MULILO
RENEWABLE PROJECT DEVELOPMENTS

Environmental Impact Assessment for the proposed Kuruman Phase 2 Wind Energy Facility near Kuruman in the Northern Cape

Draft Scoping Report

CSIR Report No.:
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May 2018

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Scoping and Environmental Impact Assessment for the proposed development of the Kuruman Phase 2 Wind Energy Facility near Kuruman in the Northern Cape

DRAFT SCOPING REPORT

May 2018

Prepared for:
Mulilo Renewable Project Developments (Pty) Ltd

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REPORT DETAILS

Title:	**Scoping and Environmental Impact Assessment for the proposed development of the Kuruman Phase 2 Wind Energy Facility near Kuruman in the Northern Cape: DRAFT SCOPING REPORT**
Prepared for:	This Scoping Report forms part of a series of reports and information sources that are being provided during the Environmental Impact Assessment (EIA) Process for the proposed Kuruman WEF Phase 2 project. In accordance with the EIA Regulations, the purpose of the Scoping Report is to: • Provide a description of the proposed project, including a sufficient level of detail to enable stakeholders to identify relevant issues and concerns; • Describe the local environmental and development context within which the project is proposed, to assist further in identifying issues and concerns; and • Provide an overview of the process being followed in the Scoping Phase, in particular the Public Participation Process, as well as present the Plan of Study for EIA that would be followed in the subsequent EIA Phase. This Draft Scoping Report (DSR) is hereby released for a 30-day commenting period ending on 21 June 2018. Comments on the DSR will be included in the Final Scoping which will be submitted to the national Department of Environmental Affairs for decision-making.
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CONTENTS

PART A: MAIN REPORT

PART B: APPENDICES

EXECUTIVE SUMMARY

PROJECT OVERVIEW

Mulilo Renewable Project Developments (Pty) Ltd (hereafter "Mulilo") is proposing to construct two Wind Energy Facilities (WEFs), namely Kuruman Phase 1 WEF and Kuruman Phase 2 WEF and supporting electrical infrastructure, in the Ga-Segonyana Local Municipality and the John Taolo Gaetsewe District Municipality, 8 km and 37 km south west from Kuruman and from Kathu, respectively, in the Northern Cape Province. The proposed Kuruman WEF will be connected to the Ferrum substation (located in Kathu) or to the Segame substation (located in Kuruman) and a collector substation, via a 132 kV powerline. This report comprises the Draft Scoping Report (DSR) for the development of **the Kuruman Phase 2 WEF.**

The proposed Kuruman Phase 2 WEF will be developed on the following land portions:

- Portion 1 of Farm Bramcote 446; and
- Remainder of Farm Bramcote 446.

In terms of the National Environmental Management Act (Act 107 of 1998, as amended) (NEMA) and the 2014 NEMA Environmental Impact Assessment (EIA) Regulations (as amended), promulgated in Government Gazette 40772 and Government Notice (GN) R326, R327, R325 and R324 on 7 April 2017, a full Scoping and EIA Process is required for the construction of the proposed Kuruman Phase 2WEF.

Mulilo has appointed the Council for Scientific and Industrial Research (CSIR) to undertake the EIA Process in order to determine the biophysical, social and economic impacts associated with undertaking the proposed activities. Given that energy related projects have been elevated to national strategic importance in terms of the EIA Process, the proposed WEF requires authorisation from the National Department of Environmental Affairs (DEA) as the Competent Authority (CA), acting in consultation with other spheres of government.

NEED FOR THE PROJECT

The Integrated Resource Plan (IRP) for South Africa for the period 2010 to 2030 (referred to as "IRP2010") was released by government in 2010, and an updated report was published in 2013, which proposes to secure 17 800 MW of renewable energy capacity by 2030 (including wind, solar and other energy sources)., in August 2011, the Department of Energy (DOE) launched the Renewable Energy Independent Power Producer Procurement Programme (REIPPPP) and invited potential IPPs to submit proposals for the financing, construction, operation and maintenance of the first 3 725 MW of onshore wind, solar thermal, solar photovoltaic (PV), biomass, biogas, landfill gas or small hydropower projects. On 18 August 2015, an additional procurement target of 6 300 MW to be generated from renewable energy sources was added to the REIPPPP for the years 2021 - 2025, as published in Government Gazette 39111. The additional target allocated for wind energy is 3 040 MW.

In terms of the REIPPPP, the submitted proposals are currently evaluated according to two main evaluation criteria for compliant proposals, which are price and economic development with a point allocation of 70/30 (DOE, 2013), with other selection criteria including technical feasibility and grid connectivity, environmental acceptability, black economic empowerment, community development, and local economic and manufacturing propositions. The bidders whose responses rank the highest (according to the aforementioned criteria) will have the greatest potential to be appointed as "Preferred Bidders" by the DOE. Mulilo intends to bid this project in the next bidding process to be potentially selected as an IPP. The establishment of the proposed WEF would strengthen the existing electricity grid for the area. Additionally, the project would contribute towards meeting the national energy target as set by the DOE and assist the government in achieving its proposed renewable energy target of 17 800 MW by 2030.

Should the proposed site and development identified by Mulilo be acceptable, it is considered viable that long term benefits for the community and society in the Kuruman/Kathu area would be realised. The towns in the Northern Cape are generally small with limited job opportunities, and the proposed project will provide an opportunity for additional employment in an area where job creation is identified as a key priority. Approximately 420 employment opportunities will be created during the construction and 35 during the operational period (including 25 permanent employees) of the proposed Kuruman Phase 2 WEF. The proposed project would also have international significance as it contributes to South Africa being able to meet some of its international obligations by aligning domestic policy with internationally agreed strategies and standards as set by the United Nations Framework Convention on Climate Change (UNFCCC), The Paris Agreement on climate Change, Kyoto Protocol, and United Nations Convention on Biological Diversity (UNCBD), all of which South Africa is a signatory to. Renewable energy is critical to South Africa as this source of energy is recognised as a major contribution to climate protection, has a much lower environmental impact, as well as advancing economic and social development.

PROJECT DESCRIPTION

A summary of the key components of the proposed project is described below.

The proposed Kuruman Phase 2 WEF will consist of the following components:

- ***Wind turbines:***

  - A number of 20 – 52 turbines;
  - Hub height of 80 -140 m and rotor diameter of 100 - 160 m;
  - Blade length of 50 - 80 m;

- Reinforced Concrete Foundation: 20 x 20 m (0.04 ha per turbine);
- Crane platform: 50 m x 50 m (0.25 ha) for each turbine; and
- Turbine capacity: 4.5 MW.

- ***Collector substation:***

  - 22/33 kV to 132 kV collector substation of approximately 2 ha to receive, convert and step up electricity from the WEF to the 132 kV grid suitable supply. The substation will be 5 m high. The facility will house control rooms and grid control yards for both Eskom and the IPP as well as a communication tower of up to 32 m.

- ***Operations and Maintenance building:***

  - Operations and Maintenance (O&M) buildings of approximately 1 ha. These buildings will comprise the following:
    - Parking area, reception area, offices, and ablution facilities for operational staff, security and visitors;
    - Workshops, storage areas for materials and spare parts;
    - Water storage;
    - Septic tanks and sewer lines to service ablution facilities;
    - Central waste collection and storage area; and
    - The buildings and other infrastructure, including a communication tower, will be less than 32 m high.

- ***Construction site office area and laydown area (used during construction and rehabilitated thereafter):***

  - Three construction laydown areas (yards) will be established. It is anticipated that each construction yard will comprise an area of approximately 2 ha (6 ha in total) and will consist of the following:

    - Canteen;
    - Ablution facilities;
    - Site offices;
    - Changing room;
    - Meeting rooms;
    - Parking area;
    - Storage area including bunded fuel areas, oil storage areas, general stores (containers) and skips; and an
    - On-site concrete batching plant: 50 m x 50 m (0.25 ha).

- ***Access roads:***

  - The proposed main access road is located on D3420. This main access road connects to the main access road of Phase 1 on the boundary of the two phases. Turbines could therefore be delivered to the Phase 1 area via the proposed main access road of Phase 2.

- ***Service roads:***

  - New roads will be constructed with a width of approximately 5 m and will connect all turbines. The existing roads to be used will be extended to a width of 8 m.

- ***Other infrastructure:***

  - Fencing of 5 m high around the O&M building and the on-site substation;
  - Cabling (22/33kV internal reticulation lines) between turbines to be laid underground where practical, which will connect to an on-site substation; and
  - Stormwater channels and culverts.

The proposed Kuruman Phase 2 WEF will connect to the Ferrum substation (located in Kathu) or to the Segame substation (located in Kuruman) and a collector substation via a 132 kV overhead transmission line. The proposed transmission line will extend over 50 km to the Ferrum substation or 10 km to the Segame substation. Note that this transmission infrastructure is assessed under a separate BA process.

NEED FOR AN ENVIRONMENTAL IMPACT ASSESSMENT

As noted above, in terms of the National Environmental Management Act (Act 107 of 1998, as amended) (NEMA) and the 2014 NEMA Environmental Impact Assessment (EIA) Regulations (as amended), promulgated in Government Gazette 40772 and Government Notice (GN) R326, R327, R325 and R324 on 7 April 2017, a full Scoping and EIA Process is required for the construction of the proposed Kuruman Phase 2 WEF.

The need for the full Scoping and EIA is triggered by, amongst others, the inclusion of Activity 1 listed in GN R325 (Listing Notice 2):

"The development of a facility or infrastructure for the generation of electricity from a renewable resource where the electricity output is 20 megawatts or more, excluding where such development of facility or infrastructure is for photovoltaic installations and occurs (a) within an urban area; or (b) on existing infrastructure".

Chapter 4 of this Draft Scoping Report contains the detailed list of activities contained in R327, R325, and R324 which may be triggered by the various project components and thus form part of the Scoping and EIA Process.

The purpose of the EIA is to identify, assess and report on any potential impacts the proposed project, if implemented, may have on the receiving environment. The environmental assessment, therefore, needs to show the CA, the DEA, and the project applicant, Mulilo, what the consequences of their choices will be in terms of impacts on the biophysical and socio-economic environment and how such impacts can, as far as possible, be enhanced or mitigated and managed as the case may be.

PURPOSE OF THE SCOPING REPORT

The Scoping Phase of the EIA refers to the process of determining the spatial and temporal boundaries for the EIA. In broad terms, the objectives of the Scoping Process in terms of the 2014 NEMA EIA Regulations (GN R325) are to:

- Confirm the process to be followed and opportunities for stakeholder engagement;
- Clarify the project scope to be covered;
- Identify and confirm the preferred activity and technology alternative;
- Identify and confirm the preferred site for the preferred activity;
- Identify the key issues to be addressed in the impact assessment phase and the approach to be followed in addressing these issues; and

- Confirm the level of assessment to be undertaken during the impact assessment

This is achieved through parallel initiatives of consulting with:

- The lead authorities involved in the decision-making for this EIA application;
- The public to ensure that local issues are well understood; and
- The EIA specialist team to ensure that technical issues are identified.

The Scoping Process is supported by a review of relevant background literature on the local area. Through this comprehensive process, the environmental assessment can identify and focus on key issues requiring assessment.

The primary objective of the Scoping Report is to present key stakeholders (including affected organs of state) with an overview of the project and key issues that require assessment in the EIA Phase and allow the opportunity for the identification of additional issues that may require assessment. Issues raised in response to this Draft Scoping Report (currently being released for a 30-day comment period) will be captured in an Issues and Responses Trail as an appendix to the Final Scoping Report, which will be submitted to the National DEA for decision-making (i.e. approval or rejection). This approval is planned to mark the end of the Scoping Phase after which the EIA Process moves into the impact assessment and reporting phase.

IDENTIFICATION OF ISSUES

The list below indicates the main issues identified thus far during the Scoping Phase and to be addressed during the EIA Process.

TERRESTRIAL AND FRESHWATER ECOLOGY IMPACTS:

The proposed development will result in the loss of approximately 100 ha of vegetation during the construction phase. The proposed development site will also have an impact on Species of Conservation Concern (SCC) and fauna through habitat loss and mortality. The proposed development will also result in a number of actions including:

- Impact on Ecological Support Area (ESA);
- Impact on plant Species of Conservation Concern (SCC);
- Direct and indirect faunal impacts;
- Increased alien plant invasion;
- Increased erosion; and
- Cumulative impact on habitat loss and broad-scale ecological processes.

The potential impacts identified during the scoping phase of the terrestrial and freshwater ecology assessment are outlined below:

Construction Phase

- Physical disturbance and destruction of aquatic features and major drainage lines;
- Altered drainage patterns, increased runoff and sedimentation of related ecosystems;
- Impairment of water quality;
- Impact on vegetation and plant SCC; and
- Direct and indirect faunal impacts.

Operational Phase

- Physical disturbance and destruction of aquatic features and major drainage lines;
- Alteration of the natural hydrological regime;
- Increased soil erosion;
- Increased alien plant invasion;
- Impacts on fauna; and
- Impacts on ESA.

Decommissioning Phase

- Degradation of aquatic features and major drainage lines;
- Impairment of water quality;
- Increased alien plant invasion;
- Increased soil erosion; and
- Direct and indirect impacts on fauna.

VISUAL IMPACTS:

The activities that will be undertaken as part of the construction and operation phases of the proposed Kuruman Phase 2 WEF project that will result in potential visual impacts are discussed below. The potential visual issues identified by the specialists during the scoping phase of this EIA process include the following:

- Potential scarring in the landscape caused by site clearance and earthworks for access roads and assembly platforms, particularly on the steeper slopes;
- Potential visual clutter in the landscape of the on-site substation, operational and maintenance structures, and connecting powerlines;
- Potential visual intrusion and increased dust emissions during construction from heavy machinery and truck traffic;
- Visual effect of wind turbines on the ridge skylines; and
- Cumulative visual impact from several other renewable energy facilities in the broader area could potentially alter the sense of place and visual character of the area.

The potential impacts identified during the scoping phase of the visual assessment are outlined below:

Construction Phase

- Potential visual intrusion, dust and noise caused by heavy construction vehicles and cranes;
- Potential visual effect of construction camp and material stockpiles;
- Potential visual scarring caused by earthworks for roads and platforms, as well as site clearance and borrow-pits; and
- Potential visual pollution caused by littering and wind-blown packaging materials.

Operational Phase

- Potential visual intrusion of the rural landscape resulting from large-scale wind turbines located on ridge lines and higher plateaus;
- Potential visual clutter caused by substation and operations/maintenance structures and overhead powerlines;
- Potential alteration of the visual character of the area;

- Potential alteration of the night time visual environment as a result of operational, navigation and security lighting, as well as navigational lighting on top of the wind turbines; and
- Potential visual effect on surrounding farmsteads and the Oryx Trail Game Lodge.

Decommissioning Phase

- Potential visual intrusion resulting from vehicles and equipment involved in the decommissioning process;
- Potential impacts of increased dust emissions from decommissioning activity activities and related traffic; and
- Potential visual effect of remaining infrastructure such as roads, platforms and concrete slabs on the landscape after decommissioning of the WEF.

HERITAGE, ARCHAEOLOGY, CULTURAL LANDSCAPE AND PALAEONTOLOGY:

Both direct (destruction through the proposed project activities) and indirect (destruction through unintended consequences or deviations from the authorised work and footprint, and through visual intrusion into a sensitive area) impacts may occur during the construction, operation and decommissioning of the proposed WEF.

The potential impacts identified during the construction, operational and decommissioning phases of the proposed project in the scoping assessment are:

- The destruction or disturbance of archaeological sites and their immediate contexts;
- The destruction of palaeontological resources (mainly of Precambrian stromatolites);
- The destruction or disturbance of graves or burial sites;
- The destruction or disturbance of built heritage resources; and
- Visual intrusion into the cultural landscape which might erode its association with intangible heritage.

BAT IMPACTS:

Direct impacts to bats will be limited to species that make use of the airspace in the rotor-swept zone of the wind turbines.

The following impacts to bats have been identified in the scoping phase:

Construction Phase

- Roost disturbance;
- Roost destruction; and
- Habitat modification i.e. destruction of foraging habitat.

Operational Phase

- Bat mortality during commuting and/or foraging and during migration by colliding with the operational wind turbines and/or due to barotrauma;
- Cave ecosystem collapse due to bat mortalities of cave dwelling bat populations; and
- Displacement and reduced foraging opportunities for bats due to light pollution;

- Cumulative impact of increased area of potential bat mortality by turbine blades due to proposed neighbouring Kuruman WEF Phase 1.

BIRD IMPACTS:

The main impacts of WEFs and their associated infrastructure have been identified as displacement through disturbance and habitat destruction, mortality through collisions with turbines and/or powerlines and electrocution on live power infrastructure.

Construction Phase

- Displacement of priority species due to habitat transformation / destruction; and
- Displacement of priority species due to disturbance and noise associated with the construction activities.

Operational Phase

- Bird mortality due to collisions with operational wind turbines;
- Displacement of priority species due to habitat transformation; and
- Disruption of local bird movement patterns.

Decommissioning Phase

- Displacement of priority species due to disturbance and noise associated with decommissioning activities.

SOILS AND AGRICULTURAL POTENTIAL

The following key issues, based on the project aspects (construction, operation and decommissioning phase) have been identified:

Construction Phase

- Loss of agricultural land use due to direct occupation by the infrastructural footprint of the proposed development for the duration of the project. This will take affected portions of land out of agricultural production;
- Soil erosion as the result of wind or water. This may be due to alteration of the land surface characteristics. Alteration of surface characteristics may be caused by construction related land surface disturbance, vegetation removal, and the establishment of hard standing areas, surfaces and roads. Erosion will cause loss and deterioration of soil resources;
- Loss of topsoil due to poor topsoil management (burial, erosion, etc.) during construction related soil profile disturbance (levelling, excavations, road surfacing etc.) and resultant decrease in that soil's capability for supporting vegetation; and
- Degradation of veld vegetation beyond the direct facility footprint due to constructional disturbance and potential trampling by vehicles.

Operational Phase

- Loss of agricultural land use due to direct occupation by the infrastructural footprint of the development for the duration of the project. This will take affected portions of land out of agricultural production;

- Soil erosion as the result of wind or water. This may be due to alteration of the land surface characteristics. Alteration of surface characteristics may be caused by construction related land surface disturbance, vegetation removal, and the establishment of hard standing areas, surfaces and roads. Erosion will cause loss and deterioration of soil resources;
- Additional land use income will be generated by the farming enterprise through the leasing agreements with land owners. This provides the farming enterprise with increased cash flow and rural livelihood thus improving financial sustainability; and
- Regional loss of agricultural land use due to cumulative occupation by the infrastructural footprint of all renewable energy developments within 50 km from the proposed development area. This will take affected portions of land out of agricultural production, but the cumulative impact is low because of the limited agricultural potential of all land in the area.

Decommissioning Phase

- Loss of agricultural land use due to direct occupation by the infrastructural footprint of the development for the duration of the project. This will take affected portions of land out of agricultural production;
- Soil erosion as the result of wind or water. This may be due to alteration of the land surface characteristics. Alteration of surface characteristics may be caused by construction related land surface disturbance, vegetation removal, and the establishment of hard standing areas, surfaces and roads. Erosion will cause loss and deterioration of soil resources;
- Loss of topsoil due to poor topsoil management (burial, erosion, etc.) during construction related soil profile disturbance (levelling, excavations, road surfacing etc.) and resultant decrease in that soil's capability for supporting vegetation; and
- Degradation of veld vegetation beyond the direct facility footprint due to constructional disturbance and potential trampling by vehicles.

SOCIO-ECONOMIC ISSUES:

The following key issues, based on the project aspects (construction, operation and decommissioning phase) have been identified:

Construction phase

- Increase in production and GDP-R due to capital expenditure;
- Temporary employment creation due to construction activities;
- Skills development and enhancement due to construction activities;
- Household income attainment due to employment opportunities;
- Increased demand for housing and social facilities due to influx of migrant labour and job seekers;
- Possible Health Risks for employees due to Asbestos prevalence in region;
- Potential increase in theft related crimes due to high unemployment rate, social ills, and increased movement of people in area; and
- Change in sense of place due to construction activities (visibility of WEF infrastructure and impact on tourism and surrounding property values).

Operational phase

- Increase in production and GDP-R due to operating expenditure (diversification of land-use for other income streams to landowner);
- Long-term employment creation due to operation and maintenance activities of the WEF;
- Skills development and enhancement due to operation activities at the WEF;
- Household income attainment due to employment opportunities;

- Increase in local government revenue due to rates and taxes;
- Possible Health Risks for employees due to Asbestos prevalence in region;
- Benefits from community development plans and income for other local sectors; and
- Change in sense of place due to visual impact of operational wind turbines.

Decommissioning phase

- Local economy stimulation due to decommissioning costs;
- Temporary employment creation as a result of decommissioning activities (influx of people);
- Possible Health Risks for employees due to Asbestos prevalence in region; and
- Change in sense of place due to removal of wind turbines (increase in tourism and surrounding property values).

TRANSPORTATION IMPACTS:

The potential transportation or traffic related issues identified during the scoping phase of this EIA process include:

Construction, operational and decommissioning phases

- Noise, dust and exhaust pollution due to the increased vehicle traffic on the internal on-site roads and local unsurfaced access roads owing to transportation of people, construction materials, water and equipment to and from the development site, excavations of turbine footings, trenching for electrical cables and other ancillary construction works, as well as abnormal trucks delivering turbine components to the site; and
- Noise, dust, exhaust pollution and increased traffic congestion and/or delays on the surrounding road network (i.e. N14 and R31) due to construction vehicles and abnormal trucks transporting turbine components.

NOISE IMPACTS:

The following potential noise impacts have been identified during the scoping phase:

Construction Phase

- Increase in ambient sound levels as a result of construction activities during the day.

Operational Phase

- Increase in ambient sound levels as result of operational wind turbines at night.

Decommissioning Phase

- Increase in ambient sound levels as a result of construction activities during the day; and
- Ambient sound levels to return to pre-construction levels as a result of turbines which ceased operations.

GEOHYDROLOGY IMPACTS:

The following potential impacts to the groundwater and geohydrological resources have been identified during the scoping phase:

Construction Phase

- Potential impact on the groundwater as a result of the construction of storage yards and temporary labour accommodation;
- Potential impact of increased storm water outflows; and
- Potential impact on groundwater quality as a result of accidental oil spillages or fuel leakages.

Operational Phase

- Potential impact of increased storm water outflows;
- Potential impact on groundwater quality as a result of accidental oil spillages or fuel leakages; and
- Long term surface source pollution may lead to the formation of sinkholes in the Karst aquifer towards the north east of the WEF site, assuming the general groundwater flow direction is towards the north east.

Decommissioning Phase

- Potential impact on groundwater quality as a result of accidental oil spillages and fuel leakages.

The Plan of Study for EIA (Chapter 7) presents the approach to the forthcoming EIA Phase. This includes the Terms of Reference for the various specialist studies that are proposed to address the issues raised, where necessary.

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PROJECT TEAM

NAME	ORGANISATION	ROLE/STUDY TO BE UNDERTAKEN
Environmental Management Services (CSIR)		
Paul Lochner	CSIR	Technical Advisor and Quality Assurance (EAPSA) Certified
Minnelise Levendal	CSIR	EAP and Project Leader (*Pr. Sci. Nat.)*
Lizande Kellerman	CSIR	Project Manager (*Pr. Sci. Nat*)
Specialists		
Werner Marais	Animalia Consultants (Pty) Ltd	Bat Impact Assessment
Chris van Rooyen	Chris van Rooyen Consulting	Bird Impact Assessment
Natasha van de Haar	EnviroSwift (Pty) Ltd	Freshwater Impact Assessment
Julian Conrad	Geohydrological and Spatial Solutions International (Pty) Ltd	Geohydrology Impact Assessment
Nicholas Wiltshire	Cedar Tower Services (Pty) Ltd	Heritage Impact Assessment (Archaeology and Cultural Landscape)
Morné de Jager	Enviro-Acoustic Research cc	Noise Impact Assessment

NAME	ORGANISATION	ROLE/STUDY TO BE UNDERTAKEN
Dr John Almond	Private, sub-contracted by Cedar Tower Services (Pty) Ltd	Palaeontological Impact Assessment
Elena Broughton	Urban-Econ Development Economists (Pty) Ltd	Socio-Economic Impact Assessment
Johann Lanz	Private	Soils and Agricultural Potential Assessment
Simon Todd	3Foxes Biodiversity Solutions	Terrestrial Ecology (fauna and flora)
Adrian Johnson	JG Afrika (Pty) Ltd	Transportation Impact Assessment
Stephan Jacobs	SiVEST SA (Pty) Ltd	Visual Impact Assessment

PUBLIC PARTICIPATION

In order to notify and inform the public of the proposed project and invite I&APs to register on the project database, the project and EIA Process were advertised in one local newspaper (i.e. "Kathu Gazette" dated 24 February 2018), proof of which can be seen in Appendix D of the Draft Scoping Report. The newspaper advertisement also provided the details of the project website (i.e. https://www.csir.co.za/environmental-impact-assessment) where information available on the project, could be downloaded from.

In addition to the newspaper advertisement, letters regarding the Scoping and EIA Processes were mailed to all pre-identified key stakeholders on the database (see Appendix C for the database), allowing I&APs to register their interest on the project database and comment on the Background Information Document.

Regulation 41 (2) (a) of the 2014 EIA Regulations, as amended, requires that a notice board providing information on the project and EIA Process is fixed at a place that is conspicuous to and accessible by the public at the boundary, on the fence or along the corridor of the site where the application will be undertaken or any alternative site. To this end, site notice boards were placed at the farm gates and at various locations in Kathu and Kuruman as reflected in Appendix D of this Draft Scoping Report.

This DSR is currently being released for a 30-day commenting period ending on 21 June 2018. Comments on the DSR will be included in the Final Scoping Report which will be submitted to DEA for decision-making.

GLOSSARY

AC	Alternating Current
ADU	Animal Demography Unit
AGIS	Agricultural Geo-Referenced Information System
ASL	Above Sea Level
BA	Basic Assessment
BGIS	Biodiversity Geographic Information System
BLSA	BirdLife South Africa
CA	Competent Authority
CAA	Civil Aviation Act (Act 13 of 2009)
CARA	Conservation of Agricultural Resources Act (Act 43 of 1983)
CBA	Critical Biodiversity Area
CEMP	Construction Environmental Management Plan
CPV	Concentrated Photovoltaic
CSIR	Council for Scientific and Industrial Research
CWAC	The Coordinated Waterbird Count
DAFF	National Department of Agriculture, Forestry and Fisheries
DC	Direct Current
DEA	National Department of Environmental Affairs
DENC	Northern Cape Department of Environment and Nature Conservation
DM	John Taolo Gaetsewe District Municipality
DMR	National Department of Minerals Resources
DOE	Department Of Energy
DOT	National Department of Transport
DSR	Draft Scoping Report
DWAF	Department of Water Affairs and Forestry
DWS	National Department of Water and Sanitation
EA	Environmental Authorization
EAP	Environmental Assessment Practitioner
EC	Electrical Conductivity
ECO	Environmental Control Officer
EI	Ecological Importance
EIA	Environmental Impact Assessment
EIS	Ecological Importance and Sensitivity
EMP	Environmental Management Plan
EMPr	Environmental Management Programme
EO	Environmental Officer
ES	Ecological Sensitivity
EWT	Endangered Wildlife Trust
FEPA	Freshwater Ecosystem Priority Area
FSR	Final Scoping Report
GA	General Authorization
GDP	Gross Domestic Product
GG	Government Gazette
GIS	Geographical Information Systems
GNR	Government Notice Regulation

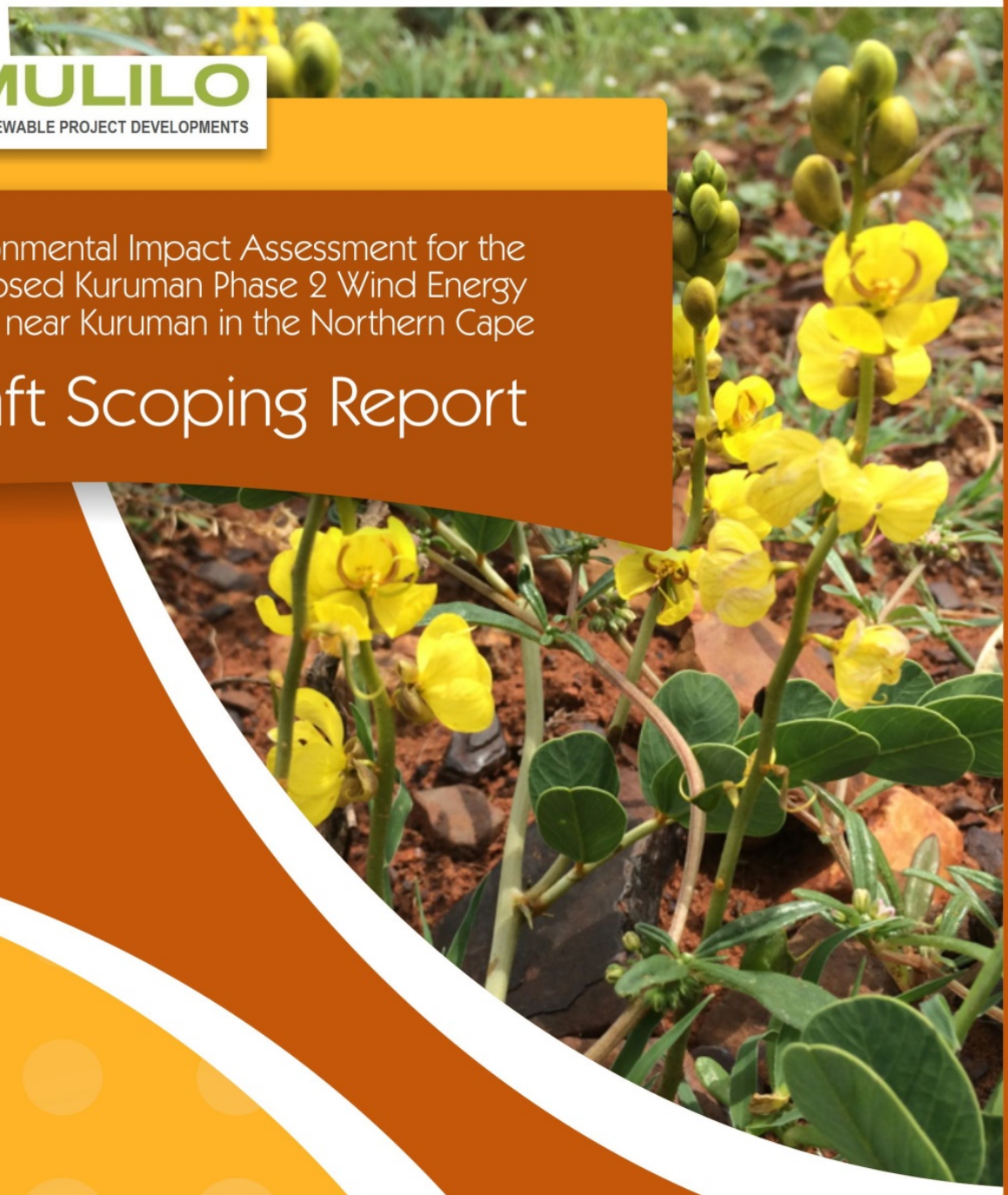
GPS	Global Positioning System
HIA	Heritage Impact Assessment
I&AP	Interested and Affected Party
IAIR	Avifaunal Impact Assessment Report
IBA	Important Bird Area
IDP	Integrated Development Plan
IEM	Integrated Environmental Management
IFC	International Financial Corporation
IKA	Index of Kilometric Abundance
IPP	Independent Power Producer
IRP	Integrated Resource Plan
IUCN	International Union for Conservation of Nature
KZN	KwaZulu-Natal
LED	Local Economic Development
LM	Local Municipality
LUDS	Land Use Decision Support Tool
MAP	Mean Annual Precipitation
MetMast	Meteorological Mast
MW	Megawatt
NCPAES	Northern Cape Protected Expansion Strategy
NEMA	National Environmental Management Act
NEMBA	National Environmental Management: Biodiversity Act
NEMPA	National Environmental Management: Protected Areas Act
NFA	National Forest Act
NFEPA	National Freshwater Ecosystem Priority Areas
NHRA	National Heritage Resources Act (Act 25 of 1999)
NP	National Park
NPAES	National Protected Areas Expansion Strategy
NWA	National Water Act (Act No. 36 of 1998)
O&M	Operation and Maintenance
PES	Present Ecological State
PoS	Plan of Study
PPA	Power Purchasing Agreement
PPP	Public Participation Process
PSDF	Provincial Spatial Development Framework
PSEIA	Plan of Study for Environmental Impact Assessment
PTY LTD	Proprietary Limited
PV	Photovoltaic
REDZs	Renewable Energy Development Zones
REIPPPP	Renewable Energy Independent Power Producer Procurement Programme
S&EIR	Scoping and Environmental Impact Reporting
SABAP1	South African Bird Atlas Project 1
SABAP2	South African Bird Atlas Project 2
SACNASP	South African Council for Natural Scientific Professions
SAHRA	South African Heritage Resources Agency
SAHRIS	South African Heritage Resources Information System
SALA	Subdivision of Agricultural Land Act (Act 70 of 1970)
SANBI	South African National Biodiversity Institute
SANRAL	South African National Roads Agency Limited
SANS	South African National Standards
SARERD	South African Renewable Energy Resource Database
SCC	Species of Conservation Concern
SDF	Spatial Development Framework

SKA	Square Kilometre Array
SEA	Strategic Environmental Assessment
SM	Short Mast
TIA	Transportation Impact Assessment
ToR	Terms of Reference
UNCBD	United Nations Convention on Biological Diversity
UNFCCC	United Nations Framework Convention on Climate Change
VIA	Visual Impact Assessment
VP	Vantage Point
WASA	Wind Atlas of South Africa
WEF	Wind Energy Facility
WMA	Water Management Area
WMS	Water Management Systems
WULA	Water Use License Application
WUL	Water Use License

MULILO
RENEWABLE PROJECT DEVELOPMENTS

Environmental Impact Assessment for the proposed Kuruman Phase 2 Wind Energy Facility near Kuruman in the Northern Cape

Draft Scoping Report



CHAPTER 1: Introduction

CONTENTS

TABLES

FIGURES

KEY INFORMATION TO THIS APPLICATION

Table 1.1: Summary of Project Description

Infrastructure	Footprint and dimensions
Location of the site	District Municipality – John Taolo Gaetsewe District Municipality
	Local Municipality - Ga-Segonyana Local Municipality
	Ward number - 11
Farm names and SG 21 Digit Codes:	
Portion 1 of Farm Bramcote 446	C04100000000044600001
Remainder of Farm Bramcote 446	C04100000000044600000
Number of turbines	52 turbines
Turbine Capacity	4.5 MW
Hub Height	80 - 140 m
Rotor Diameter	100 – 160 m
Blade length	50-80 m
Project Size	50 - 225 MW
Area occupied by on-site substation	2 ha
Height of substation	5 m
Capacity of on-site substation	132 kV
Area occupied by construction lay down areas (including construction camp)	6 ha (3 construction lay down areas required of 2 ha each)
Internal access roads	50 km of internal road linking a maximum of 52 turbine locations 8 m in width
Concrete batching plant	50 m x 50 m (on-site batching)
O&M Building	1 ha
General temporary Hardstand Area (boom erection, storage, and assembly area)	15 ha
Turbines	Reinforced Concrete Foundation – 20 x 20 m (0.04 ha per turbine) Crane Platform/Pad – 50 m x 50 m (0.25 ha)
Site Access	The proposed main access road is located on D3420. This main access road connects to the main access road of Phase 1 on the boundary of the two phases. Turbines could therefore be delivered to the Phase 1 area via the proposed main access road of Phase 2.
Proximity to grid connection	The proposed Kuruman Phase 2 WEF will link to the Ferrum substation (10 km) or to the Segame substation (50 km).
Fencing	Fencing will be required around the O&M Building and on-site substation and will be a maximum of 5 m high.

IMPORTANT NOTICE

The Scoping and Environmental Impact Report process required by the National Environmental Management Act (Act. 107 of 1998) (NEMA) consists of two phases: (1) scoping and (2) a detailed impact assessment phase (i.e. the EIA Phase).

The scoping phase is very important to any project, as it is the first stage of the proposed development to be introduced to the public and that they have the opportunity to contribute valuable local knowledge and help identify significant issues. This information is then used to define the Terms of Reference (i.e. Plan of Study for EIA) for the EIA phase, by identifying the approach, critical issues to address, , the scope of work for detailed specialist assessments and preliminary mitigation measures (DEAT, 2002).

However, the current 2014 NEMA EIA Regulations (as amended, Government Notice No. R 326 of 2017, specifically Appendix 2 to these regulations), requires the Scoping Report to include much more detailed information, such as the identification of impacts, the preferred site, and mitigation measures. These were previously only required in the EIA phase in terms of the 2006 and 2010 EIA Regulations. In order to meet these current requirements, specialists provided the scoping phase inputs included in Appendix E of this Final Scoping Report.

All Interested and Affected Parties (I&APs) should note that despite the above-mentioned changes to Scoping Report requirements, they still have the opportunity to raise issues that would define the terms of reference for the EIA Phase. All concerns raised during the Scoping phase will be addressed appropriately and incorporated, where relevant, to guide the EIA phase. If additional specialist assessments are required, based on the concerns raised and/or comments received by the Department of Environmental Affairs (DEA), the additional studies will be undertaken during the EIA phase.

I&APs should note that only one version of the Scoping Report and one version of the Environmental Impact Report will be made available for public comment in terms of the 2014 NEMA EIA Regulations (as amended). Therefore the Scoping and Environmental Impact Report made publically available should be viewed as final reports.

NEMA REQUIREMENTS WITH REFERENCE TO RELEVANT SECTIONS OF THIS REPORT

The Environmental Impact Assessment (EIA) process undertaken to date has culminated in the production of this Scoping Report (SR), which provides information relevant to the project and establishes the potential impacts of the project and the methodologies and impacts that will be assessed in detail during the impact assessment phase.

Table 1.2 illustrates how the structure of the SR addressed applicable requirements for information in terms of National Environmental Management Act (Act No. 107 of 1998) (NEMA).

Table 1.2: Requirements of a Scoping Report as defined in terms of Appendix 2 of GN R326

Section of the EIA Regulations	Requirements for a Scoping Report in terms of Appendix 2 of the 2014 NEMA EIA Regulations (as amended, GN R326)	Section	Page
Appendix 2 - (1)(a)	Details of - i. the EAP who prepared the report; and ii. the expertise of the EAP, including a curriculum vitae;	Section 1.6 to 1.7 and Appendix A	Pages 1-23 to 1-26 and A1-22
Appendix 2 - (1)(b)	The location of the activity, including - i. the 21 digit Surveyor General code of each cadastral land parcel; ii. where available, the physical address and farm name; iii. where the required information in items (i) and (ii) is not available, the coordinates of the boundary of the property or properties;	Section 1.0 and 3.1	Pages 1-2, and 3-3
Appendix 2 - (1)(c)	A plan which locates the proposed activity or activities applied for at an appropriate scale, or if it is - i. a linear activity, a description, and coordinates of the corridor in which the proposed activity or activities is to be undertaken; or ii. on land where the property has not been defined, the coordinates within which the activity is to be undertaken;	Section 1.0, 1.1 and 3.1	Pages 1-8 to 1-9 and 3-4
Appendix 2 - (1)(d)	A description of the scope of the proposed activity, including – i. all listed and specified activities triggered; ii. a description of the activities to be undertaken, including associated structures and infrastructure;	Section 2.1 and 4.1	Pages 2-3 to 2-9 and 4-3 to 4-7
Appendix 2 - (1)(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 4.1 and 4.2	Pages 4-3 to 4-16
Appendix 2 - (1)(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 1.5	Pages 1-13 to 1-25
Appendix 2 - (1)(g)	A full description of the process followed to reach the proposed preferred activity, site and location of the development footprint within the site, including -	Section 3.2, 3.3, 3.4; Section 5.1; Section 6.1 - 6.13	Pages 3-5 to 3-19, 5-3 to 5-

Section of the EIA Regulations	Requirements for a Scoping Report in terms of Appendix 2 of the 2014 NEMA EIA Regulations (as amended, GN R326)	Section	Page
	i. details of all the alternatives considered; ii. details of the public participation process undertaken in terms of regulation 41 of the Regulations, including copies of the supporting documents and inputs; iii. 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; iv. the environmental attributes associated with the alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects; v. the impacts and risks which have informed the identification of each alternative, including nature, significance, consequence, extent, duration, and probability of such identified 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; vi. the methodology used in identifying and ranking the nature, significance, consequences, extent, duration, and probability of potential environmental impacts and risks associated with the alternatives; vii. 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; viii. the possible mitigation measures that could be applied and level of residual risk; ix. the outcome of the site selection matrix; x. if no alternatives, including alternative locations for the activity, were investigated, the motivation for not considering such and xi. a concluding statement indicating the preferred alternatives, including the preferred location of the activity;	and Section 7.3, 7.5, 7.6, 7.7, 7.8, 7.9 Appendix D3	14; 6-3 to 6-45, 7-5 to 7-7 and 7-8 to 7-35. Pages D1-28
Appendix 2 - (1)(h)	A plan of study for undertaking the environmental impact assessment process to be undertaken, including - i. a description of the alternatives to be considered and assessed within the preferred site, including the option of not proceeding with the activity; ii. a description of the aspects to be assessed as part of the environmental impact assessment process; iii. aspects to be assessed by specialists; iv. a description of the proposed method of assessing the environmental aspects including aspects to be assessed by specialists; v. a description of the proposed method of assessing duration and significance; vi. an indication of the stages at which the competent authority will be consulted;	Section 7.1 - 7.9	Pages 7-3 to 7-35

Section of the EIA Regulations	Requirements for a Scoping Report in terms of Appendix 2 of the 2014 NEMA EIA Regulations (as amended, GN R326)	Section	Page
	vii. particulars of the public participation process that will be conducted during the environmental impact assessment process; and viii. a description of the tasks that will be undertaken as part of the environmental impact assessment process; ix. 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.		
Appendix 2 - (1)(i)	An undertaking under oath or affirmation by the EAP in relation to - i. the correctness of the information provided in the report; ii. the inclusion of comments and inputs from stakeholders and interested and affected parties; and iii. 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;	Appendix B	Pages B 1-2
Appendix 2 - (1)(j)	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	Pages B 1-2
Appendix 2 - (1)(k)	Where applicable, any specific information required by the competent authority.	Not applicable at this stage	N/A
Appendix 2 - (1)(l)	Any other matter required in terms of section 24(4)(a) and (b) of the Act.	Not applicable at this stage	N/A

1. INTRODUCTION

Mulilo Renewable Project Developments (Pty) Ltd (hereafter, "Mulilo") is proposing to construct two Wind Energy Facilities (WEFs), namely Kuruman Phase 1 WEF and Kuruman Phase 2 WEF and supporting electrical infrastructure, in the Ga-Segonyana Local Municipality and the John Taolo Gaetsewe District Municipality, 8 km and 37 km south west from Kuruman and from Kathu, respectively, in the Northern Cape Province (see Figure 1.1). The proposed projects are being developed to generate electricity via wind energy which will feed into and supplement the national electricity grid. This report comprises the Draft Scoping Report (DSR) for the development of **the Kuruman Phase 2 WEF** (hereafter, "Kuruman WEF"). The proposed Kuruman WEF will be connected to the the Ferrum substation (located in Kathu) or to the Segame substation (located in Kuruman) and a collector substation, via a 132 kV powerline.

The proposed Kuruman WEF will be developed on the following land portions:

- Portion 1 of Farm Bramcote 446; and
- Remainder of Farm Bramcote 446.

This chapter provides an introduction (project overview) of the proposed Kuruman WEF, and includes the following:

- An overview of the of the proposed WEF;
- The legal requirements for an EIA;
- Information on the Project Applicant;
- Project Motivation;
- Need and Desirability;
- The EIA team;
- The objectives of the Scoping Report; and the
- Requirements for a Scoping Report in terms of Appendix 2 of the 2014 NEMA EIA Regulations (as amended, GN R326).

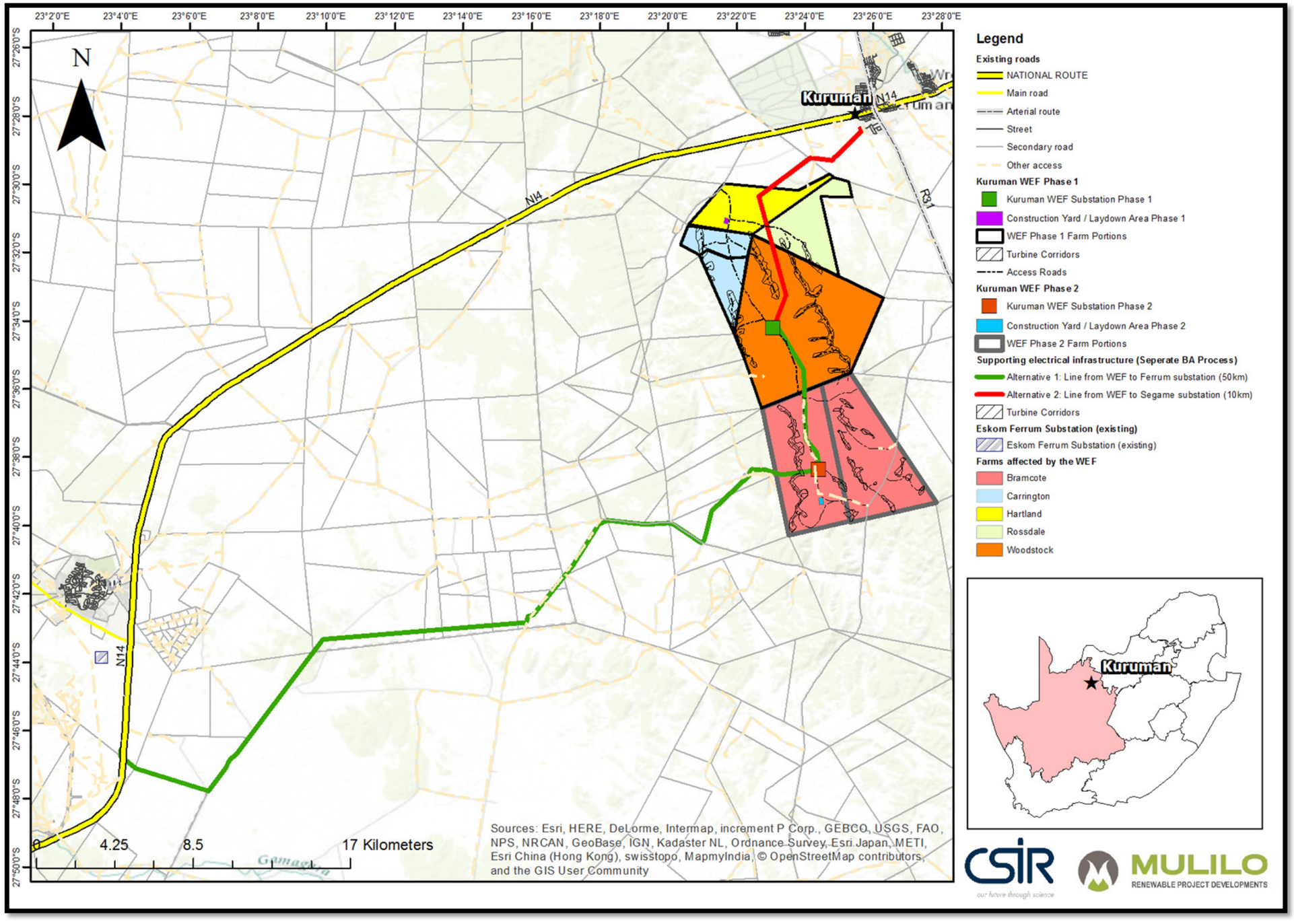


Figure 1.1: Locality map for the proposed Kuruman Phase 1 and Phase 2 Wind Energy Facilities near Kuruman in the Northern Cape.
(Note: The 132 kV powerline routing will still be finalised)

1.1. An Overview of the Proposed Kuruman Wind Energy Facility

The proposed Kuruman WEF will comprise of a maximum of 52 turbines with a hub height and rotor diameter of 80 - 140 m and 100 – 160 m respectively. The blade length is 50 - 80 m. The development footprint of the proposed WEF will be approximately 400 ha. The key components of the Kuruman WEF are discussed in more detail in Chapter 2 of this DSR.

1.2. Legal Requirements for an EIA

In terms of the National Environmental Management Act (Act 107 of 1998, as amended) (NEMA) and the 2014 NEMA Environmental Impact Assessment (EIA) Regulations (as amended), promulgated in Government Gazette 40772 and Government Notice (GN) R326, R327, R325 and R324 on 7 April 2017, a full Scoping and EIA Process is required for the construction of the proposed Kuruman WEF.

The need for the full Scoping and EIA is triggered by, amongst others, the inclusion of Activity 1 listed in GN R325 (Listing Notice 2):

"The development of facilities or infrastructure for the generation of electricity from a renewable resource where the electricity output is 20 megawatts or more, excluding where such development of facility or infrastructure is for photovoltaic installations and occurs (a) within an urban area; or (b) on existing infrastructure".

Mulilo has appointed the Council for Scientific and Industrial Research (CSIR) to undertake the EIA Process in order to determine the biophysical, social and economic impacts associated with undertaking the proposed activities. Given that energy related projects have been elevated to national strategic importance in terms of the EIA Process, the proposed WEF requires authorisation from the National Department of Environmental Affairs (DEA) as the Competent Authority (CA), acting in consultation with other spheres of government.

Chapter 4 of this DSR contains the detailed list of activities contained in R327, R325, and R324 which may be triggered by the various project components and thus form part of the Scoping and EIA Process.

The purpose of the EIA is to identify, assess and report on any potential impacts the proposed project, if constructed and implemented, may have on the receiving environment. The environmental assessment therefore, needs to show the CA, what the biophysical and socio-economic impacts will be of the proposed WEF. It also needs to show the CA how such impacts can be, avoided, remedied, mitigated or managed and how positive impacts can be enhanced.

1.3. Project Applicant

Mulilo Renewable Project Developments (PTY) Ltd is a locally owned, South African based renewable energy developer that was formed in 2008. The company focuses on solar, wind and hydro technologies and works with landowners, project developers, technology providers, regulators and investors to source and develop renewable energy projects. Mulilo acts as the project interface, coordinating the research and studies, the site identification, the project structure, environmental impact assessments, selecting the strategic partners, arranging financing, ensuring bid compliance and bidding under the Department of Energy's (DoE) Renewable Energy Independent Power Producer Programme (REIPPP) and reaching financial closure. Mulilo's core activities are shown in Figure 1.2 below.

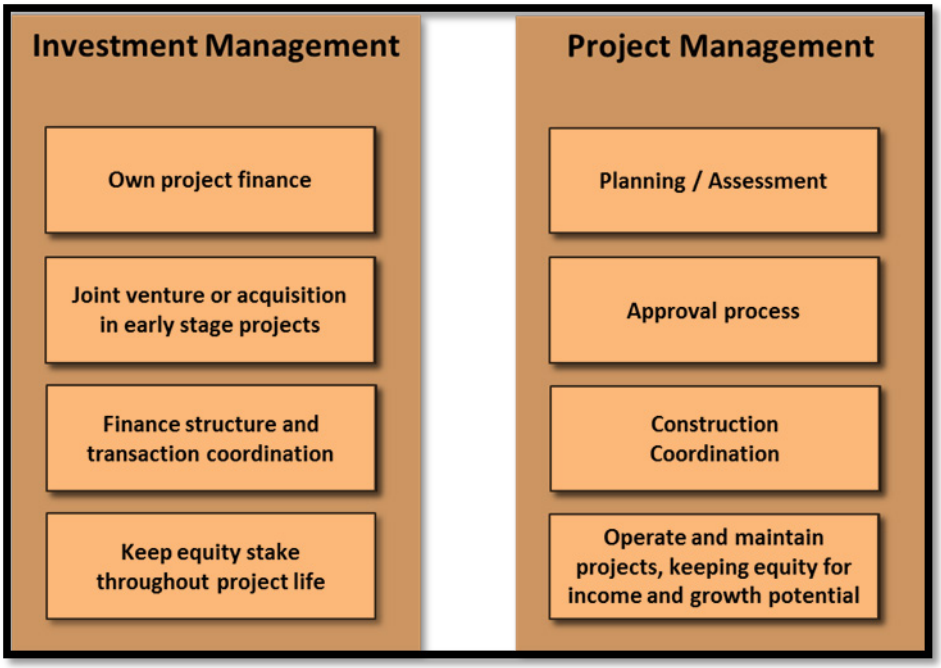


Figure 1.2: Mulilo's core business activities

In December 2011, Mulilo was successful in Round 1 of the DoE REIPPP, as they were identified as a preferred bidder for two Solar Photovoltaic (PV) Power Facilities of 10 MW and 20 MW located in Copperton and De Aar. In October 2013, during Round 3 of the REIPPP Mulilo was also identified as a preferred bidder for two wind farms with a combined capacity of 244 MW located in De Aar, and two 75 MW Solar PV Power Facilities located in Prieska. Furthermore, in February 2014, Mulilo was awarded the Selected Bidder for two 5 MW Solar PV Facilities under the DoE's Small Independent Power Producer Programme and subsequently achieved Preferred Bidder status for its Du Plessis Solar PV4 project in De Aar on the 3rd October 2015. Mulilo plans to continue its success in the REIPPP and is planning to tender this project in this program.

The Applicant is proposing to develop a facility with a possible maximum installed capacity of 225 MW. Once a Power Purchase Agreement (PPA) is awarded, the proposed facility will generate electricity for a minimum period of 20 years. It is proposed that Mulilo will implement the Self-Build Option for the additional electrical infrastructure to be constructed (which includes the 132 kV transmission line and additional feeder bay(s), busbar(s), 400/132kV transformer and a transformer bay at the Eskom Ferrum

or Segame substation. Following the construction phase, the proposed transmission line will either be transferred into the ownership of Eskom or remain in the ownership of Mulilo.

1.4. Project Motivation

The need for renewable energy is becoming increasingly apparent, in both local and international context, with South Africa becoming an integral part of the global transition towards renewable sources of electricity generation. The urgency behind this evolution can be appreciated considering that South Africa is the largest emitter of greenhouse gases in Africa, accounting for as much as 42% of the continent's total emissions, and is also estimated to rank amongst the top 20 largest emitters of greenhouse gases in the world. These emissions are largely a result of an energy-intensive economy and high dependence on coal-based electricity generation. The South African government is therefore committed to supplementing the existing generation capacity of thermal and nuclear power plants with renewable energy power generation, thus creating the framework that will lead to an increase in the supply of clean energy for the nation. The development of renewable energy is important for South Africa to reduce its overall environmental footprint from power generation (including externality costs), and thereby to steer the country on a pathway towards sustainability.

The Integrated Resource Plan (IRP) for South Africa for the period 2010 to 2030 (referred to as "IRP2010") was released by government in 2010, and a draft of an updated report was published in 2013, which proposes to secure 17 800 MW of renewable energy capacity by 2030 (including wind, solar and other energy sources). As noted above, in August 2011, the DoE launched the REIPPPP and invited potential Independent Power Producers (IPPs) to submit proposals for the financing, construction, operation and maintenance of the first 3 725 MW of onshore wind, solar thermal, solar photovoltaic (PV), biomass, biogas, landfill gas or small hydropower projects. On 18 August 2015, an additional procurement target of 6 300 MW to be generated from renewable energy sources was added to the REIPPPP for the years 2021 - 2025, as published in Government Gazette 39111. The additional target allocated for wind energy is 3 040 MW.

In terms of the REIPPPP, submitted proposals are then evaluated according to a DoE Request for Proposal (RfP). Currently, the two main evaluation criteria for compliant proposals are price and economic development with a point allocation of 70/30 (DOE, 2013), with other selection criteria including technical feasibility and grid connectivity, environmental acceptability, black economic empowerment, community development, and local economic and manufacturing propositions. The bidders whose responses rank the highest (according to the aforementioned criteria) will have the greatest potential to be appointed as "Preferred Bidders" by the DoE. Mulilo intends to bid this project in the next bidding process to be potentially selected as an IPP.

The establishment of the proposed WEF would strengthen the existing electricity grid for the area. Additionally, the project would contribute towards meeting the national energy target as set by the DoE and assist the government in achieving its proposed renewable energy target of 17 800 MW by 2030.

Should the proposed Kuruman WEF identified by Mulilo be acceptable, it is considered viable that long term benefits for the community and society in the Kuruman/Kathu area would be realised. The towns in the Northern Cape are generally small with limited job opportunities, and the proposed project will provide an opportunity for additional employment in an area where job creation is identified as a key priority. Approximately 420 employment opportunities will be created during the construction phase and 35 during the operational period (including 25 permanent employees) of the proposed Kuruman WEF. The proposed Kuruman WEF will make use of local labour as much as possible, and a minimum of 50% of the jobs (during the construction and operational phases) will be filled by the local communities.

The proposed project would also have international significance as it contributes to South Africa being able to meet some of its international obligations by aligning domestic policy with internationally agreed strategies and standards as set by the United Nations Framework Convention on Climate Change (UNFCCC), The Paris Agreement on climate Change, Kyoto Protocol, and United Nations Convention on Biological Diversity (UNCBD), all of which South Africa is a signatory to. Renewable energy is critical to South Africa as this source of energy is recognised as a major contributor to climate protection, has a much lower environmental impact, as well as advancing economic and social development.

1.5. Need and Desirability

It is an important requirement in the EIA Process to review the need and desirability of the proposed project. Guidelines on Need and Desirability were published in the Government Gazette of 20 October 2014. These guidelines list specific questions to determine need and desirability of proposed developments. This checklist is a useful tool in addressing specific questions relating to the need and desirability of a project and assists in explaining that need and desirability at the provincial and local context. Need and desirability answer the question of whether the activity is being proposed at the right time and in the right place. Table 1.3 includes a list of questions based on the DEA's Guideline to determine the need and desirability of the proposed project. It should be noted this table will be informed by the outcomes of the Scoping and EIA Process and will be updated, once the relevant impact assessment has been received.

Table 1.3: The Guideline on the Need and Desirability's list of 14 questions to determine the "Need and Desirability" of a proposed project

NEED	
Question	**Response**
1. How will this development (and its separate elements/aspects) impact on the ecological integrity of the area)?	
1.1. How were the following ecological integrity considerations taken into account? 1.1.1. Threatened Ecosystems, 1.1.2. Sensitive, vulnerable, highly dynamic or stressed ecosystems, such as coastal shores, estuaries, wetlands, and similar systems require specific attention in management and planning procedures, especially where they are subject to significant human resource usage and development pressure, 1.1.3. Critical Biodiversity Areas ("CBAs") and Ecological Support Areas ("ESAs"), 1.1.4. Conservation targets, 1.1.5. Ecological drivers of the ecosystem, 1.1.6. Environmental Management Framework, 1.1.7. Spatial Development Framework, and	**The environmental sensitivities present on site will be assessed within the Ecological Impact Assessment to be included in the EIA Report.** **The specialist will identify all ecological sensitive areas on site that have to be avoided by the proposed development as well as ecologically sensitive areas and how to suitably develop within these areas so that the ecological integrity of the areas is maintained.** **The Ecology specialist has prepared scoping inputs and these inputs have been included in Appendix E of this Scoping Report. There are no CBAs within the site although the majority of the footprint of the development is within an Ecological Support Area (ESA). It is however unlikely that the development would compromise the functioning of the ESA and with the appropriate mitigation, the**

NEED	
Question	**Response**
1.1.8 Global and international responsibilities relating to the environment (e.g. RAMSAR sites, Climate Change, etc.).	**development of a WEF is considered compatible with the aims and objectives of ESAs, from a terrestrial biodiversity point of view.** **The preliminary outcome of the Scoping phase input is that the likely overall residual ecological impact after mitigation will be of low significance.** **The preliminary sensitivity map is included in Chapter 5 of this Scoping Report and will be further refined during the EIA Phase following assessments done by the specialists on the project team. The specialists provided scoping inputs which informed the current preliminary sensitivity map.**
1.2. How will this development disturb or enhance ecosystems and/or result in the loss or protection of biological diversity? What measures were explored to firstly avoid these negative impacts, and where these negative impacts could not be avoided altogether, what measures were explored to minimise and remedy (including offsetting) the impacts? What measures were explored to enhance positive impacts?	**The environmental sensitivities present on site were identified by the Ecology specialist and were discussed in the Scoping inputs provided. A detailed Ecological Impact Assessment will be undertaken and will be included in the EIA Report. Based on the biodiversity screening and fine scale mapping that was done for the site, the specialist confirmed that the site falls within an ESA.** **The specialist will identify all ecological sensitive areas on site that have to be avoided by the proposed development and propose mitigation measures to reduce or minimise impacts to ensure that the ecological integrity of the areas is maintained.** **The preliminary sensitivity map is included in Chapter 3 and 5 of this Scoping Report and will be further refined during the EIA Phase.** **Measures to avoid, remedy, mitigate and manage impacts will be included in the Environmental Management Programme (EMPr) that will be compiled during the EIA Phase and included within the EIA Report.**
1.3. How will this development pollute and/or degrade the biophysical environment? What measures were explored to firstly avoid these impacts, and where impacts could not be avoided altogether, what measures were explored to minimise and remedy (including offsetting) the impacts? What measures were explored to enhance positive impacts?	**Measures to avoid, remedy, mitigate or manage biophysical impacts will be included in the EMPr that will be compiled during the EIA Phase and included within the EIA Report.**

NEED	
Question	**Response**
1.4. What waste will be generated by this development? What measures were explored to firstly avoid waste, and where waste could not be avoided altogether; what measures were explored to minimise, reuse and/or recycle the waste? What measures have been explored to safely treat and/or dispose of unavoidable waste?	**Waste will mostly be generated during the construction and decommissioning phases of the project. Measures to avoid, remedy, mitigate or manage waste will be included within the EMPr that will be compiled during the EIA Phase and included within the EIA Report. Waste generated on site will be disposed of at a licenced landfill site.**
1.5. How will this development disturb or enhance landscapes and/or sites that constitute the nation's cultural heritage? What measures were explored to firstly avoid these impacts, and where impacts could not be avoided altogether, what measures were explored to minimise and remedy (including offsetting) the impacts? What measures were explored to enhance positive impacts?	**A Heritage Impact Assessment (HIA) will be undertaken to assess potential archaeological, palaeontological and cultural impacts resulting from the proposed development during the EIA Phase. Scoping inputs have been provided by the heritage specialist and are included in Appendix E of this Scoping Report. It will be further refined during the EIA Phase and the full HIA will be included in the EIA Report.**
1.6. How will this development use and/or impact on non-renewable natural resources? What measures were explored to ensure responsible and equitable use of the resources? How have the consequences of the depletion of the non-renewable natural resources been considered? What measures were explored to firstly avoid these impacts, and where impacts could not be avoided altogether, what measures were explored to minimise and remedy (including offsetting) the impacts? What measures were explored to enhance positive impacts?	**Measures to avoid, remedy, mitigate or manage impacts on non-renewable natural resources will be included in the EMPr that will be compiled during the EIA Phase and included within the EIA Report.**
1.7. How will this development use and/or impact on renewable natural resources and the ecosystem of which they are part? Will the use of the resources and/or impact on the ecosystem jeopardise the integrity of the resource and/or system taking into account carrying capacity restrictions, limits of acceptable change, and thresholds? What measures were explored to firstly avoid the use of resources, or if avoidance is not possible, to minimise the use of resources? What measures were taken to ensure responsible and equitable use of the resources? What measures were explored to enhance positive impacts? 1.7.1. Does the proposed development exacerbate the increased dependency on increased use of resources to maintain economic growth or does it reduce resource dependency (i.e. de-materialised growth)? (note: sustainability requires that settlements reduce their ecological footprint by using less material and energy demands	**South Africa has heavily relied on coal as a source of electricity for decades. Due to the nature of coal as a non-renewable resource that causes major environmental degradation, there is therefore a need to identify alternative resources that could promote sustainable energy sources as well as cleaner energy production ways. The proposed project aims to harness the wind resource available in the area for the generation of electricity. This project is seen as a source of 'clean energy' and reduces the dependence on non-renewable sources.** **The proposed project is a sustainable option for the area and the footprint will as far as possible avoid areas of very high environmental sensitivity. Where impacts cannot be avoided, the footprint will be placed to minimise, mitigate or manage potential impacts to the receiving environment.**

NEED	
Question	**Response**
and reduce the amount of waste they generate, without compromising their quest to improve their quality of life) 1.7.2. Does the proposed use of natural resources constitute the best use thereof? Is the use justifiable when considering intra- and intergenerational equity, and are there more important priorities for which the resources should be used (i.e. what are the opportunity costs of using these resources of the proposed development alternative?) 1.7.3. Do the proposed location, type and scale of development promote a reduced dependency on resources?	
1.8. How were a risk-averse and cautious approach applied in terms of ecological impacts?: 1.8.1. What are the limits of current knowledge (note: the gaps, uncertainties and assumptions must be clearly stated)? 1.8.2. What is the level of risk associated with the limits of current knowledge? 1.8.3. Based on the limits of knowledge and the level of risk, how and to what extent was a risk-averse and cautious approach applied to the development?	**The precautionary approach has been adopted for this study, i.e. assuming the worst-case scenario will occur and then identifying ways to mitigate or manage these impacts.** **Current gaps in knowledge include confirmation on the preferred turbine types to be used at this site. Ways in which these gaps are addressed are to consider the worst-case scenarios as noted above in terms of turbine size and generation capacity. A range of specifications have been provided as new technology may also come onto the market closer to the construction period (should the proposed Kuruman WEF be approved).**
1.9. How will the ecological impacts resulting from this development impact on people's environmental right in terms following: 1.9.1. Negative impacts: e.g. access to resources, opportunity costs, loss of amenity (e.g. open space), air and water quality impacts, nuisance (noise, odour, etc.), health impacts, visual impacts, etc. What measures were taken to firstly avoid negative impacts, but if avoidance is not possible, to minimise, manage and remedy negative impacts? 1.9.2. Positive impacts: e.g. improved access to resources, improved amenity, improved air or water quality, etc. What measures were taken to enhance positive impacts?	**A detailed Socio-Economic Impact Assessment will be included in the EIA Report. A preliminary socio-economic profile is included in Chapter 3 of this Scoping Report and will be further refined during the EIA Phase. Scoping inputs have been provided by the Socio-Economics specialist and have been included in Appendix E of the Scoping Report.**

NEED	
Question	**Response**
1.10. Describe the linkages and dependencies between human wellbeing, livelihoods and ecosystem services applicable to the area in question and how the development's ecological impacts will result in socio-economic impacts (e.g. on livelihoods, loss of heritage site, opportunity costs, etc.)?	**Linkages and dependencies between human wellbeing, livelihoods and ecosystem services applicable to the area will be considered as part of the Socio-Economic Impact Assessment undertaken for this project and will be included within the EIA Report.**
1.11. Based on all of the above, how will this development positively or negatively impact on ecological integrity objectives / targets / considerations of the area?	**The impacts on ecological integrity objectives of the area will be considered as part of the Ecology Impact Assessment undertaken for this project and will be included within the EIA Report.**
1.12. Considering the need to secure ecological integrity and a healthy biophysical environment, describe how the alternatives identified (in terms of all the different elements of the development and all the different impacts being proposed), resulted in the selection of the "best practicable environmental option" in terms of ecological considerations?	**Please refer to Chapter 5 of this Scoping Report where the alternatives are discussed.**
1.13. Describe the positive and negative cumulative ecological/biophysical impacts bearing in mind the size, scale, scope and nature of the project in relation to its location and existing and other planned developments in the area?	**Please refer to Chapter 6 of this Scoping Report where the potential cumulative impacts are discussed for this project. Table 6.2 in Chapter 6 also contains a list of all the other renewable energy projects and powerline projects that are operational or are proposed for the area.**
2.1. What is the socio-economic context of the area, based on, amongst other considerations, the following considerations?:	
2.1.1. The IDP (and its sector plans' vision, objectives, strategies, indicators and targets) and any other strategic plans, frameworks of policies applicable to the area,	**The Ga-Segonyana Local Municipality Integrated Development Plan (IDP) (2017-2018) recognises renewable energy projects (with an emphasis on solar PV projects) as potential new economic development opportunities. The development of the Kuruman WEF will therefore also be in line with the vision of the municipality to diversity the job market by creating sustainable economic growth and development opportunities.** **One of the economic priority issues identified within the Ga-Segonyana Local Municipality Integrated Development Plan (IDP) (2017-2018) is the fairly high level of unemployment. Although close to three-quarters of the working age population in the Ga-Segonyana LM were employed in the formal sector and approximately 20% in the informal sector (Quantec Easy Data, 2017), the unemployment rate of 35% is much higher than the national unemployment rate. The IDP further states that the Local Municipality constitutes close to a quarter of the adult population with no schooling and are in need of employment opportunities. The**

NEED	
Question	**Response**
	proposed WEF project will create job opportunities and economic spin offs during the construction and operational phases (if an EA is granted by the DEA). It is estimated that approximately 420 employment opportunities will be created during the construction phase and approximately 35 during the operational phase. It should, however, be noted that employment during the construction phase will be temporary, whilst 25 employment opportunities being long-term during the operational phase. **Therefore, the proposed WEF would help to address the need for increased electricity supply while also providing advanced skills transfer and training to the local communities and creating contractual and permanent employment in the area. The proposed project will therefore be supportive of the IDP's objective of facilitating job creation to address the high unemployment rate.**
2.1.2. Spatial priorities and desired spatial patterns (e.g. need for integrated of segregated communities, need to upgrade informal settlements, need for densification, etc.),	**N/A- The proposed project is located within a rural area and the site is zoned for agricultural use.**
2.1.3. Spatial characteristics (e.g. existing land uses, planned land uses, cultural landscapes, etc.)	**As indicated above, the current land use on the site is agriculture (particularly livestock farming). The impact of the proposed project on cultural/heritage areas (archaeology and palaeontology) will be assessed as part of the EIA Phase.** **Should the proposed project proceed, approximately 400 ha (comprising 9 % of the total farm area) of the land will be developed on and it is not expected that this will significantly threaten the agricultural activities present on site. A Soils and Agricultural Potential Study will be included within the EIA Report to reflect the impact of the proposed project in terms of the land use and agricultural potential. Scoping inputs have been provided by the specialist which indicate that the impact on agricultural resources on site is Low.** **As noted, an EMPr will be compiled for the proposed project to ensure that all potentially negative impacts identified are suitably managed and mitigated, and potential positive impacts are enhanced. The impact on the sense of place is difficult to predict and would potentially be**

NEED	
Question	**Response**
	ambiguous. This is due to the subjective nature of perceptions regarding the relative attraction or disturbance of the wind facility in a rural landscape. The visual impact and considerations will be further assessed as part of the Visual Impact Assessment to be undertaken as part of the EIA Phase of this project. A preliminary environmental sensitivity map was prepared during the Scoping phase based on the input obtained from the various scoping specialist studies. The map will be updated in the EIA Phase to ensure that sensitive features will be identified and avoided by the project layout.
2.1.4. Municipal Economic Development Strategy ("LED Strategy").	**The LED Strategy will be considered and potential alignment will be discussed in the EIA Report.**
2.2. Considering the socio-economic context, what will the socio-economic impacts be of the development (and its separate elements/aspects), and specifically also on the socio-economic objectives of the area? 2.2.1. Will the development complement the local socio-economic initiatives (such as local economic development (LED) initiatives), or skills development programs?	**This will be addressed within the Socio-Economic Impact Assessment that will be included in the EIA Report.**
2.3. How will this development address the specific physical, psychological, developmental, cultural and social needs and interests of the relevant communities?	**These needs and interests of the relevant communities will be addressed within the Socio-Economic Impact Assessment that will be included in the EIA Report. Issues raised by I&APs to this effect will also be addressed in the relevant Issues and Responses Trail of the Scoping and/or the EIA Report.**
2.4. Will the development result in equitable (intra- and inter-generational) impact distribution, in the short- and long term? Will the impact be socially and economically sustainable in the short- and long-term?	**This will be addressed in the Socio-Economic Impact Assessment that will be included in the EIA Report.**
2.5. In terms of location, describe how the placement of the proposed development will:	
2.5.1. result in the creation of residential and employment opportunities in close proximity to or integrated with each other,	**Local employment opportunities will be provided as far as possible. Approximately 420 and 35 employment opportunities will be generated in the construction and operational phases respectively.**
2.5.2. reduce the need for transport of people and goods,	**N/A- the proposed project is located within a rural area and the development site is zoned for agricultural use.**
2.5.3. result in access to public transport or enable non-motorised and pedestrian transport (e.g. will the development result in densification and the	**N/A -the proposed project is located within a rural area and the site is zoned for agricultural use. This project is a renewable energy project and not a transportation project.**

NEED		
Question		**Response**
	achievement of thresholds in terms public transport),	
2.5.4.	compliment other uses in the area,	**The preferred project site is currently being used for agricultural purposes. Should the proposed project proceed, approximately 400 ha of the land will be developed on and it is not expected that this will significantly threaten the agricultural activities undertaken on site. A Soils and Agricultural Potential Study will be included within the EIA Report to reflect the impact of the proposed project in terms of the land use and agricultural potential.**
2.5.5.	be in line with the planning for the area,	
2.5.6.	for urban related development, make use of the underutilised land available with the urban edge,	**N/A - the proposed project is located within a rural area and the site is zoned for agricultural use.**
2.5.7.	optimise the use of existing resources and infrastructure,	**The proposed project will connect to the Ferrum substation (located in Kathu) or to the Segame substation (located in Kuruman) and a collector substation via a 132 kV overhead transmission line.**
2.5.8.	opportunity costs in terms of bulk infrastructure expansions in non-priority areas (e.g. not aligned with the bulk infrastructure planning for the settlement that reflects the spatial reconstruction priorities of the settlement),	**N/A**
2.5.9.	discourage "urban sprawl" and contribute to compaction/densification,	**N/A**
2.5.10.	contribute to the correction of the historically distorted spatial patterns of settlements and to the optimum use of existing infrastructure in excess of current needs,	**N/A - the proposed project is located within a rural area and the site is zoned for agricultural use.**
2.5.11.	encourage environmentally sustainable land development practices and processes,	**The development of a renewable energy facility is a sustainable land development practice provided it is constructed and operated in an environmentally friendly manner.**
2.5.12.	take into account special locational factors that might favour the specific location (e.g. the location of a strategic mineral resource, access to the port, access to rail, etc.),	**Please refer to Chapter 5 for a description of the process undertaken to identify the site as a preferred site for a WEF.**
2.5.13.	the investment in the settlement or area in question will generate the highest socio-economic returns (i.e. an area with high economic potential),	**To be addressed within the Socio-Economic Impact Assessment that will be included within the EIA Report.**
2.5.14.	impact on the sense of history, sense of place and heritage of the area and the socio-cultural and cultural-historic	**The impact of the proposed project on cultural/heritage areas (archaeology and palaeontology) and the sense of place will be**

NEED	
Question	**Response**
characteristics and sensitivities of the area, and	**assessed in the HIA and VIA which will be included in the EIA Report.**
2.5.15. in terms of the nature, scale and location of the development promote or act as a catalyst to create a more integrated settlement?	**Several Renewable Energy projects (particularly solar energy projects) are proposed and environmentally approved in the area, which lends itself potentially to a renewable energy development area.**
2.6. How were a risk-averse and cautious approach applied in terms of socio-economic impacts?	
2.6.1. What are the limits of current knowledge (note: the gaps, uncertainties and assumptions must be clearly stated)?	**To be addressed within the Socio-Economic Impact Assessment that will be included in the EIA Report.**
2.6.2. What is the level of risk (note: related to inequality, social fabric, livelihoods, vulnerable communities, critical resources, economic vulnerability and sustainability) associated with the limits of current knowledge?	
2.6.3. Based on the limits of knowledge and the level of risk, how and to what extent was a risk-averse and cautious approach applied to the development?	
2.7. How will the socio-economic impacts resulting from this development impact on people's environmental right in terms following:	
2.7.1. Negative impacts: e.g. health (e.g. HIV-Aids), safety, social ills, etc. What measures were taken to firstly avoid negative impacts, but if avoidance is not possible, to minimise, manage and remedy negative impacts?	**To be addressed within the Socio-Economic Impact Assessment that will be included in the EIA Report.**
2.7.2. Positive impacts. What measures were taken to enhance positive impacts?	
2.8. Considering the linkages and dependencies between human wellbeing, livelihoods and ecosystem services, describe the linkages and dependencies applicable to the area in question and how the development's socioeconomic impacts will result in ecological impacts (e.g. over utilisation of natural resources, etc.)?	
2.9. What measures were taken to pursue the selection of the "best practicable environmental option" in terms of socio-economic considerations?	
2.10. What measures were taken to pursue environmental justice so that adverse environmental impacts shall not be distributed in such a manner as to unfairly discriminate against any person, particularly vulnerable and disadvantaged persons	

NEED	
Question	**Response**
(who are the beneficiaries and is the development located appropriately)? Considering the need for social equity and justice, do the alternatives identified, allow the "best practicable environmental option" to be selected, or is there a need for other alternatives to be considered?	
2.11. What measures were taken to pursue equitable access to environmental resources, benefits and services to meet basic human needs and ensure human wellbeing, and what special measures were taken to ensure access thereto by categories of persons disadvantaged by unfair discrimination?	
2.12. What measures were taken to ensure that the responsibility for the environmental health and safety consequences of the development has been addressed throughout the development's life cycle?	
2.13. What measures were taken to:	
2.13.1. ensure the participation of all interested and affected parties,	**The Public Participation Process that was undertaken as part of the Scoping phase to date and to be undertaken in the EIA process is included in Chapter 4 of the Draft Scoping Report. Various methods were employed to notify potential I&APs of the proposed project and the opportunity to comment on the DSR, namely, through notices in the local newspaper, sites notices emails as well as notification letters.**
2.13.2. provide all people with an opportunity to develop the understanding, skills and capacity necessary for achieving equitable and effective participation,	
2.13.3. ensure participation by vulnerable and disadvantaged persons,	
2.13.4. promote community wellbeing and empowerment through environmental education, the raising of environmental awareness, the sharing of knowledge and experience and other appropriate means,	**The EIA process will take cognisance of all interests, needs, and values espoused by all I&APs. Opportunity for public participation will be provided to all I&APs throughout the EIA process in terms of the 2014 NEMA EIA Regulations (as amended).**
2.13.5. ensure openness and transparency, and access to information in terms of the process,	**The Public Participation Process that was undertaken as part of the Scoping phase to date and to be undertaken in the EIA process is included in Chapter 4 of the Draft Scoping Report. Various methods were employed to notify potential I&APs of the proposed project and the opportunity to comment on the DSR, namely, through notices in the local newspaper, sites notices emails as well as notification letters.**
2.13.6. ensure that the interests, needs and values of all interested and affected parties were taken into account and that adequate recognition were given to all forms of knowledge, including traditional and ordinary knowledge,	**The EIA process will take cognisance of all interests, needs and values adopted by all I&APs.**
2.13.7. ensure that the vital role of women and	**Public participation of all I&APs will be promoted**

NEED	
Question	**Response**
youth in environmental management and development were recognised and their full participation therein was promoted.	**and opportunities for engagement will be provided during the EIA process.**
2.14. Considering the interests, needs and values of all the interested and affected parties, describe how the development will allow for opportunities for all the segments of the community (e.g. a mixture of low-, middle-, and high-income housing opportunities) that is consistent with the priority needs of the local area (or that is proportional to the needs of an area)?	**To be addressed within the Socio-Economic Impact Assessment that will be included within the EIA Report.**
2.15. What measures have been taken to ensure that current and/or future workers will be informed of work that potentially might be harmful to human health or the environment or of dangers associated with the work, and what measures have been taken to ensure that the right of workers to refuse such work will be respected and protected?	**An EMPr will be developed to address health and safety concerns. An Environmental Control Officer (ECO) will be appointed to monitor compliance.**
2.16. Describe how the development will impact on job creation in terms of, amongst other aspects:	
2.16.1. the number of temporary versus permanent jobs that will be created,	**To be addressed within the Socio-Economic Impact Assessment that will be included within the EIA Report.**
2.16.2. whether the labour available in the area will be able to take up the job opportunities (i.e. do the required skills match the skills available in the area),	
2.16.3. the distance from where labourers will have to travel,	
2.16.4. the location of jobs opportunities versus the location of impacts (i.e. equitable distribution of costs and benefits),	
2.16.5. the opportunity costs in terms of job creation (e.g. a mine might create 100 jobs, but impact on 1000 agricultural jobs, etc.).	
2.17. What measures were taken to ensure:	
2.17.1. that there were intergovernmental coordination and harmonisation of policies, legislation and actions relating to the environment,	**The different government departments have been listed as I&APs and are given the opportunity to comment on the DSR and will be given the opportunity to comment on the Draft EIA Report during the 30 day public participation period.**
2.17.2. that actual or potential conflicts of interest between organs of state were resolved through conflict resolution procedures?	**To be determined during the EIA Phase (following the Public Participation Phase undertaken as part of the Scoping Phase).**
2.18. What measures were taken to ensure that the	**The proposed WEF will adhere to the principles of**

NEED	
Question	**Response**
environment will be held in public trust for the people, that the beneficial use of environmental resources will serve the public interest, and that the environment will be protected as the people's common heritage?	**environmental management. Measures taken to ensure adherence to the principles of NEMA will be determined during the EIA Phase.**
2.19. Are the mitigation measures proposed realistic and what long-term environmental legacy and managed burden will be left?	**It would be premature to decide whether proposed mitigation measures of the WEF are realistic prior to the completion of the impact assessment phase of this EIA Process. Therefore the practicality of mitigation measures shall be determined during the EIA Phase. The proposed mitigation measures to be included in the EMPr that will be included in the EIA Report will be informed by the Specialist studies undertaken. This will include a detailed assessment of the environment as well as the impacts associated with the proposed development. WEFs can be dismantled and completely removed from the site leased for the development and do not permanently prevent alternative land-uses on the same land parcel.**
2.20. What measures were taken to ensure that he costs of remedying pollution, environmental degradation and consequent adverse health effects and of preventing, controlling or minimising further pollution, environmental damage or adverse health effects will be paid for by those responsible for harming the environment?	**The EMPr (to be included in the EIA Report) of this proposed project must form part of the contractual agreement and be adhered to by both the contractors/workers and the applicant.**
2.21. Considering the need to secure ecological integrity and a healthy bio-physical environment, describe how the alternatives identified (in terms of all the different elements of the development and all the different impacts being proposed), resulted in the selection of the best practicable environmental option in terms of socio-economic considerations?	**Agriculture on site is influenced by climatic variables and limitations. Renewable energy development is a suitable land use option for the site. The proposed WEF would be more robust in terms of economic viability and profitability while also being largely uninfluenced by climate change variables. The proposed project would also provide the farm owner with additional income by way of lease agreements (as explained above) and will also contribute to local socio-economic upliftment through job creation.**
2.22. Describe the positive and negative cumulative socio-economic impacts bearing in mind the size, scale, scope, and nature of the project in relation to its location and other planned developments in the area?	**The potential cumulative impacts resulting from the proposed project can only be objectively determined at the end of the EIA Process. These will be assessed as part of the EIA. The cumulative impacts of similar types of projects that are being undertaken or are proposed to be undertaken (e.g. other wind and solar energy projects within 30 km of the proposed project) will be assessed in the EIA report.**

1.6. EIA Team

As previously noted, the CSIR has been appointed by Mulilo to undertake the EIA required for the proposed project. Public participation forms an integral part of the EIA Process and assists in identifying issues and possible alternatives to be considered during the EIA Process. The CSIR is undertaking the PPP for this EIA. Details on the Public Participation Process (PPP) are included in Chapter 4 of this Scoping Report.

The EIA team which is involved in this Scoping and EIA Process is listed in Table 1.4 below. This team includes a number of specialists who have extensive experience in conducting specialist studies for renewable energy projects in South Africa.

Table 1.4: The EIA Team

NAME	ORGANISATION	ROLE/STUDY TO BE UNDERTAKEN
Environmental Management Services (CSIR)		
Paul Lochner	CSIR	Technical Advisor and Quality Assurance (EAPSA) Certified
Minnelise Levendal	CSIR	EAP (*Pr. Sci. Nat.)*
Lizande Kellerman	CSIR	EIA Project Manager (*Pr. Sci. Nat.)*
Specialists		
Simon Todd	3foxes Biodiversity Solutions	Ecology Impact Assessment (Terrestrial Ecology including fauna and flora)
Chris van Rooyen	Chris van Rooyen Consulting	Bird Impact Assessment
Werner Marias	Animalia Consultants (Pty) Ltd	Bat Impact Assessment
Natasha van der Haar	Enviroswift (Pty) Ltd	Freshwater Impact Assessment
Julian Conrad	Geohydrological and Spatial Solutions International (Pty) Ltd	Geohydrological Impact Assessment
Stephan Jacobs	SiVEST SA (Pty) Ltd	Visual Impact Assessment
Nicholas Wiltshire	Cedar Tower Services (Pty) Ltd	Heritage Impact Assessment
Dr John Almond	Private, sub-contracted by Cedar Tower Services (Pty) Ltd	Palaeontological Impact Assessment
Johann Lanz	Private	Soils and Agricultural Potential Assessment
Elena Broughton	Urban-Econ Development Economists	Socio-Economic Impact Assessment
Morné de Jager	Enviro-Acoustic Research	Noise Impact Assessment
Adrian Johnson	JG Afrika	Transportation Impact Assessment

Please note that a Wake Effect Analysis is not required as there are no other WEFs in close proximity to the Kuruman WEF site.

1.7. Details and Expertise of the CSIR EIA Project Management Team

Paul Lochner (Technical Advisor and Quality Assurance (EAPSA) Certified:

Paul is the manager of the Environmental Management Services (EMS) Group at CSIR and has 22 years of experience in environmental assessment and management studies, primarily in the leadership and integration functions. This includes Strategic Environmental Assessments (SEAs), EIAs, BAs and EMPrs. In July 2003, he obtained certification as a registered EAP with the Interim Certification Board for EAPs of South Africa (EAPSA). He has been extensively involved in renewable energy projects over the last few years. He was the Project Leader for the Electrawinds BA and EIA project at the Coega Industrial Development Zone (IDZ), and was the Project Leader for the EIA for the Mainstream Kouga WEF (Phase 1) at Jeffrey's Bay. Phase 1 of this project was granted EA by the Eastern Cape Government in March 2009. He was part of the CSIR team that prepared the EIA and EMP for the Eskom wind energy demonstration facility at Klipheuwel (Western Cape), which was approved by the Western Cape provincial government. Paul was the Project Leader for the SEA for the location and placement of wind and solar energy projects in South Africa. He has also led EIAs for Solar PV projects in the Free State and Northern Cape for Mainstream Renewable Energy, Solaire Direct and Mulilo. Paul has also authored several Guidelines for national and provincial government, such as the Guideline for EMPs published in 2005 by the Western Cape government.

Minnelise Levendal, Pri. Sci. Nat. registered, 117078 (EAP): Minnelise is a Senior Environmental Assessment Practitioner (EAP) in the EMS Group of the CSIR and holds a Master's degree in Botany from the Stellenbosch University. She also obtained her BSc (Education) and BSc (Honours) degrees at the University of the Western Cape. She has 15 years of experience in Environmental Management (which includes nine years working as an EAP). Before she joined the CSIR she was employed at the Western Cape Department of Environmental Affairs and Development Planning (DEA&DP) where she assessed EIAs, BAs and EMPs. Minnelise is currently managing various EIAs for wind and solar renewable energy projects in South Africa. Minnelise was the CSIR project manager for the 100 MW Ubuntu WEF near Jeffrey's Bay (EA granted in June 2012), as well as the 50 MW Banna Ba Pifhu WEF proposed by WKN Wind current near Humansdorp in the Eastern Cape (EA granted in July 2014). She was the project manager of ten BAs for wind monitoring masts in South Africa as part of the National Wind Atlas Project of the DoE. EAs for all the ten masts were obtained from DEA in 2010. Minnelise was also the Project Leader for seven solar PV facilities near Kenhardt for Mulilo in the Northern Cape in 2016. Minnelise is the Project Manager of the Special Needs and Skills Development Programme of DEA which provides *pro bono* environmental assessments (BAs) to applicants with special needs.

Minnelise is supported by the EIA Project Manager, Lizande Kellerman.

Lizande Kellerman (Pri, Sci. Nat. registered, 400046/10): Lizande holds a Bachelor's degree in Zoology and Entomology, with an Honours and Masters both in Botany from the University of Pretoria. She also obtained a Postgraduate Certificate for Higher Education and Further Training from the University of South Africa. Lizande is currently completing her PhD in Plant Ecology specialising in natural restoration of degraded rangeland in the Succulent Karoo. For almost 15 years, Lizande spent teaching and mentoring, as a researcher and lecturer, numerous undergraduate and postgraduate students in subjects of biological, ecological and environmental sciences at University of Pretoria, University of South Africa and the Midrand Graduate Institute.

Following her academic career, Lizande has more than 10 years' experience in environmental assessment and management studies, primarily in planning, preparing, managing and conducting environmental impact assessments (BAs & EIAs), EMPs, environmental screening studies and fatal flaw assessments, as well as license applications for air emissions, water use, waste management, mining rights, ploughing

rights, bioprospecting, biotrade and biodiversity permitting for numerous projects in the agricultural (including aquaculture), biodiversity, bioprospecting, construction and mining sectors.

Lizande has joined the CSIR in January 2012 as a Senior Enterprise Development Specialist in the Enterprise Creation for Development (ECD) unit in Pretoria. Her main responsibility was the planning, design, implementation, management and financial administration of various rural community-based government-funded agro-processing projects/enterprises in the following South African provinces; Limpopo, North West, Mpumalanga, Northern Cape, Eastern Cape, Western Cape, Free State and KwaZulu-Natal. The focus was on the sustainable cultivation, harvesting and processing of essential oils and indigenous plant species with cosmetic, medicinal and nutritional value to enable community upliftment and poverty alleviation. She was also responsible for all authority liaison and stakeholder engagement, as well as for environmental screening and legal compliance of these projects, specifically relating to the application for and management of EIAs, Environmental Management Programmes (EMPrs), water use and waste management licenses, ploughing rights, biodiversity and bioprospecting permitting, and the facilitation and coordination of specialist assessments. During this time, Lizande has also provided specialist input relating to aspects of environmental impact assessment requirements and legal compliance into the preparation of numerous proposals, tenders, feasibility studies, development strategies, business plans and socio-economic development enabling frameworks conducted by CSIR ECD.

Since April 2016, Lizande has been working as a Principal EAP in the EMS Group situated in Stellenbosch. She is currently managing the national-scale SEA for marine and freshwater aquaculture development in South Africa. Apart from managing the EIA processes for the proposed development of the Kuruman Phase 1 and 2 WEFs with supporting electrical infrastructure near Kuruman in the Northern Cape, Lizande is also part of a team that is presently undertaking the development of a Biodiversity Economy Transformation Strategy for the North West Province.

1.8. Objectives for this Scoping Report

The Scoping Phase of the EIA refers to the process of determining the spatial and temporal boundaries for the EIA. In broad terms, the objectives of the Scoping Process in terms of the 2014 NEMA EIA Regulations, as amended (GN R325) are to:

- Confirm the process to be followed and opportunities for stakeholder engagement;
- Clarify the project scope to be covered;
- Identify and confirm the preferred activity and technology alternative;
- Identify and confirm the preferred site for the preferred activity;
- Identify the key issues to be addressed in the impact assessment phase and the approach to be followed in addressing these issues; and
- Confirm the level of assessment to be undertaken during the impact assessment.

This is achieved through parallel initiatives of consulting with:

- The lead authorities involved in the decision-making for this EIA application;
- The public to ensure that local issues are well understood; and
- The EIA specialist team to ensure that technical issues are identified.

The Scoping Process is supported by a review of relevant background literature on the local area. Through this comprehensive process, the environmental assessment can identify and focus on key issues requiring further assessment during the EIA Phase.

The primary objective of the Scoping Report is to present key stakeholders (including affected organs of state) with an overview of the proposed project and key issues that require assessment in the EIA Phase and allows the opportunity for the identification of additional issues that may require assessment.

This DSR has been released for a 30-day commenting period. Issues that will be raised will be captured in the Issues and Responses Trail that will be included in the Final Scoping Report and Plan of Study for EIA. The Final Scoping Report will be submitted to the DEA for decision-making (i.e. approval or rejection) in line with Regulation 21 (1) of GN R325. This approval is planned to mark the end of the Scoping Phase after which the EIA Process moves into the impact assessment and reporting phase.

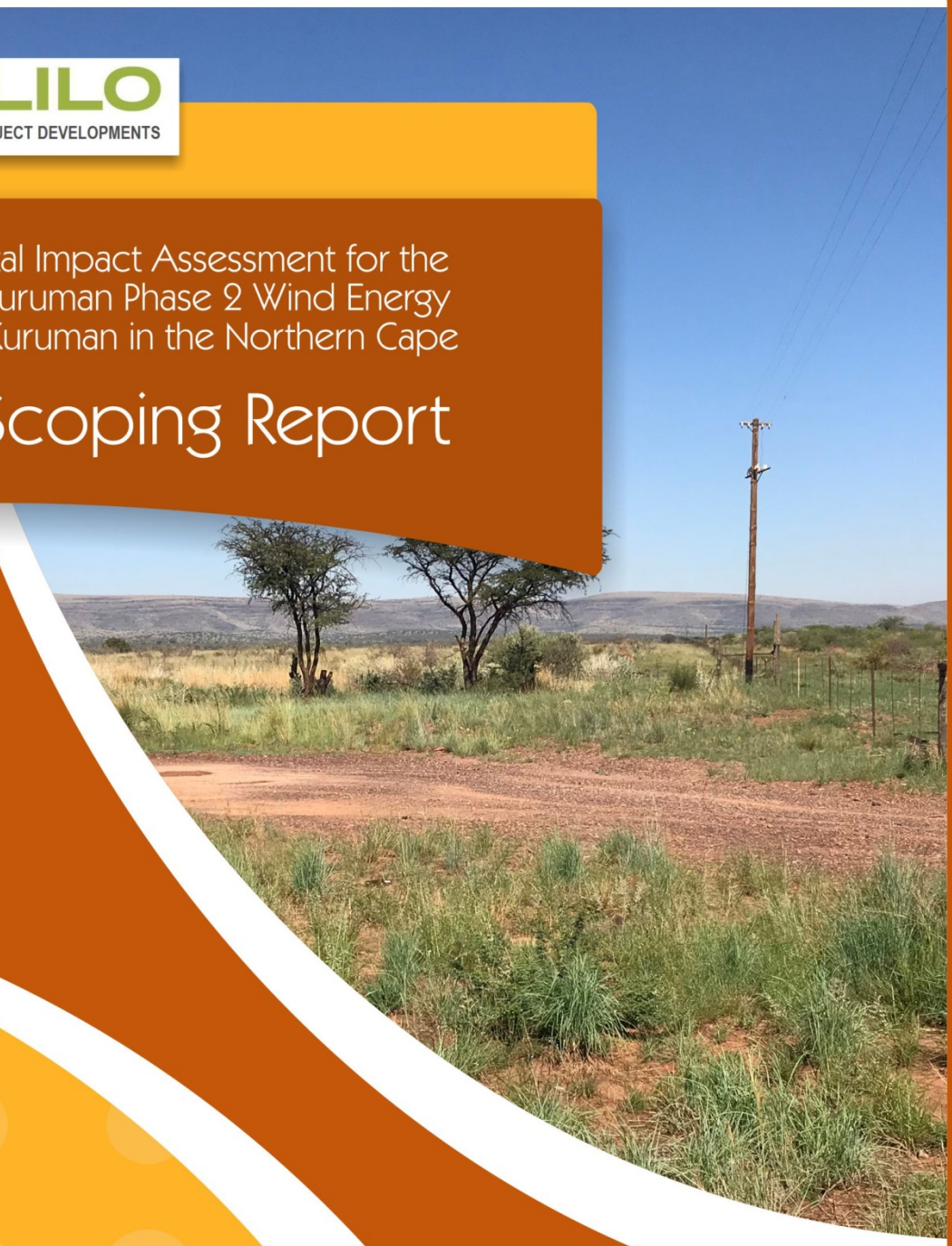
In terms of legal requirements, a crucial objective of the Scoping Report is to satisfy the requirements of Appendix 2 of the 2014 NEMA EIA Regulations (as amended, as noted in Regulation 21 (3) of the GN R326). This section regulates and prescribes the content of the Scoping Report and specifies the type of supporting information that must accompany the submission of the Scoping Report to the authorities. An overview of where the requirements of Appendix 2 of the 2014 NEMA EIA Regulations (as amended) are addressed in this Scoping Report is presented in Table 1. 2.

Furthermore, this process is designed to satisfy the requirements of Regulations 41, 42, 43 and 44 of the 2014 NEMA EIA Regulations (as amended) relating to the PPP and, specifically, the registration of and submissions from I&APs.

MULILO
RENEWABLE PROJECT DEVELOPMENTS

Environmental Impact Assessment for the proposed Kuruman Phase 2 Wind Energy Facility near Kuruman in the Northern Cape

Draft Scoping Report



CHAPTER 2:
Project Description

CONTENTS

TABLES

FIGURES

2. PROJECT DESCRIPTION

This chapter provides an overview of the conceptual project design and an overview of the site and technology selection process for the Kuruman WEF, as provided by Mulilo.

The purpose of this chapter is to present sufficient project information on the proposed Kuruman WEF (including the facility itself and the associated infrastructure) to inform the EIA Process in terms of design parameters applicable to the project.

As noted in Chapter 1 of this Scooping Report, Mulilo is proposing to develop the Kuruman WEF and associated infrastructure including a 132 kV distribution line and on-site substation near Kuruman in the Northern Cape. While the exact type of the turbines is yet to be finalised, the turbines are expected to have a combined maximum generation capacity of 225 MW. The proposed Kuruman WEF will consist of a maximum of 52 individual turbines which will be positioned at strategic locations that have been informed by the scoping assessment inputs provided by the specialists on the project team. The proposed location of the Kuruman WEF is shown in Figure 1.1 in Chapter 1. Table 2.1 shows the co-ordinates of the preferred project site.

Table 2.1: Co-ordinates of the Corner Points of the Preferred Project Site

Site	Point	Latitude	Longitude
Kuruman WEF	North East	27°35'54.68"S	23°24'28.61"E
	South East	27°39'51.58"S	23°25'17.63"E
	South West	27°40'17.54"S	23°23'32.95"E
	North - West	27°36'37.42"S	23°22'46.55"E

2.1 Key components of the proposed Kuruman WEF

A summary of the key components of the proposed project is described below. It is important to note at the outset that the exact specifications of the proposed project components will be determined during the detailed engineering phase (subsequent to the issuing of an EA, should such an authorisation be granted for the proposed project, and shortly before construction commences). In line with the precautionary approach and in order to ensure that any environmental impacts which may arise as a result of the project are adequately assessed during the EIA Phase, worst-case scenarios and estimates have been provided in this section. For example, the current project description is representative of a worst-case scenario in terms of the total number of turbines proposed for implementation, as it reflects the maximum number of wind turbines which may be implemented, i.e. 52 turbines. The hub height is 80 - 140 m, the rotor diameter is 100 - 160 m and the blade length is 50 - 80 m.

The total physical footprint of the proposed project (i.e. maximum 52 turbines and supporting infrastructure) is estimated to be approximately 400 ha. As mentioned in Chapter 1 of this DSR once commercial operation date is achieved, the proposed facility will generate electricity for a minimum period of 20 years. The property on which the WEF is to be constructed will be leased by the project owner from the property owners for the life span of the project. As the proposed Kuruman WEF requires approximately 400 ha which comprises 9 % of the total affected farm area of approximately 4 454 ha, there is spatial scope to avoid major environmental constraints through optimisation of the final design. Figure 2.1 indicates the draft project layout, including the associated infrastructure.

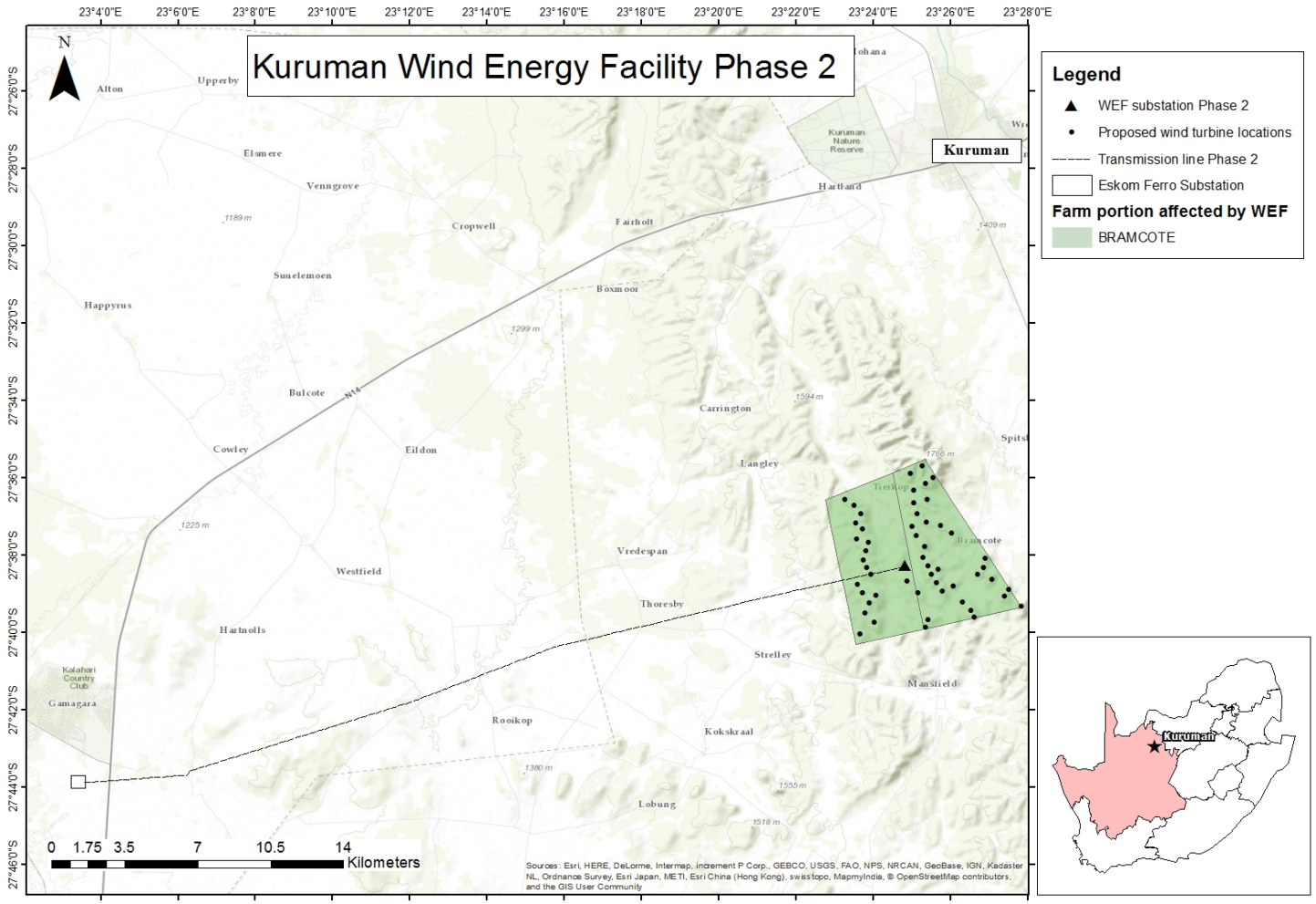


Figure 2.1: Proposed draft layout of the Kuruman WEF development area (Phase 2)

Note: The powerline routing will still be finalised in the separate BA process to be conducted.

All high resource areas along the ridges of the relevant properties, as well as potential locations for all supporting infrastructure were assessed during the scoping phase. Based on the findings of the specialist studies, a preliminary environmental sensitivity map was prepared and is included in this Scoping Report (Chapter 3 and 5). This map shows the sensitivities on site (terrestrial, watercourses, and sensitive heritage features) within the larger site that was assessed. Based on this map, the preferred location for the Kuruman WEF, also known as the Development Envelope, avoids (where possible) the sensitive features that were identified by the specialists within the original assessed area.

A summary of the key components of the proposed project is described below. Furthermore, technical components forming part of the proposed WEF are discussed in detail in Sections 2.1.1 to 2.1.3 below.

- ***Wind turbines:***

  - Number of turbines: 20 - 52
  - Hub height of 80 -140 m and rotor diameter of 100 - 160 m;
  - Blade length of 50 - 80 m;
  - Reinforced Concrete Foundation – 20 x 20 m (0.04 ha per turbine)
  - Crane platform: 50 m x 50 m (0.25 ha) for each turbine; and
  - Turbine capacity: 4.5 MW.

- ***Collector substation:***

  - 22/33 kV to 132 kV collector substation of approximately 2 ha to receive, convert and step up electricity from the WEF to the 132 kV grid suitable supply. The substation will be 5 m high. The facility will house control rooms and grid control yards for both Eskom and the IPP as well as a communication tower of up to 32 m.

- ***Operations and Maintenance building:***

  - Operations and Maintenance (O&M) buildings of approximately 1 ha. These buildings will comprise the following:
    - Parking area, reception area, offices, and ablution facilities for operational staff, security and visitors;
    - Workshops, storage areas for materials and spare parts;
    - Water storage;
    - Septic tanks and sewer lines to service ablution facilities;
    - Central waste collection and storage area; and
    - The buildings and other infrastructure, including a communication tower, will be less than 32 m high.

- ***Construction site office area and laydown area (used during construction and rehabilitated thereafter):***

  - Three construction laydown areas (yards) will be established. It is anticipated that each construction yard will comprise an area of approximately 2 ha (6 ha in total) and will consist of the following:

    - Canteen;
    - Ablution facilities;
    - Site offices;

- Changing room;
- Meeting rooms;
- Parking area;
- Storage area including bunded fuel areas, oil storage areas, general stores (containers) and skips; and an
- On-site concrete batching plant: 50 m x 50 m (0.25 ha).

It is proposed that one of the laydown areas will be used as the site compound. Temporary single storey structures (prefab container-type offices) will be used. Approximately five buildings will be used for the main contractor and one or two buildings for sub-contractors. These may not necessarily all be at the same construction camp (i.e. the turbine erection crew may have a site camp on top of the plateau while the main construction site could be at the site access).

- ***Access road:***

  - The proposed main access road is located on D3420. This main access road connects to the main access road of Phase 1 on the boundary of the two phases. Turbines could therefore be delivered to the Phase 1 area via the proposed main access road of Phase 2.

- ***Service roads:***

  - New roads will be constructed with a width of approximately 5 m and will connect all turbines. The existing roads to be used will be extended to a width of 8 m.

- ***Other infrastructure:***

  - Fencing of 5 m high around the O&M building and the on-site substation;
  - Cabling (22/33kV internal reticulation lines) between turbines to be laid underground where practical, which will connect to an on-site substation; and
  - Stormwater channels and culverts.

The proposed Kuruman WEF will connect to the Ferrum substation (located in Kathu) or to the Segame substation (located in Kuruman) and a collector substation via a 132 kV overhead transmission line. The proposed transmission line will extend over 50 km to the Ferrum substation or 10 km to the Segame substation. Note that this transmission infrastructure is assessed under a separate BA process. The Kuruman WEF will consist of the components presented in Figure 2.2 below.

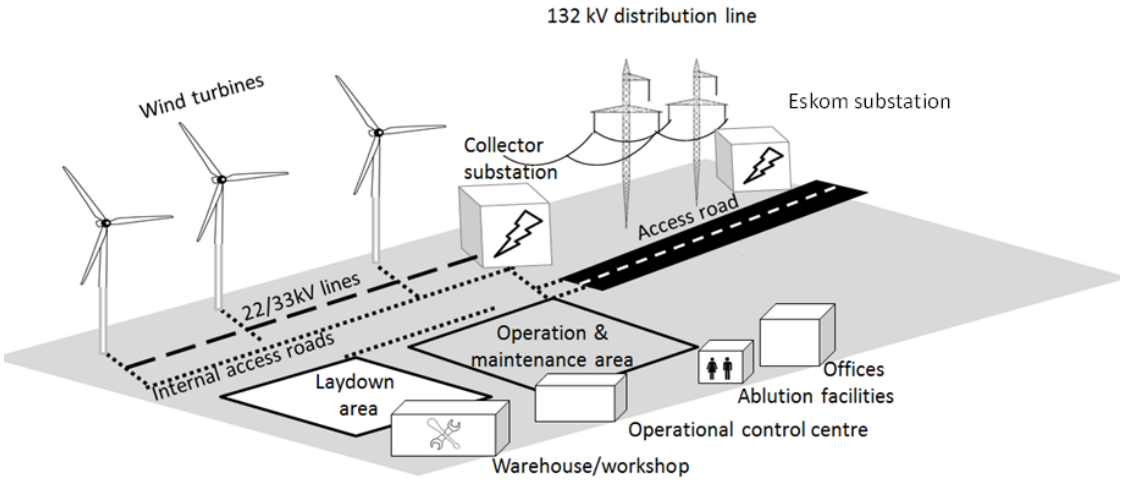


Figure 2.2: Components of the Kuruman WEF (*Source*: Tennessee Valley Authority, Wikimedia).

2.1.1 General Description of a Wind Turbine and Wind Turbine Technology

Wind turbines generate electricity by converting movement or kinetic energy produced by the wind into electricity. Different turbine technologies achieve this through slightly different means. A typical horizontal-axis wind turbine consists of a number of components, which work together to generate electricity as depicted in Figure 2.3 below. When the rotor spins the shaft, the shaft spins the assembly of magnets, which generate voltage in the coil of wire. This voltage provides alternating electrical current which can then be distributed through powerlines. The wind turbine tower supports the rotor and nacelle and provides the height for the rotor blades to clear the ground safely, and to capitalise on atmospheric wind resources which occur approximately 80 - 200 m above the earth's surface. It is anticipated that the individual wind turbines will have a hub height of 80 - 140 m, rotor diameter of 100 -160 m and the blade length will be 50- 80 m.

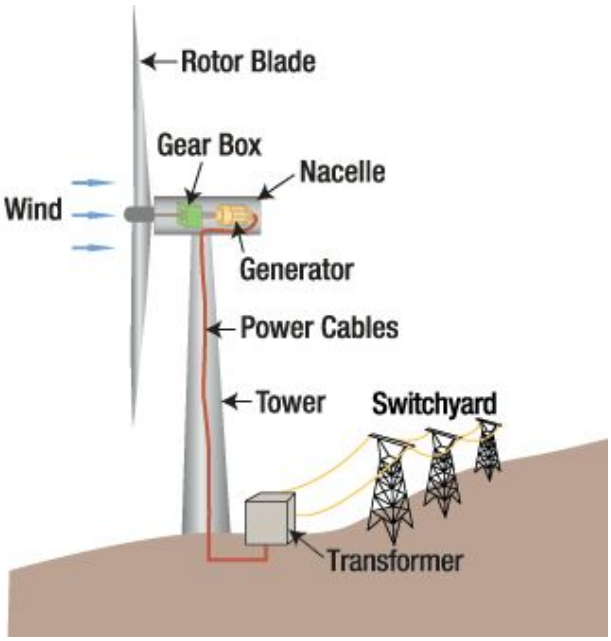


Figure 2.3: Generic design for a wind turbine (*Source*: Tennessee Valley Authority, Wikimedia).

The energy output of a wind turbine ultimately depends on the size of the generator, velocity of the wind, the height of the hub, and the length of the rotor blades. Wind turbines operate at a range of wind speeds and have a start-up speed, which is the speed at which the blades and rotor start to rotate, and a cut-in speed, which reflects the minimum wind speed at which usable power is generated. This is typically about 3 - 4 m/s with full power output occurring at higher wind speeds of approximately 10 to 12 m/s. Wind turbines are also equipped with a cut-out speed or pitch control system as a safety feature to prevent mechanical damage at high or turbulent wind speeds. The cut-out speed is the highest wind speed after which a wind turbine will stop producing power, and a braking system will be activated. This is typically between 25 and 28 m/s depending on the manufacturer and type of turbine selected for implementation. The pitch control system will turn the rotor out of the mean wind direction and change the orientation of the blades so the rotor will capture lower wind speeds and the output power of generator stays within the allowed range. Once the wind drops below the cut-out speed back to a safe level, the turbine can resume normal operation.

Even though wind turbines are relatively tall they do not require extensive land space. Each turbine will have a concrete base. The concrete foundation of each turbine will have a footprint of approximately 20 x 20 m (0.04 ha) and a crane platform of 50 m x 50 m (0.25 ha) will be established next to each turbine. It will comprise a total area of 15.08 ha for the 52 turbines. The comparatively small base of the turbine allows other activities to continue uninterrupted in the space underneath and around the turbine. Conventional large scale development footprints often lead to habitat fragmentation and interference with fauna. As such the micro-siting of the wind turbines will be in an optimum position that minimises the possibility of habitat fragmentation and interference with movement of fauna.

In terms of wind turbine technology to be used as part of the proposed development, Mulilo is currently considering a range of wind turbine designs and capacity. The exact turbine specifications have not been determined yet. Some turbine specifications will only be finalised closer to construction. However the "worst-case scenario" was presented and will be assessed by the specialists.

The turbine technology selection process shall be subjected to further wind analysis and is also dependent on technical, commercial and site suitability assessment that will, in part, be informed by the EIA.

2.1.2 Associated Infrastructure

2.1.2.1 Construction Laydown and Hardstand Areas

During construction, three construction laydown areas with a footprint of 2 ha each (200 m x 100 m), including a construction camp and crane platform (including boom erection, storage and assembly area), will be established. These crane platform areas (50 x 50 m)will be utilised by cranes to erect the turbines during the construction phase (and also possibly when maintenance is done in the operational phase). The crane platform covering a footprint of approximately 0.25 ha will be established adjacent to each wind turbine. The crane platform will support turbine assembly, off-loading and storage during the construction phase. A schematic illustration of a typical hard stand area and crane platform is provided in Figure 2.4 below.

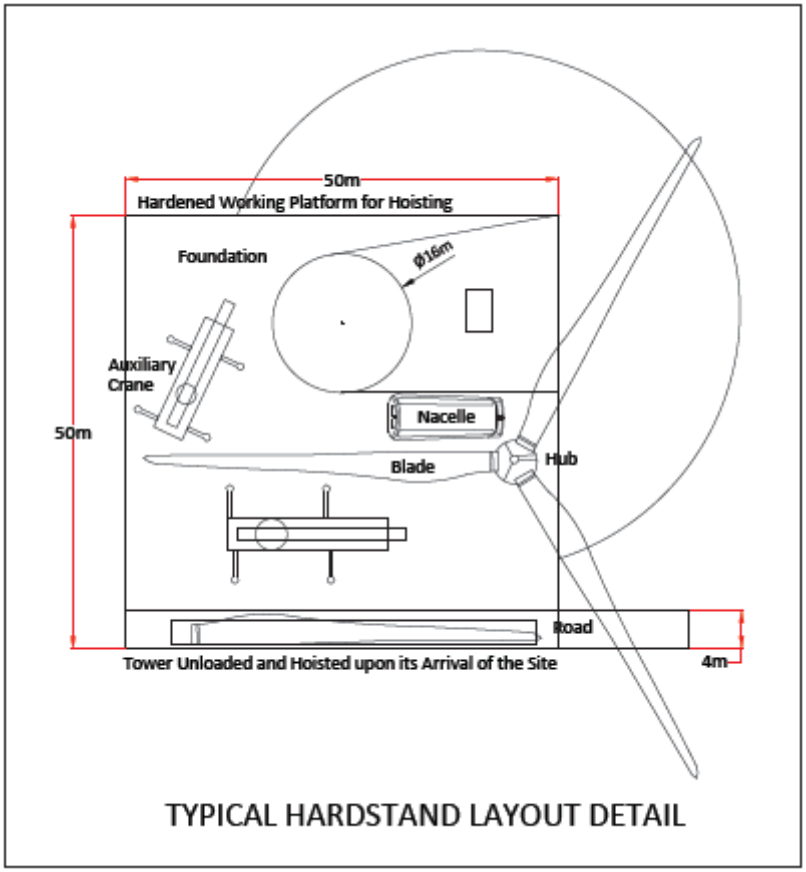


Figure 2.4: Example of a hard standing area and crane platform.

2.1.2.2 Fencing

For various reasons (such as security, public protection and lawful requirements), the proposed facility will be secured via the installation of boundary fencing. Permanent fencing will be required around the O&M Building and on-site substation. The fencing is planned to be approximately 5 m high. Access points will be managed and monitored by an appointed security service provider. The type of fencing is yet to be determined and detailed design will follow as the development progresses.

2.1.2.3 Stormwater Channels and Water Pipelines

Stormwater drainage systems will be constructed on site to ensure that stormwater run-off from site is appropriately managed. Water from these systems will not contain any chemicals or hazardous substances, and will be released into the surrounding environment based on the natural drainage contours.

2.1.2.4 Batching plant

A concrete batching plant is proposed on site with a footprint of approximately 0.25 ha during construction.

2.1.2.5 Operations and Maintenance Area

The on-site operation and maintenance area is required to support the functioning of the proposed Kuruman WEF and provide services to personnel who will be responsible for the operation and routine maintenance of the facility. The proposed infrastructure entails establishment of the following: operational control centre, workshop or warehouse, ablution facilities, site offices, on-site substation building, security enclosures, and an area for the storage of maintenance equipment.

2.1.3 Electrical Components and Connection to the Grid

Note: The electrical components are discussed below to provide a holistic overview of the proposed Kuruman WEF and for the sake of completeness. However, as noted in Chapter 1, the transmission component to the project forms part of a separate Basic Assessment process which will be undertaken for the project.

2.1.3.1 Electrical Infrastructure

The transmission line for the proposed Kuruman WEF will be constructed and will extend between the proposed on-site substation and the Ferrum substation (located in Kathu) or to the Segame substation (located in Kuruman).

A servitude of approximately 31 m wide will be established for the construction of a 132 kV high voltage powerlines to connect to Eskom's Electricity Distribution. Two different route alternatives (Alternatives 1 and 2) are considered as part of the separate BA process and a corridor of 500 m wide is being assessed along each route alternative. It should be noted that the footprint will only be where the pylons are located and the 4x4 track (less than 2.5 m wide). The preliminary routing of the powerlines has been proposed in such a way to minimise the length of powerlines required, as well as the total number of properties which would need to be traversed. Where practical and possible, the internal cabling (22/33 kV) will be routed underground between each turbine and will be located alongside on-site access roads as far as possible. This will reduce the visual impact of the proposed project, and the risk of collision with overhead powerlines for birds and bats, and provides increased security against cable theft. However, it is important to note that the extent to which cabling may be routed underground would be dependent on site conditions present along the cabling route. Should internal overhead lines be required, the bird specialist should assess and approve the design and recommend additional mitigation measures where appropriate. All structures must be bird friendly.

The on-site substation buildings and structures are expected to be approximately 5 m high, with a maximum footprint of 2 ha. The construction of the on-site substation would require the following activities:

- A survey of the site on which the proposed on-site substation will be constructed;
- Site clearing and levelling;
- Construction of access road/s to the proposed substation site (where required);
- Construction of substation terrace and foundations;
- Assembly, erection and installation of equipment (including transformers);
- Connection of conductors to equipment;
- Testing of equipment; and
- Rehabilitation of any disturbed areas and protection of erosion sensitive areas.

The development of the 132 kV powerline will consist of the following steps:

- Establishment of a servitude;
- Construction of tower/support structures;
- Stringing of the high voltage cables; and
- Ongoing maintenance.

Tower types available for the 132 kV powerlines include lattice structures, concrete monopole structures, steel monopole structures, wood pole structures, guyed steel monopole structures and steel H structures. Double circuit towers are towers which accommodate the routing of two powerlines on the same/single structure. Double circuit towers may either route powerlines as horizontal circuits (where the two powerlines run level horizontally alongside one another) or as vertical circuits (where powerlines run above and below one another). Due to their configuration, vertical circuit towers are generally taller than horizontal circuit towers, and are perceived to have a greater visual impact on the surrounding area. The preferred tower type for a particular line depends on the conductor size, terrain, required electrical characteristics, cost, maintenance requirements, live line compatibility, reliability and regional preferences. The type of tower structure selected for implementation would therefore need to be determined during the detailed project design phase, and would be based on the outcomes of the EIA Process and additional on-site investigations. Further powerline details will be confirmed in the separate BA process that was undertaken for the construction of the proposed electrical infrastructure associated with the proposed WEF. The size and type of foundation are also dependent on the type of tower structure selected for implementation, and the geotechnical conditions present on site. The foundations will therefore be designed based on the soil conditions. Once the foundations have been constructed, tower structures may be assembled on the ground and then erected, followed by the stringing of powerlines and conductors.

2.1.4 Site Access and Transportation of Wind Turbine Components to Site

2.1.4.1 Site access

The proposed main route will be along the R31 (Voortrekker Road) and the N14 (Hoof Street). The proposed WEF site can be accessed via the gravel road D3420, located east of the site and accessed via the R31 to the east of the site and the partially surfaced road D3441, located to the west of the site and accessed via the N14. The access roads are shown in Figure 2.5 below.

It should be noted that there are additional existing gravel roads located further south off D3441. These existing gravel roads could be further investigated as alternative accesses to the proposed Phase 2 site should the proposed main access (located off D3420) not be a feasible option. An additional option for access to the Phase 2 area would be via gravel road D3441. For Phase 1 of the Kuruman WEF, the proposed main access road is located off D3441. This main access road connects to the main access road of Phase 2 on the boundary of the two phases. Turbines could therefore be delivered to the Phase 2 area via the proposed main access road of Phase 1. This option, however, is dependent on the approval of Phase 2 in conjunction with Phase 1.

The existing gravels roads within the proposed Kuruman WEF site are narrow and have not been maintained. These gravel roads will be widened to form part of the internal roads of the proposed WEF (Figure 2.6).

Mulilo appointed JG Afrika (Pty) Ltd to undertake a Transportation Impact Assessment (TIA) for the proposed Kuruman WEF. The TIA will assess the expected traffic related impacts of the proposed facility during the construction, operation and subsequent decommissioning phases. The purpose of the study is also to consider the traffic impact that the facility will have on the surrounding road network and

environment during the construction of the access roads, construction and installation of the turbines and during maintenance.

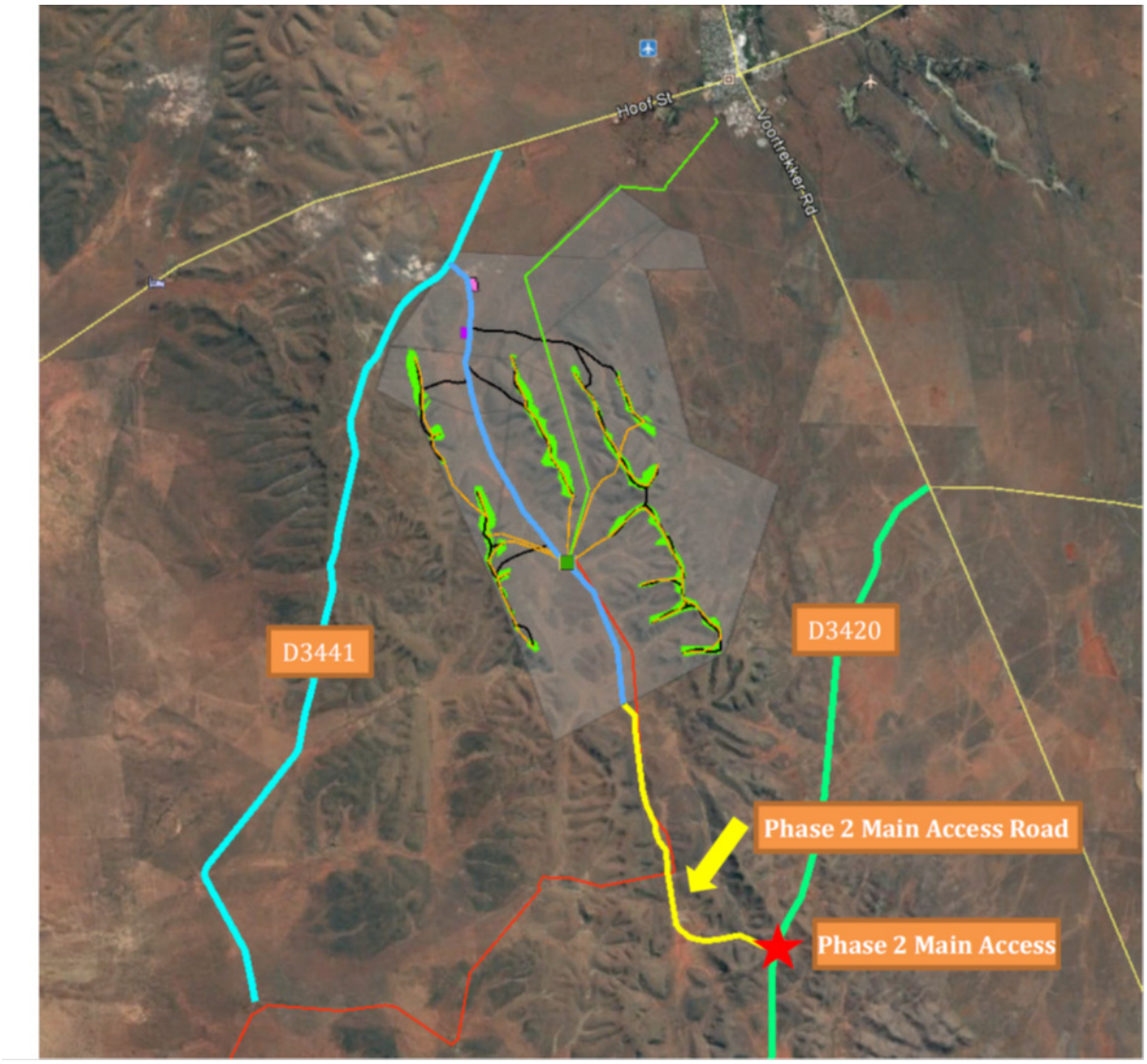


Figure 2.5: Access roads to the proposed Kuruman WEF (Phase 2).

The nearest towns in relation to the proposed Kuruman WEF site are Kuruman and Kathu. Kuruman is situated within 5 km from the WEF and Kathu at 40 km. The main route linking Kuruman and Kathu to the proposed WEF is the N14. The Transportation study (JK Afrika, 2018) states that it is envisaged that the majority of materials, plant and labour will be sourced from Kuruman and Kathu and will be transported to the WEF via the N14. Existing concrete batch plants and quarries are situated in Kuruman and Kathu. If these businesses were contracted to supply materials and concrete, the impact on the traffic would be reduced due to their proximity to the proposed WEF site. Alternatively, mobile concrete batch plants and temporary construction material stockpile yards could be commissioned on vacant land near the proposed WEF site. Delivery of materials to the mobile batch plant and the stockpile yard could be staggered to minimise traffic disruptions. It is envisaged that most materials, water, plant, services and labour will be procured within a 60 km radius from the proposed WEF.

Figure 2.6: Main access to Kuruman WEF (Phase 2) via D3420.

2.1.4.2 Port of entry

It is assumed that the wind turbine components will be imported to South Africa via the Port of Ngqura in Port Elizabeth in the Eastern Cape (Figure 2.7). The Port of Ngqura is a world class deep water transhipment hub offering an integrated, efficient and competitive port service for containers on transit. The Port forms part of the Coega Industrial Development Zone and is operated by Transnet National Ports Authority. The Port also services the industrial bulk commodity requirements of the regional and national hinterland. Containers handled include imports and exports from across the globe as well as transhipment cargoes serving primarily East and West coast traffic as well as inter-line traffic from South America to Asia.

Most shipping vessels importing the turbine components will be equipped with on-board cranes to do all the safe off-loading of WTG components to the abnormal transport vehicles, parked adjacent to the shipping vessels (Figure 2.8).

Figure 2.7: Preferred route from Port of Ngqura to the proposed Kuruman WEF (Map from Transport study: Scoping Report prepared by JG AFRIKA (PTY) LTD, 2018)

Figure 2.8: Example of cranes at Port of Entry (Image from Transport study: Scoping Report prepared by JG AFRIKA (PTY) LTD, 2018)

2.1.4.3 Transportation of wind turbines

For the transportation of the turbines to the WEF site, it was assumed that the turbine blades will be transported separately to site. Consequently, for each wind turbine three abnormal loads will be required for the blades, seven abnormal loads for the tower sections and another abnormal load for the nacelle. All further components will be transported with normal limitations haulage vehicles. With approximately 11 abnormal loads trips, the total trips to deliver the components of 52 turbines to the WEF site will be around 572 trips. The constructions of roads and concrete footings will also have a significant impact on the surrounding road network as vehicles deliver materials to the site. A concrete footing (approximately 500 m^3) adds over 80 trips by concrete trucks to the surrounding road network (JG AFRIKA (PTY) LTD, 2018).

In terms of the Road Traffic Act (Act 29 of 1989) the trucks delivering turbine components will be considered as abnormal loads. Approval may have to be obtained from National, Provincial and Local competent authority for the transportation of abnormal heavy components. This is normally the responsibility of the logistics company in charge of these components. Figures 2.9 to 2.12 below provide examples of transportation of some of the turbine components.

Figure 2.9: Tower section being transported.

Rotor blade being transported

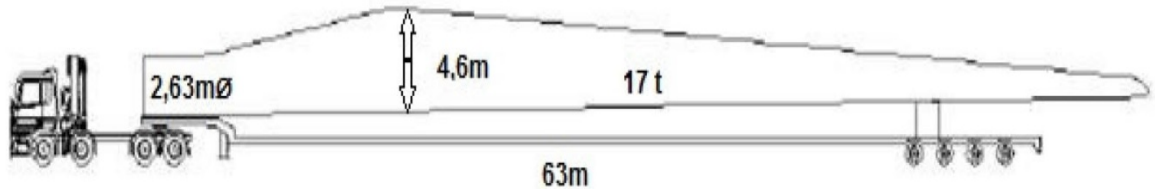


Figure 2.10: Rotor blade being transported.

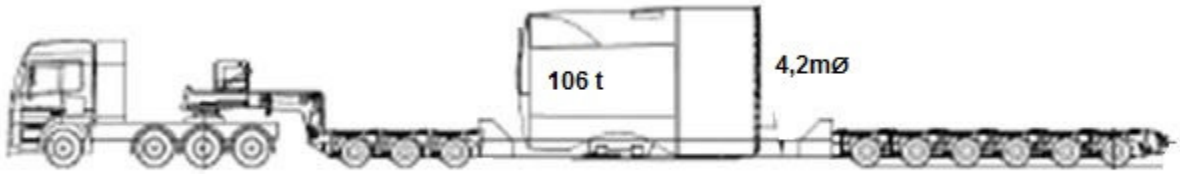


Figure 2.11: Nacelle being transported.

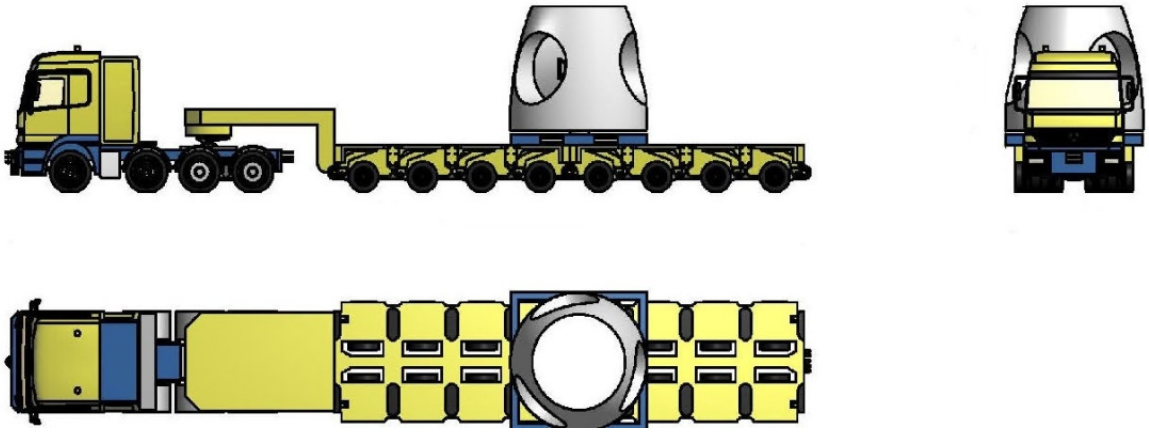


Figure 2.12: Hub and Rotary units being transported.

Note: Photos from Transport study: Scoping Report prepared by JG AFRIKA (PTY) LTD, 2018

2.1.5 Water requirements

The construction phase will extend over approximately 18 months. The weekly water requirement during this phase is an average of 409, 640 l. High water use is only anticipated for the first six months for the construction of the turbine foundations, roads and dust suppression. Thereafter the water usage will decrease drastically.

The weekly water requirement during the operational phase is an average of 100 l. Water will be sourced from a borehole on site which will be subject to a Water Use Licence Application (WULA) that will be applied for by the project applicant. A groundwater census will be included in the WULA.

2.2 Overview of Project Development Cycle

This section provides an outline of the main activities that are proposed during each phase of the proposed project, i.e. extending from the Planning and Design phase through to the Decommissioning phase. The operational life of the wind turbine facility is expected to be approximately 20 years which could be extended through regular maintenance and/or upgrades in technology.

2.2.1 Detailed Planning and Design

The project layout, including the placement of each individual turbine and subsequent proposed access roads will be finalised in the EIA phase. The project layout will be informed by the findings of the specialist studies, which included the identification of sensitive biophysical areas that need to be avoided. The specialists will be requested to comment on the final layout. The turbine manufacturer and turbine capacity to be used will be dependent on availability of turbines in the international market, suitability to the South African wind climate, and service levels and experience in South Africa.

2.2.2 Construction Phase

The construction phase will take place subsequent to the issuing of an EA from the DEA and once a power purchase agreement (PPA) with a suitable energy off-taker is signed, this could be Government or private. The construction phase for the proposed Kuruman WEF project is expected to extend over 18 months (however the construction period is subject to the actual number of turbines, the final requirements of Eskom and the REIPPPP RfP provisions at that point in time).

The main activities that are proposed to take place during the construction phase will entail the removal of vegetation within the footprint of the infrastructure that will be constructed (including but not limited to the turbines, laydown areas, internal access roads and building structures). The temporary laydown area will then be constructed to enable the storage of construction equipment and machinery and will include the establishment of the construction site camp (including site offices and other temporary facilities for the appointed contractors). The wind turbine foundations will then be constructed at each turbine location. As noted above, each turbine will be supported by a concrete foundation of approximately 400 m^2, with the aid of a mechanical excavator.

Thereafter, the on-site substation, including the substation building will be constructed. The construction of the substation building will entail construction of the foundations and building structure as well as the installation of electrical infrastructure (such as transformers, conductors, etc.). The construction phase will also involve the transportation of personnel, construction material and equipment to and from the site. Subsequently, the trenches will be excavated at a depth of approximately 5 m, between each wind turbine, for the laying of the cables to facilitate the connection of the wind turbines to the on-site substation.

All efforts will be made to ensure that all construction work will be undertaken in compliance with local, provincial and national legislation, local and international best practice, as well as the EMPr which will be compiled and included in the EIA Report. An independent Environmental Control Officer (ECO) will be appointed during the construction phase and will monitor compliance with the recommendations and conditions of the EMPr and EA respectively. Skilled as well as unskilled temporary employment

opportunities will be created during the construction phase. It is difficult to specify the actual number of employment opportunities that will be created at this stage; however approximately 420 employment opportunities (180 permanent and 240 temporary) are expected to be created during the construction phase. Of these 20% will comprise highly skilled; 50% skilled; and 30% will comprise unskilled employment opportunities. The proposed construction and operational phases will make use of local labour (including female labour) as far as possible and a minimum of 50 % of the workers will be sourced from the local communities. All non-local workers will be housed in rental accommodation in the nearby towns, i.e. Kuruman and Danielskuil. Mulilo will transport these workers to and from the site by busses. No workers will be accommodated in workers camps on site.

2.2.3 Operational Phase

The following activities will occur during the operational phase:

- Operation of the WEF and generation of electricity to add to the national grid;
- Routine maintenance of the WEF; and
- Unscheduled maintenance of the WEF.

The operational lifespan of the proposed Kuruman WEF is expected to be approximately 20 years. Wind turbines will be operational for this entire period except under circumstances of mechanical breakdown, extreme weather conditions and/or maintenance activities. Wind turbines will be subject to regular maintenance and inspection (i.e. routine servicing) to ensure the continued optimal functioning of the turbine components. It is expected that the WEF will operate throughout the day and night. During the operational phase, most of the WEF project area will continue its current agricultural use. The only development related activities on-site will be routine servicing and maintenance.

The projected operations are expected to provide several services and added economic spin offs (as highlighted in Chapter 1 of this Scoping Report). Approximately 35 employment opportunities (25 permanent and 10 temporary) will be created during the operational phase of the project. Of these, 30% will comprise highly skilled-; 20% semi-skilled- and 50% unskilled employment opportunities. Approximately 70% of the operations and maintenance team will be sourced from the local community.

2.2.4 Decommissioning Phase

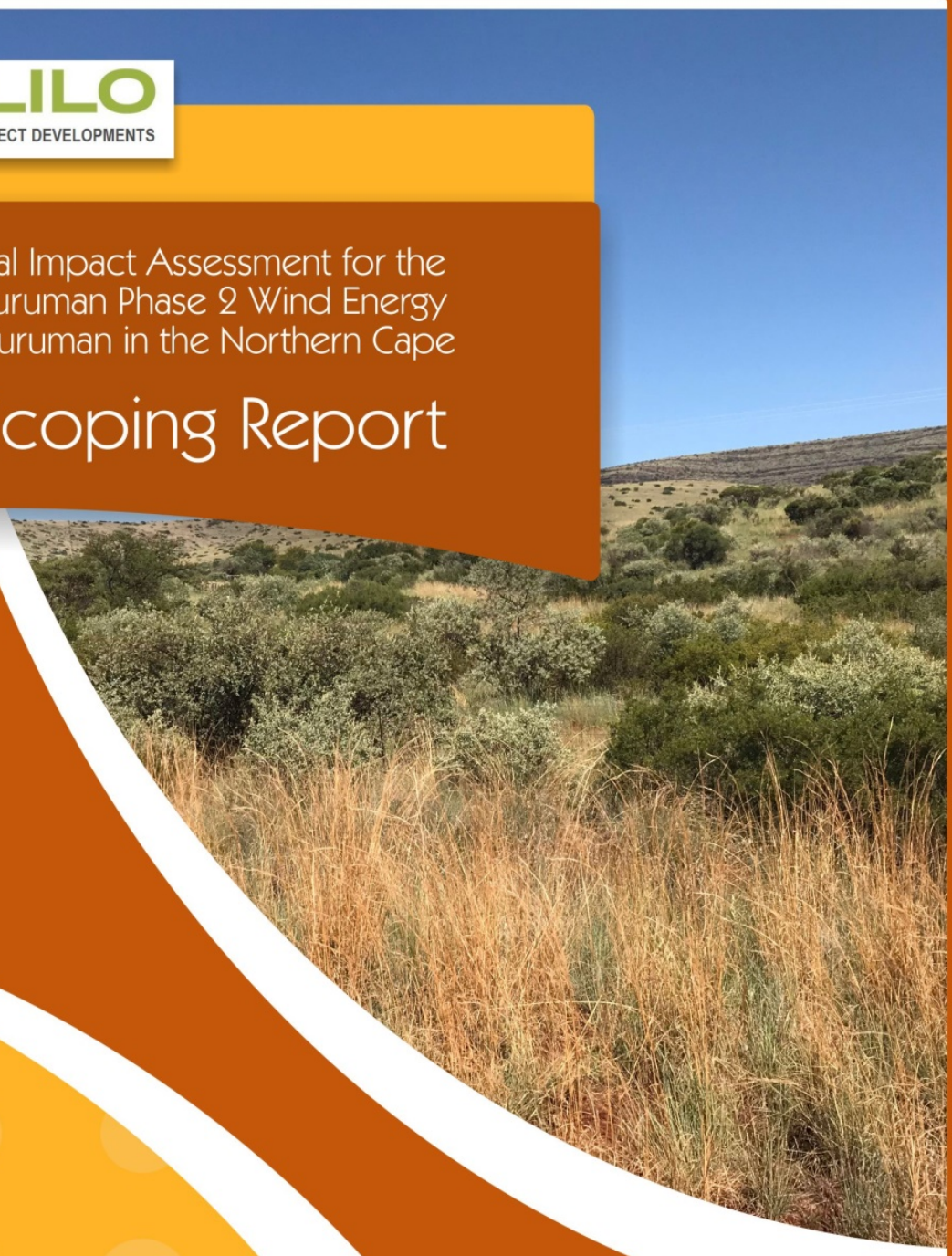
At the end of the operational phase, the WEF may be decommissioned, or may be repowered i.e. redesigned and refitted so as to operate for a longer period. The main aim of decommissioning is to return the land to its original, pre-construction condition. Should the unlikely need for decommissioning arise (i.e. if the facility becomes outdated or the land needs to be used for other purposes), the decommissioning procedures will be undertaken in line with the EMPr and the site will be rehabilitated and returned to its pre-construction state.

Various components of the proposed Kuruman WEF which are decommissioned will be reused, recycled or disposed of in accordance with the relevant regulatory requirements. All of the components of the wind turbines are considered to be reusable or recyclable. The turbines may also be traded or sold as there is an active second hand market for wind turbines and/or it may be used as scrap metal. The decommissioning phase of the project is also expected to create skilled and unskilled employment opportunities.

MULILO
RENEWABLE PROJECT DEVELOPMENTS

Environmental Impact Assessment for the proposed Kuruman Phase 2 Wind Energy Facility near Kuruman in the Northern Cape

Draft Scoping Report



CHAPTER 3:
Description of the Environment

CONTENTS

TABLES

FIGURES

3 DESCRIPTION OF THE AFFECTED ENVIRONMENT

This chapter provides an overview of the affected environment for the proposed Kuruman WEF and the surrounding region. The receiving environment is understood to include biophysical, socio-economic and heritage aspects which could be affected by the proposed development or which in turn might impact on the proposed development.

This information is provided to identify the potential issues and impacts of the proposed project on the environment. The information presented here has been sourced from:

- Scoping inputs from the specialists that form part of the project team;
- Review of information available on the South African National Biodiversity Institute (SANBI) Biodiversity Geographical Information System (BGIS) and Agricultural Geo-Referenced Information System (AGIS); and
- Gamagara Local Municipality and Ga-Segonyana Local Municipality IDPs, the John Taolo Gaetsewe District Municipality SDF and the Northern Cape PSDF.

It is important to note that this chapter intends to provide an overview and does not represent a detailed environmental study. Detailed studies focused on significant environmental aspects of this project within the development footprint of the project will be provided during the EIA Phase.

3.1 Background

As noted in Chapters 1 and 2, the development of the proposed Kuruman WEF Phase 2 and associated electrical infrastructure (subject to a separate Basic Assessment Process) will be on the following farm portions near Kuruman in the Northern Cape Province:

- Portion 1 of the Farm Bramcote No. 446
- Remainder of the Farm Bramcote No. 446

Figure 3.1 below represents the regional setting of the proposed Kuruman WEF Phase 2 project.

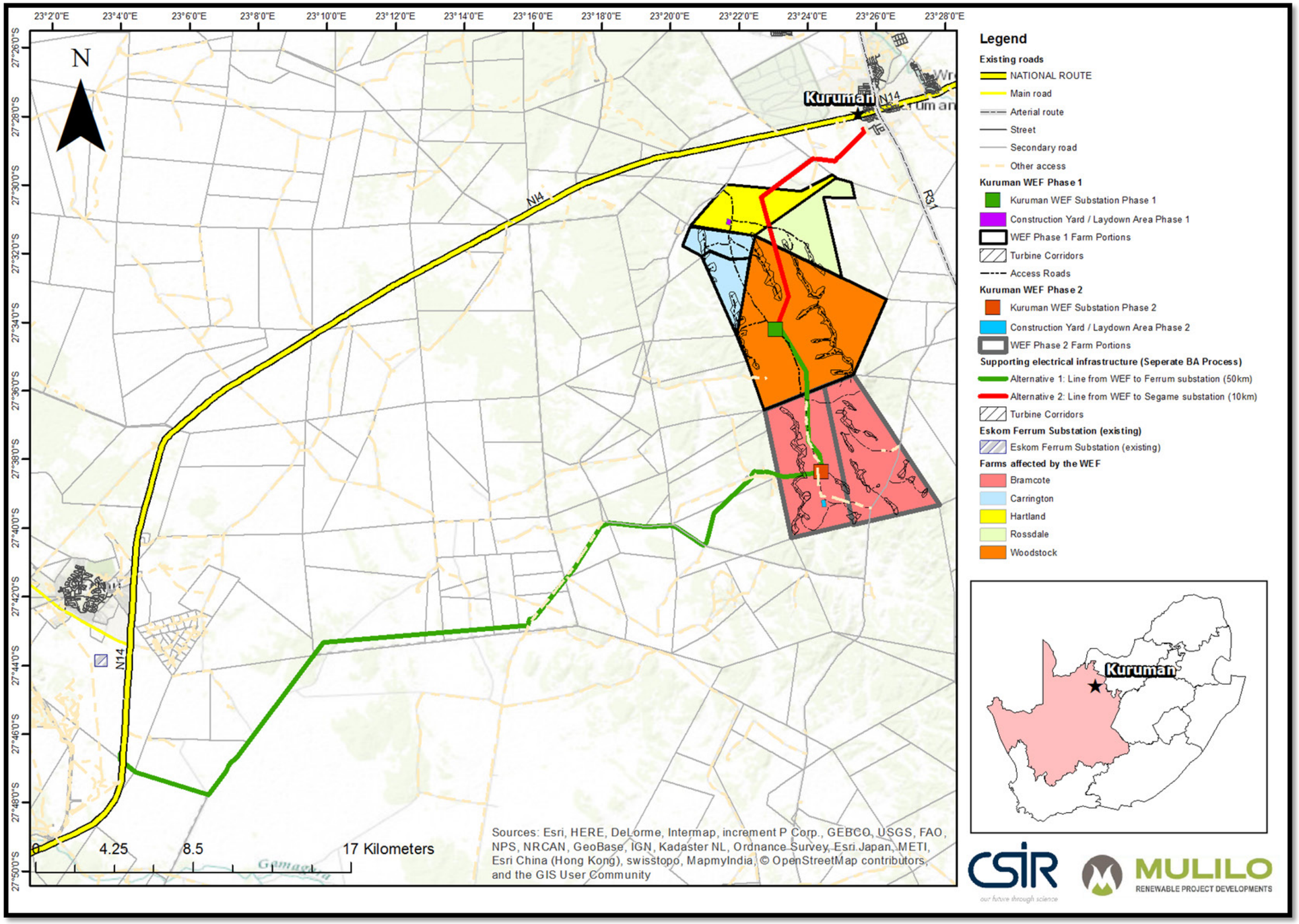


Figure 3.1: Locality Map for the proposed Kuruman WEF project within a Regional Setting. Please note that the 132kV transmission line route (Alternative 1) is yet to be confirmed.

3.2 Biophysical Environment

3.2.1 Climatic Conditions

The climate of the Northern Cape is semi-arid with a late summer-autumn rainfall regime. The average rainfall of the area varies from 0 mm to 200 mm per year. Evaporation levels within this province exceed the annual rainfall. Climate conditions are extreme (i.e. very cold in winter and extremely hot in summer). The mean annual rainfall of South Africa is shown in Figure 3.2 below.

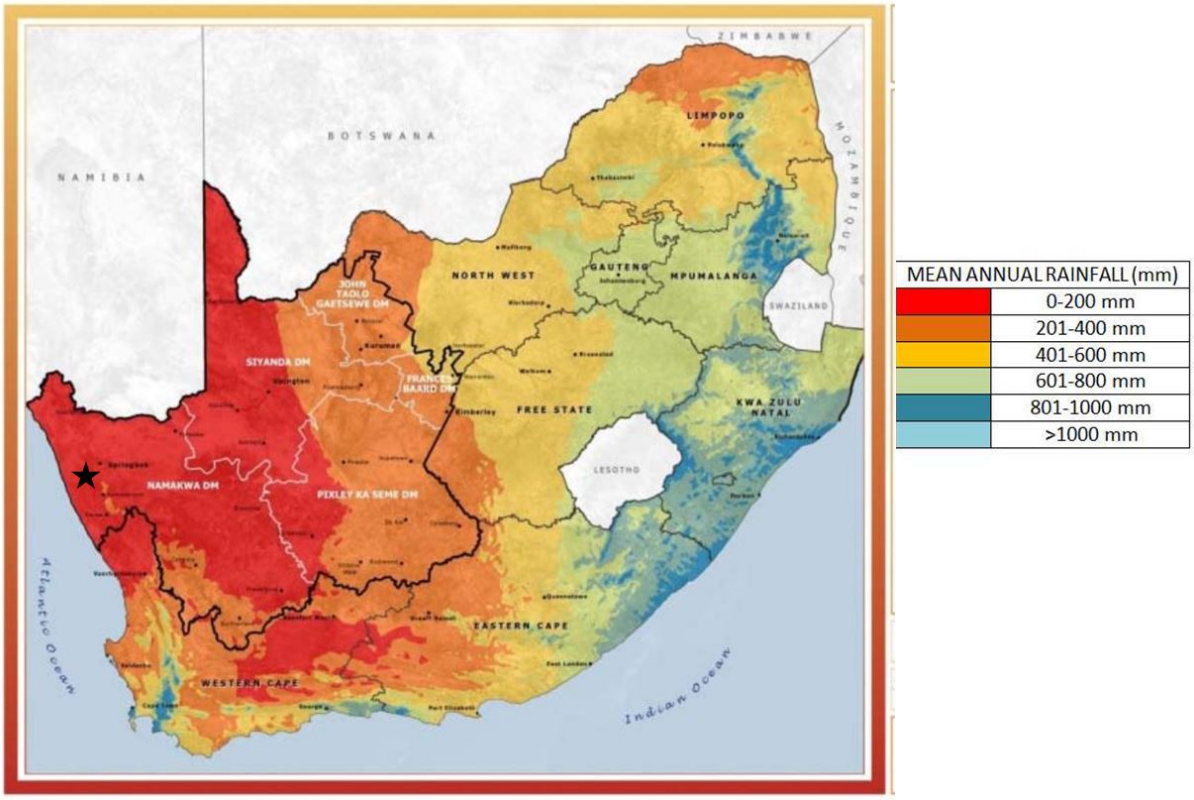


Figure 3.2: Mean Annual Rainfall Levels of South Africa (*Source: Northern Cape PSDF, 2012*)

One of the most important climate parameters for agriculture in a South African context is moisture availability, which is the ratio of rainfall to evapotranspiration. According to the World Bank Climate Change Knowledge Portal (2005), the average annual rainfall for the proposed site is low, at 400 mm per annum. The average monthly distribution of rainfall is shown in Figure 3.3 below.

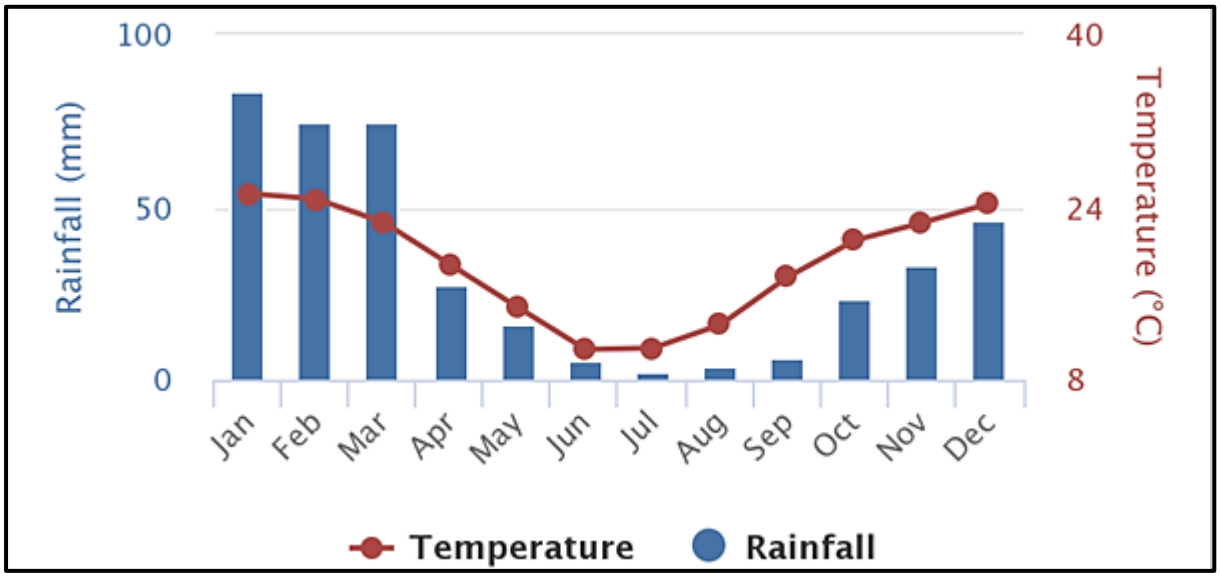


Figure 3.3: The average monthly distribution of rainfall within the area, including the Kuruman WEF ***(Source: Lanz, 2018)***

3.2.2 Topography and Landscape

The proposed development is located on a series of hilly, north-south running ridges which rise from the plateau at varying altitudes of between 1 300 m and 1 700 m. Slopes vary across the area, with maximum slopes of 35% down the sides of the ridges where they are steepest. The proposed turbine locations are along the ridge lines with maximum slopes that would be impacted by any footprint of the development much less and are not likely to exceed 15%.

3.2.3 Regional Geology

The underlying geology of the area is underlain by the Quaternary age alluvial material in the lower lying areas, which overlays the yellow-brown banded or massive jaspilite with crocidolite, and banded ironstone from the Danielskuil Formation with subordinate amphibolite, crocidolite and ferruginous brecciated banded ironstone from the Kuruman Formation (Figure 3.4). These geological units are part of the Griquatown group and form the distinctive north-south trending ironstone mountain ranges of the larger Kuruman area. This is underlain by fine and coarse - grained dolomite with interbedded chert of Ghaaplato Formation part of the Campbell Group (Council for Geoscience, 1:250 000 Map (2722 – Kuruman)).

3.2.4 Regional Hydrogeology

According to the 1:500 000 scale groundwater map of Kuruman (2723) the northern portion of the study area hosts a karst aquifer, whereas the central portion of the study area hosts a fractured aquifer (Figure 3.5). Although groundwater quality in the area is considered to be generally good with greatest recharge occurring in the mountainous areas, the potential for groundwater vulnerability is overall low except for a small portion that is considered high towards the north-east corner of the proposed project area (Figure 3.6).

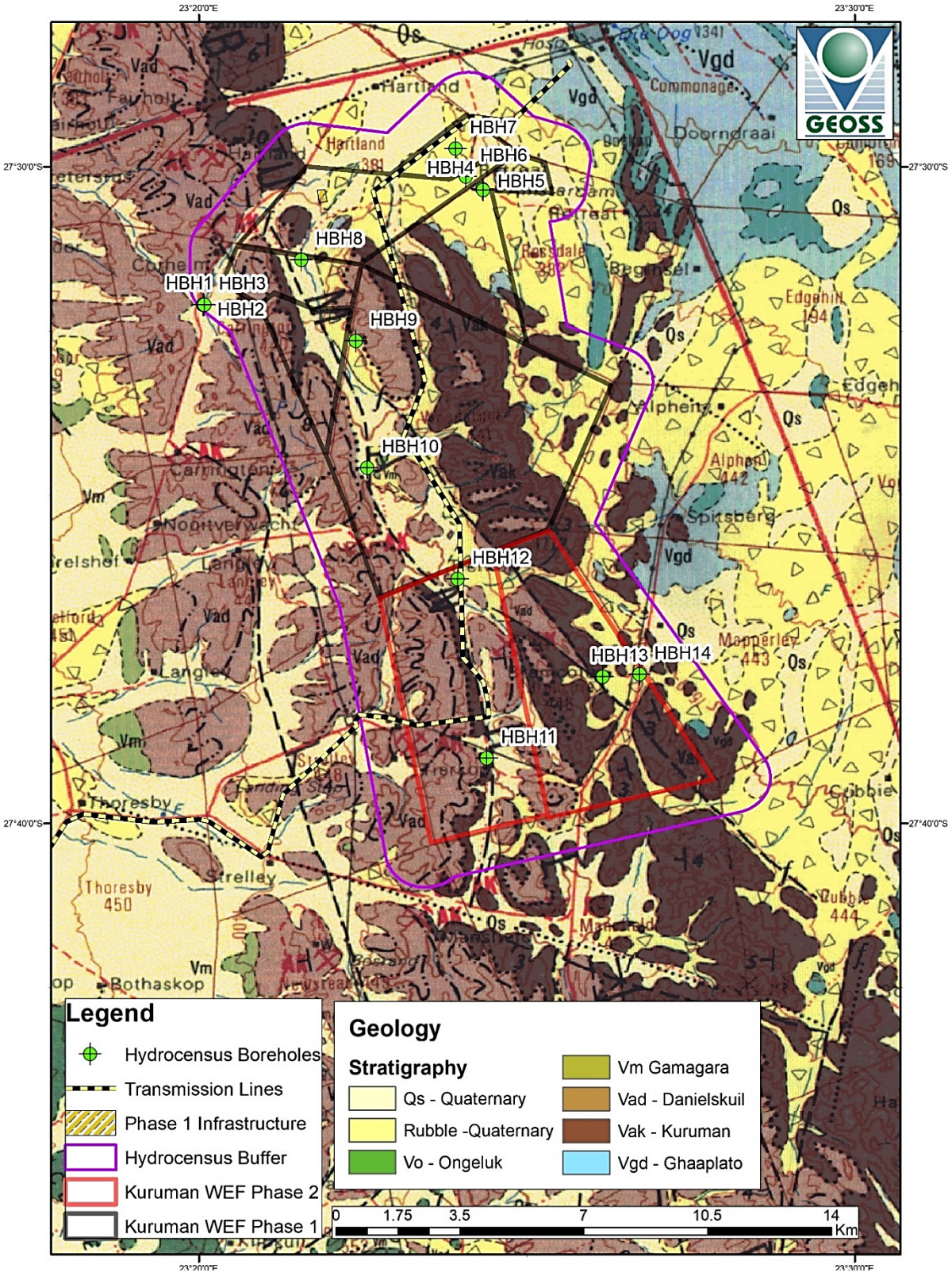


Figure 3.4: Geological setting of the proposed Kuruman WEF and the surrounding environment (*Source: Mulder et.al. 2018*)

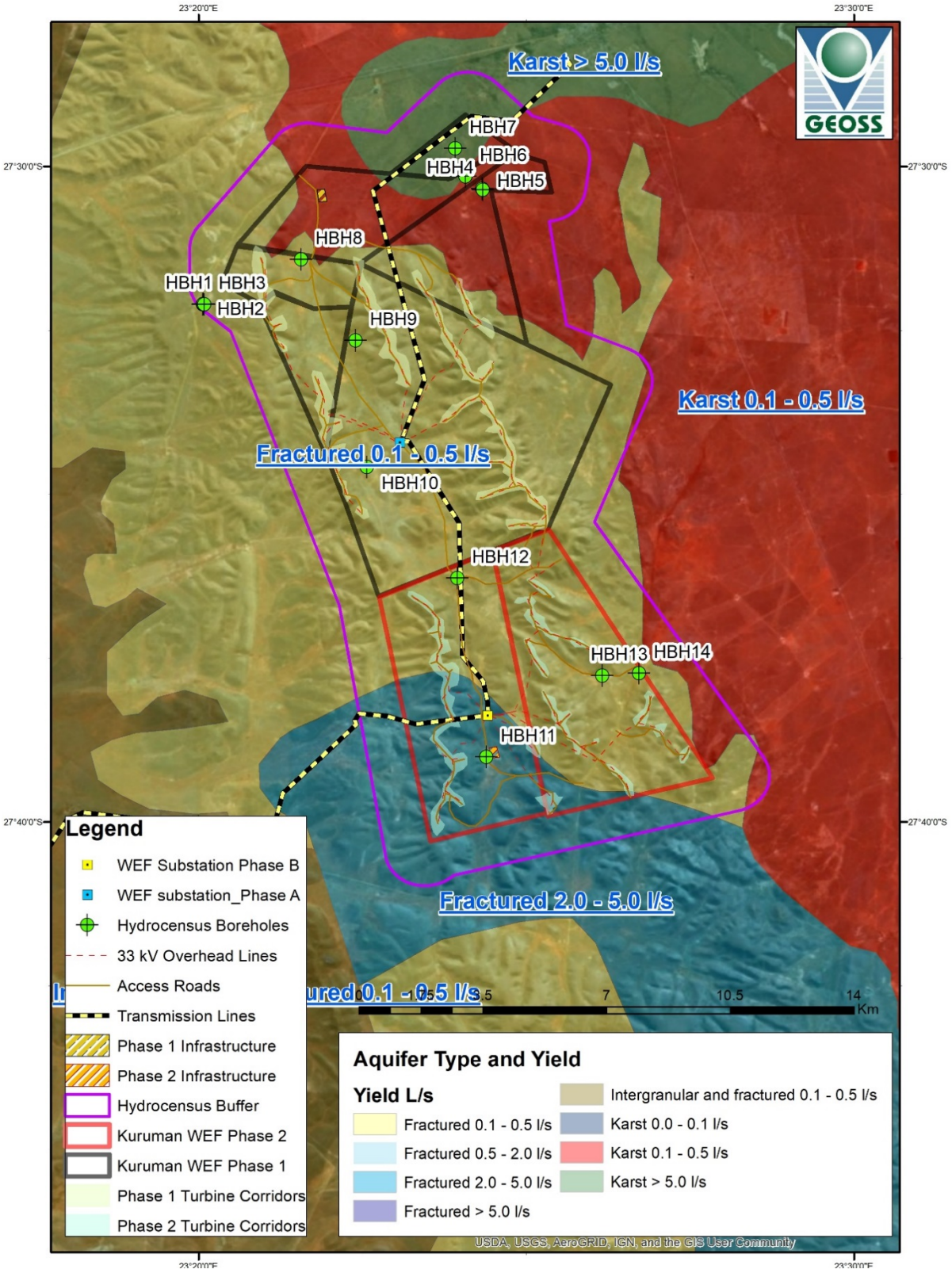


Figure 3.5: Hydrogeological setting of the proposed Kuruman WEF and the surrounding environment: Aquifer type and yield of the (*Source: Mulder et.al. 2018*)

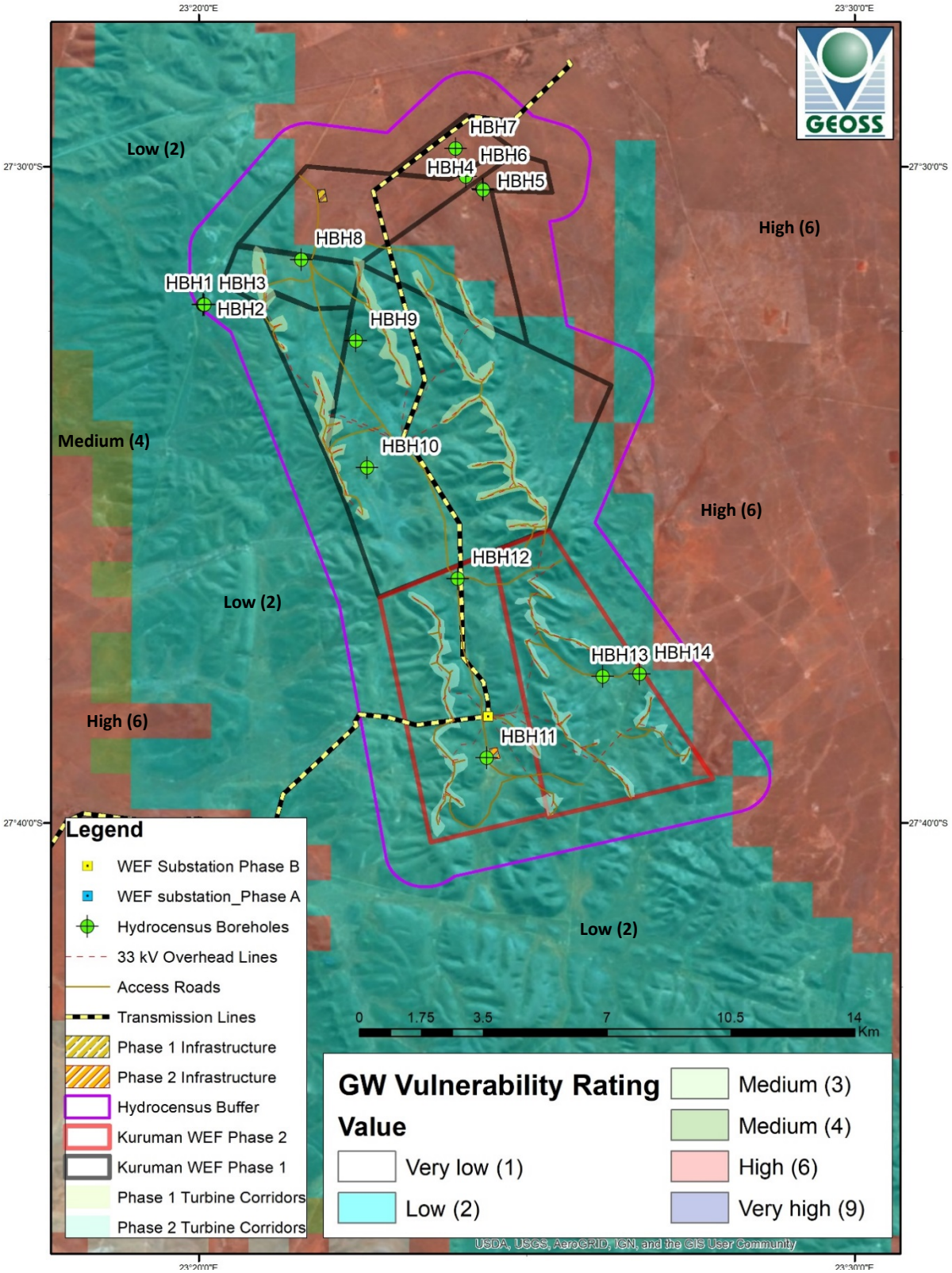


Figure 3.6: Groundwater vulnerability of the proposed Kuruman WEF and the surrounding environment (*Source: Mulder et.al. 2018*)

3.2.5 Soil Types and Soil Potential

The land type classification is a nationwide survey that groups areas of similar soil, terrain and climatic conditions into different land types. The proposed development site is located on land zoned and used for agriculture. The proposed project site characteristic of predominantly only one land type, Ib236, across the hilly terrain of the area with a second, Ae2, extending a small distance into the site up into some of the largest valleys. Land type Ib236 is dominated (71% of the surface) by rock outcrop. The soils between the rock outcrops are red, sandy soils on underlying hard rock, of the Hutton soil form. They are predominantly shallow, but patches of deeper sands occur. The soils of Ae2 are shallow to deep, red, sandy soils on underlying rock or hardpan carbonate and are of the Hutton or Plooysburg soil forms. The soils would fall into the Oxidic and Calcic (underlying hardpan carbonate) soil groups according to the classification of Fey (2010). The environment does not pose a particularly high erosion risk, but due to the sandy texture of the resident soils, they are susceptible to wind erosion (Lanz, 2018). A summary of detailed soil data for land types is provided in Table 3.1.

Table 3.1: Land Types Soil data for the site (*Source: Lanz, 2018*)

Land type	Land capability class	Soil series (forms)	Depth (mm)	Clay % A horizon	Clay % B horizon	Depth limiting layer	% of land type
Ib236	8	Rock outcrop					71
		Hutton	50 - 300	2 - 6	4 - 10	R	22
		Hutton	300 - 1200	2 - 6	4 - 10	R	6
Ae2	5	Hutton	600 > 1200	2 - 6	4 - 10	R	26
		Hutton	750 > 1200	2 - 6	4 - 9	R,ka	23
		Hutton	300 - 600	2 - 6	4 - 10	R	16
		Hutton	100 - 300	4 - 8	4 - 10	R	15
		Hutton	300 - 600	2 - 6	4 - 9	R,ka	10
		Rock outcrop					4
		Hutton	450 - 750	10 - 15	15 - 20	R,ka	2
		Clovelly	750 - 1200	2 - 6	4 - 10	ka	1
		Mispah	50 - 250	4 - 10		ka	1

Land capability classes: 5 = non-arable, moderate potential grazing land; 8 = non-utilisable wilderness land.
Depth limiting layers: R = hard rock; ka = hardpan carbonate.

3.2.6 Agricultural Capability and Sensitivity

Land capability is the combination of soil suitability and climate factors. As noted above, Land type Ib236, which characterises the majority of the site, is classified as Class 8 – non-utilisable wilderness land. The small portion of land type Ae2 included in the site is classified as Class 5, which is defined as non-arable, moderate potential grazing land. Limitations to agriculture are predominantly the shallow, rocky soils on the ridges where the turbines are located, but in the patches of deeper soils, agriculture is still very limited by the low climatic moisture availability. The grazing capacity of the area is classified at approximately 20 hectares per large stock unit. Agricultural potential and conditions are very uniform across the site and the choice of placement of facility infrastructure, including access roads and transmission lines therefore has minimal influence on the significance of agricultural impacts. No sensitive agricultural areas occur within the study area. From an agricultural point of view, no parts of the site need to be avoided by the proposed development and no buffers are required (Lanz, 2018).

3.2.7 Ecology: Freshwater and Terrestrial Environment

The ecological evaluation is based on a preliminary desktop and scoping exercise of the site and general area, and site visits were undertaken during the Scoping phase. The SANBI BGIS was used to define the regional vegetation and water resources present in the area and the anticipated ecological sensitivity of the receiving environment. In addition, a literature review of existing reports, scientific studies, databases, reference works, guidelines and legislation relevant to the study area was conducted to establish the baseline ecological and vegetative condition of the site and associated environment.

3.2.8 Freshwater Environment (Surface Water, Drainage, and Wetland Ecosystems)

The water resources of South Africa have been divided into quaternary catchments, which serve as water management units for the country (DWA, 2015). A Quaternary Catchment is a fourth order catchment in a hierarchical classification system in which the primary catchment is the major unit. The quaternary catchments indicated for the study area are D41L and D41K and the study area falls within the Southern Kalahari Ecoregion and within the Lower Vaal Water Management Area (WMA), as well as the Molopo sub-Water Management Area (sub-WMA) as defined by NFEPA (2011) (Van de Haar, 2018).

Only the Kuruman River and one of its larger tributaries, the Ga-Mogara River, traverse the Ga-Segonyana Local Municipality. The Kuruman River originates east of Kuruman where it receives water from several springs of which the Great Koning Eye, Little Koning Eye and the Kuruman Eye are the largest. Both the Kuruman River and the Ga-Mogara River are usually dry, flowing only for short periods following sufficient rainfall. The nearest river system is a tributary of the Kuruman River located approximately 10.5 km east of the study area, with the Kuruman River itself located approximately 14 km from the study area boundary, both of which are ephemeral watercourses (Figure 3.7) (Van de Haar, 2018).

The applicable wetland vegetation unit for seeps and depressions, the only wetland habitat identified within the study area, is the Eastern Kalahari Bushveld Group 3 and 4 (Figure 3.8) both listed as ‘Least Threatened’ (NFEPA, 2011). A single natural seep wetland extending over approximately 9 ha is located within the study area, indicated to fall within an AB wetland condition (natural or good) with three artificial features of less than 1 ha each. No other wetlands are indicated within 500 m of the study area boundary (Northern Cape Critical Biodiversity Areas, 2016 and NFEPA, 2011). The topography has however resulted in the formation of numerous small ephemeral drainage lines occurring throughout the study area (Van de Haar, 2018).

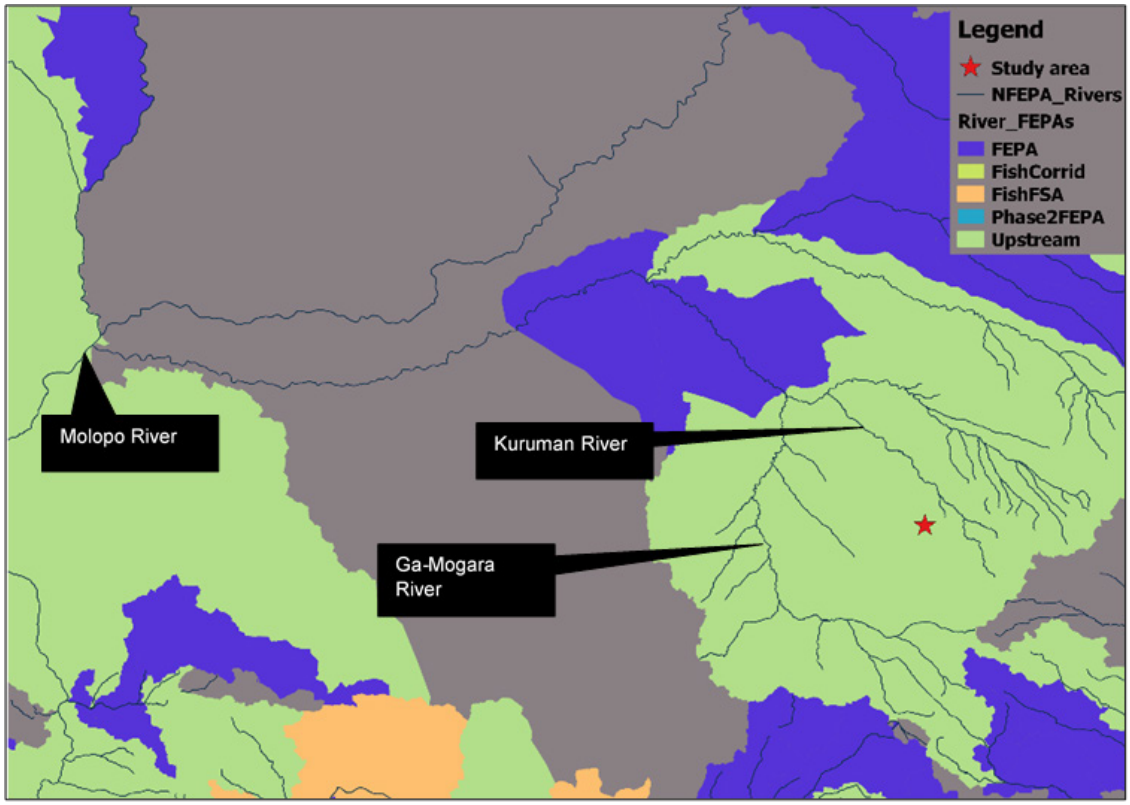


Figure 3.7: Freshwater Ecosystem Priority Areas and major rivers (*Source*: *Van de Haar, 2018*).

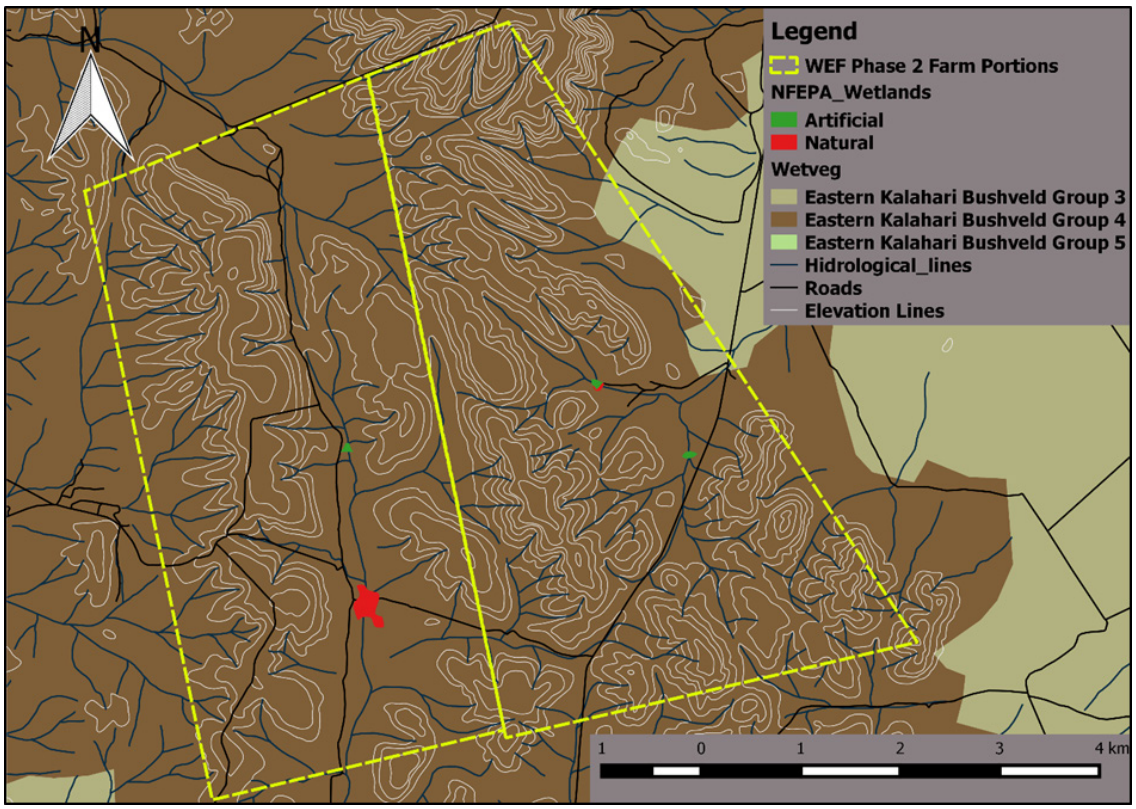


Figure 3.8: Wetland vegetation units, wetland habitats and drainage lines (*Source: Van de Haar, 2018*).

3.3 Terrestrial Environment

3.3.1 General Vegetation Description

The proposed Kuruman WEF Phase 2 site consists of Kuruman Mountain Bushveld on the rocky hills and Kuruman Thornveld on the lowlands/plains (Figure 3.9). The majority of the site is mapped as Kuruman Mountain Bushveld. Kuruman Mountain Bushveld has a limited distribution in the Northern Cape and North-West provinces with a total mapped extent of 4,360 km^2 which is a narrow range for an arid vegetation type. This vegetation type is associated with rolling hills with gentle to moderate slopes and hill pediment areas, and typically consists of an open shrubveld. Kuruman Mountain Bushveld has been little impacted by transformation and is classified as 'Least Threatened', but is not currently conserved within any formal conservation areas. The plains areas of the site are mapped as Kuruman Thornveld. This is also a restricted vegetation type which occupies 5,794 km^2 of the Northern Cape and North West provinces from the vicinity of Postmasburg and Danielskuil in the south, extending via Kuruman to Tsineng and Dewar in the north. It has been little impacted by transformation with more than 98% of the original extent still intact and it is classified as 'Least Threatened'. This vegetation type occupies flat rocky plains and sloping hills with a very well-developed, closed shrub layer and well-developed tree stratum usually consisting of *Acacia erioloba* (Todd, 2018).

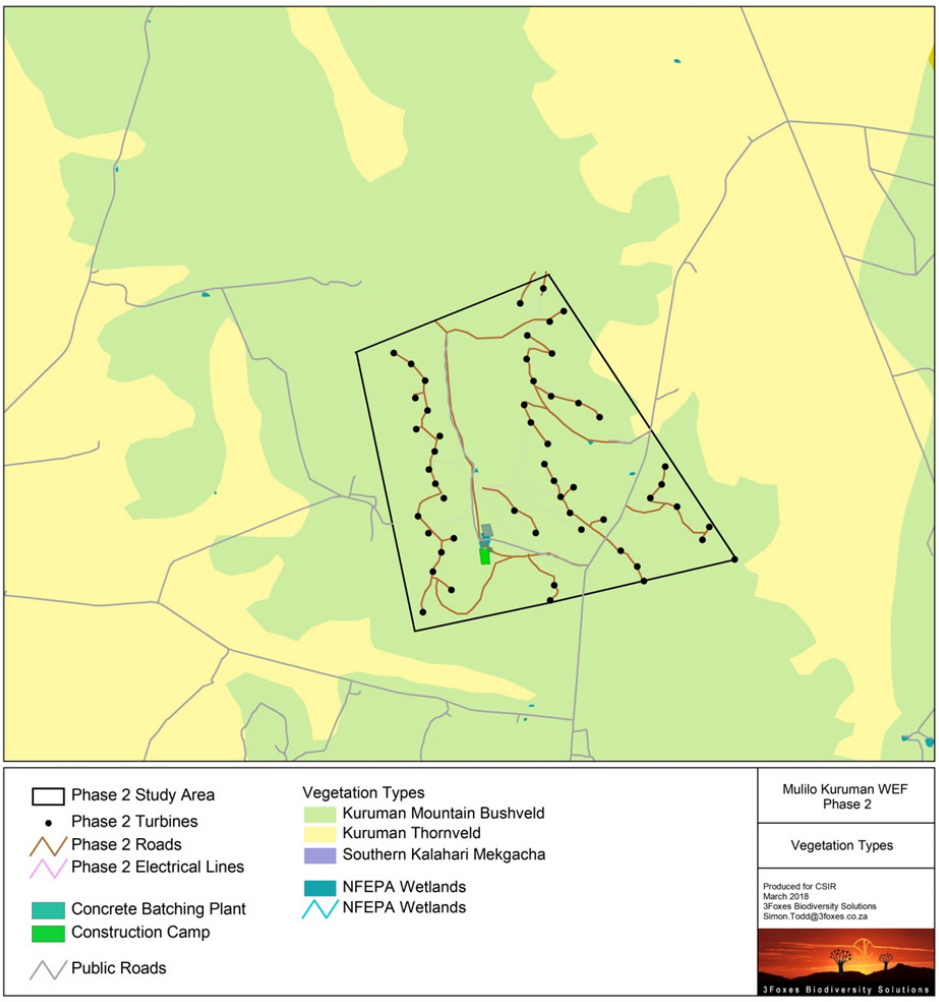


Figure 3.9: Vegetation mapping for the proposed Kuruman WEF Phase 2 study area (*Source: Todd, 2018*)

There are no Critical Biodiversity Areas (CBAs) within the immediate vicinity of the proposed Kuruman WEF Phase 2 development site. The majority of the footprint of the development is within an Ecological Support Areas associated with the larger ridges of the site with some footprint areas such as the collector substation and laydown areas within areas that are classified as 'other natural areas'. It is highly unlikely that the development would compromise the functioning of the ESA and with the appropriate mitigation, the development of a wind energy facility is considered compatible with the aims and objectives of ESAs, at least from a terrestrial biodiversity point of view. As a result, the overall impact of the development on ESAs is considered to be low and a long-term significant impact is unlikely. In addition, the site does not fall within an area identified as being a priority conservation expansion area under the Northern Cape Protected Area Expansion Strategy (NCPAES) Focus Area (2017) (Todd, 2018).

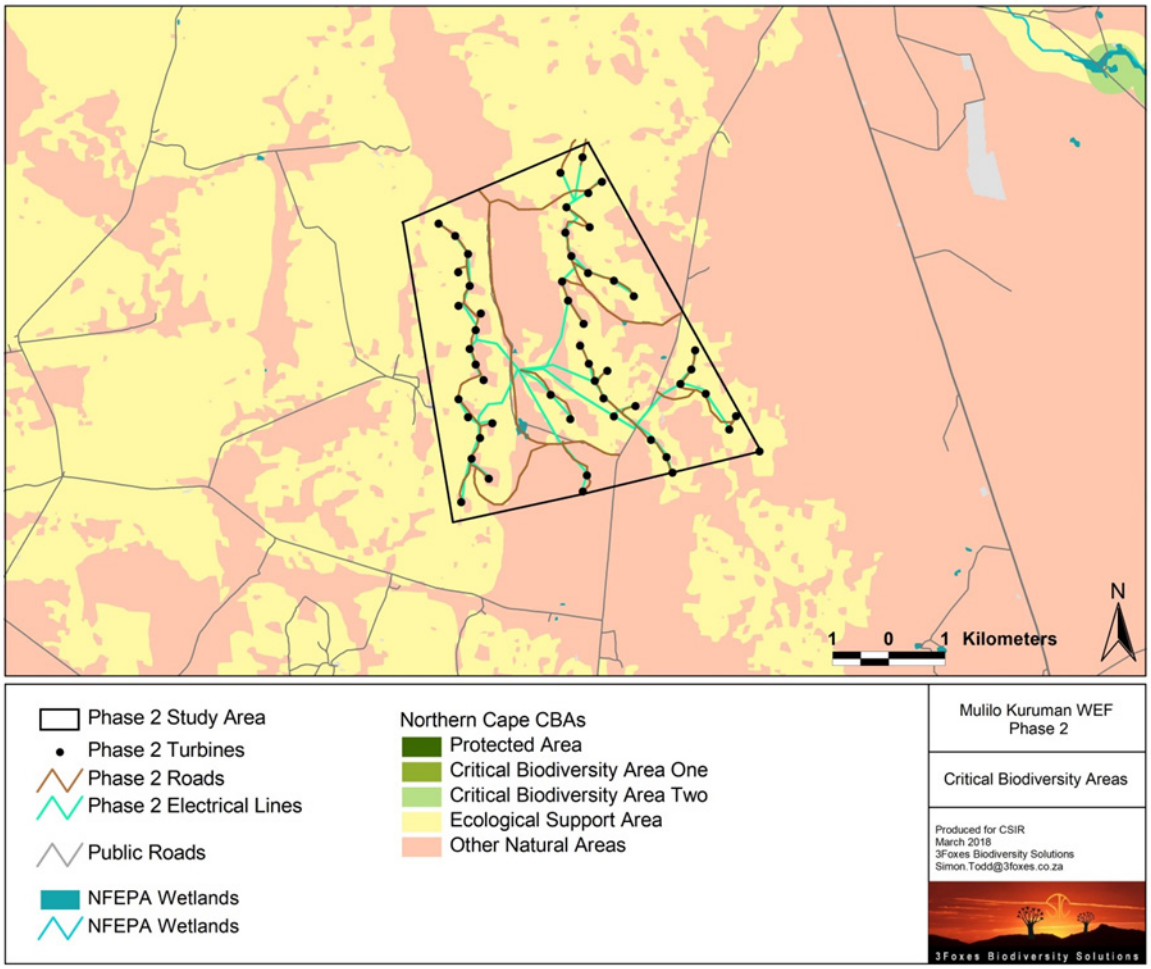


Figure 3.10: Critical Biodiversity Areas map for the study area, showing that the site does not contain any CBAs but does contain a fairly large proportion of Ecological Support Areas (*Source: Todd, 2018*).

3.3.1.1 Flora

Based on the SANBI POSA database and field surveys conducted at the proposed Kuruman WEF Phase 2 development site, the abundance of listed and protected species at the site is low. No threatened plant species were observed at the site and while the SANBI POSA database does indicate that few such species are present in the wider area surrounding the proposed development site, the site is large and it is possible that some red-listed species are present at the site, but if present they would not be common.

Only two endemic species are known to occur in the area, namely the succulent *Euphorbia planiceps* which is characteristic of the Kuruman Mountain Bushveld vegetation type, and *Gnaphalium englerianum* which is associated with Kuruman Thornveld. None of these two species was recorded on site. There are however at least three protected tree species present at the site; *Boscia albitrunca*, which is rare and was not observed within the development footprint; *Acacia haematoxylon,* which occurs at a low density across the plains and would be affected to some extent by the proposed development; and *Acacia erioloba*, which is a common to dominant species across the plains present on site and would be impacted to some degree. However, no local populations of any protected species would be compromised by the development (Todd, 2018).

3.3.1.2 Fauna

There are 39 different mammal species that are known to occur in the broader area around the proposed development site. The affected properties pertaining to the proposed Kuruman WEF Phase 2 are currently utilised for livestock farming. Naturally-occurring species present at the site includes Kudu, Common Duiker, Cape Hare, Steenbok, Chacma Baboon, Rock Hyrax, Yellow Mongoose, Porcupine and Smith's Red Rock Rabbit, as well as numerous other species which will be identified through the camera trapping that is currently being conducted at the site. Small mammals trapped or observed at the site includes South African Pouched Mouse, Namaqua Rock Mouse, Four-striped Mouse and Multimammate Mouse. The only Species of Conservation Concern (SCC) that may occur in the area includes the Southern African Hedgehog, *Atelerix frontalis* (Near-Threatened), as well as the Ground Pangolin, *Smutsia temminckii* (Vulnerable). Although neither of these two species were recorded on site, it is likely that both the Hedgehog and the Pangolin could be present in the area as the habitat is broadly suitable, but as these species usually occur at a low density the extent of habitat loss for these species would be low. Although it has not previously been recorded to occur in the area, one of the landowners reported that a Brown Hyeana (Near-Threatened) had been observed in the area, hence the assumption that this species could be present in the area at low density (Todd, 2018).

As many as 38 reptile species are known to occur in the wider area surrounding the proposed development site. Species observed at the site include the Ground Agama, Boomslang, Rock Monitor, Spotted Sand Lizard, Variegated Skink and Leopard Tortoise. No reptile SCC have been recorded from the area. Overall, impacts of the development on reptiles are likely to be of local significance only as there are no species with a very narrow distribution range or of high conservation concern present on site.

The only amphibian species recorded from the area was the Tremelo Sand Frog although some of the other toad species such as Olive Toad are also likely to occur in the area. Given the scarcity of important amphibian habitats at the site i.e. lack of any natural permanent water sources and the low diversity of amphibians, a significant impact on frogs is unlikely.

3.3.1.3 Bats

The topography of the site consists of a series of rolling ridges with generally gentle to moderate slopes and hill pediment areas characteristic of an open shrubveld with a well-developed grass layer. The dominant vegetation type around the proposed turbine ridges is Kuruman Mountain Bushveld with Kuruman Thornveld occurring on the ridge edges, along the sloping hills and in the valleys. The latter is typical of a closed shrub layer and well-developed open tree stratum dominated by *Acacia erioloba*. The abundance of trees provides roosting and foraging for several insectivorous bat species. Geologically the area consists of Campbell Group dolomite and chert, as well as mostly younger, superficial Kalahari Group sediments with red wind-blown sand which forms rocky pavements in some places. The landscape

features provide roosting space for bat species inhabiting rock crevices, outcrops and hollows, while the grassland provides opportunities for open-air foraging bat species.

The project falls within the actual or predicted distribution range of approximately nine bat species (African Chiroptera Report 2016; Monadjem *et al*. 2010). Analysis of the acoustic monitoring data confirmed the presence of at least five species of bat on site (Table 3.2). The sensitivity of each of these species to the project is a function of their conservation status and the likelihood of risk of fatality to these species from WEF development. The likelihood of risk to impacts of wind energy facility was determined from the South African Good Practice Guidelines for Surveying Bats in Wind Energy Facility Developments, as well as South African Good Practice Guidelines for Operational Monitoring for Bats at Wind Energy Facilities and is based on the foraging and flight ecology of bats and migratory behaviour.

Pre-construction bird monitoring is currently undertaken for the site and a marked decrease in bat activity was found with an increase in altitude on site (e.g. low-lying areas compared to hilltops), therefore larger turbines with a higher minimum rotor swept height will decrease the probability of bat mortalities due to moving blades (Marais, 2018).

Table 3.2: Bat Species recorded at the proposed WEF site and their sensitivity to WEFs

Species	Species Code	# of Bat Passes	Conservation Status		Likelihood of Risk
			National	Regional	
Egyptian free-tailed bat *Tadarida aegyptiaca*	EFB	14,813	Least Concern	Least Concern	High
Roberts's flat-headed bat *Sauromys petrophilus*	RFB	894	Least Concern	Least Concern	High
Natal long-fingered bat *Miniopterus natalensis*	NLB	1,749	Near Threatened	Least Concern	Medium-High
Cape serotine *Neoromicia capensis*	CS	5,983	Least Concern	Least Concern	Medium-High
Long-tailed serotine *Eptesicus hottentotus*	LTS	135	Least Concern	Least Concern	Medium
Dent's horseshoe bat *Rhinolophus denti*	DeHB	395	Near Threatened	Near Threatened	Low
Geoffroy's horseshoe bat *Rhinolophus clivosus*	GHB		Near Threatened	Least Concern	Low
Darling's horseshoe bat *Rhinolophus darlingi*	DaHB		Near Threatened	Least Concern	Low
Egyptian slit-faced bat *Nycteris thebaica*	ESB	tbc	Least Concern	Least Concern	Low

3.3.1.4 Birds

It is important to note that the proposed development site does not fall within an Important Bird Area (IBA). The proposed WEF development area is situated in the savanna biome and consists of a series of parallel ridges with a general south-east to north-west orientation, known as the Kuruman Mountains, interspersed with broad valleys. The ridges consist of gentle slopes covered in short grassland with an open shrub layer, and a few exposed rocky ridges, whereas the valleys are covered in tall grassland on red Kalahari sands with scattered trees. The variety in vegetation types can explain the distribution and abundance of an estimated 166 bird species that could potentially occur in the study area, of which 136

were recorded at the proposed WEF development area during pre-construction bird monitoring. Of the 166 species that could occur on site, 18 are classified as priority species for wind farm developments (Retief *et al.* 2012). Priority species associated with savanna which occur or could potentially occur in the study area include for example the African Rock Pipit (slopes), Black Harrier, Black-chested Snake-Eagle, Double-Banded Courser, Greater Kestrel, Grey-winged Francolin (slopes), Jackal Buzzard, Kori Bustard, Lesser Kestrel, Martial Eagle, Southern Pale Chanting Goshawk, Spotted Eagle-Owl, Verreaux's Eagle (slopes), Steppe Buzzard, Lanner Falcon and Northern Black Korhaan (valleys) (Van Rooyen, 2018).

Surface water is of specific importance to avifauna in this semi-arid study area. The proposed WEF development area contains several boreholes with water troughs and a number of small, man-made farm dams. Priority species that could attracted to surface water are mostly raptors such as Jackal Buzzard, Steppe Buzzard, Black Harrier, Black-chested Snake-Eagle, Greater Kestrel, Lanner Falcon, Martial Eagle and Verreaux's Eagle (Van Rooyen, 2018). High voltage lines are an important potential roosting and breeding substrate for large raptors in the study area and although there are no existing high voltage lines crossing the actual WEF development area, the Mercury – Ferrum 400kV line crosses the study area to the north of the proposed WEF development area, running more or less parallel to the N14 national road. The Moffat – Valley 66kV distribution line runs east and south of the WEF development area and terminates at the Valley Substation in the study area. The Gryppoort - Valley 66kV distribution line enters the study area from the south and terminates at the Valley Substation. These powerlines, as well as a number of smaller reticulation lines and telephone lines are used as perches by priority species such as Lesser Kestrel, Jackal Buzzard, Steppe Buzzard, Black Harrier, Black-chested Snake-Eagle, Greater Kestrel, Lanner Falcon, Martial Eagle and Verreaux's Eagle. No raptor nests were recorded on any of the powerlines in the study area (Van Rooyen, 2018).

The overall abundance of priority species at the WEF development area is very low. The sensitive areas that have been identified from a bird impact perspective, are areas of surface water and ridge edges. A 300 m no-turbine-zone (other infrastructure allowed) is recommended around all areas of surface water to reduce the risk of collisions for priority species, particularly raptors which are attracted to the surface water to drink and bath. A 100 m 'no turbine' setback buffer zone (other infrastructure allowed) is recommended around selected ridge edges to reduce the risk of collisions for soaring raptors (Van Rooyen, 2018).

3.3.2 Heritage, Archaeology and Palaeontology Profile

The Kuruman Hills have historically been used for small scale pastoralist farming activities with goats and sheep, a practice which extends back possibly as much as 2,000 years ago when Khoekhoe herders first entered the area. Three sites with possible herder art were found in association with Later Stone Age artefact assemblages on the Tierkop farm during a survey undertaken by Dave Halkett and Jayson Orton in 2009, when investigating the potential impacts of iron and manganese ore mining on Bramcote farm (No. 446), which forms part of the proposed Kuruman WEF Phase 2 development site. Based on the findings from the scoping level desktop study, a number of sites and/or structures of heritage and archaeological value have been recorded on the proposed Kuruman WEF Phase 2 development site (Figure 3.11). It is anticipated that similar findings such as ruined farm infrastructure, possible old mines, open site scatters of artefacts representative of Early, Middle and Later Stone Ages, and possibly more rock art sites in overhangs could be made on site during the EIA Phase. Also, a number of visual impacts in terms of the cultural landscape encompassed by the inner valley and boundary hills containing the proposed WEF should also be further assessed. The Wonderwerk Cave, a National Heritage Site containing archaeological traces stretching back over 2 million years, is located approximately 25 km to the southeast of the proposed WEF (Wiltshire, 2018).

The proposed WEF development footprint is geologically underlain by Precambrian sediments and lavas of the Transvaal Supergroup, including the Ghaap Group (marine carbonates of the Campbell Rand Subgroup followed by banded iron formations of the Asbestos Hills Subgroup) and Postmasburg Group (Ongeluk Formation lavas). Most of these rock units are of low palaeontological sensitivity. However, the Campbell Rand carbonates found to the east of the proposed development site may be stromalite-rich and therefore of high sensitivity. Late Caenozoic superficial sediments include windblown sands (Kalahari Group), colluvial and other surface gravels, alluvium and pedocretes (e.g. calcretes). Most of these younger sediments are of low sensitivity but older alluvial deposits along major drainage lines, as well as calcretes need to be inspected for fossils (e.g. mammalian remains).

A complete Heritage Impact Assessment (which includes archaeology and palaeontology) assessing the potential impacts to cultural landscape character, secondary (and possibly primary) impacts on built environment resources, archaeological resources, graves and burial grounds, as well as fossil and mining heritage will be included in the EIA Phase.

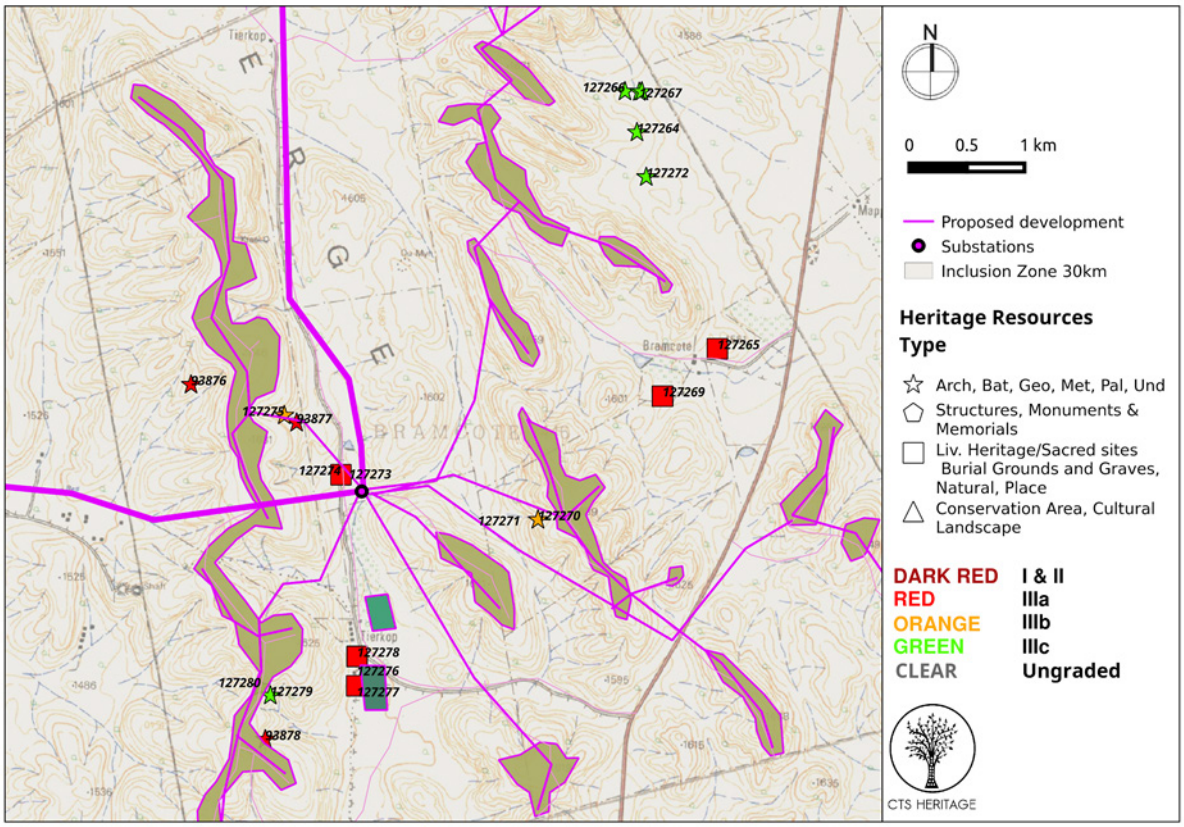


Figure 3.11: Heritage Resources Map for the proposed Kuruman WEF Phase 2 study area (Heritage resources with SAHRIS Site IDs) (*Source: Wiltshire, 2018*).

3.4 Environmental Sensitivity Map

Based on the sensitivities identified on site by the specialists to date in their scoping inputs, an environmental sensitivity map has been compiled for the development footprint of the proposed Kuruman WEF (Figure 3.12). The sensitivities will be considered and refined during the EIA phase through final specialist studies which will be included in the EIA Report.

Figure 3.12: Environmental Sensitivity Map for the proposed Kuruman WEF Phase 2 (site's boundary indicated in purple).

3.5 Socio-Economic Environment

The available data used to compile the socio-economic baseline for the Kuruman area and surrounds, although not exhaustive, is interpreted in terms of professional opinion and is indicative of generally accepted trends within the study area and South Africa.

3.5.1 Demographic and Economic Profile

The Ga-Segonyana Local Municipality (LM) has a population of approximately 96 297, with a total of 93 651 households (Stats SA, 2017). This is indicative of an average household size of 3.5 in the municipality. The Ga-Segonyana LM constitutes 8% of the provincial population and two-fifths of the John Taolo Gaetsewe District Municipality (DM) population, making it the largest in the district. Furthermore, 44% of the total households in the John Taolo Gaetsewe DM are located in the Ga-Segonyana LM. The average population growth rate over the past five years has been just over 1%, indicative of stagnant to slow population growth. This could be attributed to the closure of mines and limited job opportunities thus resulting in limited in-migration of job seekers and migrant labour.

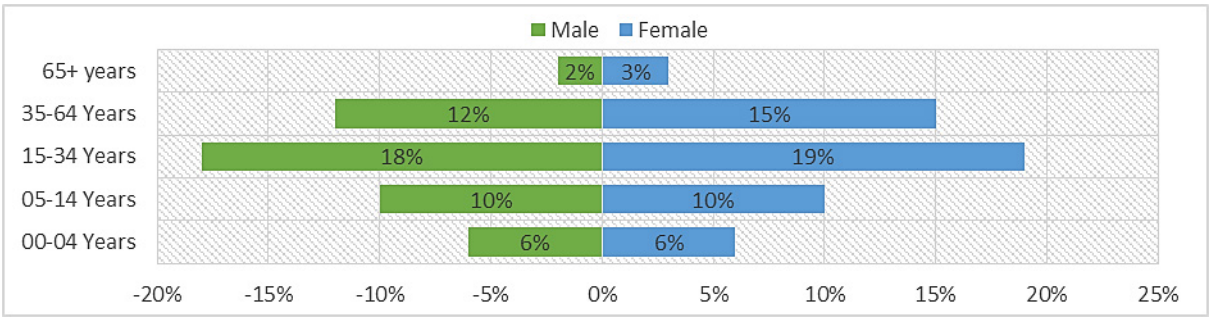


Figure 3.13: Population gender pyramid by age groups for the Ga-Segonyana Local Municipality (Ga-Segonyana LM IDP, 2017-2018)

A large portion of the population (85%) reside in tribal areas, followed by 14% located in urban areas, and the remaining 1% reside on farm land (Stats SA, 2017). In the zone of influence, the population density is concentrated in the closest town, Kuruman and the villages of Mothibistadt, Ga-Motlhware, Bankhara Bodulong and Wrenchville. The majority of residents in the Ga Segonyana LM (87%) are Black, 8% are Coloured and 4% are White. Setswana is the most commonly used language in the municipality followed by Afrikaans (Stats SA, 2017).

Within the Ga Segonyana Local Municipality, several sectors contribute to the municipality's economy and the Gross Domestic Product (GDP). These sectors include, amongst others agriculture, mining, manufacturing, electricity, gas and water, construction, trade, transport and communications. From 2006 to 2016, the municipality's economy grew at a positive compounded annual growth rate (CAGR) of 3% per annum and contributes a quarter to the economy of the John Taolo Gaetsewe DM, as well as 6% to the economy of the Northern Cape Province (Table 3.3).

Economic activities currently characteristic of the proposed development area are mainly agriculture, specifically game farming and hunting, and tourism related. Adjacent land uses include livestock farming and irrigated crop production.

Table 3.3: GDP Contributions of the Northern Cape and Ga-Segonyana LM (*Source: Broughton, 2018*)

Economic Sector	Northern Cape (GDP in 2010 prices)			Ga-Segonyana LM (GDP in 2010 prices)		
	GDP (R'mil)	% of GDP	CAGR (2010-2016)	GDP (R'mil)	% of GDP	CAGR (2010-2016)
Agriculture, forestry and fishing	R10 908	9%	0%	R371	5%	3%
Mining and quarrying	R30 141	25%	2%	R1 880	26%	3%
Manufacturing	R7 479	6%	0%	R500	7%	1%
Electricity, gas and water	R3 973	3%	2%	R215	3%	1%
Construction	R5 260	4%	2%	R390	5%	3%
Trade	R12 892	11%	2%	R905	13%	3%
Transport and communication	R12 688	11%	3%	R730	10%	5%
Finance and business services	R16 760	14%	3%	R988	14%	5%
General government	R14 369	12%	2%	R726	10%	1%
Personal services	R6 003	5%	3%	R397	6%	3%
TOTAL	**R120 473**	**100%**	**2%**	**R7 101**	**100%**	**3%**

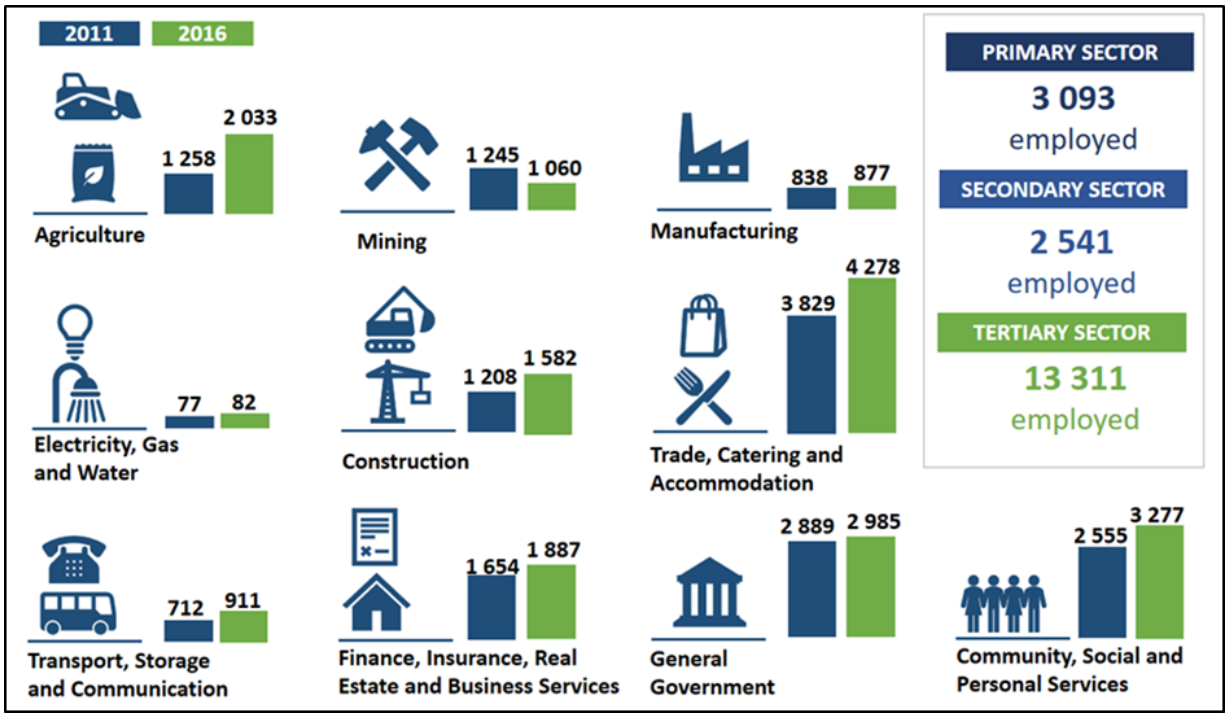


Figure 3.14: Employment profile per economic sector compared between 2011 and 2016 in the Ga-Segonyana LM (*Source: Broughton, 2018*)

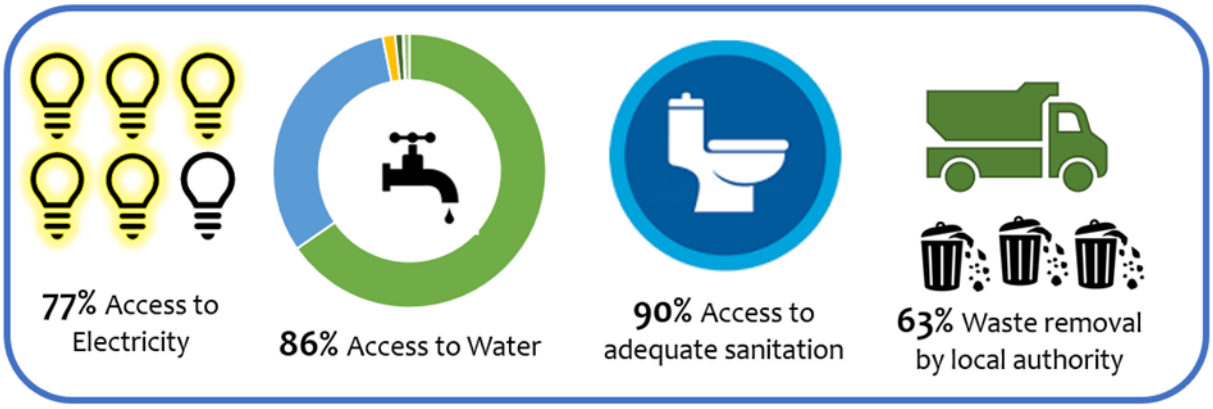


Figure 3.15: Status of service delivery in the Ga-Segonyana LM (*Source: Broughton, 2018*)

Kuruman

The town of Kuruman, named after the Chief who lived in the area called Kudumane and currently the main business / services centre of the Ga-Segonyana municipal area, was at first a mission station of the London Missionary Society founded by Robert Moffat in 1821. It is known for its scenic beauty and the 'Eye of Kuruman', a geological feature i.e. mineral spring that brings water from deep underground and gives about 20 million litres of water daily to approximately 10 000 inhabitants. Kuruman is regarded as the "Oasis of the Kalahari" with this spring also known as 'Die Oog' (in Afrikaans) or 'Gasegonyane' (in Setswana) of the Kalahari region (Ga-Segonyana Local Municipality: 2017/18 IDP). In 2011, Kuruman had 3 188 households with 13 057 residents (Broughton, 2018). Kuruman is situated on a main route between Gauteng and Namibia/Cape Town via Upington. This route is growing in popularity because of the unspoilt nature and wide variety of tourist attractions found on the route. As a result, the Ga-Segonyana LM is experiencing a growth in game-related tourism with a particular emphasis on hunting.

Asbestos

Historically the larger Kuruman area has been mined for iron ore and asbestos (John Taolo Gaetsewe DM SDF, 2017). The mining of iron ore, an ongoing activity occurs towards the south west of the study area (mainly around Kathu) where large quantities of iron ore are still being mined from rocks characteristic of the geological Griquatown Group. Earlier mining of asbestos from rocks of the same geological formation in the vicinity of Kuruman and surrounds was ceased in 2002 and although all of these asbestos mines have been decommissioned, there might still be an ongoing risk of contamination through exposure to remaining mine dumps. The proposed WEF development site is located in close proximity to several rehabilitated, partially rehabilitated and un-rehabilitated asbestos mines, all of which continue to pose potential health risks to surrounding communities and land uses (Liebenberg-Weyers, 2010). Due to the carcinogenic nature of asbestos, numerous diseases can result from exposure to the asbestos fibres in the soil for prolonged periods. Asbestosis is an occupational disease confined to the workplace wherein continuous inhalation of asbestos fibres weaken the lungs. However, an additional disease linked to asbestos is Mesothelioma, which occurs as a result of trivial exposure to asbestos fibres (Journeyman.tv, 2002). In light of the latter, it is important to note the potential health risk that residual asbestos exposure within the proposed development area could have on workers during the construction and operational phases of the proposed WEF project.