.

The following impacts have been identified:

Construction Phase Impacts

Loss and Fragmentation of Vegetation and Habitat

Temporary fragmentation of vegetation communities can lead to disturbance and potential loss of portion of certain vegetation types and associated floral species assemblages (habitat destruction). Permanent loss of floral Species of Conservation Concern (SCC) may occur if the proposed site footprint and construction activities takes place within sensitive habitat units.

Impacts on CBAs and broad-scale ecological processes

A significant part of the Project Area falls within a CBA (Irreplaceable and Optimal). While CBAs are not necessarily no-go areas, development within CBAs is not encouraged as such development may compromise the ecological functioning of the CBA or result in direct biodiversity loss within the CBA if not approached carefully and managed effectively.

Loss and Displacement of Fauna

The construction of project infrastructure will require the clearance vegetation (possibly providing refuge or breeding grounds to fauna). These activities will cause disturbance and displacement of local fauna (including possible threatened or protected species) due to habitat loss; and/or direct mortalities. Although it is assumed that the majority of fauna species will move to different areas because of disturbance, some protected fauna species have very specific habitat requirements, and the disturbance of sensitive habitats will result in displacement to less optimal habitats.

Secondary impacts associated include the destruction and disturbance to local breeding grounds and nesting sites; leading to potential decrease in population densities of threatened and protected species. If development takes place within the sensitive habitats permanent loss of faunal SCC carrying capacity will potentially occur.

Some mammals and reptiles would be vulnerable to illegal collection or poaching during the construction phase as a result of the large number of construction personnel that are likely to be present.

Proliferation of alien invasive plant species

The disturbance associated with the construction phase of the project will render the disturbed areas vulnerable to alien plant invasion. Some alien plant invasion is inevitable and regular alien plant clearing activities would be required to limit the extent of this problem. Once the natural vegetation has returned to the disturbed areas, the site will be less vulnerable to alien plant invasion, however, the roadsides and turbine service areas are likely to remain the focus of alien plant invasion for years.

Operational Phase Impacts

Proliferation of alien invasive plant species

Proliferation of alien invasive plant species has the potential to manifest during the operational phase. In addition, the presence of the wind turbines and daily operational activities at the site may deter certain species from the area, resulting in a loss in broad-scale landscape connectivity.

Cumulative Impacts

Cumulative impacts might occur due to the additional Camden I WEF proposed in proximity to the study area. The footprint of these two developments will likely be cumulative, with the ecological impact of all facilities operating in combination likely to exceed the sum of individual parts.

Mitigation Considerations

- The preferred project layout must avoid sensitive habitats as far as possible.
- Minimise development footprint within high sensitivity areas and ensure that final development layout takes account of areas identified as sensitive during the field

survey. Some avoidance and changes to the layout may be required if some areas with a high abundance of species of concern are shown to occur within the preferred development areas.

- Sensitive faunal habitats such as drainage lines and wetlands must be avoided.
- Detailed biodiversity assessment is required to determine sensitivity, quantify potential impacts to flora and fauna, and provide for recommendation of mitigation measures.
- Alien and invasive vegetation control should take place throughout the duration of the construction and operation phases. An alien management plan must be part of the EMPr.

The main mitigation measures, other than required Management Plans for plant rescue, rehabilitation, and alien plant management, are related to infrastructure location, which is a planning phase measure. Specific recommendations will form part of the outcome of the EIA.

Recommended EIA Phase Studies

A detailed terrestrial ecological assessment will be carried out in the EIA phase. Refer to **Section 7** of this Report for the Plan of Study for the Terrestrial Ecology Assessment.

6.10 AVIFAUNA

The effects of a wind farm on birds are highly variable and depend on a wide range of factors, including the specification of the development, the topography of the surrounding land, the habitats affected and the number and species of birds present.

Construction Phase Impacts

Displacement due to disturbance during the Construction Phase

It is inevitable that a measure of displacement will take place for all priority species during the construction phase, due to the disturbance factor associated with the construction activities. This is likely to affect ground nesting species in the remaining high quality grassland, wetlands and wetland fringes the most, as this could temporarily disrupt their reproductive cycle. Some species might be able to recolonise the area after the completion of the construction phase, but for some species, this might only be partially the case, resulting in lower densities than before once the WEF is operational, due to the disturbance factor of the operational turbines, and the habitat fragmentation. In summary, the following species could be impacted by disturbance during the construction phase: Blue Crane, Black-bellied Bustard, White-bellied Bustard, Denham's Bustard, Grey Crowned Crane, Spotted Eagle-Owl, Grey-winged Francolin, Northern Black Korhaan, Blue Korhaan, Marsh Owl and African Grass Owl..

Operational Phase Impacts

Displacement due to habitat loss

The network of roads is likely to result in significant habitat fragmentation. This, together with the disturbance factor of the operating turbines, could have an effect on the density of several species, particularly larger terrestrial species which is breeding in the remaining high quality grassland, wetlands and wetland fringes. Given the conceptual turbine layout and associated road infra-structure, it is not expected that any priority species will be permanently displaced from the development site, but densities may be reduced. In summary, the following species are likely to be affected by habitat transformation: Blue Crane, Black-bellied Bustard, White-bellied Bustard, Denham's Bustard, Grey Crowned Crane, Grey-winged Francolin, Northern Black Korhaan, Blue Korhaan, Marsh Owl, African Grass Owl, Black-winged Lapwing and Secretarybird..

Collisions Mortality on wind turbines

The proposed WEF will pose a collision risk to several priority species which could occur regularly at the site. Species exposed to this risk are large terrestrial species and occasional long distance fliers i.e., bustards, cranes, flamingos, storks, Southern Bald Ibis and

Secretarybird, although bustards and cranes generally seem to be not as vulnerable to turbine collisions as was originally anticipated (Ralston-Paton & Camagu 2019). Soaring priority species, i.e., species such as Cape Vulture and a variety of raptors, including several species of eagles, are highly vulnerable to the risk of collisions. In summary, the following priority species could be at risk of collisions with the turbines: Common Buzzard, Jackal Buzzard, Blue Crane, Brown Snake Eagle, Black-chested Snake Eagle, Long-crested Eagle, Martial Eagle, Peregrine Falcon, Lanner Falcon, Greater Flamingo, Lesser Flamingo, Montagu's Harrier, African Marsh Harrier, Black Harrier, African Harrier-Hawk, Cape Vulture, Secretarybird, Black-bellied Bustard, White-bellied Bustard, Denham's Bustard, Wattled Crane, Grey Crowned Crane, African Fish Eagle, Spotted Eagle-Owl, Amur Falcon, Grey-winged Francolin, Southern Bald Ibis, Black-winged Kite, Northern Black Korhaan, Blue Korhaan, Black-winged Lapwing, Western Osprey, Marsh Owl, African Grass Owl, Black Sparrowhawk and White Stork.

Electrocution on the medium voltage network

Electrocution refers to the scenario where a bird is perched or attempts to perch on the electrical structure and causes an electrical short circuit by physically bridging the air gap between live components and/or live and earthed components (van Rooyen 2000). The electrocution risk is largely determined by the design of the electrical hardware.

While the intention is to place the medium voltage reticulation network underground where possible, there are areas where the lines might have to run above ground, for technical reasons. In these instances, the electricity could potentially pose an electrocution risk to several priority species that could on occasion perch on these poles. In summary, the following priority species are potentially vulnerable to electrocution in this manner: Grey Crowned Crane, Marsh Owl, African Grass Owl, Spotted Eagle-Owl, Common Buzzard, Peregrine Falcon, Black Harrier, Jackal Buzzard, Brown Snake Eagle, Black-chested Snake Eagle, Long-crested Eagle, Martial Eagle, Lanner Falcon, Montagu's Harrier, African Marsh Harrier, African Harrier-Hawk, Cape Vulture, African Fish Eagle, Southern Bald Ibis, Black-winged Kite, Western Osprey and Black Sparrowhawk.

Collisions with the medium voltage network

Collisions are the biggest threat posed by transmission lines to birds in southern Africa (Van Rooyen 2004). Most heavily impacted upon are bustards, storks, cranes, and various species of waterbirds, and to a lesser extent, vultures. These species are mostly heavy-bodied birds with limited manoeuvrability, which makes it difficult for them to take the necessary evasive action to avoid colliding with transmission lines (Van Rooyen 2004, Anderson 2001).

While the intention is to place the majority of the medium voltage reticulation network underground at the wind farm, there are areas where the lines will run above ground. Priority species which most at risk of collisions with the medium voltage powerlines are the following: Grey Crowned Crane, Marsh Owl, African Grass Owl, Spotted Eagle-Owl, Cape Vulture, Southern Bald Ibis, Blue Crane, Black-bellied Bustard, White-bellied Bustard, Denham's Bustard, Northern Black Korhaan, Blue Korhaan, Secretarybird, Greater Flamingo, Lesser Flamingo and White Stork.

Cumulative Impacts

Cumulative impacts might occur due to the additional Camden I WEF proposed in proximity to the study area. The footprint of these two developments will likely be cumulative, with the ecological impact of all facilities operating in combination likely to exceed the sum of individual parts.

Mitigation Considerations

- Construction activity should be restricted to the immediate footprint of the infrastructure as far as possible.
- Access to the remainder of the site should be strictly controlled to prevent unnecessary disturbance of priority species.
- Measures to control noise and dust should be applied according to current best practice in the industry.

- Maximum use should be made of existing access roads and the construction of new roads should be kept to a minimum.
- Development in the remaining high sensitivity grassland must be limited as far as possible. Where possible, infrastructure must be located near margins, with shortest routes taken from the existing roads
- A raptor-friendly pole design must be used, and the pole design must be approved by the avifaunal specialist.
- All internal medium voltage lines must be marked with Eskom approved Bird Flight Diverters according to the Eskom standard as required by the avifaunal specialist
- It is recommended that suitable pro-active mitigation be implemented at all turbines, which could include shut down on demand or other proven mitigation measures. This is recommended for the following reasons:
  - The site is located between three IBAs. Due to the close proximity of the site to the IBAs, it is possible that some highly mobile priority species which are also IBA trigger species, and which occur either permanently or sporadically in the IBAs, might be at risk of collisions they leave to forage or breed beyond the borders of the IBA at the project site.
  - Cape Vultures have been recorded at the site. The species could occur sporadically, and they are highly vulnerable to turbine collisions.
  - The habitat at the site is used by a variety of Red List priority species. This includes not only natural grassland, but also agriculture e.g., Southern Bald Ibis forage extensively in agricultural fields.

Recommended EIA Phase Studies

The EIA Phase will entail the implementation of four avifaunal surveys and a full assessment of the likely impacts and available mitigation options, based on the results of systematic and quantified monitoring, in line with the monitoring protocols. Refer to **Section 7** of this Report for the Plan of Study for the Avifauna Assessment.

6.11 BATS

The following potential impacts of the proposed Camden II WEF on bats were identified:

Construction Phase Impacts

Loss of foraging habitat by clearing of vegetation

Foraging habitat will be permanently lost by construction of turbines, crane pads, infrastructure, and access roads. Temporary foraging habitat loss will occur during construction due to storage areas and movement of heavy vehicles.

Roost destruction during earthworks

Destruction of bat roosts due to earthworks and blasting. During construction, the earthworks and especially blasting can damage bat roosts in rock crevices. Any type and duration of blasting in close proximity to a rock crevice roost or man-made structure (barns, sheds, abandoned houses, pump houses etc.), can cause mortality to the inhabitants of the roost.

Operational Phase Impacts

Bat mortalities during foraging

Bat mortalities due to direct blade impact or barotrauma during foraging activities (not migration). If the impact is too severe (e.g., in the case of no mitigation) local bat populations may never recover from mortalities.

Bat mortalities during migration

Mortalities of bats due to wind turbines during migratory activities can have significant ecological consequences as the bat species at risk are insectivorous and thereby contribute significantly to the control of nocturnal flying insects. On a project specific level insect numbers in a certain habitat can increase if significant numbers of bats are killed off. But if such an impact is present on multiple projects in close vicinity to each other, insect numbers can increase regionally and possibly cause outbreaks of colonies of certain insect species. Additionally, if migrating bats are killed it can have detrimental effects on the

ecology of the caves that a specific colony utilises. This is due to the fact that bat guano is the primary form of energy input into a cave ecology system, given that no sunshine that allows photosynthesis exists in cave ecosystems.

Increased bat mortalities due to light attraction and habitat creation

During operation, artificial lights that may be used at the turbine base or immediately surrounding infrastructure will attract insects and thereby also bats to the turbines. This will significantly increase the likelihood of mortality from collision with turbine blades of bats foraging around such lights.

Cumulative Impacts

Cumulative impacts might occur due to the additional Camden I WEF proposed in proximity to the study area. The footprint of these two developments will likely be cumulative.

Mitigation Considerations

- Adhere to the sensitivity map criteria and avoid development in sensitive areas during turbine placement, road, and infrastructure building.
- Rehabilitate cleared vegetation where possible at areas such as laydown yards
- Only use lights with low sensitivity motion sensors that switch off automatically when no persons are nearby, to prevent the creation of regular insect gathering pools. This will be at turbine bases (if applicable, and other infrastructure buildings). For buildings, avoid tin roofs and roof structures that offer entrance holes into the roof cavity
- Keep artificial lighting to a minimum at infrastructure buildings and on wind turbines, while still adhering to safety and security requirements.
- Turbine layout adjustments to adhere to the sensitivity map, and where needed, reducing blade movement at selected turbines during high-risk bat activity times/weather conditions
- Reducing blade movement at selected turbines if a migration route is discovered
- The required and most effective method of mitigation can be determined from pre-construction acoustic bat activity data, climatic data and the results from the operational bat mortality monitoring.
- Curtailment that increases cut-in speed.
- Curtailment to prevent freewheeling
- Acoustic bat deterrents

Recommended EIA Phase Studies

The pre-construction bat monitoring has now been completed and will inform the EIA phase; passive bat activity data has been gathered, which will provide comparative bat activity and species assemblages across all seasons as well as various habitats, terrain and/or areas of the site.

The EIA Phase will also entail a full assessment of the likely impacts and available mitigation options, based on the results of systematic and quantified monitoring that has been completed. Refer to **Section 7** of this Report for the Plan of Study for the Bat Impact Assessment.

6.12 VISUAL AND LANDSCAPE

Construction Phase Impacts

During the construction phase of the proposed Camden II WEF and associated infrastructure, there will be some visual impacts on motorists and inhabitants during the construction and decommissioning periods resulting from laydown areas, construction vehicles, dust, and equipment. These impacts will be transitory in nature for the duration of construction /decommissioning and include the following:

- Potential visual intrusion resulting from large construction vehicles and equipment.
- Potential visual effect of construction laydown areas and material stockpiles.

- Potential impacts of increased dust emissions from construction activities and related traffic.
- Potential visual scarring of the landscape as a result of site clearance and earthworks; and
- Potential visual pollution resulting from littering on the construction site.

Operational Phase Impacts

The operation of the Camden II WEF will have a visual impact on the following receptors:

- Potential alteration of the visual character of the area;
- Potential visual intrusion resulting from wind turbines dominating the skyline in a largely natural / rural area;
- Potential visual clutter caused by substation and other associated infrastructure on-site.
- Potential visual effect on surrounding farmsteads;
- Visual impact of shadow flicker impact, and motion-based visual intrusion, and
- Potential alteration of the nighttime visual environment as a result of operational and security lighting as well as navigational lighting on top of the wind turbines.

Cumulative impacts

- Combined visual impacts from mining, industrial, infrastructural, and renewable energy development in the broader area could potentially alter the sense of place and visual character of the area; and
- Combined visual impacts from mining, industrial, infrastructural, and renewable energy development in the broader area could potentially exacerbate visual impacts on visual receptors.

Mitigation Considerations

- Carefully plan to minimise the construction period and avoid construction delays.
- Position laydown areas and related storage/stockpile areas in unobtrusive positions in the landscape, where possible.
- Minimise vegetation clearing and rehabilitate cleared areas as soon as possible.
- Vegetation clearing should take place in a phased manner.
- Make use of existing gravel access roads where possible.
- Limit the number of vehicles and trucks travelling to and from the proposed sites, where possible.
- Ensure that dust suppression techniques are implemented:
  - on all access roads;
  - in all areas where vegetation clearing has taken place;
  - on all soil stockpiles.
- Maintain a neat construction site by removing litter, rubble, and waste materials regularly.
- Turbine colours should adhere to CAA requirements. Bright colours and logos on the turbines should be kept to a minimum.
- Inoperative turbines should be repaired promptly, as they are considered more visually appealing when the blades are rotating (or at work).
- If turbines need to be replaced for any reason, they should be replaced with the same model, or one of equal height and scale to lessen the visual impact.
- As far as possible, limit the number of maintenance vehicles which are allowed to access the site.
- Ensure that dust suppression techniques are implemented on all gravel access roads.
- As far as possible, limit the amount of security and operational lighting present on site.
- Light fittings for security at night should reflect the light toward the ground and prevent light spill.
- Lighting fixtures should make use of minimum lumen or wattage.

- Mounting heights of lighting fixtures should be limited, or alternatively foot-light or bollard level lights should be used.
- If possible, make use of motion detectors on security lighting.
- Where possible, the operation and maintenance buildings should be consolidated to reduce visual clutter.
- The operations and maintenance (O&M) buildings should not be illuminated at night.
- The O&M buildings should be painted in natural tones that fit with the surrounding environment.

Recommended EIA Phase Studies

The scoping phase Visual Impact Assessment (VIA) report has adequately assessed the visual impacts of the proposed Camden II WEF and no further field investigation will be required. The EIA Phase study will entail updating the scoping phase VIA report and will include a review of the findings of the VIA in accordance with detailed site layouts and a comparative assessment of the layout alternatives provided. Following comments from the relevant stakeholders, the final report will be updated and submitted with the final EIA report. Refer to **Section 7** of this Report for the Plan of Study for the Visual Impact Assessment.

6.13 HERITAGE AND CULTURAL RESOURCES

Construction Phase Impacts

Disturbance to Known Cultural Resources

Construction activities may lead to disturbance or destruction of cultural resources (archaeological and historical remains and sacred sites e.g., graves) should the development footprint encroach on identified cultural/heritage sites.

Chance finds of Cultural Resources

Earthworks may accidentally expose unidentified subsurface fossil remains. This will result in a lost opportunity to preserve local cultural heritage and historical records should appropriate management measures not be in place (e.g., Chance Find Procedure).

Operational Phase Impacts

No impacts anticipated.

Mitigation Considerations

- Chance Find Procedure must be included in the EMPr.
- Areas of potential heritage sensitivities that are identified in the EIA phase, should be demarcated.

Recommended EIA Phase Studies

A field-based Heritage Impact Assessment, as defined in section 38 of the NHRA, will be undertaken during the EIA phase of the assessment. Refer to **Section 7** of this Report for the Plan of Study for the Heritage Impact Assessment.

6.14 PALAEONTOLOGY

Construction Phase Impacts

The construction phase will entail surface clearance as well as excavations into the superficial sediment cover and underlying bedrock. The development may adversely affect potential fossil heritage within the study area by destroying, damaging, disturbing or permanently sealing-in fossils preserved at or beneath the surface of the ground that are then no longer available for scientific research or other public good.

Operational Phase Impacts

No impacts anticipated.

Mitigation Considerations

- If a chance find is made, then all work must cease in the immediate vicinity of the find. The Environmental Control Officer must report the find to the relevant Heritage Agency (South African Heritage Research Agency, SAHRA). Mitigation of chance fossil finds reported by the Environmental Control Officer would involve the recording, sampling and / or collection of chance fossil finds and associated geological data by a professional palaeontologist during the construction phase of the development. The palaeontologist concerned with potential mitigation work would need a valid fossil collection permit from the relevant Heritage Agency and any material collected would have to be curated in an approved depository (e.g., museum or university collection).

Recommended EIA Phase Studies

The study area is of insignificant to moderate to very high paleontological sensitivity and according to the SAHRIS palaeontological sensitivity map must be subjected to a palaeontological assessment in the EIA phase. Refer to **Section 7** of this Report for the Plan of Study for the Palaeontological Impact Assessment.

6.15 TRAFFIC

Construction Phase Impacts

Increased traffic generation around the study area by construction vehicles

The construction phase is expected to generate additional traffic volumes on the local road network due to the transport of raw materials and machinery to site.

Deterioration of the surrounding road network due to an increase of traffic around the site

Raw materials and machinery will be transported to the study area during the construction phase. This may result in potential damage to the existing road network. It is expected that the bulk of the construction plant would remain on site during construction. The impact of the heavy vehicles on the surrounding roads is considered to be negligible.

Transportation of abnormal loads during the construction phase

The construction phase will result in impacts on roads users due to the need to transport over-sized components such as generators, turbine blade, turbine mast segments etc. to site. It is anticipated that the transport route(s) between the origin of the components and the facility may include national, provincial, and local roads.

Operational Phase Impacts

The operational phase of the facility will require very presence of staff personnel, except for those undertaking inspection, maintenance and repair works. The traffic impact on the surrounding roads will therefore be negligible.

Mitigation Considerations

- The movement of vehicles into and out of the site must be managed such as ensuring that abnormal loads are moved outside of peak traffic hours.
- Stagger component delivery to the site.
- All drivers should comply with the relevant traffic laws and regulations.
- Abnormal vehicle routes and management plans may be required dependant on the type and route of the abnormal vehicle loads. Abnormal vehicles may require special permits and route plans from the relevant road authority. These permits are the responsibility of the developer and its logistics/freight companies.
- Undertake regular maintenance of gravel roads during the construction phase.
- Have separate entrance and exist route for vehicles to limit traffic.

Recommended EIA Phase Studies

A Traffic Impact Statement will form part of the EIA phase. The Traffic Specialist study will assess potential impacts of the proposed route during the construction phase and

identify potential and suitable alternatives for construction vehicle access to the site. Refer to **Section 7** of this Report for the Plan of Study for the Traffic Impact Statement.

6.16 SOCIO-ECONOMIC

Construction Phase Impacts

Creation of local employment, training, and business opportunities

The construction phase will create employment opportunities that will benefit members from the local communities in the area, specifically Ermelo. These opportunities will include opportunities for low, semi and highly workers. Most of the employment opportunities will accrue to Historically Disadvantaged (HD) members of the community. A percentage of the wage bill will be spent in the local economy which will also create opportunities for local businesses in the local towns in the area, specifically Ermelo. Given relatively high local unemployment levels and limited job opportunities in the area, this will represent a significant, if localised, social benefit. The capital expenditure associated with the construction phase will also create opportunities for local businesses. Due to the presence of the mining and energy sector, there are likely to qualified companies in Ermelo that can provide the required services and products. The local service sector will also benefit from the construction phase. The potential opportunities would be linked to accommodation, catering, cleaning, transport, and security, etc. associated with the construction workers on the site.

The hospitality industry in the area will also benefit from the provision of accommodation and meals for professionals (engineers, quantity surveyors, project managers, product representatives etc.) and other (non-construction) personnel involved on the project. Experience from other construction projects indicates that the potential opportunities are not limited to on-site construction workers but also to consultants and product representatives associated with the project.

Impact of construction workers on local communities

The presence of construction workers poses a potential risk to family structures and social networks. While the presence of construction workers does not in itself constitute a social impact, the manner in which construction workers conduct themselves can impact on local communities. The most significant negative impact is associated with the disruption of existing family structures and social networks. This risk is linked to potentially risky behaviour, mainly of male construction workers, including:

- An increase in alcohol and drug use.
- An increase in crime levels.
- The loss of girlfriends and/or wives to construction workers.
- An increase in teenage and unwanted pregnancies.
- An increase in prostitution.
- An increase in sexually transmitted diseases (STDs), including HIV.

The objective will be to source as many of the low and semi-skilled workers locally. These workers will be from the local community and form part of the local family and social networks. This will reduce the risk and mitigate the potential impacts on the local community. The potential impact on the local community is therefore likely to be negligible.

Influx of job seekers

Large construction projects tend to attract people to the area in the hope that they will secure a job, even if it is a temporary job. These job seekers can in turn become “economically stranded” in the area or decide to stay on irrespective of finding a job or not. While the proposed project on its own does not constitute a large construction project,

the establishment of a number of renewable energy projects in the area may attract job seekers to the area. As in the case of construction workers employed on the project, the actual presence of job seekers in the area does not in itself constitute a social impact. However, the way in which they conduct themselves can impact on the local community. The main areas of concern associated with the influx of job seekers include:

- Impacts on existing social networks and community structures.
- Competition for housing, specifically low-cost housing.
- Competition for scarce jobs.
- Increase in incidences of crime.

These issues are similar to the concerns associated with the presence of construction workers and are discussed above. Given the location of the project the potential for large scale economically motivated in-migration and subsequent labour stranding is likely to be negligible.

Risk to safety, livestock, and farm infrastructure

The presence on and movement of construction workers on and off the site poses a potential safety threat to local famers and farm workers in the vicinity of the site. In addition, farm infrastructure, such as fences and gates, may be damaged and stock losses may also result from gates being left open and/or fences being damaged, or stock theft linked either directly or indirectly to the presence of farm workers on the site. The potential risks (safety, livestock, and farm infrastructure) can be effectively mitigated by careful planning and managing the movement of construction on and off the site workers during the construction phase.

Increased risk of grass fires

The presence of construction workers and construction-related activities on the site poses an increased risk of grass fires that could, in turn pose, a threat to livestock, crops, wildlife and farm infrastructure. The potential risk of grass fires will be higher during the dry, windy winter months from May to October. The impacts will be largely local and can be effectively mitigated.

Nuisance impacts associated with construction related activities

Construction related activities, including the movement of heavy construction vehicles of and on the site, has the potential to create dust, noise and safety impacts and damage roads. The impacts will be largely local and can be effectively mitigated.

Impacts associated with loss of farmland

The activities associated with the construction phase and establishment of the proposed project and associated infrastructure will result in the disturbance and loss of land available for grazing. The impact on farmland associated with the construction phase can be mitigated by minimising the footprint of the construction related activities and ensuring that disturbed areas are fully rehabilitated on completion of the construction phase. In addition, the landowner will be compensated for the loss of land.

Operational Phase Impacts

Improve energy security and support the renewable energy sector

The primary goal of the proposed project is to improve energy security in South Africa by generating additional energy. The proposed development also reduces the carbon footprint associated with energy generation. The project should therefore be viewed within the context of the South Africa's current reliance on coal powered energy to meet most of its energy needs, and secondly, within the context of the success of the REIPPP.

Creation of employment and business opportunities

The proposed development will create full time employment opportunities during the operational phase that will be available to the local community. The operational phase will

also create business and procurement opportunities which will benefit local companies in the area.

Generate income for affected landowners

The proponent will enter into rental agreements with the affected landowners for the use of the land for the establishment of the proposed projects. In terms of the rental agreement the affected landowners will be paid an annual amount dependent upon the number of wind turbines located on the property. The additional income will reduce the risk to his livelihoods posed by droughts and fluctuating market prices for livestock, crops, and farming inputs, such as fuel, feed etc. Given the risks posed by climate change the additional income represents a significant benefit for the affected landowner.

Benefits associated with the socio-economic development contributions

The REIPPP has been designed not only to procure energy but has also been structured to contribute to the broader national development objectives of job creation, social upliftment and broadening of economic ownership. Socio-economic development (SED) contributions are an important focus of the REIPPP and are aimed at ensuring that local communities benefit directly from the investments attracted into the area. These contributions are linked to Community Trusts and accrue over the project operation life and, in so doing, create an opportunity to generate a steady revenue stream over an extended period. This revenue can be used to fund development initiatives in the area and support the local community. The long-term duration of the revenue stream also allows local municipalities and communities to undertake long term planning for the area.

Visual impact and impact on sense of place

The proposed development has the potential to impact on the areas existing rural sense of place. Combined visual impacts from mining, industrial, infrastructural and renewable energy development in the broader area could potentially alter the sense of place and visual character of the area.

Potential impact on property values

The potential visual impacts associated with the proposed Renewable Energy Facility (REF) have the potential to impact on property values. Based on the results of a literature review undertaken for other REFs the potential impact on property values in rural areas is likely to be limited. A study undertaken in Australia in 2016 (Urbis Pty Ltd) found that:

- Appropriately located wind farms within rural areas, removed from higher density residential areas, are unlikely to have a measurable negative impact on surrounding land values.
- There is limited available sales data to make a conclusive finding relating to value impacts on residential or lifestyle properties located close to wind farm turbines, noting that wind farms in NSW have been constructed in predominantly rural areas.

Potential impact on tourism

The potential visual impacts associated with the proposed REF have the potential to impact on tourism facilities and tourism in the area. Based on the findings of the literature review there is limited evidence to suggest that the proposed WEF would impact on the tourism in the area at both a local and regional level. The findings will be confirmed during the Assessment Phase.

Cumulative Impacts

Cumulative impact on sense of place

The potential cumulative impacts on the areas sense of place will be largely linked to potential visual impacts. In this regard the Scottish Natural Heritage (2005) describes a range of potential cumulative landscape impacts associated with wind farms on landscapes. The relevant issues identified by Scottish Natural Heritage study include:

- Combined visibility (whether two or more wind farms will be visible from one location).

- Sequential visibility (e.g., the effect of seeing two or more wind farms along a single journey, e.g., road or walking trail).
- The visual compatibility of different wind farms in the same vicinity.
- Perceived or actual change in land use across a character type or region.
- Loss of a characteristic element (e.g., viewing type or feature) across a character type caused by developments across that character type.

The guidelines also note that cumulative impacts need to be considered in relation to dynamic as well as static viewpoints. The experience of driving along a tourist road, for example, needs to be considered as a dynamic sequence of views and visual impacts, not just as the cumulative impact of several developments on one location. The viewer may only see one renewable energy facility and the associated infrastructure at a time, but if each successive stretch of the road is dominated by views of renewable energy facilities, then that can be argued to be a cumulative visual impact (National Wind Farm Development Guidelines, DRAFT - July 2010).

As indicated above, combined visual impacts from mining, industrial, infrastructural and renewable energy development in the broader area could potentially alter the sense of place and visual character of the area. The visual impacts will however be assessed by the visual specialist in the EIA phase.

Cumulative impact on local service and accommodation

The establishment of a number of REFs has the potential to place pressure on local services and accommodation, specifically during the construction phase. The objective will be to source as many low and semi-skilled workers for the construction phase from the Msukaligwa Local Municipality, specifically Ermelo. This will reduce the potential pressure on local services and accommodation in Ermelo. In addition, due to the size of the town of Ermelo the potential impact on local services is likely to be limited. The capacity of accommodate workers will be addressed during the assessment phase.

The potential impact should also be viewed within the context of the potential positive cumulative impacts for the local economy associated with the establishment of the proposed facility and other potential renewable energy projects in the Msukaligwa Local Municipality. These benefits will create opportunities for investment in the Msukaligwa Local Municipality, including the opportunity to up-grade and expand existing services and the construction of new houses.

Cumulative impact on local economy

In addition to the potential negative impacts, the establishment of renewable energy facilities and associated infrastructure, including the proposed WEF, will also create several socio-economic opportunities for the Municipality. The positive cumulative opportunities include creation of employment, skills development and training opportunities, and downstream business opportunities.

The review of the REIPPPP (June 2020) indicates that the SED contributions associated with 68 operational projects has amounted to R 1.2 billion to date. In terms of Enterprise Development (ED), R 7.2 billion has been committed for BW1 to BW4, 1S2 and 2S2. Assuming an equal distribution of revenue over the 20-year project operational life, enterprise development contributions would be R360 million per annum. Of the total commitment, R5.6 billion is specifically committed directly within the local communities where the IPPs operate, contributing significantly to local enterprise development. Up until the end of June 2020 a total of R 384.2 million had already been made to the local communities located in the vicinity of the 68 operating IPPs. This represents 93% of the total R384.2 million enterprise development contributions made to date).

The potential cumulative benefits for the local and regional economy are therefore associated with both the construction and operational phase of renewable energy projects and associated infrastructure and extend over a period of 20-25 years. However, steps must be taken to maximise employment opportunities for members from the local communities in the area and support skills development and training programmes.

Mitigation Considerations

- Ensuring local communities (through formal channels such as ward councillors and Department of Labour) are made aware of the potential opportunities available during construction in order for expectations to be managed appropriately.
- Prioritisation of local labour through implementing contractor policies.
- Undertake a survey of industries and businesses in the local area to identify potential suppliers.
- The developer and contractors must make HIV/AIDS awareness and prevention program development and implementation a condition of contract for all suppliers and sub-contractors.

Recommended EIA Phase Studies

Based on the Scoping Assessment, the majority of social issues have been identified. A site visit will be undertaken during the EIA Phase of the Scoping Impact Assessment (SIA). The site visit will include interviews with key stakeholders and interested and affected parties. Refer to **Section 7** of this Report for the Plan of Study for the SIA.

6.17 CLIMATE CHANGE

Construction Phase Impacts

Greenhouse Gas Emissions

A GHG is any gaseous compound in the atmosphere that can absorb infrared radiation, thereby trapping and holding heat in the atmosphere. By increasing the heat in the atmosphere, greenhouse gases are responsible for the greenhouse effect, which ultimately leads to global warming and contributes to the negative effects of climate change.

The manufacturing of the materials associated with the project, and associated transportation of materials to and from the construction areas will result in indirect GHG emissions. The exhaust emissions will contribute to the presence of GHGs in the atmosphere.

Measures could be considered in respect of the construction phase i.e., attempting to implement GHG emissions reductions measures within the EPC contractor's activities. However, given the site locality, it is anticipated that typical measures (such as stipulating that the EPC contractor measure and report on their GHG emissions during construction and try to incentivise a reduction via the use of energy efficient trucks etc.) are unlikely to be practical or worth the effort (or cost).

Climate Risks and Vulnerability

Loss of topsoil and vegetation community due to soil erosion can be exacerbated by climate change as soil erosion is mostly the result of extreme but short rainfall events. Therefore, changes of precipitation intensity and frequency could exacerbate soil erosion processes.

Operational Phase Impacts

Reduced Greenhouse Gas Emissions

Carbon dioxide (CO_2) is one of the major GHGs under the UN Framework Convention on Climate Change, and a priority GHG in terms of the National Environmental Management: Air Quality Act - Declaration of Greenhouse Gases as Priority Air Pollutants (GN. R710, 2017). CO_2 is emitted from the combustion of fossil fuels. There will be no GHG emissions directly associated with power generation from the facility in the operational phase due to the nature of the technology.

Contribution of cleaner energy to the National Grid

The project may be regarded as having a positive impact in terms of GHG emissions associated with the development of power generation capacity in South Africa i.e. less GHG emissions per unit of power contributed when compared to conventional fossil fuel derived power.

Mitigation Considerations	Due to the fact that the proposed development will have no impact on climate, mitigation measures are not deemed necessary. The implementation of the project can be regarded as having a mitigatory effect in terms of contributing to the curbing of South African's CO2 emission increases.
Recommended EIA Phase Studies	No further studies are recommended.

6.18 SUMMARY OF IMPACT SIGNIFICANCE SCREENING

This section provides an overview of the likely significance of construction phase (**Table 6-1**), operational phase (**Table 6-2**) and initial cumulative impacts (**Table 6-3**) presenting the results of the impact screening tool based on two criteria, namely probability and consequence (outlined in **Section 4.5**). This is used as a guide to determine whether additional assessment may be required in the EIA phase. Impacts will be refined and assessed during the EIA phase.

Table 6-1: Construction Phase Impacts

ASPECT	IMPACT	NATURE	PROBABILITY	CONSEQUENCE	SIGNIFICANCE (BEFORE MITIGATION)	FURTHER ASSESSMENT REQUIRED
Air Quality	Dust Emissions	Negative	3	1	**Low**	**No**
Noise and Vibrations	Noise and Vibration Emissions	Negative	3	1	**Low**	**No**
Topography, & Geology	Constructability	Negative	3	1	**Low**	**No**
Soils, Land Capability and Agricultural Potential	Loss of agricultural potential by soil degradation	Negative	4	3	**High**	**Yes**
	Loss of agricultural potential by occupation of land	Negative	4	3	**High**	
Surface water	Loss of aquatic species of special concern	Negative	3	3	**Medium**	**Yes**
	Damage or loss of riparian and wetlands systems and disturbance of the waterbodies during construction	Negative	3	3	**Medium**	
	Potential impact on localised surface water quality	Negative	3	3	**Medium**	

ASPECT	IMPACT	NATURE	PROBABILITY	CONSEQUENCE	SIGNIFICANCE (BEFORE MITIGATION)	FURTHER ASSESSMENT REQUIRED
	Impact on habitat change and fragmentation related to hydrological regime changes	Negative	3	3	**Medium**	
Groundwater	Ground Contamination	Negative	3	1	**Low**	**No**
Hazardous Substances and Pollutants	Soil, groundwater and surface water contamination	Negative	3	3	**Medium**	**No**
Waste Generation	Generation of General Waste	Negative	3	2	**Medium**	**No**
	Generation of Hazardous Waste	Negative	3	2	**Medium**	
	Sanitation Waste	Negative	3	2	**Medium**	
Biodiversity	Loss and Fragmentation of Vegetation and Habitat	Negative	4	3	**High**	**Yes**
	Impacts on CBAs and broad-scale ecological processes	Negative	4	3	**High**	
	Loss and Displacement of Fauna	Negative	4	3	**High**	
	Proliferation of alien invasive plant species	Negative	4	3	**High**	
Avifauna	Displacement due to disturbance during the Construction Phase	Negative	4	3	**High**	**Yes**
Bats	Loss of foraging habitat by clearing of vegetation	Negative	4	3	**High**	**Yes**
	Roost destruction during earthworks	Negative	4	3	**High**	

ASPECT	IMPACT	NATURE	PROBABILITY	CONSEQUENCE	SIGNIFICANCE (BEFORE MITIGATION)	FURTHER ASSESSMENT REQUIRED
Visual and Landscape	Potential visual intrusion resulting from large construction vehicles and equipment	Negative	3	2	**Medium**	**Yes**
	Potential visual effect of construction laydown areas and material stockpiles.	Negative	3	2	**Medium**	
	Potential impacts of increased dust emissions from construction activities and related traffic	Negative	3	2	**Medium**	
	Potential visual scarring of the landscape as a result of site clearance and earthworks	Negative	3	2	**Medium**	
	Potential visual pollution resulting from littering on the construction site	Negative	3	1	**Low**	
Heritage and Cultural Resources	Disturbance to known Cultural Resources	Negative	3	2	**Medium**	**Yes**
	Chance Find of Cultural Resources	Negative	3	2	**Medium**	
Palaeontology	Chance Find of Palaeontological resources	Negative	3	2	**Medium**	**Yes**
Traffic	Increased traffic generation around the study area by construction vehicles	Negative	3	1	**Low**	**Yes**
	Deterioration of the surrounding road network due to an increase of traffic around the site	Negative	3	2	**Medium**	
	Transportation of abnormal loads during the construction phase	Negative	4	1	**Medium**	

ASPECT	IMPACT	NATURE	PROBABILITY	CONSEQUENCE	SIGNIFICANCE (BEFORE MITIGATION)	FURTHER ASSESSMENT REQUIRED
Socio-Economic	Creation of local employment, training, and business opportunities	Positive	2	3	**Medium**	**Yes**
	Impact of construction workers on local communities	Negative	3	3	**Medium**	
	Influx of job seekers	Negative	3	3	**Medium**	
	Risk to safety, livestock, and farm infrastructure	Negative	3	3	**Medium**	
	Increased risk of grass fires	Negative	3	3	**Medium**	
	Nuisance impacts associated with construction related activities	Negative	3	3	**Medium**	
	Impacts associated with loss of farmland	Negative	3	3	**Medium**	
Climate Change	Greenhouse Gas Emissions	Negative	2	1	**Very Low**	**No**
	Climate Risks & Vulnerabilities	Negative	2	1	**Very Low**	

Table 6-2: Operational Phase Impacts

ASPECT	IMPACT	NATURE	PROBABILITY	CONSEQUENCE	SIGNIFICANCE (BEFORE MITIGATION)	FURTHER ASSESSMENT REQUIRED
Noise and Vibrations	Noise Emissions	Negative	4	3	**High**	**Yes**
Soils, Land Capability and Agricultural Potential	Enhanced agricultural potential through increased financial security for farming operations	Positive	3	3	**Medium**	**Yes**

ASPECT	IMPACT	NATURE	PROBABILITY	CONSEQUENCE	SIGNIFICANCE (BEFORE MITIGATION)	FURTHER ASSESSMENT REQUIRED
	Prevention of crop spraying by aircraft over land occupied by turbines.	Negative	4	3	**High**	
	Interference with farming operations	Negative	4	3	**High**	
Surface Water	Increased runoff, sedimentation and erosion	Negative	3	3	**Medium**	**Yes**
Waste Generation	Generation of General Waste	Negative	3	2	**Medium**	**Yes**
	Generation of Hazardous Waste	Negative	3	2	**Medium**	
	Sanitation Waste	Negative	3	2	**Medium**	
Biodiversity	Proliferation of alien invasive plant species	Negative	3	3	**Medium**	**Yes**
Avifauna	Displacement due to habitat loss	Negative	4	3	**High**	**Yes**
	Collisions Mortality on wind turbines	Negative	4	3	**High**	
	Electrocution on the medium voltage network	Negative	4	3	**High**	
	Collisions with the medium voltage network	Negative	4	3	**High**	
Bats	Bat mortalities during foraging	Negative	4	3	**High**	**Yes**
	Bat mortalities during migration	Negative	4	3	**High**	
	Increased bat mortalities due to light attraction and habitat creation	Negative	4	3	**High**	

ASPECT	IMPACT	NATURE	PROBABILITY	CONSEQUENCE	SIGNIFICANCE (BEFORE MITIGATION)	FURTHER ASSESSMENT REQUIRED
Visual	Potential alteration of the visual character of the area;	Negative	4	3	**High**	**Yes**
	Potential visual intrusion resulting from wind turbines dominating the skyline in a largely natural / rural area	Negative	4	3	**High**	
	Potential visual clutter caused by substation and other associated infrastructure on-site	Negative	3	3	**Medium**	
	Potential visual effect on surrounding farmsteads	Negative	4	3	**High**	
	Visual impact of shadow flicker impact, and motion-based visual intrusion	Negative	4	3	**High**	
	Potential alteration of the night time visual environment as a result of operational and security lighting as well as navigational lighting on top of the wind turbines	Negative	3	3	**Medium**	
Social	Improve energy security and support the renewable energy sector	Positive	3	3	**Medium**	**Yes**
	Creation of employment and business opportunities	Positive	3	3	**Medium**	
	Generate income for affected landowners	Positive	3	3	**Medium**	
	Benefits associated with the socio-economic development contributions	Positive	3	3	**Medium**	

ASPECT	IMPACT	NATURE	PROBABILITY	CONSEQUENCE	SIGNIFICANCE (BEFORE MITIGATION)	FURTHER ASSESSMENT REQUIRED
	Visual impact and impact on sense of place	Negative	4	3	**High**	
	Potential impact on property values	Negative	3	3	**Medium**	
	Potential impact on tourism	Negative	3	3	**Medium**	
Climate Change	Reduced GHG Emissions	Positive	4	3	**High**	**No**
	Contribution of cleaner energy to the National Grid	Positive	4	3	**High**	

Table 6-3: Initial Cumulative Impacts

RECEPTOR	DESCRIPTION	NATURE	PROBABILITY	CONSEQUENCE	SIGNIFICANCE (BEFORE MITIGATION)	FURTHER ASSESSMENT REQUIRED
Noise and Vibrations	Cumulative Noise Emissions	Negative	4	3	**High**	**Yes**
Soils, Land Capability and Agricultural Potential	Cumulative Agricultural Impacts	Negative	4	3	**High**	**Yes**
Biodiversity	Cumulative impacts on biodiversity	Negative	4	3	**High**	**Yes**
Avifauna	Cumulative Collision impacts	Negative	4	3	**High**	**Yes**
	Cumulative Electrocution Impacts	Negative	4	3	**High**	
Bats	Cumulative Mortalities	Negative	4	3	**High**	**Yes**

RECEPTOR	DESCRIPTION	NATURE	PROBABILITY	CONSEQUENCE	SIGNIFICANCE (BEFORE MITIGATION)	FURTHER ASSESSMENT REQUIRED
Visual	Combined visual impacts from mining, industrial, infrastructural and renewable energy development in the broader area could potentially alter the sense of place and visual character of the area	Negative	4	3	**High**	**Yes**
	Combined visual impacts from mining, industrial, infrastructural and renewable energy development in the broader area could potentially exacerbate visual impacts on visual receptors	Negative	4	3	**High**	
Social	Cumulative impact on sense of place	Negative	4	3	**High**	**Yes**
	Cumulative impact on local service and accommodation	Positive	3	3	**Medium**	
	Cumulative impact on local economy	Positive	3	3	**Medium**	

7 PLAN OF STUDY FOR EIA

7.1 PLAN OF STUDY FOR EIA TERMS OF REFERENCE

Table 7-1: outlines the structure of the plan of study as required in terms of Annexure 2 of GNR 982.

Table 7-1: Plan of Study Requirements

PLAN OF STUDY CHAPTER	INFORMATION REQUIREMENT AS PER GNR 982
Description of EIA Tasks	— A description of the tasks that will be undertaken as part of the environmental impact assessment process.
Description of Alternatives	— A description of the alternatives to be considered and assessed within the preferred site, including the option of not proceeding with the activity.
Aspects to be Assessed in the EIA Process	— A description of the aspects to be assessed as part of the environmental impact assessment report process.
Specialist Studies	— Aspects to be assessed by specialists.
Impact Assessment Methodology	— A description of the proposed method of assessing the environmental aspects, including a description of the proposed method of assessing the environmental aspects including aspects to be assessed by specialists. — A description of the proposed method of assessing duration and significance.
Environmental Impact Report	— Contents of EIAR as specified in GNR 982 (as amended) Annexure 2
Stakeholder and Authority Engagement	— An indication of the stages at which the competent authority will be consulted. — Particulars of the public participation process that will be conducted during the environmental impact assessment process.

7.2 OVERVIEW OF THE EIA PHASE TASKS

The EIA phase will consist of the following tasks; each of these tasks is detailed separately in the following sub-sections:

- Specialist studies;
- Continuation of authority and stakeholder engagement;
- Assessment of the significance of potential impacts; and
- Preparation of the EIA Report.

7.3 DESCRIPTION OF ALTERNATIVES

The EIA process identifies two types of project alternatives:

- Concept Level Alternatives, which relate to the site, technology and process alternatives
- Detailed Level Alternatives which relate to working methods and mitigation measures

The feasibility of the higher-level concept alternatives have been considered and assessed within **Section 2.4** of the DSR. The Detailed Level Alternatives will be addressed within the EIA Report.

7.4 ASPECTS TO BE ASSESSED IN THE EIA PROCESS

Table 7-2 outlines the key aspects that were identified in the scoping phase; these aspects will be subject to further assessment in the EIA Phase

Table 7-2: Summary of aspects to be addressed in the EIA Phase

ENVIRONMENTAL ASPECT	IMPACT
Noise and vibrations	Noise and vibration emissions during construction
	Noise disturbance and nuisance to sensitive receptors during operational phase
	Cumulative impacts
Soils, Land Capability and agricultural Potential	Loss of agricultural potential by soil degradation
	Loss of agricultural potential by occupation of land
	Reduction in land available for cultivation and grazing animals
	Prevention of crop spraying by aircraft over land occupied by turbines. Enhanced agricultural potential through increased financial security for farming operations
	Cumulative impacts
Surface water	Loss of aquatic species of special concern
	Damage or loss of riparian and wetlands systems and disturbance of the waterbodies during construction
	Potential impact on localised surface water quality
	Impact on habitat change and fragmentation related to hydrological regime changes
	Impact on aquatic systems through the possible increase in surface water runoff on form and function - Increase in sedimentation and erosion.
	Cumulative impacts
Biodiversity	Loss and Fragmentation of Vegetation and Habitat
	Impacts on CBAs and broad-scale ecological processes
	Loss and Displacement of Fauna
	Proliferation of alien invasive plant species
	Impact on provincial biodiversity frameworks

	Cumulative impacts
Avifauna	Displacement due to disturbance during construction
	Displacement of priority species due to habitat transformation as a result of the operation of the wind turbines and associated infrastructure
	Mortality of priority species due to collisions with wind turbines
	Cumulative impacts
Bats	Loss of foraging habitat by clearing of vegetation
	Roost destruction during earthworks
	Bat mortalities during foraging (not migration)
	Bat mortalities during migration
	Increased bat mortalities due to light attraction and habitat creation
	Cumulative impacts
Visual and Landscape	Visual impact during construction and decommissioning
	Potential alteration of the visual character of the area
	Potential visual intrusion resulting from wind turbines dominating the skyline in a largely natural / rural area
	Potential visual clutter caused by substation and other associated infrastructure on-site.
	Potential visual effect on surrounding farmsteads
	Visual impact of shadow flicker impact, and motion-based visual intrusion
	Potential alteration of the night time visual environment as a result of operational and security lighting as well as navigational lighting on top of the wind turbines.
	Cumulative visual impacts
Heritage and Cultural Resources	disturbance or destruction of cultural resources
Palaeontology	Physical disturbance of palaeontological sites
Traffic	Increased traffic generation around the study area by construction vehicles
	Deterioration of the surrounding road network due to an increase of traffic around the site

	Transportation of abnormal loads during the construction phase
Socio-economic	Creation of local employment, training, and business opportunities
	Impact of construction workers on local communities
	Influx of job seekers
	Risk to safety, livestock, and farm infrastructure
	Increased risk of grass fires
	Nuisance impacts associated with construction related activities
	Impacts associated with loss of farmland
	Generate income for affected landowners
	Benefits associated with the socio-economic development contributions
	Visual impact and impact on sense of place
	Potential impact on property values
	Potential impact on tourism
	Cumulative impact on sense of place
	Cumulative impact on local service and accommodation
	Cumulative impact on local economy

7.5 SPECIALIST STUDIES TO BE UNDERTAKEN

The following specialist assessments have been commissioned for the EIA Phase:

- Soils and Agricultural Potential Assessment;
- Archaeological and Cultural Heritage Assessment;
- Palaeontology Impact Assessment;
- Visual Impact Assessment[10] ;
- Biodiversity Impact Assessment (inclusive of terrestrial biodiversity, plant species and animal species);
- Freshwater Assessment;

[10] The Visual Impact Assessment will consider the impact of flicker associated with the Camden II WEF development.

- Avifauna Impact Assessment;
- Bat Impact Assessment;
- Environmental Acoustic (Noise) Impact Assessment;
- Social Impact Assessment;
- Qualitative Risk Assessment (specific to the BESS);
- Desktop Geotechnical Assessment; and
- Desktop Traffic Assessment.

It should be noted that the specialist studies will be undertaken according to the procedures for the assessment and minimum criteria for reporting on identified environmental themes in terms of Sections 24(5)(a) and (h) and Section 44 of the NEMA (GNR 320, dated 20 March 2020), where applicable.

7.5.1 AGRICULTURAL IMPACT ASSESSMENT

The terms of reference for the EIA phase is to produce Agricultural Agro-Ecosystem Specialist Assessment that complies with all the requirements of the agricultural protocol. These assessments will require fieldwork and collection of agricultural data.

7.5.2 TERRESTRIAL BIODIVERSITY ASSESSMENT

The relative sensitivity of habitats in different parts of the study area differs from location to location. The sensitivity assessment was done as a screening exercise primarily through interpretation of aerial imagery in combination with habitat assessments that were not within specific footprint areas. Although footprint areas have been designated as sensitive in some cases, it is important to assess footprint areas in detail to ascertain whether local conditions justify the sensitivity categorisation or not. It is therefore important that all footprint areas within mapped sensitive areas (MEDIUM-HIGH, HIGH and VERY HIGH) are assessed in the field to confirm sensitivity.

A detailed terrestrial ecology assessment will be carried out in the EIA phase and will include the following:

- Confirmation of sensitivities and buffers.
- A comprehensive site visit and field assessment in order to characterise the vegetation and plant communities present at the site in greater detail. This includes habitat mapping, developing species lists and descriptions of the typical and dominant species within the site and the potential impact of the development on these habitats and plant communities.
- Identification and quantification of the abundance and distribution of species of conservation concern within the site and especially within the development footprint.
- Evaluate the possible impact of the development on landscape connectivity in the field based on the likely use of the area as a corridor for movement by fauna as well as any local impacts on faunal communities. This should include the identification of any corridors that should be kept clear of development at the site and any buffers required around such features.
- Identify sensitive faunal habitats that should be avoided and measures that should be implemented to reduce impacts on fauna in general.
- Consider the potential impact of the development on CBAs and broad-scale ecological processes at the site. This should consider the habitats affected by the current development as well as the overall impact of renewable energy development in the area at a broader scale.
- Evaluate, based on the site attributes, what the most applicable mitigation measures to reduce the impact of the development on the site would be and if there are any areas where specific precautions or mitigation measures should be implemented.
- Assess the impacts identified above in light of the site-specific findings and the layout to be provided by the developer.

7.5.3 FRESHWATER IMPACT ASSESSMENT

The assessment will include the following aspects related to aquatic features associated with the site:

- A detailed assessment of the study area. This will cover the development footprint in relation to available information related to wetland / riverine ecosystems functioning, river classification, flow regime, water quality, physical, biota, and riparian habitat within the region.
- Identification of aquatic features and assessing impacts on, specifically, NFEPA features, important wetlands and rivers.
- Undertake a wetland delineation and classification.
- A functional assessment of the identified wetlands.
- A risk assessment of the identified wetlands.
- Wetland Mitigation measures.
- A map demarcating the relevant local drainage area of the respective waterbodies, and the respective catchments within a 500m radius of the study area. This will demonstrate, from a holistic point of view the connectivity between the site and the surrounding regions, i.e. the zone of influence.
- The determination of the ecological state of any aquatic systems, estimating their biodiversity, conservation and ecosystem function importance with regard ecosystem services.
- Recommend buffer zones and No-go areas around any delineated wetland areas based on the relevant legislation, e.g. Conservation Plan guidelines or best practice.
- Assess the potential impacts, based on the supplied methodology.
- Provide mitigations regarding project related impacts on the identified aquatic features
- Provide the relevant aspects with regard compiling the Environmental Management / Monitoring Plans.
- Supply geo-referenced GIS shape files of the aquatic areas.

The Freshwater Impact Assessment must be undertaken to align with the requirements for a WULA/GA.

7.5.4 AVIFAUNA IMPACT ASSESSMENT

The following are proposed for the EIA Phase:

- The implementation of four avifaunal surveys, utilising transects, vantage point watches, focal points and incidental counts, to inform the assessment of the potential impacts of the planned infrastructure within the development footprint (see Appendix 3) . The monitoring protocol is guided by the following:
  - Procedures for the Assessment and Minimum criteria for reporting on identified environmental themes in terms of sections 24(5)(a) and (h) and 44 of NEMA when applying for Environmental Authorisation (Gazetted October 2020)
  - Protocol for the specialist assessment and minimum report content requirements for environmental impacts om avifaunal species by onshore wind energy generation facilities where the electricity output is 20MW or more (Government Gazette No. 43110 – 20 March 2020).
  - Jenkins, A.R., Van Rooyen, C.S., Smallie, J.J., Anderson, M.D., & A.H. Smit. 2015. Best practice guidelines for avian monitoring and impact mitigation at proposed wind energy development sites in southern Africa. Produced by the Wildlife & Energy Programme of the Endangered Wildlife Trust & BirdLife South Africa. Hereafter referred to as the wind guidelines.
- The avifaunal specialists report will be structured around the following terms of reference:
  - Description of the affected environment from an avifaunal perspective.
  - Discussion of gaps in baseline data and other limitations.
  - Description of the methodology that was used for the field surveys.
  - Comparison of the site sensitivity recorded in the field with the sensitivity classification in the DFFE National Screening Tool and adjustment if necessary.
  - Provision of an overview of all applicable legislation.
  - Provision of an overview of assessment methodology.

  - Identification and assessment of the potential impacts of the proposed development on avifauna including cumulative impacts.
  - Provision of sufficient mitigation measures to include in the Environmental Management Programme (EMPr).
  - Conclusion with an impact statement whether the facility is fatally flawed or may be authorised.
- For each anticipated impact, management recommendations for the design, construction, and operational phase (where appropriate) will be drafted for inclusion in the project EMPr.

7.5.5 BAT IMPACT ASSESSMENT

The pre-construction bat monitoring has now been completed and will inform the EIA phase; passive bat activity data has been gathered, which will provide comparative bat activity and species assemblages across all seasons as well as various habitats, terrain and/or areas of the site. The EIA phase studies will comprise of the following:

- Confirmation of sensitivities impacts and mitigation measures
- Study bat species assemblage and abundance on the site.
- Study temporal distribution of bat activity across the night as well as the four seasons of the year in order to detect peaks and troughs in activity.
- Determine whether weather variables (wind, temperature, humidity and barometric pressure) influence bat activity.
- Determine the weather range in which bats are mostly active.
- Develop long-term baseline data for use during operational monitoring.
- Identify which turbines need to have special attention with regards to bat monitoring during the operational phase and identify if any turbines occur in sensitive areas and need to be shifted into less sensitive areas or removed from the layout.
- Detail the types of mitigation measures that are possible if bat mortality rates are found to be unacceptable, including the potential times/ circumstances, which may result in high mortality rates.

7.5.6 ACOUSTIC (NOISE) IMPACT ASSESSMENT

The environmental acoustic specialist study for the Camden II WEF as part of the EIA phase will comprise the following:

PRELIMINARY MODELLING

A preliminary modelling exercise will be carried out using a simple model which assumes hemispherical propagation of noise from each turbine. Such modelling will focus on receptors located within a 2 km radius of the turbines.

If the preliminary model suggests that turbine noise at all sensitive receptors is likely to be below an LA90 level of 35 dB(A) at a wind speed of 10 m/s at 10 m height during day and night times, then this preliminary modelling is likely to be sufficient to assess noise impact of the proposed project. If LA90 levels at any receptor location are above 35 dB(A) then a more detailed acoustic study will need to be carried out which includes comprehensive baseline monitoring. Alternatively input into micro-siting of the turbines will be provided to avoid unwanted impacts or further detailed studies.

ENVIRONMENTAL ACOUSTIC IMPACT ASSESSMENT REPORT

A detailed Environmental Acoustic Impact Assessment report will be provided detailing findings of the preliminary modelling, associated impacts, any inputs into micro-siting, as well as detailed recommendations, including mitigation measures if deemed necessary.

7.5.7 HERITAGE AND PALAEONTOLOGICAL IMPACT ASSESSMENT

The scoping study did not identify any fatal flaws for the proposed Camden II WEF. To comply with the National Heritage Resources Act (Act 25 of 1999) it is recommended that a Phase 1 HIA must be undertaken for the study area.

During the HIA the potential impact on heritage resources will be determined as well as levels of significance of recorded heritage resources. The HIA will also provide management and mitigation measures should any significant sites be impacted upon, ensuring that all the requirements of the SAHRA are met.

The study area is of insignificant to moderate to very high paleontological sensitivity and according to the SAHRIS palaeontological sensitivity map must be subjected to a palaeontological assessment in the impact assessment phase.

During the Public participation and stakeholder consultation process (advertisements & site notices) must reference the National Heritage Resources Act and include heritage concerns from stakeholders.

7.5.8 TRAFFIC IMPACT ASSESSMENT

The Traffic Impact Assessment will be conducted as follows:

- A site visit will be undertaken to obtain the following information:
  - Existing layouts and traffic control measures of intersections considered in the study;
  - Accesses to various properties surrounding the proposed development site;
  - Appropriateness of proposed site accesses;
  - Condition of the road network; and
  - Presence of existing public transport and non-motorised transport facilities.
- A weekday 12-hour traffic counts (6am to 6pm) will be conducted at affected intersections in relation to the potential access positions
- Description of the local and potentially affected road network, including planning and comment on the road condition, where information is available.
- Description of latent development in the vicinity of the facility that may also have an impact on the local road network.
- Assessment of the required site access, parking and internal circulation. Two access positions have provisionally been identified via local roads from the N11 freeway. These accesses will be confirmed during the preparation of the study and the final access position will be evaluated.
- Assessment of expected trip generation (construction & operational phases).
- Capacity analysis (construction & operational phases), including an assessment of the expected total E80's (heavy axle loading) for the life cycle of the facility.
- Assessment of public transport and Non-motorised transport (if applicable).
- Recommendations and conclusions with regards to the required traffic and transport related road upgrades.

7.5.9 VISUAL IMPACT ASSESSMENT

The scoping phase VIA report has adequately assessed the visual impacts of the proposed Camden II WEF and no further field investigation will be required. The focus of the EIA phase assessment will be to update the scoping phase VIA report. This will entail:

- A review of the findings of the VIA in accordance with detailed site layouts;
- A comparative assessment of the layout alternatives provided;
- Addressing any comments or concerns arising from the public participation process

7.5.10 SOCIAL IMPACT ASSESSMENT

The approach to undertaking the SIA study is based on the Western Cape Department of Environmental Affairs and Development Planning Guidelines for Social Impact Assessment (February 2007). These guidelines are based on international best practice. The key activities in the SIA process embodied in the guidelines include:

- Describing and obtaining an understanding of the proposed intervention (type, scale, and location), the settlements, and communities likely to be affected by the proposed project.
- Collecting baseline data on the current social and economic environment.
- Identifying the key potential social issues associated with the proposed project (construction, operational, and decommissioning phase). This requires a site visit to the area and consultation with affected individuals and communities.
- Assessing and documenting the significance of social impacts associated with the proposed development. Annexure B summarises the assessment methodology that will be used to assign significance ratings during the assessment process.
- Identifying alternatives and enhancement and mitigation measures.

The site visit will be undertaken during the Assessment Phase of the SIA. The site visit will include interviews with key stakeholders and interested and affected parties.

7.6 IMPACT ASSESSMENT METHODOLOGY

The assessment of impacts and mitigation evaluates the likely extent and significance of the potential impacts on identified receptors and resources against defined assessment criteria, to develop and describe measures that will be taken to avoid, minimise or compensate for any adverse environmental impacts, to enhance positive impacts, and to report the significance of residual impacts that occur following mitigation.

The key objectives of the risk assessment methodology are to identify any additional potential environmental issues and associated impacts likely to arise from the proposed project, and to propose a significance ranking. Issues / aspects will be reviewed and ranked against a series of significance criteria to identify and record interactions between activities and aspects, and resources and receptors to provide a detailed discussion of impacts. The assessment considers direct,[11] indirect,[12] secondary[13] as well as cumulative[14] impacts.

A standard risk assessment methodology is used for the ranking of the identified environmental impacts pre-and post-mitigation (i.e. residual impact). The significance of environmental aspects is determined and ranked by considering the criteria[15] presented in **Table 7-3**.

Table 7-3: Impact Assessment Criteria and Scoring System

CRITERIA	SCORE 1	SCORE 2	SCORE 3	SCORE 4	SCORE 5
Impact Magnitude (M) The degree of alteration of the affected environmental receptor	Very low: No impact on processes	Low: Slight impact on processes	Medium: Processes continue but in a modified way	High: Processes temporarily cease	Very High: Permanent cessation of processes
Impact Extent (E) The geographical extent of the impact on a given environmental receptor	Site: Site only	Local: Inside activity area	Regional: Outside activity area	National: National scope or level	International: Across borders or boundaries

[11] Impacts that arise directly from activities that form an integral part of the Project.
[12] Impacts that arise indirectly from activities not explicitly forming part of the Project.
[13] Secondary or induced impacts caused by a change in the Project environment.
[14] Impacts are those impacts arising from the combination of multiple impacts from existing projects, the Project and/or future projects.
[15] The definitions given are for guidance only, and not all the definitions will apply to all the environmental receptors and resources being assessed. Impact significance was assessed with and without mitigation measures in place.

CRITERIA	SCORE 1	SCORE 2	SCORE 3	SCORE 4	SCORE 5
Impact Reversibility (R) The ability of the environmental receptor to rehabilitate or restore after the activity has caused environmental change	Reversible: Recovery without rehabilitation		Recoverable: Recovery with rehabilitation		Irreversible: Not possible despite action
Impact Duration (D) The length of permanence of the impact on the environmental receptor	Immediate: On impact	Short term: 0-5 years	Medium term: 5-15 years	Long term: Project life	Permanent: Indefinite
Probability of Occurrence (P) The likelihood of an impact occurring in the absence of pertinent environmental management measures or mitigation	Improbable	Low Probability	Probable	Highly Probability	Definite
Significance (S) is determined by combining the above criteria in the following formula:	$[S = (E + D + R + M) \times P]$ $Significance = (Extent + Duration + Reversibility + Magnitude) \times Probability$				

IMPACT SIGNIFICANCE RATING			
Total Score	0 – 30	31 to 60	61 – 100
Significance Rating (Negative (-)	**Low (-)**	**Moderate (-)**	**High (-)**
Significance Rating (Positive (+)	**Low (+)**	**Moderate (+)**	**High (+)**

7.6.1 IMPACT MITIGATION

The impact significance without mitigation measures will be assessed with the design controls in place. Impacts without mitigation measures in place are not representative of the proposed development's actual extent of impact and are included to facilitate understanding of how and why mitigation measures were identified. The residual impact is what remains following the application of mitigation and management measures and is thus the final level of impact associated with the development. Residual impacts also serve as the focus of management and monitoring activities during Project implementation to verify that actual impacts are the same as those predicted in this report.

The mitigation measures chosen are based on the mitigation sequence/hierarchy which allows for consideration of five (5) different levels, which include avoid/prevent, minimise, rehabilitate/restore, offset and no-go in that order. The mitigation sequence/hierarchy is shown in **Figure 7-1** below.

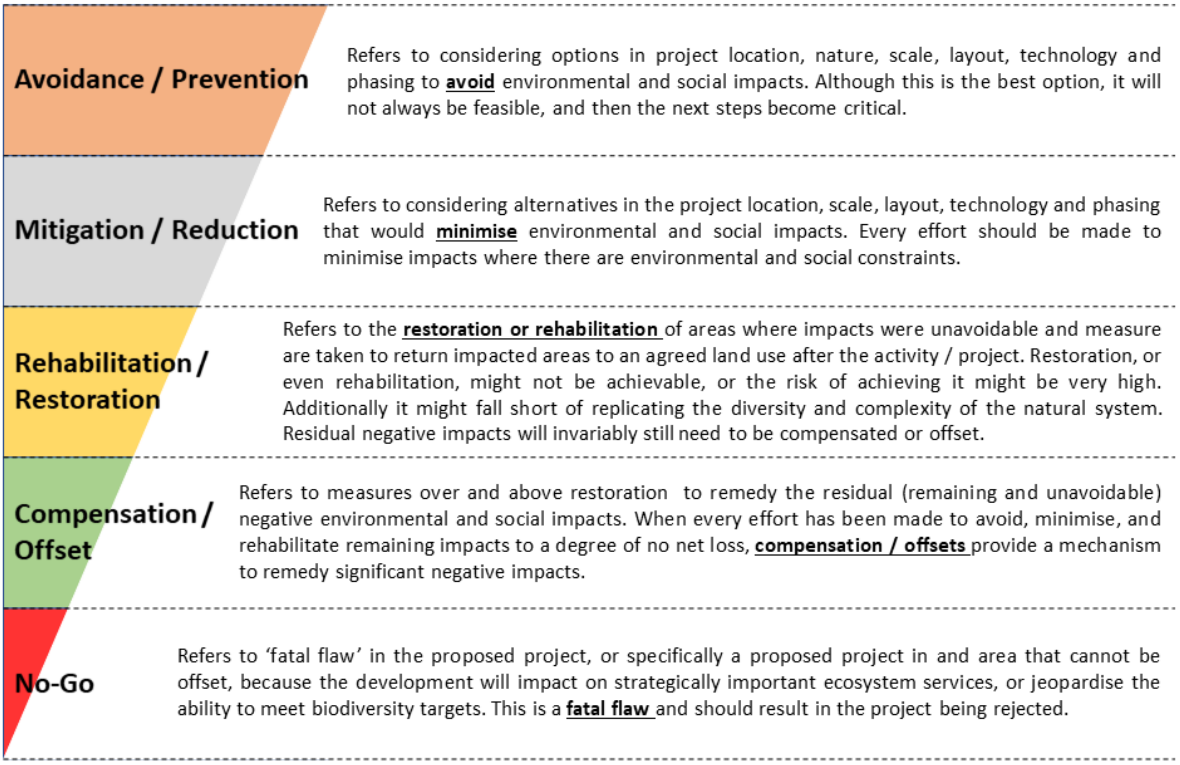


Figure 7-1: Mitigation Sequence/Hierarchy

The idea is that when project impacts are considered, the first option should be to avoid or prevent the impacts from occurring in the first place if possible, however, this is not always feasible. If this is not attainable, the impacts can be allowed, however they must be minimised as far as possible by considering reducing the footprint of the development for example so that little damage is encountered. If impacts are unavoidable, the next goal is to rehabilitate or restore the areas impacted back to their original form after project completion. Offsets are then considered if all the other measures described above fail to remedy high/significant residual negative impacts. If no offsets can be achieved on a potential impact, which results in full destruction of any ecosystem for example, the no-go option is considered so that another activity or location is considered in place of the original plan.

7.7 ENVIRONMENTAL IMPACT ASSESSMENT REPORT

Once the FSR has been approved the proposed project will proceed into detailed EIA phase, which involves the detailed specialist investigations.

WSP will produce a Draft EIAR after the completion of the required specialist studies. The Draft EIAR will provide an assessment of all the identified key issues and associated impacts from the Scoping phase. All requirements as contemplated in the EIA Regulations, 2014 (GNR 982, as amended) will be included in the Draft EIAR.

The Draft EIAR will contain, inter alia, the following:

- Details of the EAP who prepared the report and the expertise of the EAP to carry out the S&EIR process, including a curriculum vitae;
- The location of the activity, including the 21 digit Surveyor General code of each cadastral land parcel, where available, the physical address and farm name; and the coordinates of the boundary of the property or properties;
- A plan which locates the proposed activity or activities applied for as well as the associated structures and infrastructure at an appropriate scale;

- A description of the scope of the proposed activity, including all listed and specified activities triggered and being applied for; and a description of the associated structures and infrastructure related to the proposed project;
- A description of the policy and legislative context within which the development is located and an explanation of how the proposed development complies with and responds to the legislation and policy context;
- A motivation for the need and desirability for the proposed development, including the need and desirability of the activity in the context of the preferred location;
- A motivation for the preferred development footprint within the approved site;
- A full description of the process followed to reach the proposed development footprint within the approved site;
- Details of the public participation process undertaken;
- A summary of the issues raised by interested and affected parties, and an indication of the manner in which the issues were incorporated, or the reasons for not including them;
- The environmental attributes associated with the development footprint alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects;
- The impacts and risks identified including the nature, significance, consequence, extent, duration and probability of the impacts;
- The methodology used in determining and ranking of potential environmental impacts and risks;
- Positive and negative impacts;
- An assessment of each identified potentially significant impact and risk;
- The possible mitigation measures that could be applied;
- An environmental impact statement;
- A description of any assumptions, uncertainties and gaps in knowledge;
- A reasoned opinion as to whether the proposed activity should or should not be authorised;
- An undertaking under oath or affirmation by the EAP; and
- An EMPr.

7.8 STAKEHOLDER AND AUTHORITY ENGAGEMENT

Public participation during the EIA phase revolves around the review of the environmental impact assessment findings, which will be presented in the Draft EIA Report. All stakeholders will be notified of the progress to date and availability of the Draft EIA Report, via mail, email and/or SMS. A legislated period of 30 consecutive days will be allowed for public comment. Reports will be made available in the following way:

- Distribution for comment at central public places, which were used during the Scoping phase (subject to Covid 19 status quo);
- The document will be made available to download from the WSP website; and
- Copies of CDs will be made available on request.

The EIA phase will provide the following information to I&APs:

- Initial Site Plan;
- Alternatives;
- A description of activities and operations to be undertaken;
- Baseline information;
- Specialist studies;
- Impact assessment;
- Management measures;
- Monitoring and measuring plan; and
- Closure details.

The information outlined above will be presented in one or more of the following:

- Notifications;
- Scoping Report;
- EIA Report; and
- EMPr.

All comments received during the EIA phase will be recorded in the comments and response report (CRR), which will be included in the draft and final EIA Reports. The final EIA Report will incorporate public comment received on the Draft EIA Report and will be made available for public review with hard copies distributed mainly to the authorities and key stakeholders.

All stakeholders will receive a letter notifying them of the authority's decision

8 WAY FORWARD

This DSR contains:

- A description of the existing and proposed activities;
- A description of the alternatives considered to date;
- An outline of the proposed process to be followed;
- Information on the EAP and stakeholders who have chosen to participate in the project;
- An outline of the environment in which the project falls;
- Information on the potential environmental impacts to be studied in more detail during the EIAR phase of the project; and
- Information on the proposed specialist studies to be undertaken.

A number of environmental impacts have been identified as requiring some more in-depth investigation and the identification of detailed mitigation measures. Therefore, a detailed EIA is required to be undertaken in order to provide an assessment of these potential impacts and recommend appropriate mitigation measures.

The recommendation of this report is that detailed specialist studies as outlined in **Section 7.4** are undertaken.

This DSR is available for review from **25 February 2022 to 28 March 2022**. All issues and comments submitted to WSP will be incorporated in the CRR of the FSR.

The DSR will be submitted to the delegated competent authorities responsible for authorising this project.

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

WSP Group Africa

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APPENDIX

A EAP CV

APPENDIX

B EAP DECLARATION

APPENDIX

C SPECIALIST DECLARATIONS

APPENDIX

D HERITAGE SCOPING REPORT

APPENDIX

E DFFE SCREENING REPORT

APPENDIX

F

APPROVED PRE-APPLICATION MEETING MINUTES AND PUBLIC PARTICIPATION PLAN

APPENDIX

G STAKEHOLDER ENGAGEMENT

APPENDIX

G-1 I&AP DATABASE

G-2 NOTIFICATION LETTER

G-3 ADVERTISEMENT

G-4 SITE NOTICE

APPENDIX

H

AQUATIC SCOPING REPORT

APPENDIX

I

TERRESTRIAL ECOLOGY SCOPING REPORT

APPENDIX

J AVIFAUNA SCOPING REPORT

APPENDIX

K BAT SCOPING REPORT

APPENDIX

L VISUAL SCOPING REPORT

APPENDIX

M SOCIAL SCOPING REPORT