Mura 1 (Pty) Ltd

MURA ELECTRICAL GRID INFRASTRUCTURE CORRIDOR

Draft Basic Assessment Report

MARCH 2023

PUBLIC

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Draft Basic Assessment Report

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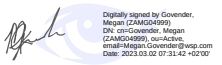
Signature				
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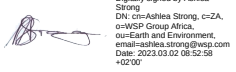
Signature				
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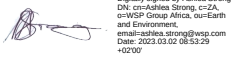
Signature				
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GENERAL SITE INFORMATION

Technical details of the proposed Mura EGI Corridor		
Location of Site	Between Loxton and Beaufort West in the Beaufort West Local Municipality (BWLM) and Ubuntu Local Municipality (ULM) and the Central Karoo District Municipality (CKDM) and Pixley ka Seme District Municipality (PkSDM) in the Western Cape and Northern Cape Provinces	
Description of all affected farm portions and 21 digit SG Codes	**Farm Name**	**21-Digit SG Code**
	Leeuwkloof Farm 43	C00900000000004300000
	Bultfontein Farm 13	C00900000000001300000
	Portion 4 of Duiker Kranse Farm 45	C00900000000004500004
	RE of Portion 3 of Duiker Kranse Farm 45	C00900000000004500003
	Portion 12 of Bultfontein Farm 387	C00900000000001200000
	Aangrensend Abramskraal Farm 11	C00900000000001100000
	RE of Abrams Kraal Farm 206	C08000000000020600000
	Sneeuwkraal Farm 46	C00900000000004600000
	RE of Duiker Kranse Farm 45	C00900000000004500000
	Portion 2 of Paardeberg Farm 49	C00900000000004900002
Central coordinates of the site and activity location	31°53'11.28"S 22°33'18.40"E	
Total Disturbance Footprint	52 ha	
Design Specifications		
Overhead lines and pylons	▪ ~70 km of overhead 132 kV lines: • ~40 km will be single overhead 132 kV lines and ~30 km will be up to two overhead 132 kV lines running in parallel running between the switching stations supported by monopole pylons with a max height 38m	
Switching stations	▪ Up to Eight switching stations ▪ Located adjacent to the solar farm substations within the solar area footprint ▪ Maximum height of 12m ▪ Footprint of up to 150 m x 75 m	

Other Switching stations:	▪ Up to four up to 150 m x 75 m switching stations located within the EGI corridor
Other infrastructure:	▪ Access tracks ▪ Temporary laydown areas (including temporary fuel (and lubricants) and powder cement storage facilities)

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GLOSSARY

Abbreviation	Definition
AC	Alternating current
AEL	Atmospheric Emissions License
AIS	Alien and Invasive Species
ATNS	Air Traffic and Navigation Services
BA	Basic Assessment
BAR	Basic Assessment Report
BWLM	Beaufort West Local Municipality
BESS	Battery Energy Storage System
BMS	Battery Management System
CA	Competent authority
CARA	Conservation of Agricultural Resources Act (No. 43 of 1983)
CBA	Critical Biodiversity Area
CKDM	Central Karoo District Municipality
CCIA	Climate Change Impact Assessment
CSP	Concentrated Solar Power
DALRRD	Department of Agriculture Land Reform and Rural Development
DC	Direct current
DEA&DP	Western Cape Department of Environmental Affairs and Development Planning
DFFE	Department of Forestry, Fisheries and Environment
DMRE	Department of Mineral Resources and Energy
DR	District roads
DWS	Department of Water & Sanitation
EA	Environmental Authorisation
EAP	Environmental Assessment Practitioner

Abbreviation	Definition
ECA	Environmental Conservation Act 73 of 1989
EGI	Electrical Grid Infrastructure
EI&ES	Ecological Importance and Ecological Sensitivity
EIA	Environmental Impact Assessment
EMPr	Environmental Management Programme
EP	Equator Principles
EPFI	Equator Principles Financial Institutions
ERA	Electricity Regulation Act (No. 4 of 2006)
ESA	Early Stone Ages
FI	Financial institutions
GA	General Authorisation
GHG	Greenhouse gas
GIIP	Good international industry practice
GNR	Government Notice Regulation
ha	Hectares
HWC	Heritage Western Cape
IBA	Important Bird & Biodiversity Area
ICAO	International Civil Aviation Organisation
IEP	National Integrated Energy Plan
IFC	International Finance Corporation
IRP	Integrated Resource Plan
KNP	Karoo National Park
LSA	Late Stone Ages
LUPA	Land Use Planning Act (Act 3 of 2014)
MSA	Middle Stone Ages
MR	Main roads
Mura 1	Mura 1 (Pty) Ltd

Abbreviation	Definition
NCPGDP	Northern Cape Provincial Growth and Development Plan
NCSDF	Northern Cape Provincial Spatial Development Framework
NDP	National Development Plan
NEMA	National Environmental Management Act (Act 107 of 1998)
NEMAQA	National Environmental Management: Air Quality Act 39 of 2004
NEMBA	National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004)
NEMPAA	National Environmental Management Protected Areas Act (No. 57 of 2003)
NHRA	National Heritage Resource Act (Act No. 25 of 1999)
NID	Notification of Intent to Develop
NPAES	National Protected Area Expansion Strategy 2010
NR	National Routes
NWA	National Water Act, 1998 (Act No. 36 of 1998)
O&M	Operational and maintenance
OHSA	Occupational Health and Safety Act (No. 85 of 1993)
PCS	Power Conditioning System
PICC	Presidential Infrastructure Coordinating Commission
PkSDM	Pixley ka Seme District Municipality
PS	Performance Standards
PSDF	Provincial Spatial Development Framework, 2014
PV	Photovoltaic
REC	Recommended ecological condition
REDZ	Renewable Energy Development Zones
REIPPPP	Renewable Energy Independent Power Producer Procurement Programme
RFI	Radio Frequency Interference
S&EIA	Scoping and EIA
SABS	South African Bureau of Standards
SACAA	South African Civil Aviation Authority

Abbreviation	Definition
SAHRA	South African Heritage Resources Agency
SAHRA	South African Heritage Resources Agency
SALA	Subdivision of Agricultural Land Act
SANBI	South African National Biodiversity Institute
SANRAL	South African National Roads Agency
SANS	South African National Standards
SARPs	Standards and Recommended Practices
SAWS	South African Weather Service
SDF	Spatial Development Frameworks
SDG	Sustainable Development Goals
SEF	Solar Energy Facilitates
SER	Stakeholder Engagement Report
SG	Surveyor General
SPLUMA	Spatial Planning and Land Use Management Act (Act 16 of 2013)
TOPs	Threatened or Protected Species
TR	Trunk roads
ULM	Ubuntu Local Municipality
UNDP	United Nations' Development Programmes
WBG	World Bank Group
WCIF	Western Cape Infrastructure Framework
WEF	Wind Energy Facilities
WSP	WSP Group Africa (Pty) Ltd
WUA	Water Use Authorisation
WUL	Water Use License

1 INTRODUCTION

WSP Group Africa (Pty) Ltd (WSP) has been appointed by Mura 1 (Pty) Ltd (Mura 1), to undertake an Environmental Impact Assessment (EIA) to meet the requirements under the National Environmental Management Act (Act 107 of 1998) (NEMA), for the proposed Mura Electrical Grid Infrastructure (EGI) Corridor between Loxton and Beaufort West in the BWLM and ULM and the CKDM and PkSDM in the Western Cape and Northern Cape Provinces (**Figure 1-1** and **Figure 1-2**).

The proposed Mura EGI Corridor falls predominantly within the Beaufort West Renewable Energy Development Zones (REDZ) and one of the Strategic Transmission Corridor; and as per Government Notice (GN) No. 145 in Government Gazette 44191 will be subject to a Basic Assessment (BA) Process in terms of NEMA (as amended) and Appendix 1 of the EIA Regulations, 2014 promulgated in Government Gazette 40772 and GN R326, R327, R325 and R324 on 7 April 2017. The competent authority (CA) for this BA process is the national Department of Forestry, Fisheries and Environment (DFFE).

1.1 PURPOSE OF THIS REPORT

The BA process is an interdisciplinary procedure to ensure that environmental and social considerations are included in decisions regarding projects. Simply defined, the process aims to identify the possible environmental and social effects of a proposed activity and how those impacts can be mitigated.

The Draft Basic Assessment Report (BAR) (this report) aims to provide stakeholders with information on the proposed development including location, layout and technological alternatives, the scope of the environmental assessment and impacts associated with the proposed development, and the consultation process undertaken through the BA Process

1.2 BACKGROUND INFORMATION

Red Cap Energy is proposing to develop four solar facilities, namely Mura 1, Mura 2, Mura 3, and Mura 4, and an associated grid connection, collectively known as the Mura PV Development between Loxton and Beaufort West. The proposed Mura PV Development is located in close proximity to the approved Nuweveld Wind Farm Development. The Mura PV Development falls partially within the Beaufort West Renewable Energy Development Zones (REDZ). The Mura 1 Solar PV Facility falls within the Beaufort West REDZ and as per GN 142 is therefore subject to an expedited Basic Assessment (BA) Process in terms of NEMA (as amended) and Appendix 1 of the EIA Regulations, 2014 promulgated in Government Gazette 40772 and GN R326, R327, R325 and R324 on 7 April 2017. Mura 2, 3 and 4 fall partially or fully outside of the REDZ and therefore subject to a full S&EIA process in terms of NEMA (as amended) and Appendix 2 and 3 of the of the EIA Regulations, 2014 promulgated in Government Gazette 40772 and GN R326, R327, R325 and R324 on 7 April 2017.

Each solar facility will connect to the Eskom grid via new 132 kV overhead lines (assessed in a separate process to the PV facilities) connecting up to two on-site solar substations via an adjacent Eskom switching stations to the approved Nuweveld Collector Substation.

For the grid connection, an EGI Corridor is proposed and is assessed as a separate project (this report). The grid line is arranged in what is called a "collector ring line". This implies that it is a

circular grid line and not just a single line between the Nuweveld Collector Substation and the Mura facilities. The use of a circular "collector ring line" is an approach used by Eskom and others to improve the grid stability and to ensure that if the grid line is damaged on one side of the "collector ring line", that the solar facilities can still export their energy along the other side of the ring line while the fault is repaired. This allows these facilities to be better integrated into the national grid and to better reduce risks of downtime which enables these solar facility projects to be better adapted to potential amendments to future bidding requirements or to potentially give them a competitive advantage over other similar projects.

The Mura EGI Corridor falls within a REDZ and is therefore subject to an expedited BA Process in terms of GNR 145.

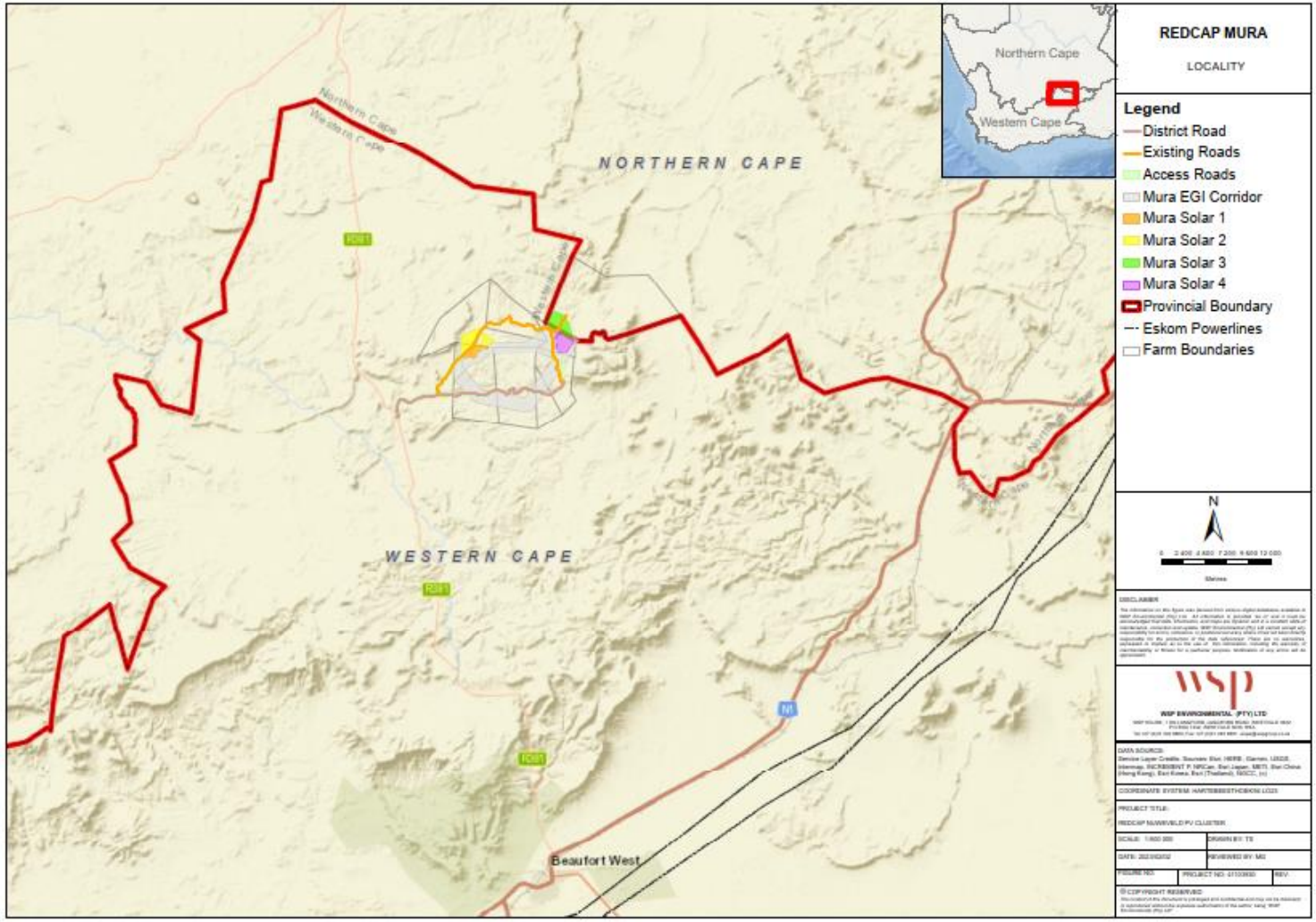


Figure 1-1 – Regional locality map of Mura Solar PV Development (including the EGI corridor)

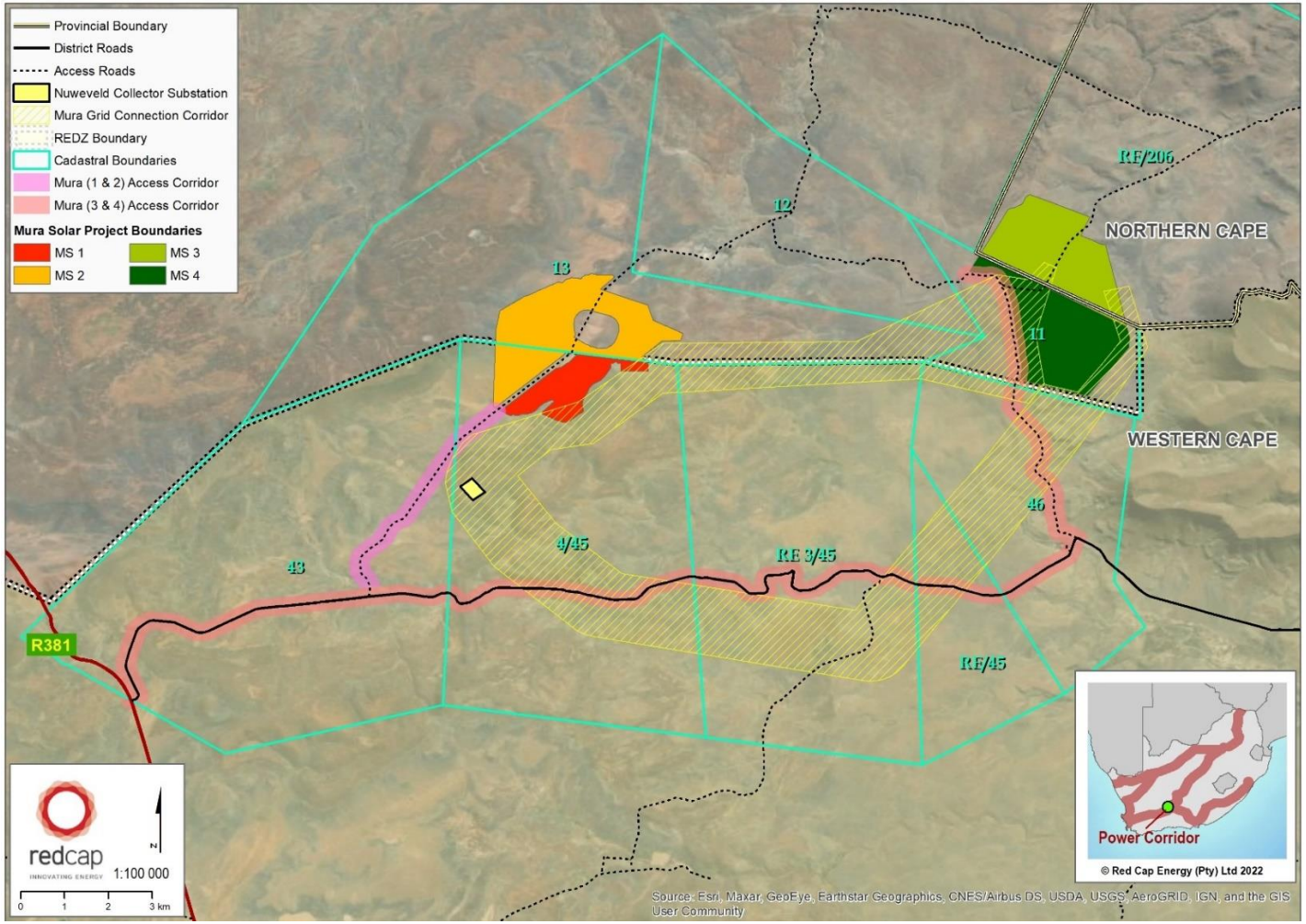


Figure 1-2 - – Locality map of EGI corridor in relation to the Mura solar projects being assessed in the formal environmental impact assessment process

1.3 DETAILS OF KEY ROLE PLAYERS

1.3.1 PROJECT PROPONENT

Mura 1 (Pty) Ltd is the project proponent (Applicant) with regards to this application for the construction and development of the Mura EGI Corridor. **Table 1-1** provides the relevant details of the project proponent.

Table 1-1 – Details of Project Proponent

Proponent:	**Mura 1 (Pty) Ltd**
Contact Person:	Lance Blaine
Postal Address	Unit B2, Mainstream Centre, Main Road Hout Bay, Cape Town
Telephone:	021 790 1392
Email:	surina@red-cap.co.za

1.3.2 COMPETENT AUTHORITY

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

As the proposed Mura EGI Corridor is related to the IRP, and crosses over two provinces (Western Cape and Northern Cape Provinces), the DFFE is the CA for the proposed project.

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

Table 1-2 – Competent Authority

Aspect	Competent Authority	Contact Details
Competent Authority: Environmental Authorisation	Department of Forestry, Fisheries, and the Environment (DFFE)	Case Officer: Jay-Jay Mpelane Integrated Environmental Authorisations Email: JMPELANE@dffe.gov.za Tel: 012 399 9404

1.3.3 COMMENTING AUTHORITY

The commenting authorities for the project include:

- Department of Water and Sanitation (DWS);
- Department of Mineral Resources and Energy (DMRE);
- Department of Agriculture, Land Reform and Rural Development (DALRRD);
- Department of Public Works;

- Department of Defence;
- National Department of Transport;
- South African National Roads Agency Limited (SANRAL);
- South African Heritage Resources Agency (SAHRA);
- South African Civil Aviation Authority (CAA);
- Square Kilometre Array (SKA);
- South African Weather Service (SAWS);
- BWLM;
- ULM;
- CKDM;
- PkSDM;
- WC DEADP;
- Heritage Western Cape (HWC);
- Northern Cape Department of Agriculture, Land Reform and Rural Development (NC DALRRD);
- NC DENC;
- Northern Cape Heritage Resources Authority;
- BirdLife South Africa;
- CapeNature;
- Endangered Wildlife Trust; and
- South African National Parks.

Refer to the Stakeholder Engagement Report (SER) in **Appendix D** for a full list of commenting authorities.

1.3.4 ENVIRONMENTAL ASSESSMENT PRACTITIONER

WSP was appointed in the role of Independent Environmental Assessment Practitioner (EAP) to undertake the BA process for the proposed project. The CV of the EAP is available in **Appendix A**. The EAP declaration of interest and undertaking is included in **Appendix B**. **Table 1-3** details the relevant contact details of the EAP.

Table 1-3 – Details of the EAP

EAP:	**WSP Group Africa (Pty) Ltd**
Contact Person:	Ashlea Strong
Physical Address:	Building C, Knightsbridge, 33 Sloane Street, Bryanston, Johannesburg
Postal Address:	P.O. Box 98867, Sloane Park 2151, Johannesburg
Telephone:	011 361 1392
Fax:	011 361 1301
Email:	Ashlea.Strong@wsp.com
EAP Qualifications:	▪ Masters in Environmental Management, University of the Free State ▪ B Tech, Nature Conservation, Technikon SA ▪ National Diploma in Nature Conservation, Technikon SA

EAPASA Registration Number:	EAPASA (2019/1005)

Statement of Independence

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

1.3.5 SPECIALISTS

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

Table 1-4 – Details of Specialists

Assessment	Name of Specialist	Company	Sections in Report	Specialist Report attached as
Agricultural Compliance Statement	Johann Lanz	Independent	▪ Section 2.7 ▪ Section 6.1.2 ▪ Section 7.1 ▪ Section 8.1 ▪ Section 9.1 ▪ Section 11.2.1	**Appendix G.1**
Terrestrial Biodiversity Compliance Statement	Simon Todd	3Foxes Biodiversity Solutions	▪ Section 2.7 ▪ Section 6.2.1 ▪ Section 7.2 ▪ Section 8.2 ▪ Section 9.2 ▪ Section 11.2.2	**Appendix G.2**
Aquatic Biodiversity Impact Assessment	Antonia (Toni) Belcher	BlueScience (Pty) Ltd	▪ Section 2.7 ▪ Section 6.2.2 ▪ Section 7.3 ▪ Section 8.3 ▪ Section 9.3 ▪ Section 11.2.3	**Appendix G.3**
Plant Species Compliance Statement	Simon Todd	3Foxes Biodiversity Solutions	▪ Section 2.7 ▪ Section 6.2.3 ▪ Section 7.4 ▪ Section 8.4 ▪ Section 9.4 ▪ Section 11.2.4	**Appendix G.4**
Animal Species Compliance Statement	Simon Todd	3Foxes Biodiversity Solutions	▪ Section 2.7 ▪ Section 6.2.4 ▪ Section 7.5	**Appendix G.5**

Assessment	Name of Specialist	Company	Sections in Report	Specialist Report attached as
			▪ Section 8.5 ▪ Section 9.5 ▪ Section 11.2.5	
Avifauna Impact Assessment	Jon Smallie	WildSkies Ecological Services (Pty) Ltd	▪ Section 2.7 ▪ Section 6.2.5 ▪ Section 7.6 ▪ Section 8.6 ▪ Section 9.6 ▪ Section 11.2.6	**Appendix G.6**
Archaeological and Cultural Heritage Impact Assessment	Jayson Orton	Asha Consulting	▪ Section 2.7 ▪ Section 6.3.1 ▪ Section 7.7 ▪ Section 8.7 ▪ Section 0 ▪ Section 11.2.7	**Appendix G.7**
Palaeontology Impact Assessment	John E. Almond	Natura Viva cc	▪ Section 2.7 ▪ Section 6.3.2 ▪ Section 7.8 ▪ Section 8.8 ▪ Section 11.2.8	**Appendix G.8**
Traffic Assessment	Athol Schwarz	Independent	▪ Section 2.7 ▪ Section 6.3.3 ▪ Section 8.9 ▪ Section 9.8 ▪ Section 11.2.9	**Appendix G.9**
Visual Impact Assessment	Quinton Lawson Bernard Oberholzer	Independent	▪ Section 2.7 ▪ Section 6.3.4 ▪ Section 7.9 ▪ Section 8.10 ▪ Section 9.9 ▪ Section 11.2.10	**Appendix G.10**
Social Impact Assessment	James Kinghorn	Independent Economic Researchers	▪ Section 2.7 ▪ Section 6.3.5 ▪ Section 7.10 ▪ Section 8.11 ▪ Section 9.10 ▪ Section 11.2.11	**Appendix G.11**

1.4 BASIC ASSESSMENT TERMS OF REFERENCE

The Mura EGI Corridor falls predominantly within the Beaufort West REDZ and as per GN 142 is therefore subject to an expedited BA Process in terms of NEMA (as amended) and Appendix 1 of

the EIA Regulations, 2014 promulgated in Government Gazette 40772 and GN R326, R327, R325 and R324 on 7 April 2017

As defined in Appendix 1 of GNR 982, as amended, the objective of the basic assessment process is to, through a consultative process:

- Determine the policy and legislative context within which the proposed activity is located and how the activity complies with and responds to the policy and legislative context;
- Identify the alternatives considered, including the activity, location, and technology alternatives;
- Describe the need and desirability of the proposed alternatives;
- Through the undertaking of an impact and risk assessment process, inclusive of cumulative impacts which focused on determining the geographical, physical, biological, social, economic, heritage, and cultural sensitivity of the sites and locations within sites and the risk of impact of the proposed activity and technology alternatives on these aspects to determine:
    - (i) the nature, significance, consequence, extent, duration, and probability of the impacts occurring to; and
    - (ii) 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; and
- Through a ranking of the site sensitivities and possible impacts the activity and technology alternatives will impose on the sites and location identified through the life of the activity to:
    - (i) identify and motivate a preferred site, activity and technology alternative;
    - (ii) identify suitable measures to avoid, manage or mitigate identified impacts; and
    - (iii) identify residual risks that need to be managed and monitored.

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

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

To inform and provide the public with information and an understanding of the Proposed Project, issues and solutions.

1.5 BASIC ASSESSMENT REPORT STRUCTURE

As per the EIA Regulations 2014, as amended, Appendix 1 of GNR 982 identifies the legislated requirements that must be contained within a BAR for DFFE to consider and come to a decision on the application. **Table 1-5** below details where the required information is located within this report.

Table 1-5 - Legal Requirements as detailed in Appendix 1 of GNR 326 of the 2014 EIA Regulations, as amended

Appendix 1 of GNR 326	Description	Relevant Report Section
3(1) (a)	Details of the EAP who prepared the report and the expertise of the EAP, including a curriculum vitae	Section 1.3.4 and **Appendix A**
3(1) (b)	The location of the activity	Section 3.1
3(1) (c)	A plan which locates the proposed activity or activities applied for as well as associated structures and infrastructure at an appropriate scale	Section 3.1 and Section 3.2
3(1) (d)	A description of the scope of the proposed activity	Section 3.2 and Section 3.2.1
3(1) (e)	A description of the policy and legislative context within which the development is proposed	Section 5
3(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 3.4
3(1) (g)	A motivation for the preferred site, activity and technology alternative	Section 4
3(1) (h)	A full description of the process followed to reach the proposed alternative within the site	Section 4
3(1) (i)	A full description of the process undertaken to identify, assess and rank the impacts the activity will impose on the preferred location through the life of the activity	Section 4
3(1) (j)	An assessment of each identified potentially significant impact and risk	Section 8
3(1) (k)	Where applicable, a summary of the findings and impact management measures identified in any specialist report complying with Appendix 6 to these Regulations and an indication as to how these findings and recommendations have been included in the final report	Section 6, Section 7, Section 8 and Section 11.1
3(1) (l)	An environmental impact statement	Section 10
3(1) (m)	Based on the assessment, and where applicable, impact management measures from specialist reports, the recording of the proposed impact management objectives, and the impact	Section 11.3

Appendix 1 of GNR 326	Description	Relevant Report Section
	management outcomes for the development for inclusion in the Environmental Management Programme (EMPr).	
3(1) (n)	Any aspects which were conditional to the findings of the assessment either by the EAP or specialist which are to be included as conditions of authorisation.	Section 11.3
3(1) (o)	A description of any assumptions, uncertainties and gaps in knowledge which relate to the assessment and mitigation measures proposed	Section 2.7
3(1) (p)	A reasoned opinion as to whether the proposed activity should or should not be authorised, and if the opinion is that it should be authorised, any conditions that should be made in respect of that authorisation	Section 12
3(1) (q)	Where the proposed activity does not include operational aspects, the period for which the environmental authorisation is required, the date on which the activity will be conducted, and the post construction monitoring requirements finalised	Section 12
3(1) (r)	An undertaking under oath or affirmation by the EAP	**Appendix B**
3(1) (s)	Where applicable, details of any financial provisions for the rehabilitation, closure, and ongoing post decommissioning management of negative environmental impacts	N/A
3(1) (t)	Any specific information that may be required by the competent authority	N/A
3(1) (u)	Any other matters required in terms of section 24(4)(a) and (b) of the Act	N/A

2 BASIC ASSESSMENT PROCESS

2.1 OBJECTIVES OF THE BASIC ASSESSMENT PROCESS AS PER THE PROCEDURAL FRAMEWORK

The BA process consists of various phases with associated timelines as defined in GNR 982. The process can generally be divided into four main phases, namely, (i) a Pre-application Phase, (ii) an Application and Draft BA Phase (current phase); (iii) Final BA Phase and (iv) Authorisation and Appeal Phase.

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

- Pre-Application Phase:
  - Undertake consultation meetings with the relevant authorities to confirm the required process, the general approach to be undertaken and to agree on the public participation plan;
  - Identify stakeholders, including neighbouring landowners/residents and relevant authorities;
- Application and Draft BA Phase:
  - Compile and submit application forms to the CA and pay the relevant application fees;
  - Compile a DBAR describing the affected environment and present an analysis of the environmental issues;
  - Assess in detail the potential environmental and socio-economic impacts of the project;
  - Identify environmental and social mitigation measures to avoid and/or address the identified impacts;
  - Develop environmental and social management plans based on the mitigation measures developed in the DBAR;
  - Inform stakeholders of the proposed project, feasible alternatives and the BA process and afford them the opportunity to register and participate in the process and identify any issues and concerns associated with the proposed project; and
  - Submit the DBAR and the associated EMPr for public consultation and to the CA to for comment.
- Final BA Phase:
  - Incorporate comments received from stakeholders during the DBAR comment period;
  - Amend BAR and the associated EMPr based on the comments received;
  - Should significant amendments be required, release the updated DBAR for a 30-day comment period to provide stakeholders with the opportunity to review the amendments as well as provide additional input if required; and
  - Submit the Final BAR, following the consultation period, to the CA for acceptance/rejection.
- Authorisation and Appeal Phase:
  - The DFEE to provide written notification of the decision to either grant or refuse EA for the proposed project; and
  - Notify all registered stakeholders of the decision and right to appeal.

2.2 DFFE WEB-BASED ENVIRONMENTAL SCREENING TOOL

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

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

A screening report for the proposed Mura EGI Corridor was generated on 27 September 2022 and is attached as **Appendix F**. The Screening Report for the project identified various sensitivities for the site. The report also generated a list of specialist assessments that should form part of the BA Process based on the development type and the environmental sensitivity of the site. Assessment Protocols in the report provide minimum information to be included in a specialist report to facilitate decision-making.

Table 2-1 below provides a summary of the sensitivities identified for the development footprint.

Table 2-1 – Sensitivities identified in the DFFE Screening Report

Theme	Very High Sensitivity	High Sensitivity	Medium Sensitivity	Low Sensitivity
Agriculture Theme		X		
Animal Species Theme		X		
Aquatic Biodiversity Theme	X			
Archaeological and Cultural Heritage Theme				X
Civil Aviation Theme				X
Defence Theme				X
Palaeontology Theme	X			
Plant Species Theme			X	
Terrestrial Biodiversity Theme	X			

Based on the selected classification, and the environmental sensitivities of the proposed development footprint, the following list of specialist assessments have been identified for inclusion in the assessment report as determined by the screening tool:

- Agricultural Impact Assessment;
- Landscape/Visual Impact Assessment;
- Archaeological and Cultural Heritage Impact Assessment ;
- Palaeontology Impact Assessment;
- Terrestrial Biodiversity Impact Assessment;
- Aquatic Biodiversity Impact Assessment;
- Avian Impact Assessment;
- Civil Aviation Assessment;
- Geotechnical Assessment;
- Plant Species Assessment; and
- Animal Species Assessment.

2.2.1 MOTIVATION FOR SPECIALIST STUDIES

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

The following specialist assessments have been commissioned for the project based on the environmental sensitivities identified by the Screening Report:

- Agricultural Impact Assessment;
- Landscape/Visual Impact Assessment;
- Archaeological and Cultural Heritage Impact Assessment ;
- Palaeontology Impact Assessment;
- Terrestrial Biodiversity Impact Assessment;
- Aquatic Biodiversity Impact Assessment;
- Avian Impact Assessment;
- Civil Aviation Assessment;
-
- Geotechnical Assessment;
- Plant Species Assessment; and
- Animal Species Assessment.

The following specialist studies have been commissioned in addition to those above:

- Socio-Economic Assessment;
- Traffic Assessment.

The above specialist studies commissioned were presented to DFFE during the pre-application meeting that was held with on 22 September 2022. The specialist studies commissioned were accepted by the DFFE as per the meeting minutes included in the SER in **Appendix D**.

Four of the identified specialist studies will not be undertaken as part of the BA process for the proposed Mura EGI Corridor. Motivation for the exclusion of these specialist studies is provided below:

- Geotechnical Assessment:

- A detailed Geotechnical Assessment will not be undertaken as this will be undertaken during the design phase. The DFFE agreed to this during the pre-application meeting held on 22 September 2022.

- Civil Aviation:
  - A formal Civil Aviation Assessment will not be undertaken as part of the BA Process. Nevertheless, the relevant Authorities have been included on the project stakeholder database. As of the 1st of May 2021, ATNS has been appointed as the new Obstacle application Service Provider for Windfarms and later Solar Plants. Their responsibility would pertain to the assessments, maintenance, and all other related matters in respect to Windfarms and in due time Power Plant assessments. Where required, an Application for the Approval of Obstacles will also be submitted to ATNS and the required permits will be obtained prior to the development of the project. The SACAA has been included on the project stakeholder database. They will be informed of the proposed Project, and comment will be sought. An Application for the Approval of Obstacles will also be submitted to SACAA by the Applicant.
  - As this theme has been identified as a low sensitivity, no compliance statement is required.
- Defence:
  - The Department of Defence has been included on the project stakeholder database. They will be informed of the proposed Project, and comment will be sought.
  - As this theme has been identified as a low sensitivity, no compliance statement is required.

Specialist assessments were conducted in accordance with the Procedures for the Assessment and Minimum Criteria for Reporting on identified Environmental Themes, which were promulgated in Government Notice No. 320 of 20 March 2020 and in Government Notice No. 1150 of 30 October 2020 (i.e. “the Protocols”). The assessment protocols followed as well as the site sensitivity verification undertaken by the specialists are indicated in **Section 7**.

2.3 APPLICATION FOR ENVIRONMENTAL AUTHORISATION

The application phase consisted of a pre-application consultation with DFFE and subsequently completing the appropriate application form as well as the submission and registration of the application for EA with the DFFE. The pre-application meeting was held with DFFE on 22 September 2022 (meeting minutes included in the SER in **Appendix D**). The application form will be submitted to the DFFE with the Draft BAR. An application reference number will be included in the Final BAR following acknowledgment of receipt from the DFFE.

2.4 BASELINE ENVIRONMENTAL ASSESSMENT

The description of the environmental attributes of the Project area was compiled through a combination of desktop reviews and site investigations. Desktop reviews made use of available information including existing reports, aerial imagery, and mapping. The specialist teams undertook site investigations, between March and October 2022, to identify sensitive features on site that informed the sensitivity mapping (**Section 7.10**) for the Mura EGI Corridor.

2.5 IMPACT ASSESSMENT METHODOLOGY

2.5.1 ASSESSMENT OF IMPACTS AND MITIGATION

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

The key objectives of the risk assessment methodology are to identify any additional potential environmental issues and associated impacts likely to arise from the proposed project, and to propose a significance ranking. Issues / aspects will be reviewed and ranked against a series of significance criteria to identify and record interactions between activities and aspects, and resources and receptors to provide a detailed discussion of impacts. The assessment considers direct[1], indirect[2], secondary[3] as well as cumulative[4] impacts.

A standard risk assessment methodology is used for the ranking of the identified environmental impacts pre-and post-mitigation (i.e. residual impact). The significance of environmental aspects is determined and ranked by considering the criteria[5] presented in **Table 2-2.**

Table 2-2 – Impact Assessment Criterion and Scoring System

Criteria	Score 1	Score 2	Score 3	Score 4	Score 5
Impact Magnitude (M) The degree of alteration of the affected environmental receptor	Very low: No impact on processes	Low: Slight impact on processes	Medium: Processes continue but in a modified way	High: Processes temporarily cease	Very High: Permanent cessation of processes
Impact Extent (E) The geographical extent of the impact on a given environmental receptor	Site: Site only	Local: Inside activity area	Regional: Outside activity area	National: National scope or level	International: Across borders or boundaries
Impact Reversibility (R) The ability of the environmental receptor to rehabilitate or restore after the activity has caused environmental change	Reversible: Recovery without rehabilitation		Recoverable: Recovery with rehabilitation		Irreversible: Not possible despite action

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

Criteria	Score 1	Score 2	Score 3	Score 4	Score 5
Impact Duration (D) The length of permanence of the impact on the environmental receptor	Immediate: On impact	Short term: 0-5 years	Medium term: 5-15 years	Long term: Project life	Permanent: Indefinite
Probability of Occurrence (P) The likelihood of an impact occurring in the absence of pertinent environmental management measures or mitigation	Improbable	Low Probability	Probable	Highly Probability	Definite
Significance (S) is determined by combining the above criteria in the following formula:	$[S = (E + D + R + M) \times P]$ $Significance = (Extent + Duration + Reversibility + Magnitude) \times Probability$				
Impact Significance Rating					
Total Score	**4 to 15**	**16 to 30**	**31 to 60**	**61 to 80**	**81 to 100**
Environmental Significance Rating (Negative (-))	**Very low**	**Low**	**Moderate**	**High**	**Very High**
Environmental Significance Rating (Positive (+))	**Very low**	**Low**	**Moderate**	**High**	**Very High**

2.5.2 IMPACT MITIGATION

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

The mitigation measures chosen are based on the mitigation sequence/hierarchy which allows for consideration of five (5) different levels, which include avoid/prevent, minimise, rehabilitate/restore, offset and no-go in that order. The idea is that when project impacts are considered, the first option should be to avoid or prevent the impacts from occurring in the first place if possible, however, this is not always feasible. If this is not attainable, the impacts can be allowed, however they must be minimised as far as possible by considering reducing the footprint of the development for example so that little damage is encountered. If impacts are unavoidable, the next goal is to rehabilitate or restore the areas impacted back to their original form after project completion. Offsets are then considered if all the other measures described above fail to remedy high/significant residual negative impacts. If no offsets can be achieved on a potential impact, which results in full destruction

of any ecosystem for example, the no-go option is considered so that another activity or location is considered in place of the original plan.

The mitigation sequence/hierarchy is shown in **Table 2-2** below.

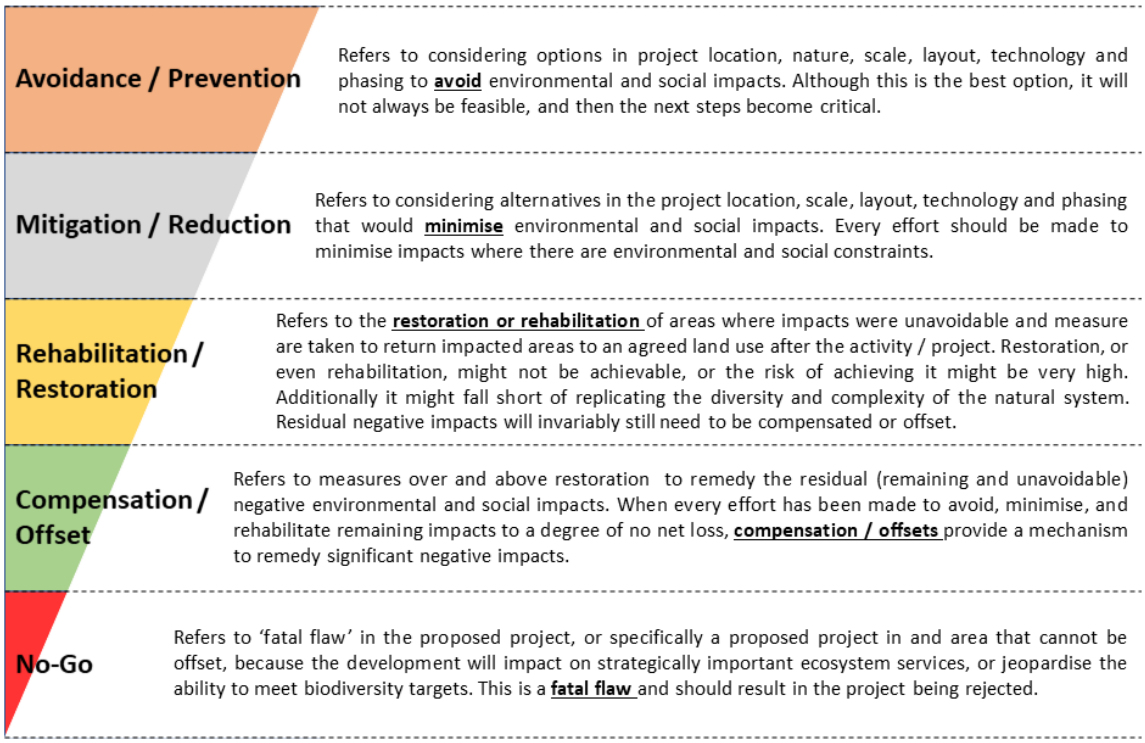


Figure 2-1 - Mitigation Sequence/Hierarchy

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

2.6 STAKEHOLDER ENGAGEMENT PROCESS

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

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

A SER has been included in **Appendix D** and will be updated in the final BAR, detailing the project's compliance with Chapter 6 of the NEMA EIA Regulations 2014, as amended.

2.6.1 STAKEHOLDER CONSULTATION

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

- Utilising existing databases from other projects in the area (specifically obtaining information from the stakeholder database for the adjacent Nuweveld Wind Farm Development stakeholder database);
- Advertising in the press;
- Placement of community notices;
- Completed comment sheets; and
- Attendance registers at meetings.

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

A list of stakeholders captured in the project database is included in the SER in **Appendix D**.

2.7 ASSUMPTIONS AND LIMITATIONS

General assumptions and limitations:

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

Terrestrial Biodiversity Assessment:

- Although not all of the grid corridor could be sampled in detail given its' large extent, the corridor is considered to have been well-covered and it is highly unlikely that there are any significant vegetation features present that would not have been observed during the study.
- Camera trapping for fauna was conducted within the four PV areas as well as previously within the Nuweveld Wind Farms project area which includes a large section of the west of the Mura EGI corridors. No rabbits were detected at any of these cameras, including those in the upper reaches of the Krom Rivier. However, data obtained from EWT indicate that there are historical sightings of Rabbits within the corridor and the field assessment confirmed th presence of suitable habitat within the corridor along some section of the Krom Rivier. In addition, in order to ensure a conservative approach, all areas with suitable habitat are assumed to have Riverine Rabbits present, and are included in the 'no-go' layer.
- It is assumed that there are no Riverine Rabbits residing in areas outside of the riparian habitat which is typically associated with this species in the Upper Karoo. This is considered to be a reasonable assumption as this species is strongly associated with riparian vegetation within the study area. It is only in the southern population that Riverine Rabbits can usually be found outside of riparian areas.
- It is assumed that the Karoo Dwarf Tortoise is potentially present in all areas mapped as optimal habitat for this species. Clearly this is not the case in reality as not all areas of suitable habitat would be occupied. As such, the assessment is designed to assess the worst-case scenario with regards to the distribution of the tortoise within the corridor.
- It is assumed that there are no Karoo Dwarf Tortoises resident in areas outside of the rocky hills habitat typically associated with this species. This is considered to be a reasonable assumption as this species is known to be strongly associated with rocky hills and does not occur within areas without sufficient shelter.

Aquatic Impact Assessment:

- Limitations and uncertainties often exist within the various techniques adopted to assess the condition of ecosystems. The methodologies and techniques used in this assessment have been developed nationally and are typically of a rapid nature, as is required for this freshwater impact assessment.
- Given the topography at the site, it was not possible to cover the site in a high level of detail, however, extrapolation of the areas ground-truthed to those not covered was thus done using the latest available aerial imagery for the site. No baseline long-term monitoring was undertaken as part of this assessment. In addition, there is very little existing information available for the aquatic features within the study area. Data was utilised for adjacent aquatic ecosystems, and where available, more detailed assessments were used for the aquatic features within the area.
- The impacts of powerlines on the aquatic features are well understood and can be effectively mitigated to ensure the impacts remain low. The preferred mitigation measure is to limit the disturbance to aquatic features as far as possible by avoiding and minimising the number of crossings and providing adequate buffer areas. This will also ensure that the cumulative impacts will remain low.
- The level of aquatic assessment undertaken was considered to be adequate for this study. The assessment was undertaken in March 2022, after recent rainfall in the area and there was sufficient water present in the rivers at the time of the site visit to allow for the required level of

assessment for this study. No further fieldwork will thus be required if the proposed project activities remain outside of the delineated aquatic features and the recommended buffers.

Plant Species Compliance Statement:

- Conditions at the time of the surveys were in a relatively favourable for the field assessment as there had been rain prior to sampling and the abundance of annuals and geophytes as relatively high, with many species growing or in flower.
- Although not all of the corridor could be searched given its' large extent and inaccessibility of some areas, the corridor is considered to have been sufficiently well-covered and it is unlikely that there are any significant vegetation features present that would not have been observed during the study.
- The consultant has spent a large amount of time in the area for the current project, the Nuweveld WEFs, the Hoogland series of WEFs as well as for a number of other projects in the area, with the result that the plant community patterns and habitats where plant SCC occur are well-known to the consultant in the study area and this knowledge of the area has been used to direct sampling site selection and inform the current study.

Animal Species Compliance Statement:

- The presence of the Riverine Rabbit within the areas of suitable habitat present within the corridor was not directly confirmed for the current study. However, data obtained from EWT indicate that all the larger tracts of habitat within the corridor and especially along the Krom Rivier have historical sightings of Rabbits. In addition, in order to ensure a conservative approach, all areas with suitable habitat are assumed to have Riverine Rabbits present.
- It is assumed that there are no Riverine Rabbits resident in areas outside of the riparian habitat typically associated with this species in the Upper Karoo. This is considered to be a reasonable assumption as this species is known to be strongly associated with riparian vegetation within the study area. It is only in the southern population that Riverine Rabbits can normally be found outside of riparian areas. Furthermore, the camera trapping conducted within the PV areas did not find any Riverine Rabbits present within the open plains habitat, adding support to the above assertion.
- The presence of the Karoo Dwarf Tortoise within the areas of suitable habitat present within the corridor could not be directly confirmed for the current study. This species has a low detectability and may be active for as little as 10 minutes a day, making it very difficult to confirm presence and density.
- In order to ensure a conservative approach, all areas with suitable habitat are assumed or treated as if they have Karoo Dwarf Tortoises present. Clearly this is not the case as not all areas of suitable habitat would be occupied. As such, the assessment is designed to assess the worst-case scenario with regards to the distribution of the tortoise within the corridor.
- It is assumed that there are no Karoo Dwarf Tortoises resident in areas outside of the rocky hills habitat typically associated with this species. This is considered to be a reasonable assumption as this species is known to be strongly associated with rocky hills and does not occur within areas without sufficient shelter.

Avifauna Impact Assessment:

- Certain biases and challenges are inherent in the methods that have been employed to collect data in this programme. It is not possible to discuss all of them here, and some will only become evident with time and operational phase data.
- The presence of the ornithologist on site is certain to have an effect on the birds itself. For example during walked transects, certain bird species will flush more easily than others (and therefore be detected), certain species may sit undetected, certain species may flee, and yet others may be inquisitive and approach the observers.

Heritage Impact Assessment:

- The field study was carried out at the surface only and hence any completely buried archaeological sites would not be readily located. Similarly, it is not always possible to determine the depth of archaeological material visible at the surface. Although there was no dedicated survey for this project, the accumulated information from other proximate projects allows an excellent understanding of the spatial distribution of archaeological resources and hence a reliable assessment of the potential impact significance.
- Cumulative impacts are difficult to assess due to the variable site conditions that would have been experienced in different areas and in different seasons. Survey quality is thus likely to be variable. As such, some assumptions need to be made in terms of what and how much heritage might be impacted by other developments in the broader area.

Traffic Impact Assessment:

The compiling of this combined report for the proposed developments are based on the following assumptions:

- Project
  - The report is a combined report that includes all four of the proposed developments and the relevant Grid Connection.
  - All proposed developments are to be constructed, simultaneously over a period of 24 months.
  - The final layout of each proposed development is pending specialist's recommendations, where applicable.
- Cumulative Effects
  - As part of the Mura Solar Development, four Mura Solar Energy Facilitates (SEFs) are proposed. In addition to the proposed developments, there are several other developments earmarked for construction in the area. Some developments will be implemented sooner than others, thus for the proposed development the following cumulative effects have been assumed to include:
    - The three Nuweveld Wind Energy Facilities (WEFs); assumed to be in the operational phase.
    - The two Hoogland WEF Clusters (North and South); each cluster consisting of two WEFs and associated infrastructure, are assumed to be in the construction phase.
    - The Gamma Grid Connection is assumed to be its construction phase.
  - The construction schedule of the projects listed above together with the proposed developments is unknown, at this point in time. Thus, a conservative (unrealistic) assessment has been adopted in the report, which assumes that all know developments will be either in

the operational phase or constructional phase (as defined above), and the traffic of all the projects peak at the same time, resulting in a worst-case scenario.

- Manpower
  - The manpower complement, for each of the proposed developments (including grid connection) is provided below:
    - Mura 1 – 165 individuals.
    - Mura 2 – 435 individuals.
    - Mura 3 – 318 individuals.
    - Mura 4 – 354 individuals.
    - The total manpower complement for the four proposed developments, is in the order of 1 272 individuals.
  - The combined manpower complement, for the operation phase of the three Nuweveld WEF is expected to be in the order of 96 individuals.
  - The combined manpower complement, for the four Hoogland wind farms and associated infrastructure during peak construction phase is assumed to be in the order of 1 200 individuals.
  - The manpower complement for the proposed Gamma Grid Connections during peak construction phase is expected to be in the order of 60 individuals.
- Workforce Distribution
  - No accommodation is provided on-site.
  - The workforce for the proposed developments is drawn from various towns within a travel distance of 200 km, and include Beaufort West, Carnarvon, Fraserburg, Hutchinson, Loxton, Murraysburg, Nelspoort and Victoria West.
  - The distribution of the workforce is based on the working-age population in each town modified by the weighting factor relating to the distance the various towns are from the proposed developments.
  - The number of specialists deployed to the area for the proposed developments is assumed to be nominal and will not adversely affect the distribution as described above.
- Traffic
  - Delivery routes of equipment and materials to the proposed developments from various commercial centres within South Africa will follow well-established road networks.
  - The commuting routes of personnel and delivery routes to the proposed development are subject to the limitations stipulated in the Traffic Management Plan for the project.
  - For analysis purposes the shortest route from the surrounding towns to the proposed developments will be adopted.
  - Construction equipment and materials (other than aggregates) for the proposed development will be transported from the various commercial centres within South Africa.
  - The supply of raw materials for the manufacture of concrete and road construction, as a worst-case scenario, will be sourced from commercial sources outside the proposed development.
  - The maximum payload of general-purpose vehicles used to transport equipment and material to the site is assumed to be in the order of 20 000 kg. However, the Molteno Pass on the TR 05801 and the De Jager's Pass on the DR 02311, shall not be used by vehicles with a gross

mass of more than ten tonnes for the commuting of personnel and the transportation of construction equipment and materials.

- The transportation of personnel shall be provided by either double cab bakkie (4 Pax), minibuses (16 Pax), or Buses (35, 45 and 55 Pax), all vehicles shall be retained on-site during the day.
- All concrete is to be batched on-site (either within the solar PV areas or within the access road corridors), concrete mixing trucks will only be permitted on the public road network from the batching site (most likely the same sites used for Nuweveld East) to the solar sites.

Visual Impact Assessment:

- The visual assessment is based on the proposed locations of the switching stations and alignment options for the powerline made available by Red Cap.

Social Impact Assessment:

- The quantification of economic impacts in order to inform the assessment of the significance of impacts was not possible, nor considered necessary, for all impacts. Where possible, quantification focused on impacts considered to be most important in the overall assessment. Assessments of impact significance made without quantification (and based on a consideration of the likely magnitudes of impacts and/or expert judgements) are, however, considered adequate unless otherwise specified.
- All impacts are assessed individually and then as a whole to the degree possible and appropriate. An overall assessment and discussion of net impacts (i.e. whether overall benefits exceed costs) was undertaken to the degree thought appropriate and justifiable combining quantifiable and unquantifiable impacts. Given uncertainties and the potentially subjective nature of comparisons between impact categories, the emphasis in the report is on presenting assessments of impact categories with less emphasis on trying to reconcile them in an overall assessment of net effects. To a large degree this role of comparing and weighing up different (and hard to reconcile) impacts is the ambit of the relevant decision-making authorities.
- The findings of the assessment reflect the best professional assessment of the author drawing on relevant and available information within the constraints of time and resources thought appropriate and made available for the assessment. See Appendix B for the disclaimer associated with this report.
- The assessment only considers the impacts of the proposed projects and the no-go alternative. It does not make comparisons with other wind energy projects which may or may not be more desirable. The Department of Mineral Resources and Energy (DMRE) is primarily responsible for making the necessary comparisons between projects as part of the process of awarding contracts to aspirant competing renewable energy developers, should these projects be bid in a Renewable Energy Independent Procurement Producer Programme (REIPPPP) bidding round.

3 PROJECT DESCRIPTION

This section provides a description of the location of the project area and the site location alternatives considered for the project. The descriptions encompass the activities to be undertaken during the construction and operational phases as well as the consideration for site accessibility, water demand, supply, storage, and site waste management. This section also considers the need and desirability of the project in accordance with Appendix 1 of GNR 326.

3.1 LOCATION OF THE PROPOSED PROJECT

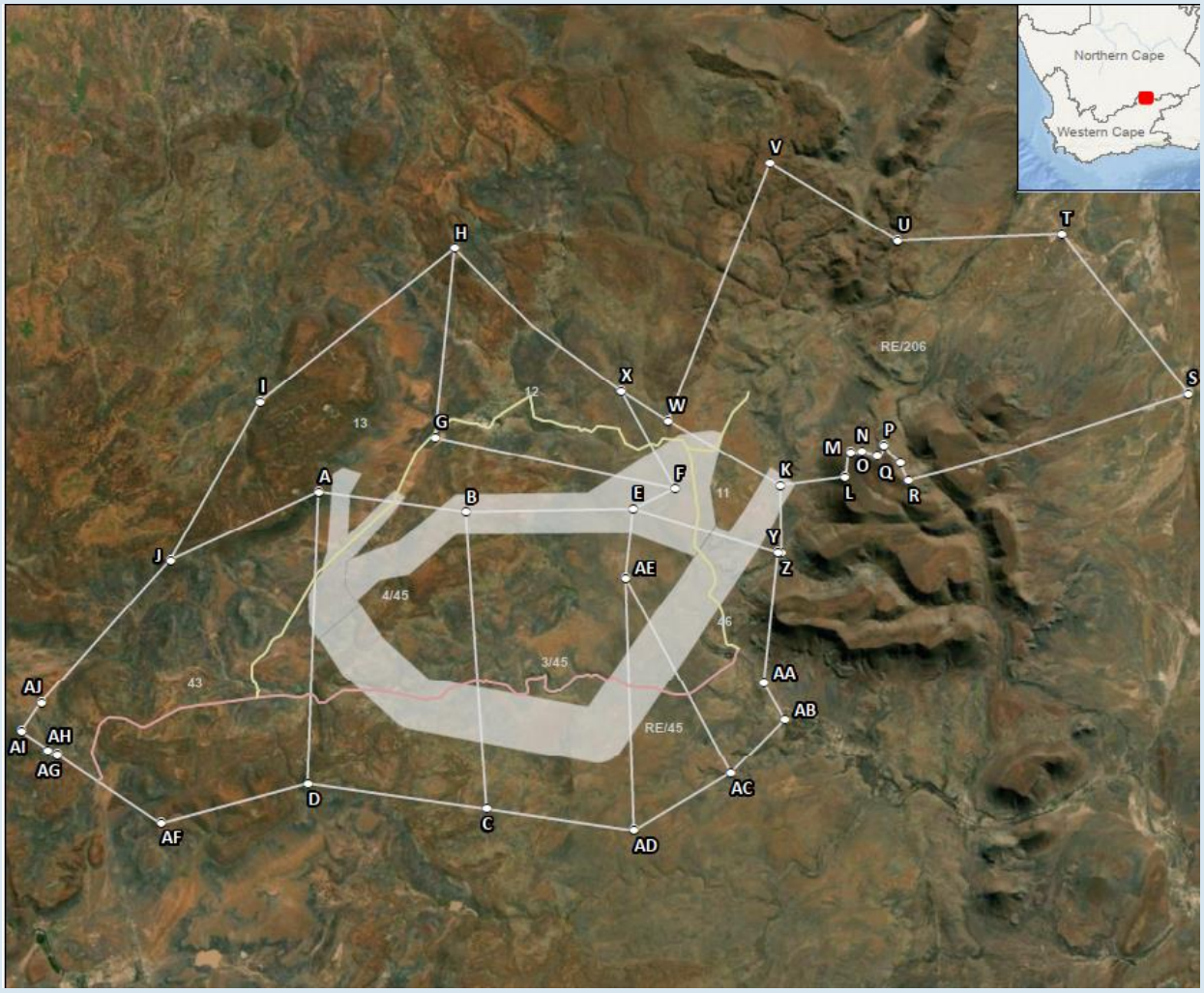
The proposed Mura EGI Corridor is located between Loxton and Beaufort West in the BWLM and ULM and the CKDM and PkSDM in the Western Cape and Northern Cape Provinces. The negotiated line routing and associated pylon positions fall within the pre-negotiated route and are presented within this Draft BAR.

The infrastructure proposed within the Mura EGI Corridor will have a total footprint of approximately 52 (ha) (**Figure 3-1**). The site will be accessed via the R381, DR02317, existing access roads, and new access tracks. The details of the properties associated with the proposed Mura EGI Corridor, including the 21-digit Surveyor General (SG) codes for the cadastral land parcels are outlined in **Table 3-1**. The co-ordinates of the cadastral land parcels are included in **Table 3-2**. The coordinates of the corridor are provided in **Table 3-3**.

Table 3-1 – Mura EGI Corridor Affected Farm Portions

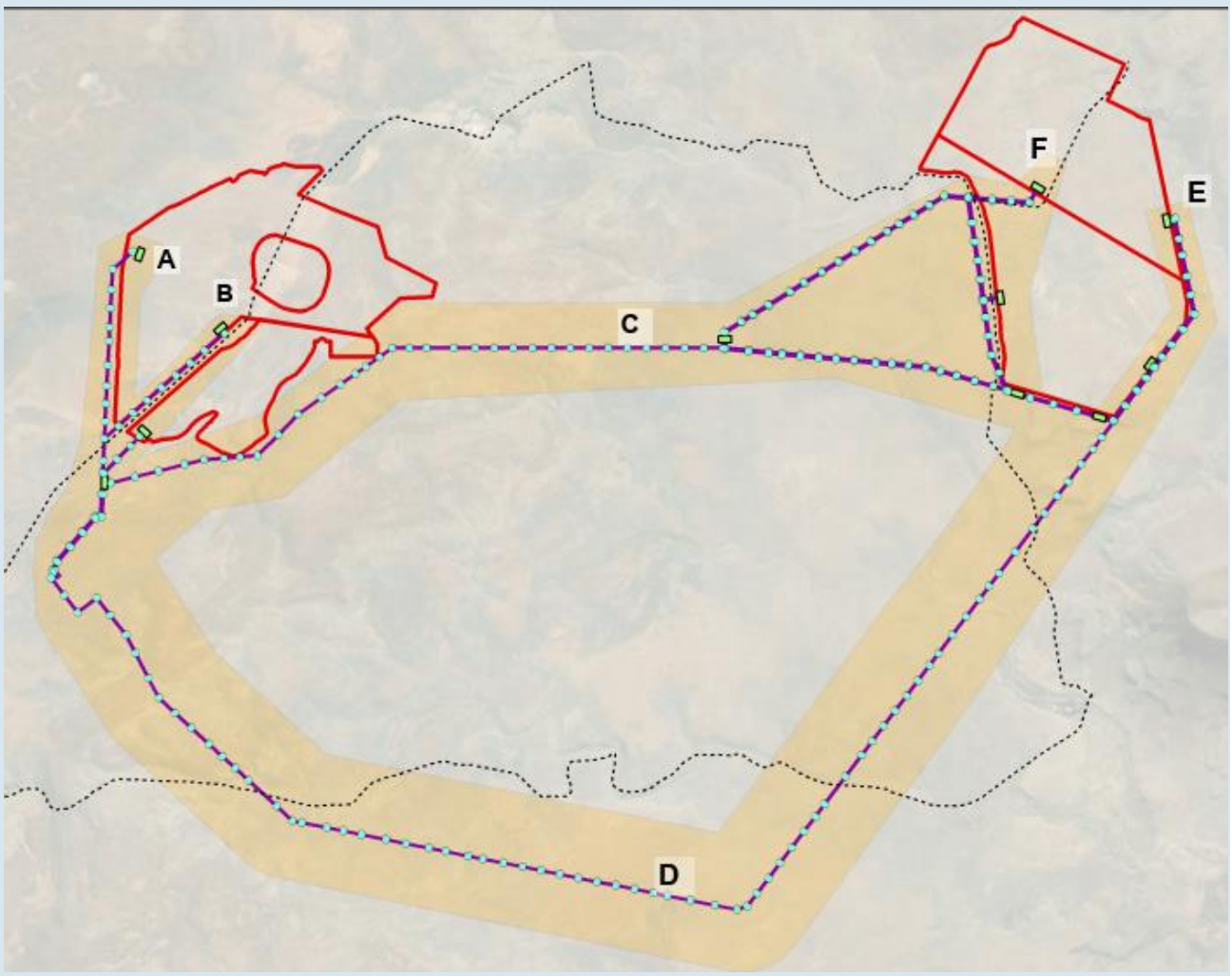
Farm Name	21 Digit Surveyor General Code of Each Cadastral Land Parcel
Leeuwkloof Farm 43	C00900000000004300000
Bultfontein Farm 13	C00900000000001300000
Portion 4 of Duiker Kranse Farm 45	C00900000000004500004
RE of Portion 3 of Duiker Kranse Farm 45	C00900000000004500003
Portion 12 of Bultfontein Farm 387	C00900000000001200000
Aangrensend Abramskraal Farm 11	C00900000000001100000
RE of Abrams Kraal Farm 206	C08000000000020600000
Sneeuwkraal Farm 46	C00900000000004600000
RE of Duiker Kranse Farm 45	C00900000000004500000
Portion 2 of Paardeberg Farm 49	C00900000000004900002

Table 3-2 – Coordinate Points of the Cadastral Land Parcel

Point	Longitude	Latitude
		
AA	22° 36' 25.045" E	31° 52' 24.492" S
AB	22° 36' 47.884" E	31° 52' 58.613" S
AC	22° 35' 48.826" E	31° 53' 47.548" S
AD	22° 34' 3.572" E	31° 54' 40.201" S
AE	22° 33' 55.562" E	31° 50' 47.224" S
AF	22° 25' 30.549" E	31° 54' 31.383" S
AG	22° 23' 38.105" E	31° 53' 27.670" S
AH	22° 23' 27.895" E	31° 53' 24.545" S
AI	22° 22' 59.281" E	31° 53' 5.869" S

Point	Longitude	Latitude
AJ	22° 23' 21.151" E	31° 52' 39.727" S
A	22° 28' 23.070" E	31° 49' 26.137" S
B	22° 31' 2.626" E	31° 49' 45.289" S
C	22° 31' 24.038" E	31° 54' 19.973" S
D	22° 28' 9.966" E	31° 53' 55.928" S
E	22° 34' 4.048" E	31° 49' 43.201" S
F	22° 34' 49.580" E	31° 49' 24.474" S
G	22° 30' 29.801" E	31° 48' 36.745" S
H	22° 30' 52.013" E	31° 45' 41.134" S
I	22° 27' 20.290" E	31° 48' 2.516" S
J	22° 25' 42.416" E	31° 50' 28.752" S
K	22° 36' 43.783" E	31° 49' 21.641" S
L	22° 37' 53.483" E	31° 49' 14.304" S
M	22° 37' 59.783" E	31° 48' 51.469" S
N	22° 38' 12.379" E	31° 48' 50.641" S
O	22° 38' 28.878" E	31° 48' 54.914" S
P	22° 38' 35.894" E	31° 48' 45.166" S
Q	22° 38' 53.992" E	31° 49' 0.955" S
R	22° 39' 2.592" E	31° 49' 17.623" S
S	22° 44' 6.338" E	31° 47' 57.746" S
T	22° 41' 49.632" E	31° 45' 30.100" S
U	22° 38' 51.511" E	31° 45' 35.597" S
V	22° 36' 33.854" E	31° 44' 23.312" S
W	22° 34' 42.038" E	31° 48' 21.715" S
X	22° 33' 51.577" E	31° 47' 53.747" S
Y	22° 36' 40.536" E	31° 50' 23.741" S
Z	22° 36' 44.935" E	31° 50' 24.688" S

Table 3-3 – Mura EGI Corridor Coordinates

Point	Longitude	Latitude
		
Corridor Development Area		
A (starting point)	22°28'58.03"E	31°49'6.67"S
B (starting point)	22°29'41.01"E	31°49'35.53"S
C (mid-point)	22°32'12.73"E	31°49'45.74"S
D (mid-point)	22°32'39.03"E	31°53'8.96"S
E (starting point)	22°35'38.07"E	31°48'31.64"S
F (starting point)	22°36'26.66"E	31°48'49.54"S

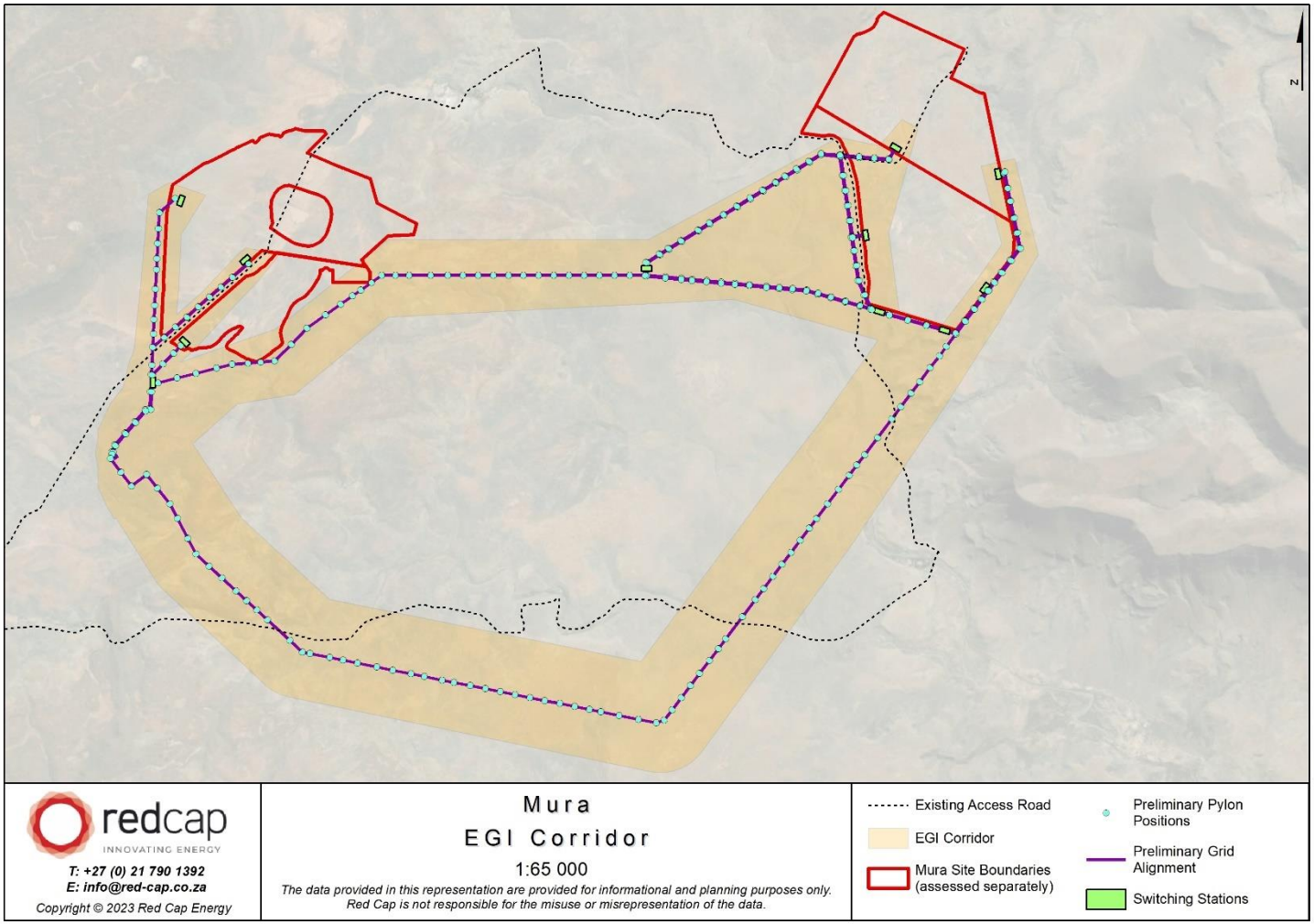


Figure 3-1 – Mura EGI Corridor and proposed grid infrastructure

3.2 PROJECT INFRASTRUCTURE

The corridor has been assessed by the specialists for approval to allow for micro siting of the line routing and pylon positions once the detailed design has been completed. The total project area is 52 ha and should be assumed to be wholly transformed. The project footprint within the corridor will contain the following:

- Overhead lines and pylons:
  - ~70 km of overhead 132 kV lines (~40 km will be single overhead 132 kV lines and ~30 km will be up to two overhead 132 kV lines running in parallel running between the switching stations supported by monopole pylons with a max height 38m)
- Switching stations:
  - Up to eight switching stations
  - Located adjacent to the solar farm substations within the solar area footprint
  - Maximum height of 12m
  - Footprint of up to 150 m x 75 m
- Other Switching stations:
  - Up to four up to 150 m x 75 m switching stations located within the EGI corridor
- Other infrastructure:
  - Access tracks
  - Temporary laydown areas (including temporary fuel (and lubricants) and powder cement storage facilities)

The relevant footprints and total disturbance footprint for the project are detailed in the **Table 3-4** below.

Table 3-4 – Mura EGI Corridor Footprints

Project component	Disturbance footprint (ha)
Overhead lines and pylons	2,5
Switching stations	13
Access roads and tracks	32
Temporary areas	4
Total disturbance footprint: Temporary	4
Total disturbance footprint: Permanent	48
Total	**52**

3.2.1 OVERHEAD LINES AND PYLONS

The proposed corridor will contain ~70 km of overhead 132 kV lines (~40 km will be single overhead 132 kV lines and ~30 km will be up to two overhead 132 kV lines running in parallel running between the switching stations supported by monopole pylons with a max height 38m. The spans (distance between pylons) on the monopole pylons (without stays) are on average 260 m.

The corridor has been assessed by the specialists for approval to allow for micro siting of tower positions once the detailed design has been completed.

3.2.2 SWITCHING STATIONS

There will be up to two switching stations on each solar farm with a footprint of approximately 150 x 75 m (11,250 m^2). The switching station area will include all the standard switching station electrical equipment/components, such as bus bars, metering equipment, switchgear, and will also house control, operational, workshop and storage buildings/areas. An additional up to four switching stations are also proposed outside of the solar farm footprints but within the EGI corridor.

3.2.3 OTHER INFRASTRUCTURE

Access roads

Existing access roads and tracks (upgraded to ± 2-4 m wide where needed) will be used as far as possible and new access tracks would be created where needed (± 2-4 m wide). These are required for all project phases.

Temporary laydown areas

Temporary laydown areas will be identified along the alignment, with the main equipment and construction yards being located along the alignment or based in one of the surrounding towns or at the solar site camp. It is anticipated that the total area required for the temporary laydown areas is up to 2 ha and two will be required. The temporary laydown area will include temporary fuel (and lubricants) and powder cement storage facilities for use during the construction phase.

3.3 PROPOSED PROJECT DEVELOPMENT ACTIVITIES

3.3.1 CONSTRUCTION PHASE

The construction process will follow industry standard methods and techniques. Key activities associated with the construction phase are described in **Table 3-5**.

Table 3-5 – Construction activities

Activity	Description
Establishment access and internal roads	Access to the proposed Mura EGI Corridor will be via the R381, DR02317, new access tracks and existing access roads.
Site preparation and establishment	Site establishment will include clearing of vegetation and any bulk earthworks that may be required.

Activity	Description
Transport of components and equipment to site	All construction material, machinery and equipment (i.e. graders, excavators, trucks, cement mixers etc.) will be transported to site utilising the national, regional and local road network. Large components (such as substation transformers) may be defined as abnormal loads in terms of the Road Traffic Act (No. 29 of 1989). In such cases a permit may be required for the transportation of these loads on public roads.
Establishment of laydown areas within the corridor	Construction materials, machinery and equipment will be kept at relevant laydown and/or storage areas. A laydown area of approximately 4 ha has been proposed for this project. The laydown area will limit potential environmental impacts associated with the construction phase by limiting the extent of the activities to one designated area.

3.3.2 OPERATIONAL PHASE

During operation the key activities will include inspection and maintenance of the electrical infrastructure within the corridor.

3.3.3 DECOMMISSIONING PHASE

The decommissioning phase will include activities similar to that of the construction phase as indicated in **Table 3-5**.

3.4 NEED AND DESIRABILITY OF THE PROJECT

The section below outlines the need for renewable energy development. Given that this proposed is proposed to support the Mura Solar Development to be connected to the National Grid. The proposed project's need and desirability is intrinsically linked to renewable energy development and the need thereof.

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

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

3.4.1 INTERNATIONAL PERSPECTIVE

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

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

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

At COP27 President Sameh Shoukry announced the *Sharm el-Sheikh Adaptation Agenda*[6], enhancing resilience for people living in the most climate-vulnerable communities by 2030. The cover decision, known as the Sharm el-Sheikh Implementation Plan, highlights that a global transformation to a low-carbon economy is expected to require investments of at least USD 4-6 trillion a year. The Sharm el-Sheikh Implementation Plan emphasises the urgent need for reduced global greenhouse gas emissions through the use of renewable energy, just energy transition partnerships and other cooperative actions. The Plan further highlights that this is a critical decade of action that requires rapid transformation towards renewable energy.

This renewable energy project aligns with the goals of the Sharm el-Sheikh Implementation Plan and the need to reduce greenhouse gas emissions and rapidly transform towards renewable energy.

3.4.2 NATIONAL PERSPECTIVE

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

The National Development Plan (NDP) is aimed at reducing and eliminating poverty in South Africa by 2030. The NDP also outlines the need to increase electricity production by 2030, with 20 000 MW of electricity capacity generated from renewable sources in order to move to less carbon-intensive electricity production. The Plan also envisages that South Africa will have an energy sector that provides reliable and efficient energy service at competitive rates, while supporting economic growth through job creation.

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

[6] https://unfccc.int/news/cop27-reaches-breakthrough-agreement-on-new-loss-and-damage-fund-for-vulnerable-countries

In 2022, South Africa witnessed its longest recorded hours of load shedding, with the power being off for 1 949 hours between January and September 2022 as shown in **Figure 3-2**. The South African Government has taken strides to try reducing these power cuts through the implementation of bid Windows in Renewable Independent Power Producer Programme (REIPPP) , but it is still expected that the country will undergo more load shedding. Over the years the construction of Solar and Wind facilities has become cheaper, and less time-consuming. Thus, acting as a faster and more efficient method of meeting the ever-growing demand for electricity in the country. Renewable energy is a key factor in the national energy mix and will assist in ensuring that load shedding is reduced in South Africa.

On 16 February 2018, the DFFE gazetted the REDZ and STC and Procedures for the Assessment of Large-scale Wind and Solar Photovoltaic Energy Development Activities (GN 114) and Grid Infrastructure (GN 113). Subsequently, on 26 February 2021 a further three REDZ were gazetted (GN 142).

REDZ are geographical areas where wind and solar PV development can occur in concentrated zones, creating priority areas for investment in the electricity grid and thereby increasing South Africa's green energy map by enabling higher levels of renewable power penetration (Greeneconomy Media, 2019).

The procedure allows for wind and solar PV activities within the eight REDZs and electricity grid expansion within the five power corridors to be subjected to a BA and not a full S&EIA process. In addition, the timeframes associated with the decision on the application is reduced from 107 days to 57 days.

The REDZs support the responsible implementation of the 2019 IRP that was gazetted by the Minister of Mineral Resources and Energy on 17 October 2019. Renewable energy projects that could be developed in these new REDZ have the potential to make significant contributions to mine rehabilitation and to support a just energy transition in the specified areas including where 12 GW of existing coal power stations are planned to be decommissioned by 2030 (CSIR, 2019).

The Mura EGI Corridor falls within the Central CST Corridor and predominantly within the REDZ.

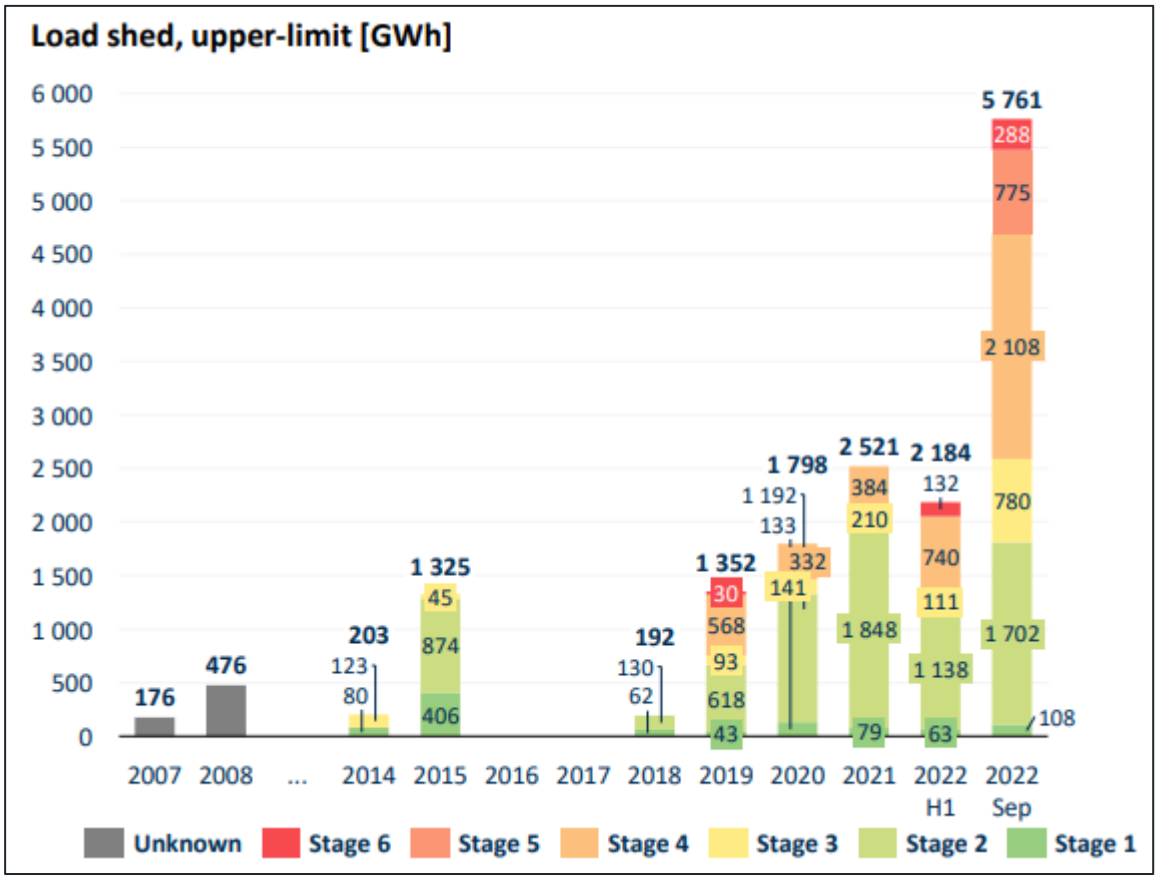


Figure 3-2 - Load shedding hours over the years in South Africa

Source: CSIR (2022)

4 PROJECT ALTERNATIVES

The EIA Regulations of 2014 (as amended) require that the BA process must identify and describe alternatives to the proposed activity that were considered, or motivation for not considering alternatives. Different types or categories of alternatives could be considered including different locations, technology types, and project layouts. The BA Process will holistically assess the impacts and risks of each alternative comparatively, as suggested by Appendix 1 of the EIA Regulations of 2014 (as amended).

All alternatives outlined below are considered both feasible and reasonable with no apparent advantages or disadvantages at this stage of the project. Extensive consideration of alternatives and avoidance of impacts took place in the screening/design phase. This is discussed in detail in the section below.

4.1 SITE ALTERNATIVES

The selection of the Mura Solar PV Development, which includes the EGI Corridor, is the outcome of a feasibility assessment by the proponent, which inter alia served to identify site options that would be optimal for energy production and grid interconnection.

4.1.1 SITE SELECTION PROCESS

Red Cap Energy has a wealth of experience in renewable wind energy development in the Beaufort West area and good relationships with the local landowners due to the approved Nuweveld Wind Farm Development and the Hoogland Wind Farm clusters. Generation from the Nuweveld and Hoogland Wind Farms will be connected to the national grid via either an approved 400kV connection from the Nuweveld Collector Substation (approved) to Droërivier (existing Eskom Substation) and/or via a 400kV connection (currently being assessed as part of a separate BA process) to Gamma substation (existing Eskom substation). Red Cap is proposing both these grid connections. The approved Collector Substation is proposed as the connection point for the Mura Solar Development.

Taking technical constraints, resource availability and grid capacity into account, Red Cap identified that up to four solar PV facilities can connect to the approved Collector Substation and subsequently undertook a site selection process to identify where these four facilities can be located.

As part of the initial desktop screening exercise, an area within or adjacent to the Nuweveld Wind Cluster within relative proximity to each of the Nuweveld wind farm switching stations were investigated by applying a 10 km radial buffer to each of the two approved Nuweveld North and West switching stations and Nuweveld Collector Substation.

Based on Red Cap's knowledge of the area and detailed input from specialists that undertook assessments for the Nuweveld Wind Farm Development and Hoogland Cluster, solar constraints were identified within the three initial broad focus areas and used to develop no-go layers. The factors considered in developing the no-go layers were: Critical Biodiversity & Protected Areas, Avifauna (buffers around nests), Bat habitat (rocky crevices only), Ecology (specifically Riverine Rabbit habitat and vegetation), Transmission lines, Airfields (none in the proposed area), Heritage (including palaeontology), Aquatic features including wetlands, dams and rivers. **Figure 4-1** shows a map indicating the no-go layers that were identified by the abovementioned constraints.

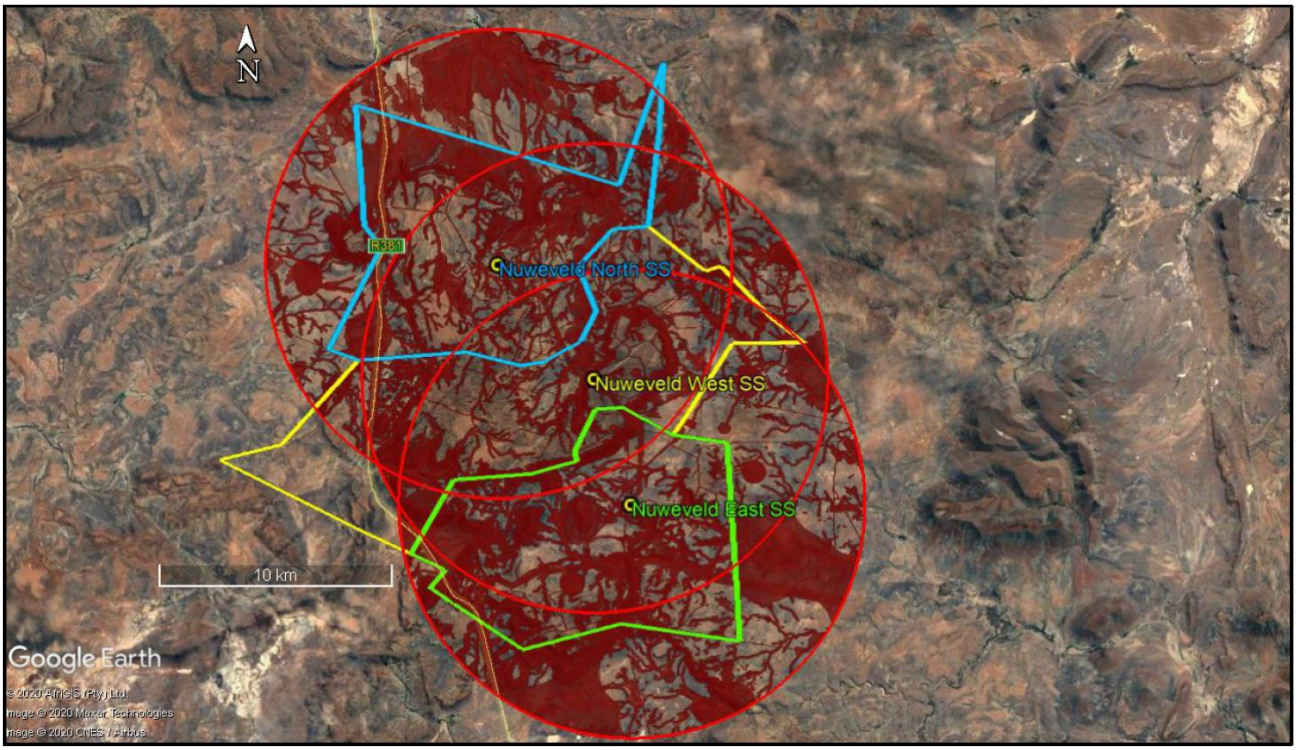


Figure 4-1 - Screening no-go layers from the identified constraints for the potential solar area

These areas were then assessed from a technical perspective by considering specifically slope, aspect, undulation, and access. Taking this into account, five areas with adequate development area (**Table 4-1**) were identified to take forward to a formal screening process (**Figure 4-2**). One of the areas (Area 5) was outside of the initial broad screening areas buffer but was also identified to be suitable for development.

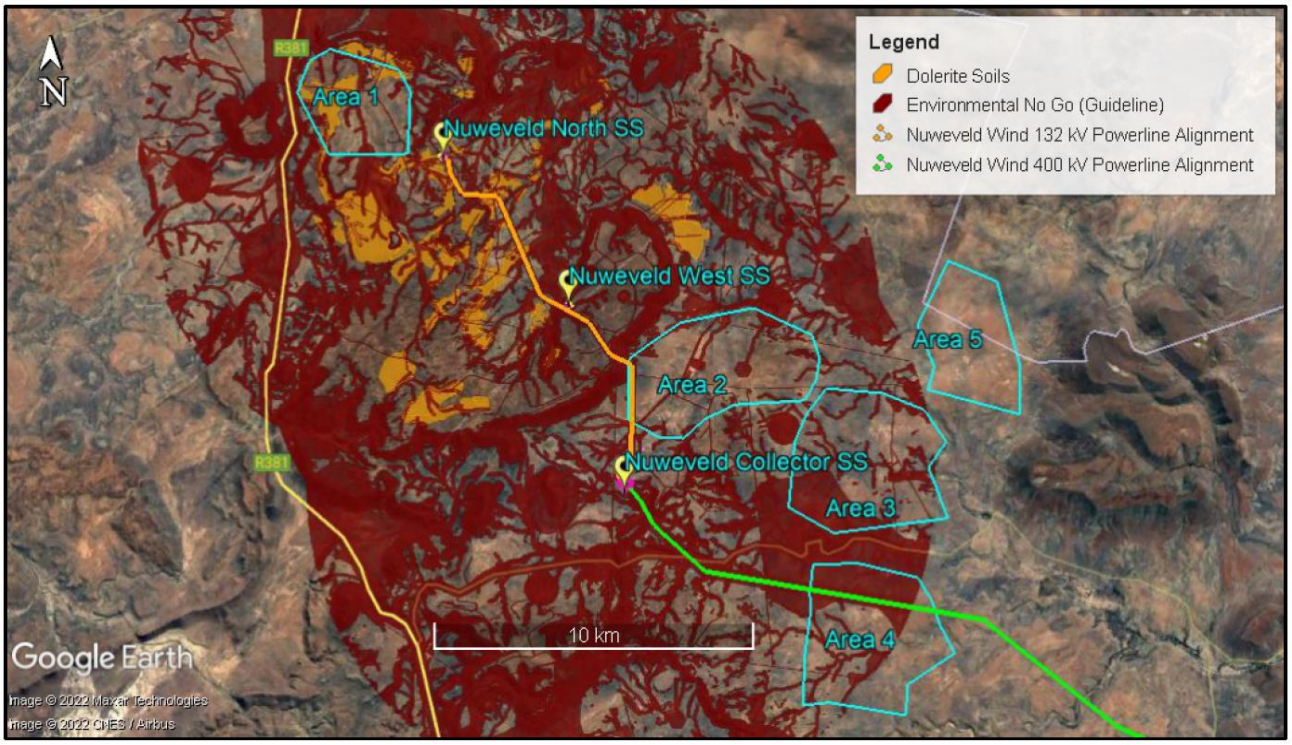


Figure 4-2 - Five potential Mura PV areas

These five areas were then screened from a more detailed technical and environmental perspective. Technical considerations included high-level solar design and the appointed environmental specialists undertook further desk and fieldwork work to provide a more detailed assessment of the environmental features present within these areas. Following this, Areas 1, 3 and 4 were screened out due to several constraints which made development within those areas unfeasible.

The remaining two areas (Areas 2 and 5) available for development were further reduced in size to avoid environmental and technical sensitivities but was determined to still have sufficient remaining development area available to each support two solar PV facilities which then became Mura 1, Mura 2, Mura 3, and Mura 4 (**Table 4-1**).

Following the identification, and considering the topography of the site, the grid corridor was determined to enable connection between the four PV sites and the approved Nuweveld Collector Substation. The grid corridor is arranged in what is called a "collector ring line". This implies that it is a circular grid line connection and not just a single line between the Nuweveld Collector Substation and the Mura facilities. The use of a circular "collector ring line" is an approach used by Eskom and others to improve the grid stability and to ensure that if the grid line is damaged on one side of the "collector ring line", that the solar facilities can still export their energy along the other side of the ring line while the fault is repaired. This allows these facilities to be better integrated into the national grid and to better reduce risks of downtime which enables these solar facility projects to be better adapted to potential amendments to future bidding requirements or to potentially give them a competitive advantage over other similar projects. The assessment footprint of the specialist assessments, specifically for the Mura EGI Corridor is shown below (**Figure 4-3**).

Table 4-1 – Solar PV areas

	Area 1	Area 2		Area 3	Area 4	Area 5	
Screening Phase	1022 Ha	1718 Ha		1779 Ha	1605 Ha	1093 Ha	
Assessment Phase	n/a	176 Ha	484 Ha	n/a	n/a	395 Ha	425 Ha

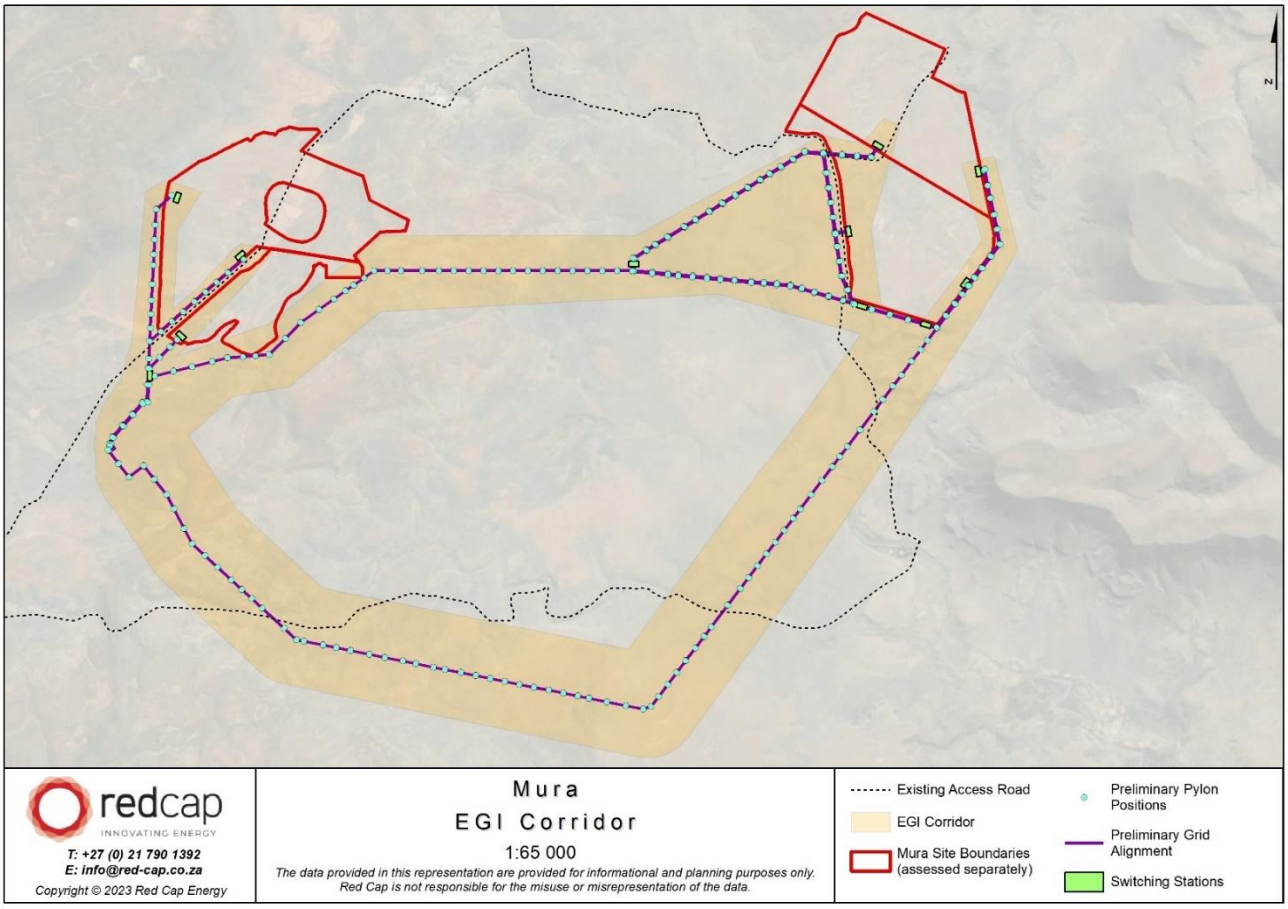
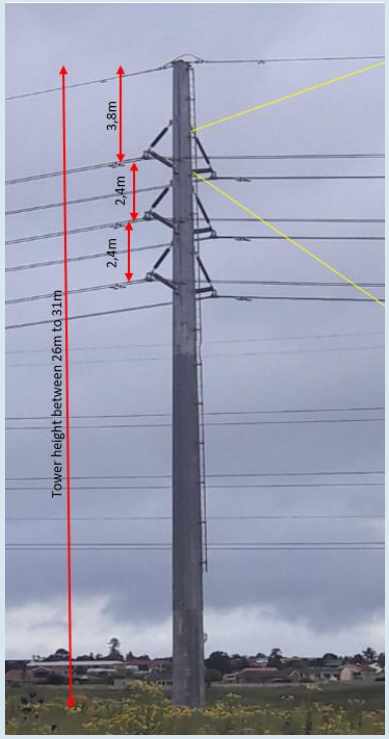


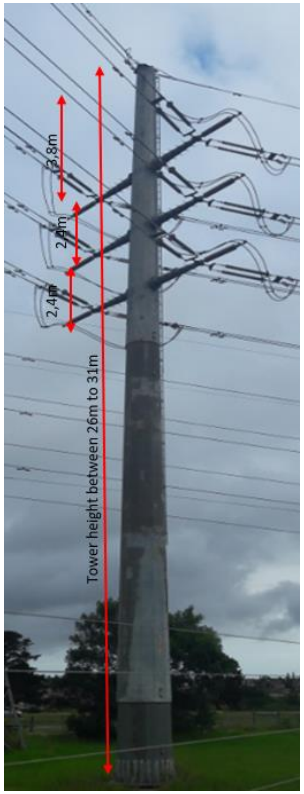
Figure 4-3 - Mura EGI Corridor and the grid alignment and associated infrastructure

4.2 TECHNOLOGY ALTERNATIVES

There are several types of tower structures being considered for the EGI. The different types are indicated in **Table 4-2**.

Table 4-2 - Mura EGI Connection – Steel or wooden Double and Single Circuit options and descriptions

Tower Type	Description	Illustration
132kV Intermediate **Self-Supporting Double Circuit Monopole**	Self-supporting galvanised steel Monopole Intermediate or Suspension structure with no stays/anchors. The monopole is designed to support a double electrical circuit with a twin conductor arrangement. This structure will be used as intermediate structures between inline strain or angle strain points. This structure will also be the most common structure used at an estimated 60% to 80% of the total number of structures. The structure is design to support the conductor weight as well as the wind loading specifications. ▪ Monopole Height: Between 26m and 32m ▪ Pole top diameter: 380mm to 450mm ▪ Pole Base diameter: 1.2m to 1.5m	Front View of the tower with typical foundation size: 
132kV Inline or Angle Strain **Self-Supporting Double Circuit** Monopole	Self-supporting galvanised steel Monopole Inline or Angle Strain structure with no stays/anchors. The monopole is designed to support a double electrical circuit with a twin conductor arrangement.	Front View of the tower:

Tower Type	Description	Illustration
	This structure will be used as the strain structure and will be positioned at the angle points along the line or as an inline position where a strain point is required due to the ground elevation. The number of inline or angle strain points estimated in the order of 20% to 40% of the total number of structures. The monopole is design to support the conductor tensions associated with the conductor weight and span lengths as well as the wind loading specifications. ■ Monopole Height: Between 26m and 32m. ■ Pole top diameter: 380mm to 450mm ■ Pole Base diameter: 1.8m to 2.5m	
132kV Inline or Angle Strain **Guyed Double Circuit** Monopole	Galvanised steel Monopole Inline or Angle Strain structure with anchors/stays for additional structure support. This monopole is similar to the self-supporting monopole but with additional anchor support for conditions where longer span lengths is required with higher conductor tensions.	Front View of the tower:

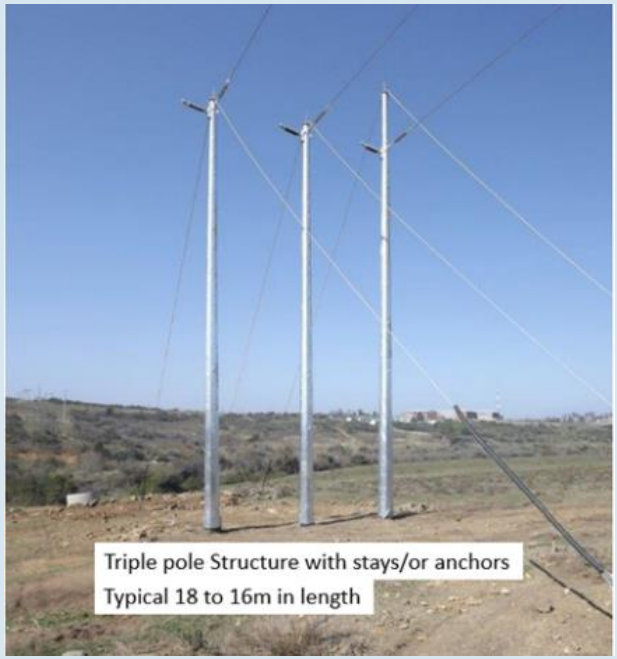
Tower Type	Description	Illustration
	The monopole with anchors is design to support the conductor tensions associated with the conductor weight and longer span lengths. ■ Monopole Height: Between 26m and 32m. ■ Pole top diameter: 380mm to 450mm ■ Pole Base diameter: 1.8m to 2.5m ■ Anchors/Stays: Depending on the angle strain point up to 4 x anchors.	
132kV Suspension **Self-Supporting Single** Circuit Monopole with **single** conductor	Self-supporting galvanised steel Monopole Suspension structure with no stays/anchors. The monopole is designed to support a single electrical circuit with a single conductor arrangement. This structure will be used as an intermediate structure between inline strain or angle strain points and if used will only be used for the collector powerlines on the wind farm sites between the collector switching/ substation and the wind farm switching stations. The structure is designed to support the conductor weight as well as the wind loading specifications. ■ Monopole Height: Between 22m and 26m.	Front View of the tower with typical foundation size:

<table>
<tr><th>Tower Type</th><th>Description</th><th>Illustration</th></tr>
<tr><td></td><td>

Pole top diameter: 230mm
Pole Base diameter: 650mm
The structure will be planted at the following depths:

<table>
<tr><td>22m</td><td>2.8m</td></tr>
<tr><td>24m</td><td>3.0m</td></tr>
<tr><td>26m</td><td>3.2m</td></tr>
</table>
</td><td>  </td></tr>
<tr><td>132kV Inline or Angle Strain Self-Supporting Single Circuit Monopole with single conductor</td><td>Self-supporting galvanised steel Monopole Inline or Angle Strain structure with no stays/anchors. The monopole is designed to support a single electrical circuit with a single conductor arrangement.
This structure will be used as a strain structure and will be positioned at the angle points along the line or as an inline position where a strain point is required due to the ground elevation. If used this structure will only be used for the collector powerlines on the wind farm sites between the collector switching/ substation and the wind farm switching stations.</td><td>Front View of the tower:</td></tr>
</table>

Tower Type	Description	Illustration
	The monopole is designed to support the conductor tensions associated with the conductor weight and span lengths as well as the wind loading specifications. ■ Monopole Height: Between 24m and 26m. ■ Pole top diameter: 380mm ■ Pole Base diameter: 1m to 1.2m The foundation will consists of a typical pad foundation with bolts inside the concrete foundation.	
Triple pole structure 2 x Single circuit with Twin Tern Conductor	For long spans (>350m to 500m) across valleys and rivers. Strain structure with three single monopoles per circuit. 5-9 stays per triple pole structure depending on angle configuration. Typical 18 to 16m in length. In a double circuit configuration it will be a triple pole structure per circuit place at 10m-15m apart	

Tower Type	Description	Illustration
Triple pole structure 1 x Single circuit with up to Twin Tern Conductor	For long spans (>350 m to 500 m) across valleys and rivers. Strain structure with three single monopoles. 5-9 stays per triple pole structure depending on angle configuration. Height: Typically 18 to 16 m.	

4.3 LAYOUT ALTERNATIVES

The approach used for the project is to apply for approval of a corridor that would reasonably be able to accommodate the proposed gridlines and its associated infrastructure. As per the requirements of GN 145, a pre-negotiated gridline alignment has been presented within this Report and avoids, the no-go areas identified by the various specialists (See **Section 10**). This alignment will undergo a pre-construction walkthrough by key specialists (and landowners where necessary) and minor adjustments may be made, were required. This alignment, together with a revised EMPr, which may contain additional mitigation recommendations from the specialists arising from observations made in the preconstruction walkthrough, will then be made available for public review and comment. The final layout and EMPr, including public comments and responses, is then submitted to the Competent Authority for final approval.

Therefore, no layout alternatives are put forward for assessment. The impact assessment provides an assessment of the corridor in which all “No-Go’s”, restrictions and requirements in terms of environmental constraints are identified to limit the impact to sensitive areas/features (within the levels of acceptable change defined by the respective specialists) of any reasonable grid alignment within the corridor.

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4.4 NO-GO ALTERNATIVE

In the “no project” alternative, the Mura EGI project will not be developed. In this scenario, there could be a missed opportunity to address the need for increase in renewable energy generation in an effort to mitigate against concerns of climate change and exploitation of non-renewable resources. The no-go alternative would not assist in responding to the growing electricity demand in South Africa and would not contribute to the reliability of electricity supply at a national scale. Conversely, negative environmental impacts of the project (as outlined in Section 8) associated with the development of the Mura EGI Corridor would be avoided.

Specialists have considered the no-go alternative and the following has been concluded:

- Agriculture:
  - The one identified potential impact is that due to irregular rainfall in the area, which is likely to be exacerbated by climate change, agriculture in the area will come under increased pressure in terms of economic viability.
  - The development offers an alternative income source to agriculture, but it restricts agricultural use of the site.
  - Therefore, even though the excluded land has low agricultural production potential, the negative agricultural impact of the development is more significant than that of the no-go alternative, and so, purely from an agricultural impact perspective, the no-go alternative is the preferred alternative between the development and the no-go.
  - However, the no-go option would prevent the proposed development from contributing to the environmental, social and economic benefits associated with the development of renewable energy in South Africa.
- Terrestrial Biodiversity:

- Assuming that the project does not go ahead, the grid would not be built and the current land use would continue into the future.
- The area is currently used for extensive livestock and/or game farming which are considered to be largely compatible with long-term biodiversity maintenance. Many fauna species are to some degree negatively affected by farming including many predators which are targeted due to their negative impact on livestock, while some species may also be vulnerable to habitat loss or degradation and may experience depressed populations within the farming landscape.
- In terms of vegetation and plant species, extensive grazing may result in changes in composition towards less palatable species and a reduction in plant cover. It is however important to recognise that the development does not represent an alternative to extensive livestock farming, but rather an additional impact independent of the current land use.
- Overall, the no-go alternative is considered to result in a low negative impact on terrestrial biodiversity.

- Aquatic:
  - Potential very low significance impacts on aquatic ecology would be avoided should the No-Go alternative be selected.
- Animal and Plant:
  - Under the no-go alternative, the current land use consisting of extensive livestock grazing would continue. When applied correctly, such livestock grazing is considered to be largely compatible with long-term biodiversity conservation, although in practice there are some negative effects associated with such land use such as predator control and negative impacts on habitat availability for the larger ungulates that would historically have utilised the area.
  - Under the current circumstances, the no-go alternative is considered to represent a low long-term negative impact on the environment.
- Avifauna:
  - The No-Go alternative or status quo would not impact on avifauna in any new way. Farming does have its' own impacts on birds, but they have evolved into co-existing for the large part, and most of the site is not intensively farmed (it being mostly livestock grazing).
- Heritage
  - If the project were not implemented, the site would stay as it currently is (impact significance of neutral). Although the heritage impacts with implementation would be greater than the existing impacts, the loss of socio-economic benefits is more significant and suggests that the No-Go option is less desirable in heritage terms.
- Traffic
  - If the proposed development does not materialise, the increase in the traffic volume will not transpire, resulting in the following impacts:
    - Road Degradation: Less traffic on the roads means that the rate of degradation to the roads will be less. However, the maintenance of the roads will not be augmented by the proposed development. Improved maintenance of the roads will improve the quality of life for the road users and could increase the economic opportunities in the area. The status quo is therefore rated as of low negative significance.

  - Road Safety: Less traffic on the roads means less probability of an incident, reducing the likelihood of a fatality. Therefore, the impact is neutral.
  - Statement: The improved road maintenance counteracts the negative impacts on the road network due to the development and economic prospects the development will bring to the local community and the impact the development has on a national scale.
- Visual
  - The No-Go alternative would result in no visual impacts and thus the status quo would remain.

5 GOVERNANCE FRAMEWORK

5.1 NATIONAL LEGAL AND REGULATORY FRAMEWORK

The South African regulatory framework establishes well-defined requirements and standards for environmental and social management of industrial and civil infrastructure developments. Different authorities at both national and regional levels carry out environmental protection functions. The applicable legislation and policies are shown in **Table 5-1**.

Table 5-1 – Applicable National Legislation[7]

Legislation	Description of Legislation and Applicability
The Constitution of South Africa (No. 108 of 1996)	The Constitution cannot manage environmental resources as a stand-alone piece of legislation hence additional legislation has been promulgated in order to manage the various spheres of both the social and natural environment. Each promulgated Act and associated Regulations are designed to focus on various industries or components of the environment to ensure that the objectives of the Constitution are effectively implemented and upheld in an on-going basis throughout the country. In terms of Section 7, a positive obligation is placed on the State to give effect to the environmental rights.
National Environmental Management Act (No. 107 of 1998)	In terms of Section 24(2) of the NEMA, the Minister may identify activities, which may not commence without prior authorisation. The Minister thus published GNR 983 (as amended) (Listing Notice 1), GNR 984 (as amended) (Listing Notice 2) and GNR 985 (as amended) (Listing Notice 3) listing activities that may not commence prior to authorisation. The regulations outlining the procedures required for authorisation are published in the EIA Regulations of 2014 (GNR 982) (as amended). Listing Notice 1 identifies activities that require a BA process to be undertaken, in terms of the EIA Regulations, prior to commencement of that activity. Listing Notice 2 identifies activities that require an S&EIR process to be undertaken, in terms of the EIA Regulations, prior to commencement of that activity. Listing Notice 3 identifies activities within specific areas that require a BA process to be undertaken, in terms of the EIA Regulations, prior to commencement of that activity. WSP undertook a legal review of the listed activities according to the proposed project description to conclude that the activities listed in in this section are considered applicable to the development: A BA process must be followed. An EA is required and will be applied for with the DFFE.
Listing Notice 1: GNR 983	**Activity 11**

[7] It should be noted that all dimensions outlined in relation to Listing Notice 1, 2 and 3 are provisional and are subject to final design.

Legislation	Description of Legislation and Applicability
	The development of facilities or infrastructure for the transmission and distribution of electricity— *(i) outside urban areas or industrial complexes with a capacity of more than 33 but less than 275 kilovolts* **Description:** The site is currently zoned as agricultural land and falls outside the urban area. The Mura EGI Corridor will include ~70 km of overhead 132 kV lines (~40 km will be single overhead 132 kV lines and ~30 km will be up to two overhead 132 kV lines running in parallel running between the switching stations) supported by monopole pylons with a max height 38m.
	Activity 12 *The development of—* *(ii) infrastructure or structures with a physical footprint of 100 square metres or more; where such development occurs—* *(a) within a watercourse; or* *(c) if no development setback exists, within 32 metres of a watercourse, measured from the edge of a watercourse* **Description:** Drainage lines are scattered along the proposed corridor. Existing roads will be used as far as possible to minimise any new impacts on these systems, but will have to cross watercourses to ensure access to the grid. No pylons are to be placed within the delineated watercourses, but some may occur within 32m of a watercourse. Therefore, more than 100m^2 disturbance within 32m of a watercourse would likely occur.
	Activity 14 *The development and related operation of facilities or infrastructure for the storage, or storage and handling of a dangerous good, where such storage occurs in containers with a combined capacity of 80 but not exceeding 500 cubic metres* **Description:** The EGI corridor would erect a temporary fuel (and lubricants) and powder cement storage facilities during the construction phase. The combined storage capacity of all of the above facilities/infrastructure will exceed 80m^3 but will be below 500m^3.
	Activity 19 *The infilling or depositing of any material of more than 10 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 10 cubic metres from a watercourse.*

Legislation	Description of Legislation and Applicability
	Description: Drainage lines are scattered along the proposed corridor. Existing roads will be used as far as possible to minimise any new impacts on these systems, but will have to cross watercourses to ensure access to the grid thus more than 10m^3 of soil, sand, shells, shell grit, pebbles or rock will likely be infilled or dredged, excavated, removed or moved from a watercourse.
	Activity 27 *The clearance of an area of 1 hectare or more, but less than 20 hectares of indigenous vegetation, except where such clearance of indigenous vegetation is required for-* *(i) undertaking of a linear activity* **Description:** The switching stations, pylons and temporary site camps associated with the Mura EGI Corridor will occupy on area of 19 ha. This area will be fully transformed.
	Activity 28 *Residential, mixed, retail, commercial, industrial or institutional developments where such land was used for agriculture, game farming, equestrian purposes or afforestation on or after 01 April 1998 and where such development:* *(ii) will occur outside an urban area, where the total land to be developed is bigger than 1 ha;* **Description:** The land is zoned as agricultural and will continue to be used for agricultural purposes should the proposed project receive environmental authorisation. The project extent of Mura EGI Corridor Facility is 52 ha. This area will be fully transformed.
Listing Notice 3: GNR 985	**Activity 12:** *The clearance of an area of 300 square metres or more of indigenous vegetation except where such clearance of indigenous vegetation is required for maintenance purposes undertaken in accordance with a maintenance management plan.* *In i. Western Cape:* *ii. Within critical biodiversity areas identified in bioregional plans;* **Description:** The Mura EGI Corridor overlaps with a Critical Biodiversity Area (CBA 1) located within the Western Cape Province.

Legislation	Description of Legislation and Applicability
	Vegetation clearance for pylon foundations and access tracks inside CBAs will be in excess of 300m^2 of indigenous vegetation.
	Activity 14: *The development of—* *(ii) infrastructure or structures with a Physical footprint of 10 Square metres or more;* *where such development occurs—* *(a) within a watercourse;* *(c) if no development setback has been adopted, within 32 metres of a watercourse, measured from the edge of a watercourse;* *In i. Western Cape:* *ii. Outside urban areas:* *(ff) Critical biodiversity areas or ecosystem service areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans* **Description:** There are a few small ESAs that are associated with minor drainage features and CBAs in the Western Cape, that are located along the proposed corridor. Existing roads will be used as far as possible to minimise any new impacts on these systems, but some new access tracks will have to cross these watercourses to ensure access to the grid. No pylons are to be placed within the delineated watercourses, but some may occur within 32m of a watercourse.
Procedures for the Assessment and Minimum Criteria for Reporting on Identified Environmental Themes (GNR 320, 20 March 2020 and GNR 1150, 30 October 2020)	The protocols provide the criteria for specialist assessment and minimum report content requirements for impacts for various environmental themes for activities requiring environmental authorisation. The protocols replace the requirements of Appendix 6 of the EIA Regulations, 2014, as amended. The assessment and reporting requirements of the protocols are associated with a level of environmental sensitivity identified by the national web based environmental screening tool (screening tool). The following environmental themes were applicable to the Mura EGI Corridor: ▪ Agriculture Theme ▪ Animal Species Theme ▪ Aquatic Biodiversity Theme ▪ Archaeological and Cultural Heritage Theme ▪ Avian Theme ▪ Civil Aviation Theme ▪ Defence Theme ▪ Landscape (Solar) Theme ▪ Palaeontology Theme ▪ Plant Species Theme ▪ Radio Frequency Interference (RFI) Theme ▪ Terrestrial Biodiversity Theme

Legislation	Description of Legislation and Applicability
Renewable Energy Development Zones and Strategic Transmission Corridors	On 16 February 2018, the DFFE gazetted the Renewable Energy Development Zones (REDZs) and Strategic Transmission Corridors and Procedures for the Assessment of Large-scale Wind and Solar Photovoltaic Energy Development Activities (GN 114) and Grid Infrastructure (GN 113). Subsequently, on 26 February 2021 a further three REDZ were gazetted (GN 142). The procedure allows for wind and solar PV activities within the eight REDZs and electricity grid development within the five power corridors to be subjected to a BA and not a full S&EIA process. In addition, the timeframes associated with the decision on the application is reduced from 107 days to 57 days. **The Mura EGI Corridor is predominantly located within a REDZ and wholly within the Central Strategic Corridor.**
Identification of Procedures to be followed when applying for or deciding on an Environmental Authorisation Application for the Development of Electricity Transmission and Distribution Infrastructure when occurring in Energy Development Zones (GN 145)	Regulation 3 of GN 145 states: *The scope of this Notice applies to an application for an amendment to an environmental authorisation contemplated in Part 2 of Chapter 5 of the Environmental Impact Assessment Regulations, 2014, as amended, and for an application for an environmental authorisation when triggering the following activities related to the development of electricity transmission and distribution infrastructure, including any associated activities necessary for the realisation of such infrastructure, where the greater part of the facility is undertaken within a Renewable Energy Development Zone contemplated in paragraph 1 or 2 of this Schedule*. Regulation 3 of GN145 is therefore applicable to the Mura EGI Corridor, which is therefore subject to a BA process. As required by Regulation 5 of GNR 145, the BAR outlines and assesses the corridor within which the pre-negotiated route will occur.
National Environmental Management: Waste Act (59 of 2008) (NEM:WA)	This Act provides for regulating waste management in order to protect health and the environment by providing reasonable measures for the prevention of pollution and ecological degradation. The Act also provides for the licensing and control of waste management activities through GNR. 921 (2013): List of Waste Management Activities that Have, or are Likely to Have, a Detrimental Effect on the Environment. The proposed project does not constitute a Listed Activity requiring a Waste Management Licence (WML) as defined in GNR 921. However, the contents of this BA Report will include reasonable measures for the prevention of pollution and good international industry practice (GIIP).
National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004)	The National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004) (NEMBA) was promulgated in June 2004 within the framework of NEMA to provide for the management and conservation of national biodiversity. The NEMBA's primary aims are for the protection of species and ecosystems that warrant national protection, the sustainable use of indigenous biological resources, the fair and equitable sharing of benefits arising from bioprospecting involving indigenous biological resources. In

Legislation	Description of Legislation and Applicability
	addition, the NEMBA provides for the establishment and functions of a South African National Biodiversity Institute (SANBI). SANBI was established by the NEMBA with the primary purpose of reporting on the status of the country's biodiversity and conservation status of all listed threatened or protected species and ecosystems. The terrestrial biodiversity assessment (**Appendix G.2**) identified an extensive CBA (CBA 1) located within the Mura EGI Corridor. The CBA maps indicate the most efficient selection and classification of land portions requiring safeguarding in order to meet national biodiversity objectives. The Conservation of Agricultural Resources Act (No. 43 of 1983) (CARA) Regulations with regards to alien and invasive species have been superseded by the National Environmental Management: Biodiversity Act, 2004 (Act no. 10 of 2004) – Alien and Invasive Species (AIS) Regulations which became law on 1 October 2014. Specific management measures for the control of alien and invasive plants will be included in the Environmental Management Programme (EMPr).
National Environmental Management Protected Areas Act (No. 57 of 2003)	The purpose of the National Environmental Management Protected Areas Act (No. 57 of 2003) (NEMPAA) is to, *inter alia*, provide for the protection and conservation of ecologically viable areas representative of South Africa's biological diversity and its natural landscapes and seascapes. To this end, it provides for the declaration and management of various types of protected areas. Section 50(5) of NEMPAA states that "no development, construction or farming may be permitted in a nature reserve or world heritage site without the prior written approval of the management authority." According to the National Parks Area Expansion Strategy (NPAES), there are no areas within the study area that have been identified as priority areas for inclusion in future protected areas. The study area is therefore outside the NPAES focus area.
The National Water Act (No. 36 Of 1998)	The National Water Act, 1998 (Act No. 36 of 1998) (NWA) provides the framework to protect water resources against over exploitation and to ensure that there is water for social and economic development, human needs and to meet the needs of the aquatic environment. The Act defines water source to include watercourses, surface water, estuary or aquifer. A watercourse is defined in the Act as a river or spring, a natural channel in which water flows regularly or intermittently, a wetland, lake or dam into which or from which water flows, and any collection of water that the Minister may declare a watercourse. Section 21 of the Act outlines a number of categories that require a water user to apply for a Water Use License (WUL) and Section 22 requires water users to apply for a General Authorisation (GA) with the Department of Water and Sanitation (DWS) if they are under certain thresholds or meet certain criteria. The list of water uses applicable to the proposed Project include: c) Impeding or diverting the flow of water in a watercourse; i) Altering the bed, banks, course or characteristics of a watercourse; The DWS will make the final decision on water uses that are applicable to the project through a pre-application meeting after which a Water Use

Legislation	Description of Legislation and Applicability
	Authorisation Application (WUA) as determined by the risk assessment will be undertaken in compliance with procedural regulations published by the DWS within General Notice 267 (GN267). These regulations specify required information per water use and the reporting structure of required supporting technical information.
The National Heritage Resources Act (No. 25 Of 1999)	The National Heritage Resource Act (Act No. 25 of 1999) (NHRA) serves to protect national and provincial heritage resources across South Africa. The NHRA provides for the protection of all archaeological and palaeontological sites, the conservation and care of cemeteries and graves by the South African Heritage Resources Agency (SAHRA) and lists activities that require any person who intends to undertake to notify the responsible heritage resources agency and furnish details regarding the location, nature, and extent of the proposed development. Part 2 of the NHRA details specific activities that require a Heritage Impact Assessment (HIA) that will need to be approved by SAHRA. Parts of Section 35, 36 and 38 apply to the proposed project, principally: ▪ Section 35 (4) - No person may, without a permit issued by the responsible heritage resources authority- • destroy, damage, excavate, alter, deface or otherwise disturb any archaeological or palaeontological site or any meteorite; • destroy, damage, excavate, remove from its original position, collect or own any archaeological or palaeontological material or object or any meteorite. ▪ Section 38 (1) Subject to the provisions of subsections (7), (8) and (9), any person who intends to undertake a development categorised as- • any development or other activity which will change the character of a site— (i) exceeding 5 000 m2 in extent, must at the very earliest stages of initiating such a development, notify the responsible heritage resources authority and furnish it with details regarding the location, nature and extent of the proposed development. In terms of Section 38(8), approval from the heritage authority is not required if an evaluation of the impact of such development on heritage resources is required in terms of any other legislation (such as NEMA), provided that the consenting authority ensures that the evaluation of impacts fulfils the requirements of the relevant heritage resources authority in terms of Section 38(3) and any comments and recommendations of the relevant resources authority with regard to such development have been taken into account prior to the granting of the consent. However, should heritage resources of significance be affected by the proposed Mura EGI Corridor, a permit is required to be obtained prior to disturbing or destroying such resources as per the requirements of Section 48 of the NHRA, and the SAHRA Permit Regulations (GN R668). A Heritage Report (**Appendix G.7**) has been carried out by a suitably qualified specialist, revealing: ▪ There are no significant concerns for the proposed EGI project. A few sites are known to occur within the corridor, but given the size of the corridor, it is expected that these will be easily avoided. The proposed project will be loaded onto the SAHRIS portal for comment by SAHRA, HWC and Northern Cape Heritage Resources Authority.

Legislation	Description of Legislation and Applicability
Noise Control Regulations in terms of the Environmental Conservation, 1989 (Act 73 of 1989)	In South Africa, environmental noise control has been in place for three decades, beginning in the 1980s with codes of practice issued by the South African National Standards (formerly the South African Bureau of Standards, SABS) to address noise pollution in various sectors of the country. Under the previous generation of environmental legislation, specifically the Environmental Conservation Act 73 of 1989 (ECA), provisions were made to control noise from a National level in the form of the Noise Control Regulations (GNR 154 of January 1992). In later years, the ECA was replaced by the National Environmental Management Act 107 of 1998 (NEMA) as amended. The National Environmental Management: Air Quality Act 39 of 2004 (NEMAQA) was published in line with NEMA and contains noise control provisions under Section 34: (1) The minister may prescribe essential national standards – (a) for the control of noise, either in general or by specific machinery or activities or in specified places or areas; or (b) for determining – (i) a definition of noise; and (ii) the maximum levels of noise. (2) When controlling noise, the provincial and local spheres of government are bound by any prescribed national standards. Under NEMAQA, the Noise Control Regulations were updated and are to be applied to all provinces in South Africa. The Noise Control Regulations give all the responsibilities of enforcement to the Local Provincial Authority, where location specific by-laws can be created and applied to the locations with approval of Provincial Government. Where province-specific regulations have not been promulgated, acoustic impact assessments must follow the Noise Control Regulations. Furthermore, NEMAQA prescribes that the Minister must publish maximum allowable noise levels for different districts and national noise standards. These have not yet been accomplished and as a result all monitoring and assessments are done in accordance with the South African National Standards (SANS) 10103:2008 and 10328:2008.
National Environment Management Air Quality Act (No. 39 of 2004)	The National Environment Management: Air Quality Act (No. 39 of 2004) (NEMAQA) came into effect on 11 September 2005. Persons undertaking such activities listed under GNR 893, as amended, are required to possess an Atmospheric Emissions License (AEL). The National Dust Control Regulations (GNR 827) were promulgated in terms of Section 32 of NEMAQA, which aim at prescribing general measures for the control of dust in both residential and non-residential areas. Although no AEL will be required for the construction and operation of the Mura EGI Corridor, the dust control regulations will be applicable during construction.
Conservation of Agricultural Resources Act (No. 43 of 1983)	The Conservation of Agricultural Resources Act (Act 43 of 1983) (CARA) provides for the implementation of control measures for soil conservation works as well as alien and invasive plant species in and outside of urban areas.

Legislation	Description of Legislation and Applicability
	In terms of the amendments to the regulations under the CARA, landowners are legally responsible for the control of alien species on their properties. Various Acts administered by the DFFE and the DWS, as well as other laws (including local by-laws), spell out the fines, terms of imprisonment and other penalties for contravening the law. Although no fines have yet been placed against landowners who do not remove invasive species, the authorities may clear their land of invasive alien plants and other alien species entirely at the landowners' cost and risk. The CARA Regulations with regards to alien and invasive species have been superseded by NEMBA Alien and Invasive Species (AIS) Regulations which became law on 1 October 2014.
Civil Aviation Act (No. 13 of 2009)	Civil aviation in South Africa is governed by the Civil Aviation Act (Act 13 of 2009). This Act provides for the establishment of a stand-alone authority mandated with controlling, promoting, regulating, supporting, developing, enforcing and continuously improving levels of safety and security throughout the civil aviation industry. This mandate is fulfilled by South African Civil Aviation Authority (SACAA) as an agency of the Department of Transport (DoT). SACAA achieves the objectives set out in the Act by complying with the Standards and Recommended Practices (SARPs) of the International Civil Aviation Organisation (ICAO), while considering the local context when issuing the South African Civil Aviation Regulations (SA CARs). As of the 1st of May 2021, Air Traffic and Navigation Services (ATNS) has been appointed as the new Obstacle application Service Provider for Windfarms and later Solar Plants. Their responsibility would pertain to the assessments, maintenance, and all other related matters in respect to Windfarms and in due time Power Plant assessments. The DFFE Screening Tool Report identified Civil Aviation as having low sensitivity for the proposed Mura EGI Corridor, and no major or other types of civil aviation aerodromes. ATNS and SACAA will be included on the project stakeholder database. They will be informed of the proposed Project, and comment will be sought from these authorities as applicable.
Occupational Health and Safety Act (No. 85 of 1993)	The National Occupational Health and Safety Act (No. 85 of 1993) (OHSA) and the relevant regulations under the Act are applicable to the proposed project. This includes the Construction Regulations promulgated in 2014 under Section 43 of the Act. Adherence to South Africa's OHSA and its relevant Regulations is essential.
National Energy Act (No. 34 of 2008)	The National Energy Act aims to ensure that diverse energy resources are available, in sustainable quantitates, and at affordable prices, to the South African economy in support of economic growth and poverty alleviation, taking into account environmental management requirements and interactions amongst economic sectors. The main objectives of the Act are to: ▪ Ensure uninterrupted supply of energy to the Republic; ▪ Promote diversity of supply of energy and its sources; ▪ Facilitate effective management of energy demand and its conservation;

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

5.2 POLICIES AND PLANS

Table 5-2 summarised key policies and plans as an outline of the governance framework for the project.

Table 5-2 – Applicable Regional Policies and Plans

Applicable Policy	Description of Policy
National Development Plan	The National Development Plan aims to eliminate poverty and reduce inequality by 2030. The NDP identifies a number of enabling milestones. Of relevance to the proposed development the NDP refers to the need to produce sufficient energy to support industry at competitive prices and ensure access for poor households, while reducing carbon emissions per unit of power by about one-third. In this regard the infrastructure is not just essential for faster economic growth and higher employment. It also promotes inclusive growth, providing citizens with the means to improve their own lives and boost their incomes. Infrastructure is essential to development. Chapter 3, Economy and Employment, identifies some of the structural challenges specific to South Africa, including an energy constraint that will act as a cap on growth and on options for industrialisation. The NDP notes that from an environmental perspective South Africa faces several related challenges. The reduction of greenhouse gas emissions and shift to a green low-carbon economy, is one of these challenges. In terms of implementation the NDP identifies three phases. The first two are of specific relevance to the proposed project. The first phase (2012–2017) notes that ensuring the supply of energy and water is reliable and sufficient for a growing economy. The second phase (2018–2023) involves building on the first phase to lay the foundations for more intensive improvements in productivity. The provision of affordable and reliable energy is a key requirement for this to take place. Chapter 4, Economic infrastructure, notes that economic infrastructure provides the foundation for social and economic development. In this regard South Africa must invest in a strong network of economic infrastructure designed to support the country's medium- and long-term economic and social objectives. The plan envisages that, by 2030, South Africa will have an energy sector that promotes: ▪ Economic growth and development through adequate investment in energy infrastructure. The sector should provide reliable and efficient energy service at competitive rates, while supporting economic growth through job creation. ▪ Environmental sustainability through efforts to reduce pollution and mitigate the effects of climate change. More specifically, South Africa should have adequate supply security in electricity and in liquid fuels, such that economic activity, transport, and welfare are not disrupted. The plan sets out steps that aim to ensure that, in 20 years, South Africa's energy system looks very different to the current situation. In this regard coal will contribute proportionately less to primary-energy needs, while gas and renewable energy resources, will play a much larger role.
Integrated Resource Plan 2010 – 2030	The IRP is an electricity capacity plan which aims to provide an indication of the country's electricity demand, how this demand will be supplied and what it will cost. On 6 May 2011, the then Department of Energy (DoE) released

Applicable Policy	Description of Policy
	the Integrated Resource Plan 2010-2030 (IRP 2010) in respect of South Africa's forecast energy demand for the 20-year period from 2010 to 2030. The promulgated IRP 2010–2030 identified the preferred generation technology required to meet expected demand growth up to 2030. It incorporated government objectives such as affordable electricity, reduced greenhouse gas (GHG) emissions, reduced water consumption, diversified electricity generation sources, localisation and regional development. The IRP recognises that solar PV, wind and CSP with storage present an opportunity to diversify the electricity mix, to produce distributed generation and to provide off-grid electricity. Renewable technologies also present huge potential for the creation of new industries, job creation and localisation across the value chain.
New Growth Path	Government released the New Economic Growth Path Framework on 23 November 2010. The aim of the framework is to enhance growth, employment creation and equity. The policy's principal target is to create five million jobs over the next 10 years and reflects government's commitment to prioritising employment creation in all economic policies. The framework identifies strategies that will enable South Africa to grow in a more equitable and inclusive manner while attaining South Africa's developmental agenda. Central to the New Growth Path is a massive investment in infrastructure as a critical driver of jobs across the economy. In this regard the framework identifies investments in five key areas namely: energy, transport, communication, water, and housing.
National Infrastructure Plan	The South African Government adopted a National Infrastructure Plan (NIP) in 2012. The NIP aims to transform the South African economic landscape while simultaneously creating significant numbers of new jobs and strengthening the delivery of basic services. It outlines the challenges and enablers which needs to be addressed in the building and developing of infrastructure. The Presidential Infrastructure Coordinating Commission (PICC) was established by the Cabinet to integrate and coordinate the long-term infrastructure build. The plan also supports the integration of African economies. In terms of the plan Government will invest R827 billion over the next three years to build new and upgrade existing infrastructure. The aim of the investments is to improve access by South Africans to healthcare facilities, schools, water, sanitation, housing and electrification. The plan also notes that investment in the construction of ports, roads, railway systems, electricity plants, hospitals, schools and dams will contribute to improved economic growth.
Integrated Energy Plan	The development of a National IEP was envisaged in the White Paper on the Energy Policy of the Republic of South Africa of 1998 and, in terms of the National Energy Act, 2008 (Act No. 34 of 2008), the Minister of Energy is mandated to develop and, on an annual basis, review and publish the IEP in the Government Gazette. The purpose of the IEP is to provide a roadmap of the future energy landscape for South Africa which guides future energy infrastructure investments and policy development. The IEP notes that South Africa needs to grow its energy supply to support economic expansion and in so doing, alleviate supply bottlenecks and supply-demand deficits. In addition, it is essential that all citizens are provided with clean and modern forms of energy at an affordable price. As

Applicable Policy	Description of Policy
	part of the Integrated Energy Planning process, eight key objectives are identified, namely: ▪ Objective 1: Ensure security of supply. ▪ Objective 2: Minimise the cost of energy. ▪ Objective 3: Promote the creation of jobs and localisation. ▪ Objective 4: Minimise negative environmental impacts from the energy sector. ▪ Objective 5: Promote the conservation of water. ▪ Objective 6: Diversify supply sources and primary sources of energy. ▪ Objective 7: Promote energy efficiency in the economy. ▪ Objective 8: Increase access to modern energy. The IEP provides an assessment of current energy consumption trends within different sectors of the economy (i.e., agriculture, commerce, industry, residential and transport) and uses this information to identify future energy requirements, based on different scenarios. The scenarios are informed by different assumptions on economic development and the structure of the economy and also take into account the impact of key policies such as environmental policies, energy efficiency policies, transport policies and industrial policies, amongst others. Based on this information the IEP then determines the optimal mix of energy sources and technologies to meet those energy needs in the most cost-effective manner for each of the scenarios. The associated environmental impacts, socio-economic benefits and macroeconomic impacts are also analysed. The IEP is therefore focused on determining the long-term energy pathway for South Africa, taking into account a multitude of factors which are embedded in the eight objectives. As part of the analysis four key scenarios were developed, namely the Base Case, Environmental Awareness, Resource Constrained and Green Shoots scenarios: ▪ The Base Case Scenario assumes that existing policies are implemented and will continue to shape the energy sector landscape going forward. It assumes moderate economic growth in the medium to long term. ▪ The Environmental Awareness Scenario is characterised by more stringent emission limits and a more environmentally aware society, where a higher cost is placed on externalities caused by the supply of energy. ▪ The Resource Constrained Scenario in which global energy commodity prices (i.e. coal, crude oil and natural gas) are high due to limited supply. ▪ The Green Shoots Scenario describes an economy in which the targets for high economic growth and structural changes to the economy, as set out in the National Development Plan (NDP), are met. The IEP notes that South Africa should continue to pursue a diversified energy mix which reduces reliance on a single or a few primary energy sources. In terms of existing electricity generation capacity, the IEP indicates that existing capacity starts to decline notably from 2025, with significant plant retirement occurring in 2031, 2041 and 2048. By 2050 only 20% of the current electricity generation capacity remains. As a result, large investments are required in the electricity sector in order to maintain an adequate supply in support of economic growth.

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

5.3 PROVINCIAL AND MUNICIPAL LEGAL AND REGULATORY FRAMEWORK

Table 5-3 – Provincial Plans

Applicable Plan	Description of Plan
Western Cape Nature Conservation Laws Amendment Act (Act No 3 of 2000):	This Act lists Protected species, requiring permits for removal (CapeNature) relating to The Nature and Environmental Conservation Ordinance, 1974.

Applicable Plan	Description of Plan
Western Cape Spatial Development Framework (2014)	The Western Cape Provincial Spatial Development Framework, 2014 (PSDF) is an approved structure plan in terms of the Spatial Planning and Land Use Management Act (Act 16 of 2013) (SPLUMA) and the Land Use Planning Act (Act 3 of 2014) (LUPA) and aims to give spatial expression to the NDP and One Cape 2040 initiatives. It provides guidelines for district, metropolitan and local municipal spatial initiatives such as Integrated Development Plans (IDPs) and Spatial Development Frameworks (SDFs). The PSDF is a broad-based document and does not control development or land use proposals at a micro-scale (e.g. individual properties). It is, however, relevant in setting out overarching planning policy guidelines adopted by the Provincial Government, and major development applications need to take guidance from and be evaluated in terms of these policy guidelines. The Western Cape PSDF is underpinned by three interrelated themes, namely: ▪ Sustainable use of the Western Cape's spatial assets (resources); ▪ Opening up opportunities in the Provincial space-economy (space economy); and ▪ Developing integrated and sustainable settlements (settlement). The WCPSDF also includes the following spatial agenda: ▪ Grow the Province's economy in partnership with the private sector, non-government and community based organisations; ▪ Use infrastructure investment as the primary lever to ensure urban and rural spatial transitions; and ▪ Improve the sustainable use of the Province's spatial assets and resources. Key spatial challenges are outlined in Chapter 2 of the PSDF. Energy security and climate change response are identified as key high-level future risk factors. With regard to energy use, the PSDF notes that the Cape Metro (albeit the province's most efficient user) and West Coast regions are the Province's main energy users. It further notes that the Western Cape's electricity is primarily drawn from the national grid, which is dominated by coal-based power stations, and that the province currently has a small emergent renewable energy sector in the form of wind and solar generation facilities located in its more rural, sparsely populated areas. With regard to renewable energy, the following policy provisions are of relevance: ▪ Policy R.4.6: Pursue energy diversification and energy efficiency in order for the Western Cape to transition to a low carbon, sustainable energy future, and delink economic growth from energy use. ▪ R.4.7: Support emergent Independent Power Producers (IPPs) and sustainable energy producers (wind, solar, biomass and waste conversion initiatives) in suitable rural locations (as per recommendations of the Strategic Environmental Assessments for wind energy (DEA&DP) and renewable energy (DFFE). Water scarcity is identified as probably the key risk associated with climate change. Policy provisions are made with regard to climate change adaptation and mitigation. Concerning renewable energy, the following is of relevance: ▪ R.4.16: Encourage and support renewable energy generation at scale.

Applicable Plan	Description of Plan
Western Cape Infrastructure Framework (2013)	The Western Cape Infrastructure Framework (WCIF) (2013) was developed by the WCP Provincial Department of Transport and Public Works in terms of the Provincial Government's mandate to coordinate provincial planning under Schedule 5A of the Constitution. The objective of the WCIF is to align the planning, delivery and management of infrastructure to the strategic agenda and vision for the province, as outlined in the 2009-2014 Draft Provincial Strategic Plan. The One Cape 2040 and 2013 Green is Smart strategy were other key informants. The document notes that given the status quo of infrastructure in the province, and the changing and uncertain world facing the Western Cape over the 2-3 decades a new approach to infrastructure is needed. Namely one that satisfies current needs and backlogs, maintains the existing infrastructure, and plans proactively for a desired future outcome. The 2040 vision requires a number of transitions to shift fundamentally the way in which infrastructure is provided and the type of infrastructure provided in WCP. The WCIF addresses new infrastructure development under five major 'systems' (themes), and outlines priorities for each. Energy is one of the 'systems' identified. The document notes that a provincial demand increase of 3% per year is anticipated for the period 2012-2040. Key priorities are in matching energy generation/ sourcing with the demand needed for WCP economic growth. Additionally, the energy focus should be on lowering the provincial carbon footprint, with an emphasis on renewable and locally generated energy. Three key transitions are identified for the WCP Energy 'system' infrastructure, namely: ▪ Shifting transport patterns to reduce reliance on liquid fuels. ▪ Promoting natural gas as a transition fuel by introducing gas processing and transport infrastructure. ▪ Promoting the development of renewable energy plants in the province and associated manufacturing capacity
Northern Cape Nature Conservation Act (Act No. 9 of 2009)	The purpose of the act is to provide for the sustainable utilisation of wild animals, aquatic biota and plants; to provide for the implementation of the Convention on International Trade in Endangered Species of Wild Fauna and Flora; to provide for offences and penalties for contravention of the Act; to provide for the appointment of nature conservators to implement the provisions of the Act and to provide for the issuing of permits and other authorisations. Schedule 1 and 2 of the Act give extensive lists of specially protected and protected fauna and flora species. Refer to Sections 6.2.3 and 6.2.4 of this report for further details on fauna and flora species present on site.
Northern Cape Provincial Growth and Development Plan (2005)	The Northern Cape Provincial Growth and Development Plan (NCPGDP) is aligned with NDP-2030 and seeks to eradicate poverty, inequality and halve unemployment by 2030. The NCPGDP identifies four key drivers to achieve the vision and reduce poverty and unemployment. Economic transformation and growth, social transformation and human welfare and environmental sustainability and resilience are relevant to identifying and assessing needs.

Applicable Plan	Description of Plan
	▪ Economic transformation and growth, which is aimed at creating employment opportunities and thereby reducing poverty. Skills development and training is identified as a key need. ▪ Social transformation and human welfare, which is aimed at improving education levels, access to affordable and quality health care, improved safety, and security, and creating sustainable human settlements. ▪ Environmental sustainability and resilience, which is aimed at protecting the regions natural resources and addressing the threats posed by climate change.
Northern Cape Provincial Growth and Development Strategy (2005)	The NCPGDS identifies poverty reduction as the most significant challenge facing the government and its partners. All other societal challenges that the province faces emanate predominantly from the effects of poverty. The NCPGDS notes that the only effective way to reduce poverty is through long-term sustainable economic growth and development. The sectors where economic growth and development can be promoted include: ▪ Agriculture and Agro-processing; ▪ Fishing and Mariculture; ▪ Mining and mineral processing; ▪ Transport; ▪ Manufacturing; and ▪ Tourism. However, the NCPGDS also notes that economic development in these sectors also requires: ▪ Creating opportunities for lifelong learning; ▪ Improving the skills of the labour force to increase productivity; ▪ Increasing accessibility to knowledge and information. The achievement of these primary development objectives depends on the achievement of a number of related objectives that, at a macro-level, describe necessary conditions for growth and development. These are: ▪ Developing requisite levels of human and social capital; ▪ Improving the efficiency and effectiveness of governance and other development institutions; and ▪ Enhancing infrastructure for economic growth and social development. Of specific relevance to the Project, the NCPGDS make reference to the need to ensure the availability of inexpensive energy. The section notes that in order to promote economic growth in the Northern Cape the availability of electricity to key industrial users at critical localities at rates that enhance the competitiveness of their industries must be ensured. At the same time, the development of new sources of energy through the promotion of the adoption of energy applications that display a synergy with the province's natural resource endowments must be encouraged. The NCPGDS also highlights the importance of close co-operation between the public and private sectors in order for the economic development potential of the Northern Cape to be realised. In this regard, care will need to be taken to ensure that the proposed Project does not negatively impact on the region's natural environment. In this regard, the NCPGDS notes that the sustainable utilisation of the natural resource base on which agriculture depends is critical in the Northern Cape with its fragile eco-systems and vulnerability to climatic variation. The

Applicable Plan	Description of Plan
	document also indicates that due to the province's exceptional natural and cultural attributes, it has the potential to become the preferred adventure and ecotourism destination in South Africa. Care therefore needs to be taken to ensure that the development of large renewable energy projects do not affect the tourism potential of the province.
Northern Cape Provincial Spatial Development Framework (2012)	The Northern Cape Provincial Spatial Development Framework (NCSDF) (2012) lists a number of sectoral strategies and plans are to be read and treated as key components of the PSDF. Of these there are a number that are relevant to the proposed Project. These include: ▪ Sectoral Strategy 1: Provincial Growth and Development Strategy of the Provincial Government; ▪ Sectoral Strategy 2: Comprehensive Growth and Development Programme of the Department of Agriculture, Land Reform and Rural Development; ▪ Sectoral Strategy 5: Local Economic Development (LED) Strategy of the Department of Economic Development and Tourism; ▪ Sectoral Strategy 11: Small Micro Medium Enterprises (SMME) Development Strategy of the Department of Economic Development and Tourism; ▪ Sectoral Strategy 12: Tourism Strategy of the Department of Economic Development and Tourism; and ▪ Sectoral Strategy 19: Provincial renewable energy strategy (to be facilitated by the Department of Economic Development and Tourism). Under Section B 14.4, Energy Sector, the NCSDF (2012), notes the total area of high radiation in South Africa amounts to approximately 194 000 km^2 of which the majority falls within the Northern Cape. It is estimated that, if the electricity production per km2 of mirror surface in a solar thermal power station were 30.2 MW and only 1% of the area of high radiation were available for solar power generation, then generation potential would equate to approximately 64 GW. A mere 1.25% of the area of high radiation could thus meet projected South African electricity demand in 2025 (80 GW) (NCPSDF, 2012). However, the SDF does indicate that this would require large investments in transmission lines from the areas of high radiation to the main electricity consumer centres. Section C8.2.3, Energy Objectives, sets out the energy objectives for the Northern Cape Province. The section makes specific reference to renewable energy. The objectives are listed below: ▪ Promote the development of renewable energy supply schemes. Large-scale renewable energy supply schemes are strategically important for increasing the diversity of domestic energy supplies and avoiding energy imports while minimizing detrimental environmental impacts. ▪ Develop and institute innovative new energy technologies to improve access to reliable, sustainable, and affordable energy services with the objective to realize sustainable economic growth and development. The goals of securing supply, providing energy services, tackling climate change, avoiding air pollution, and reaching sustainable development in the province offer both opportunities and synergies which require joint planning between local and provincial government as well as the private sector. ▪ Develop and institute energy supply schemes with the aim to contribute to the achievement of the targets set by the White Paper on

Applicable Plan	Description of Plan
	Renewable Energy (2003). This target relates to the delivery of 10 000 GWh of energy from renewable energy sources (mainly biomass, wind, solar, and small-scale hydro) by 2013. Section C8.3.3, Energy Policy, sets out the policy guidelines for the development of the energy sector, with specific reference to the renewable energy sector. ■ The construction of infrastructure must be strictly regulated in terms of the spatial plans and guidelines put forward in the PSDF. They must be carefully placed to avoid visual impacts on landscapes of significant symbolic, aesthetic, cultural or historic value and should blend in with the surrounding environment to the extent possible. ■ EIAs/BAs undertaken for such construction must assess the impacts of such activities.
Central Karoo District Municipality IDP 2017-2022, 2nd Review 2021–2022	At the district level, the IDP highlights the following projects, identified in the District LED Strategy: ■ Infrastructure development to increase access for businesses and households; ■ Business support programmes to retain existing businesses and encourage start-up or relocating businesses to enter the area; ■ Spatial planning to promote land acquisition and property development for businesses and households; ■ Skills programmes to respond to business and government for greater productivity and efficiency; and ■ Social development programmes to increase participation in the local economy and build better lifestyles for the community. The CKDM IDP goes on to mention the importance of establishing an LED unit to coordinate activities, as well as the Economic Recovery Plan being drafted to respond to the economic impact of the COVID-19 pandemic.
Beaufort West Local Municipality 2021-2022 review of the 2017-2022 IDP	In terms of future economic development goals, the 2021-2022 review of the 2017-2022 IDP is most instructive. According to this plan, the Municipal Strategic Programme is aligned to 5 Key Performance Areas: ■ KPA 1: Basic service delivery and infrastructure development ■ KPA 2: Economic development ■ KPA 3: Institutional development and municipal transformation ■ KPA 4: Financial viability and management ■ KPA 5: Good governance and community participation KPA 2 above (economic development) is linked to the following strategies: ■ To use municipal and government funded projects as means to create jobs and reduce poverty ■ To facilitate development and growth of SMME's ■ To establish and strengthen LED Structures ■ To facilitate Education and Skills Development for Cooperatives & SMME's ■ To provide SMME Support and Capacity building To manage and enhance the performance of the municipality

Applicable Plan	Description of Plan
Ubuntu Local Municipality 2017-2022 & 2020/21 Draft IDP	The 2017-2022 & 2020/21 Draft IDP outlines the following strategic objectives associated with National Key Performance Area 2: Local Economic Development: ■ Private Sector Investment Upliftment & Acceleration ■ Public Sector Investment Upliftment & Acceleration ■ Tourism Upliftment & Acceleration ■ Agriculture & Agri-processing Upliftment & Acceleration ■ Industry Upliftment & Acceleration ■ Commerce Upliftment & Acceleration ■ SMME Upliftment & Acceleration ■ Industrial & Commercial Economic Zone Establishment

5.4 INTERNATIONAL STANDARDS AND GUIDELINES

5.4.1 IFC PERFORMANCE STANDARDS

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

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

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

The IFC’s Sustainability Framework articulates the Corporation’s strategic commitment to sustainable development and is an integral part of IFC’s approach to risk management. The Sustainability Framework comprises IFC’s Policy and Performance Standards on Environmental and Social Sustainability, and IFC’s Access to Information Policy. The Policy on Environmental and Social Sustainability describes IFC’s commitments, roles, and responsibilities related to

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

The Project is considered a Category B project in terms of the IFC Policy on E&S Sustainability (2012), having the potential to cause limited adverse environmental or social risks and/or impacts that are few in number, generally site specific, largely reversible, and readily addressed through mitigation measures.

The objectives and applicability of the eight PSs are outlined in **Table 5-4.**

Table 5-4 – Objectives and Applicability of the IFC Performance Standards

Reference	Requirements		Project Specific Applicability
Performance Standard 1: Assessment and Management of Environmental and Social Risks and Impacts			
Overview	Performance Standard 1 underscores the importance of managing environmental and social performance throughout the life of a project. An effective Environmental and Social Management System (ESMS) is a dynamic and continuous process initiated and supported by management, and involves engagement between the client, its workers, local communities directly affected by the project (the Affected Communities) and, where appropriate, other stakeholders.		
Objectives	▪ To identify and evaluate environmental and social risks and impacts of the project. ▪ To adopt a mitigation hierarchy to anticipate and avoid, or where avoidance is not possible, minimize, and, where residual impacts remain, compensate/offset for risks and impacts to workers, Affected Communities, and the environment. ▪ To promote improved environmental and social performance of clients through the effective use of management systems. ▪ To ensure that grievances from Affected Communities and external communications from other stakeholders are responded to and managed appropriately. ▪ To promote and provide means for adequate engagement with Affected Communities throughout the project cycle on issues that could potentially affect them and to ensure that relevant environmental and social information is disclosed and disseminated.		
Aspects	1.1	Policy	The IFC Standards state under PS 1 (Guidance Note 23) that "*the breadth, depth and type of analysis included in an ESIA must be proportionate to the nature and scale of the proposed project's potential impacts as identified*
	1.2	Identification of Risks and Impacts	

Reference	Requirements		Project Specific Applicability
	1.3	Management Programmes	*during the course of the assessment process*." This document is the draft deliverable from the BA process undertaken for the proposed Project. The impact assessment comprehensively assesses the key environmental and social impacts and complies with the requirements of the South African EIA Regulations. In addition, an EMPr has been compiled and is included in **Appendix H**.
	1.4	Organisational Capacity and Competency	
	1.5	Emergency Preparedness and Response	
	1.6	Monitoring and Review	
	1.7	Stakeholder Engagement	
	1.8	External Communication and Grievance Mechanism	
	1.9	Ongoing Reporting to Affected Communities	
Performance Standard 2: Labour and Working Conditions;			
Overview	Performance Standard 2 recognises that the pursuit of economic growth through employment creation and income generation should be accompanied by protection of the fundamental rights of workers.		
Objectives	▪ To promote the fair treatment, non-discrimination, and equal opportunity of workers. ▪ To establish, maintain, and improve the worker-management relationship. ▪ To promote compliance with national employment and labour laws. ▪ To protect workers, including vulnerable categories of workers such as children, migrant workers, workers engaged by third parties, and workers in the client's supply chain. ▪ To promote safe and healthy working conditions, and the health of workers. ▪ To avoid the use of forced labour.		
Aspects	2.1	▪ Working Conditions and Management of Worker Relationship ▪ Human Resources Policy and Management ▪ Working Conditions and terms of Engagement ▪ Workers organisation ▪ Non- Discrimination and Equal Opportunity ▪ Retrenchment ▪ Grievance Mechanism	Even though the nature and scale of the project is considered to be small, PS2 is considered applicable as a contractor will be appointed to undertake the required scope of work. This BA Report and the EMPr, however, incorporate the requirements for compliance with local and international Labour and Working legislation and good practice on the part of the contractors. Formal human resource and labour policies will be compiled in the event that the project is developed in the future as part of the project specific ESMS/corporate ESMS.
	2.2	▪ Protecting the Workforce ▪ Child Labour ▪ Forced Labour	

Reference	Requirements		Project Specific Applicability
	2.3	Occupational health and Safety	
	2.4	Workers Engaged by Third Parties	
	2.5	Supply Chain	
Performance Standard 3: Resource Efficiency and Pollution Prevention			
Overview	Performance Standard 3 recognises that increased economic activity and urbanisation often generate increased levels of pollution to air, water, and land, and consume finite resources in a manner that may threaten people and the environment at the local, regional, and global levels. There is also a growing global consensus that the current and projected atmospheric concentration of greenhouse gases (GHG) threatens the public health and welfare of current and future generations. At the same time, more efficient and effective resource use and pollution prevention and GHG emission avoidance and mitigation technologies and practices have become more accessible and achievable in virtually all parts of the world.		
Objectives	▪ To avoid or minimise adverse impacts on human health and the environment by avoiding or minimising pollution from project activities. ▪ To promote more sustainable use of resources, including energy and water. ▪ To reduce project related GHG emissions.		
Aspects	3.1	▪ Policy Resource Efficiency ▪ Greenhouse Gases ▪ Water Consumption	PS3-related impacts, such as the management of construction waste, hazardous substances, and stormwater are assessed in **Section 8** of this report. There are no material resource efficiency issues associated with the Project. The EMPr will include general resource efficiency measures. The project is not GHG emissions intensive. The EGI Corridor seeks to facilitate resource efficiency and pollution prevention by contributing to the South African green economy. Dust air pollution in the construction phase has been adequately addressed in the EMPr (**Appendix H**). The Project will not result in the release of industrial effluents. Potential pollution associated with sanitary wastewater is low and mitigation measures have been included in the EMPr. Land contamination of the site from historical land use (i.e. low intensity agricultural / grazing) is not considered to be a cause for concern. The waste generation profile of the project is not complex. Waste mitigation and management measures have been included in EMPr. Hazardous materials are not a key issue; small quantities of construction materials (oil, grease, diesel fuel etc.) are the only wastes expected to be associated with the project. The EMPr identifies these anticipated hazardous materials and recommends relevant mitigation and management measures.
	3.2	▪ Pollution Prevention ▪ Air Emissions ▪ Stormwater ▪ Waste Management ▪ Hazardous Materials Management ▪ Pesticide use and Management	

Reference	Requirements		Project Specific Applicability
Performance Standard 4: Community Health, Safety, and Security			
Overview	Performance Standard 4 recognizes that project activities, equipment, and infrastructure can increase community exposure to risks and impacts.		
Objectives	▪ To anticipate and avoid adverse impacts on the health and safety of the Affected Community during the project life from both routine and non-routine circumstances. ▪ To ensure that the safeguarding of personnel and property is carried out in accordance with relevant human rights principles and in a manner that avoids or minimizes risks to the Affected Communities		
Aspects	4.1	▪ Community Health and Safety ▪ Infrastructure and Equipment Design and Safety ▪ Hazardous Materials Management and Safety ▪ Ecosystem Services ▪ Community Exposure to Disease ▪ Emergency Preparedness and Response	The requirements included in PS 4 have addressed in the BA process and the development of the EMPr (**Appendix H**). The following generic plans have been included in the EMPr: ▪ Emergency Response Plan; ▪ Transport Management Plan; ▪ HIV/AIDS Management Plan; and ▪ Security Policy. All plans will be made site specific as part of the financial close process, in the event that the project is developed in the future.
	4.2	Security Personnel	
Performance Standard 5: Land Acquisition and Involuntary Resettlement			
Overview	Performance Standard 5 recognises that project-related land acquisition and restrictions on land use can have adverse impacts on communities and persons that use this land. Involuntary resettlement refers both to physical displacement (relocation or loss of shelter) and to economic displacement (loss of assets or access to assets that leads to loss of income sources or other means of livelihood) as a result of project-related land acquisition and/or restrictions on land use.		
Objectives	▪ To avoid, and when avoidance is not possible, minimise displacement by exploring alternative project designs. ▪ To avoid forced eviction. ▪ To anticipate and avoid, or where avoidance is not possible, minimise adverse social and economic impacts from land acquisition or restrictions on land use by (i) providing compensation for loss of assets at replacement cost and (ii) ensuring that resettlement activities are implemented with appropriate disclosure of information, consultation, and the informed participation of those affected. ▪ To improve, or restore, the livelihoods and standards of living of displaced persons. ▪ To improve living conditions among physically displaced persons through the provision of adequate housing with security of tenure at resettlement sites.		
Aspects	5.1	▪ Displacement ▪ Physical Displacement	PS5 is not applicable to the proposed Mura EGI Corridor as no physical or economic displacement or livelihood restoration will be required.

Reference	Requirements		Project Specific Applicability
		▪ Economic Displacement ▪ Private Sector Responsibilities under Government Managed Resettlement	The proposed Mura EGI Corridor is located on privately owned land that is utilised for agriculture by the landowners. The significance of all potential agricultural impacts is kept low by the very small proportion of the land that is impacted. An Agricultural Potential Assessment has been undertaken and is included in **Appendix G.1.**
1Performance Standard 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources			
Overview	Performance Standard 6 recognizes that protecting and conserving biodiversity, maintaining ecosystem services, and sustainably managing living natural resources are fundamental to sustainable development.		
Objectives	▪ To protect and conserve biodiversity. ▪ To maintain the benefits from ecosystem services. ▪ To promote the sustainable management of living natural resources through the adoption of practices that integrate conservation needs and development priorities.		
Aspects	6.1	Protection and Conservation of Biodiversity	The Project Area falls within an extensive CBA (CBA 1). A Terrestrial Biodiversity Compliance Statement as well as an Avifaunal Impact Assessment and Aquatic Biodiversity Impact Assessment have been included in the proposed scope. The methodologies for the specialist assessments include a combination of literature review, in-field surveys and sensitivity mapping. This substantively complies with the PS 6 general requirements for scoping and baseline assessment for determination of biodiversity and ecosystem services issues. The determination of habitat sensitivity was undertaken within the legal and best practice reference framework for South Africa. The prevalence of invasive alien species will be determined, and mitigation and management measures are included in the EMPr.
Performance Standard 7: Indigenous People			
Overview	Performance Standard 7 recognizes that Indigenous Peoples, as social groups with identities that are distinct from mainstream groups in national societies, are often among the most marginalized and vulnerable segments of the population. In many cases, their economic, social, and legal status limits their capacity to defend their rights to, and interests in, lands and natural and cultural resources, and may restrict their ability to participate in and benefit from development. Indigenous Peoples are particularly vulnerable if their lands and resources are transformed, encroached upon, or significantly degraded.		
Objectives	▪ To ensure that the development process fosters full respect for the human rights, dignity, aspirations, culture, and natural resource-based livelihoods of Indigenous Peoples. ▪ To anticipate and avoid adverse impacts of projects on communities of Indigenous Peoples, or when avoidance is not possible, to minimize and/or compensate for such impacts. ▪ To promote sustainable development benefits and opportunities for Indigenous Peoples in a culturally appropriate manner.		

Reference	Requirements		Project Specific Applicability
	▪ To establish and maintain an ongoing relationship based on Informed Consultation and Participation (ICP) with the Indigenous Peoples affected by a project throughout the project's life-cycle. ▪ To ensure the Free, Prior, and Informed Consent (FPIC) of the Affected Communities of Indigenous Peoples when the circumstances described in this Performance Standard are present. ▪ To respect and preserve the culture, knowledge, and practices of Indigenous Peoples.		
Aspects	7.1	General ▪ Avoidance of Adverse Impacts ▪ Participation and Consent	As per the international instruments under the United Nations (UN) Human Rights Conventions, no indigenous peoples are present within the study area.
	7.2	Circumstances Requiring Free, Prior, and Informed Consent ▪ Impacts on Lands and Natural Resources Subject to Traditional Ownership or Under Customary Use ▪ Critical Cultural Heritage ▪ Relocation of Indigenous Peoples from Lands and Natural Resources Subject to Traditional Ownership or Under Customary Use	
	7.3	Mitigation and Development Benefits	
	7.4	Private Sector Responsibilities Where Government is Responsible for Managing Indigenous Peoples Issues	
Performance Standard 8: Cultural Heritage			
Overview	Performance Standard 8 recognizes the importance of cultural heritage for current and future generations.		
Objectives	▪ To protect cultural heritage from the adverse impacts of project activities and support its preservation. ▪ To promote the equitable sharing of benefits from the use of cultural heritage.		

Reference	Requirements		Project Specific Applicability
Aspects	8.1	Protection of Cultural Heritage in Project Design and Execution	A Heritage Assessment (**Appendix G.7**) has been carried out by a suitably qualified specialist. A Chance Find Procedure has been included in the EMPr (**Appendix H**).

5.4.2 WORLD BANK GROUP ENVIRONMENTAL HEALTH AND SAFETY GUIDELINES

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

Where host country regulations differ from the levels and measures presented in the EHS Guidelines, projects seeking international funding may be expected to achieve whichever is more stringent. If less stringent levels or measures are appropriate in view of specific project circumstances, a full and detailed justification for any proposed alternatives is required.

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

- Electric Power Transmission and Distribution (2007) - information relevant to power transmission between a generation facility and a substation located within an electricity grid, in addition to power distribution from a substation to consumers located in residential, commercial, and industrial areas
- General EHS Guidelines – this includes a section on a range of environmental, occupational health and safety, community health and safety, and construction activities that would apply to the project. The guideline also contains recommended guidelines adopted form the World Health Organisation (WHO) for ambient air and water quality, which are referred to in the relevant impact assessment sections in the ESIA report.

5.4.3 EQUATOR PRINCIPALS

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

The EPs apply globally to all industry sectors and to five financial products 1) Project Finance Advisory Services, 2) Project Finance, 3) Project-Related Corporate Loans, 4) Bridge Loans and 5) Project-Related Refinance and Project-Related Acquisition Finance. The relevant thresholds and criteria for application is described in detail in the Scope section of the EP. Currently 125 Equator Principles Financial Institutions (EPFIs) in 37 countries have officially adopted the EPs, covering the

majority of international project finance debt within developed and emerging markets. EPFIs commit to implementing the EPs in their internal environmental and social policies, procedures and standards for financing projects and will not provide Project Finance or Project-Related Corporate Loans to projects where the client will not, or is unable to, comply with the EPs.

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

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

The requirements and applicability of the EPs are outlined in **Table 5-5**.

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

Table 5-5 - Requirements and Applicability of the Equator Principles

Requirement		Project Specific Applicability
Principle 1: Review and Categorisation		
Overview	When a project is proposed for financing, the EPFI will, as part of its internal social and environmental review and due diligence, categorise such project based on the magnitude of its potential impacts and risks in accordance with the environmental and social screening criteria of the IFC. Using categorisation, the EPFI's environmental and social due diligence is commensurate with the nature, scale, and stage of the Project, and with the level of environmental and social risks and impacts. The categories are: ■ Category A: Projects with potential significant adverse environmental and social risks and/or impacts that are diverse, irreversible or unprecedented; ■ Category B: Projects with potential limited adverse environmental and social risks and/or impacts that are few in number, generally site-specific, largely reversible and readily addressed through mitigation measures; and ■ Category C: Projects with minimal or no adverse environmental and social risks and/or impacts.	Based upon the significance and scale of the Project's environmental and social impacts, the proposed project is regarded as a Category B project i.e. a project with potential limited adverse environmental or social risks and/or impacts that are few in number, generally site-specific, largely reversible, and readily addressed through mitigation measures.

Requirement		Project Specific Applicability
Principle 2: Environmental and Social Assessment		
Overview	For all Category A and Category B Projects, the EPFI will require the client to conduct an appropriate Assessment process to address, to the EPFI's satisfaction, the relevant environmental and social risks and scale of impacts of the proposed Project (which may include the illustrative list of issues found in Exhibit II). The Assessment Documentation should propose measures to minimise, mitigate, and where residual impacts remain, to compensate/offset/remedy for risks and impacts to Workers, Affected Communities, and the environment, in a manner relevant and appropriate to the nature and scale of the proposed Project. The Assessment Documentation will be an adequate, accurate and objective evaluation and presentation of the environmental and social risks and impacts, whether prepared by the client, consultants or external experts. For Category A, and as appropriate, Category B Projects, the Assessment Documentation includes an Environmental and Social Impact Assessment (ESIA). One or more specialised studies may also need to be undertaken. For other Category B and potentially C Projects, a limited or focused environmental or social assessment may be appropriate, applying applicable risk management standards relevant to the risks or impacts identified during the categorisation process.	This document is the draft deliverable from the BA process undertaken for the proposed Project. The impact assessment comprehensively assesses the key environmental and social impacts and complies with the requirements of the South African EIA Regulations (2014, as amended). In addition, a site-specific EMPr has been compiled and is included in **Appendix H**, which is to be read in conjunction with the generic powerline and substation EMPRs.
Principle 3: Applicable Environmental and Social Standards		
Overview	The Assessment process should, in the first instance, address compliance with relevant host country laws, regulations and permits that pertain to environmental and social issues. The EPFI's due diligence will include, for all Category A and Category B Projects globally, review and confirmation by the EPFI of how the Project and transaction meet each of the Principles. For Projects located in Non-Designated Countries, the Assessment process evaluates compliance with the then applicable IFC PS and WBG EHS Guidelines. For Projects located in Designated Countries, compliance with relevant host country laws, regulations and permits that pertain to environmental and social issues.	As South Africa has been identified as a non-designated country, the reference framework for environmental and social assessment is based on the IFC PS. In addition, this BAR process has been undertaken in accordance with NEMA (the host country's relevant legislation).
Principle 4: Environmental and Social Management System and Equator Principles Action Plan		

Requirement		Project Specific Applicability
Overview	For all Category A and Category B Projects, the EPFI will require the client to develop or maintain an Environmental and Social Management System (ESMS). Further, an Environmental and Social Management Plan (ESMP) will be prepared by the client to address issues raised in the assessment process and incorporate actions required to comply with the applicable standards. Where the applicable standards are not met to the EPFI's satisfaction, the client and the EPFI will agree on an Equator Principles Action Plan (EPAP). The EPAP is intended to outline gaps and commitments to meet EPFI requirements in line with the applicable standards.	A formal project specific ESMS will be compiled in the event that the project is developed in the future. Management and monitoring plans outlines in the EMPr will serve as the basis for an ESMS for the proposed Project.
Principle 5: Stakeholder Engagement		
Overview	EPFI will require the client to demonstrate effective Stakeholder Engagement as an ongoing process in a structured and culturally appropriate manner with Affected Communities Workers and, where relevant, Other Stakeholders. For Projects with potentially significant adverse impacts on Affected Communities, the client will conduct an Informed Consultation and Participation process. To accomplish this, the appropriate assessment documentation, or non-technical summaries thereof, will be made available to the public by the borrower for a reasonable minimum period in the relevant local language and in a culturally appropriate manner. The borrower will take account of and document the process and results of the consultation, including any actions agreed resulting from the consultation. Disclosure of environmental or social risks and adverse impacts should occur early in the Assessment process, in any event before the Project construction commences, and on an ongoing basis.	The BA process includes an extensive stakeholder engagement process which complies with the South African EIA Regulations. The process includes consultations with local communities, nearby businesses, and a range of government sector stakeholders (state owned enterprises, national, provincial and local departments). The stakeholder engagement process solicits interest from potentially interested parties through the placement of site notices and newspaper advertisements as well as written and telephonic communication. The stakeholder engagement process is detailed in **Section 2.6**.
Principle 6: Grievance Mechanism		
Overview	For all Category A and, as appropriate, Category B Projects, the EPFI will require the client, as part of the ESMS, to establish effective grievance mechanisms which are designed for use by Affected Communities and Workers, as appropriate, to receive and facilitate resolution of concerns and grievances	The EMPr includes a Grievance Mechanism Process for Public Complaints and Issues. This procedure effectively allows for external communications with members of the public to be undertaken in a transparent and structured manner. This procedure will be revised and updated as part of the EMPr amendment process in

Requirement		Project Specific Applicability
	about the Project's environmental and social performance. The borrower will inform the Affected Communities and Workers about the grievance mechanism in the course of the stakeholder engagement process and ensure that the mechanism addresses concerns promptly and transparently, in a culturally appropriate manner, and is readily accessible, at no cost, and without retribution to the party that originates the issue or concern.	the event that the project is developed in the future and incorporated into the Project specific ESMS.
Principle 7: Independent Review		
Overview	For all Category A and, as appropriate, Category B Projects, an Independent Environmental and Social Consultant, not directly associated with the client, will carry out an Independent Review of the Assessment Documentation including the ESMPs, the ESMS, and the Stakeholder Engagement process documentation in order to assist the EPFI's due diligence, and assess Equator Principles compliance.	This principle will only become applicable in the event that the project is developed in the future.
Principle 9: Independent Monitoring and Reporting		
Overview	To assess Project compliance with the Equator Principles after Financial Close and over the life of the loan, the EPFI will require independent monitoring and reporting for all Category A, and as appropriate, Category B projects. Monitoring and reporting should be provided by an Independent Environmental and Social Consultant; alternatively, the EPFI will require that the client retain qualified and experienced external experts to verify its monitoring information, which will be shared with the EPFI in accordance with the frequency required.	This principle will only become applicable in the event that the project is developed in the future.

5.5 OTHER GUIDELINES AND BEST PRACTICE RECOMMENDATIONS

5.5.1 GENERIC EMPR RELEVANT TO AN APPLICATION FOR SUBSTATION AND OVERHEAD ELECTRICITY TRANSMISSION AND DISTRIBUTION INFRASTRUCTURE

NEMA requires that an EMPr be submitted where an EIA has been identified as the environmental instrument to be utilised as the basis for a decision on an application for environmental authorisation. The content of an EMPr must either contain the information set out in Appendix 4 of the EIA Regulations, 2014, as amended, or must be a generic EMPr relevant to an application as identified and gazetted by the Minister in a government notice. Once the Minister has identified, through a government notice, that a generic EMPr is relevant to an application for EA, that generic EMPr must be applied by all parties involved in the EA process, including, but not limited to, the applicant and the CA.

GN 435 of 22 March 2019 identified a generic EMPr relevant to applications for substations and overhead electricity transmission and distribution infrastructure which require authorisation in terms of Section 42(2) of NEMA. Applications for overhead electricity transmission and distribution infrastructure that trigger Activity 11 of Listing Notice 1 or Activity 9 of Listing Notice 2 and any other listed or specified activities must use the generic EMPr.

The objective of the generic EMPr is "*to prescribe and pre-approve generally accepted impact management outcomes and impact management actions, which can commonly and repeatedly be used for the avoidance, management and mitigation of impacts and risks associated with the development or expansion of overhead electricity transmission and distribution infrastructure. The use of a generic EMPr is intended to reduce the need to prepare and review individual EMPrs for applications of a similar nature*."[8]

The generic EMPrs (for Substations and powerlines) are included in the Site-Specific EMPr (**Appendix H**).

5.6 ADDITIONAL PERMITS AND AUTHORISATIONS

Table 5-6 outlines the additional permits and authorisations required for the proposed development, as well as the relevant Competent Authorities responsible.

Table 5-6 – Additional Permits and Authorisations required for the proposed development

Permits / Authorisation	Legislation	Relevant Authority	Status
Notification Of Intent To Develop (NID) Section 38 (1) and Section 38 (8)	Section 38 (1) & (8) of the NHRA	HWC and SAHRA	Submitted
Water Use Licence / General	National Water Act (Act No. 36 of 1998)	Department of Water and Sanitation	An application will be submitted during or following the conclusion of the BA process
Permits for removal or destruction of Threatened or Protected Species (TOPs)	NEM:BA (ToPS), Northern Cape Nature Conservation Act (Act no. 9 of 2009) and Western Cape Nature Conservation Laws Amendment Act (Act No 3 of 2000)	Cape Nature and NC DENC	Permits will be obtained prior to the commencement of construction.

[8] DEA (2019) *Appendix 1: Generic Environmental Management Programme (EMPr) for the Development and Expansion for Overhead Electricity Transmission and Distribution Infrastructure*

6 BASELINE ENVIRONMENT

The following chapter presents an overview of the biophysical and socio-economic environment in which the proposed Project is located. It is important to gain an understanding of the Project area and its surroundings, as it will provide for a better understanding of the receiving environment in which the Project is being considered.

The description of the baseline environment is essential in that it represents the conditions of the environment before the construction of the proposed Project (i.e. the current, or status quo, environment) against which environmental impacts of the proposed Project can be assessed and future changes monitored.

The area has previously been studied to some extent and is recorded in various sources. Consequently, some components of the baseline have been generated based on literature review. However, where appropriate, baseline information has been supplemented or generated by specialists appointed to undertake baseline and impact assessments for the proposed Project.

6.1 PHYSICAL ENVIRONMENT

6.1.1 CLIMATE

*The following is extracted from the Climate Change Assessment compiled by Promethium Carbon as part of the associated Mura Solar PV Facilities Project**.***

The proposed Project falls within the arid, desert, cold climate zone. The area experiences warm to hot summers and cool, dry winters. The near-historical (since 1980) Mean annual temperature is 15.2 ±0.6°C. Mean maximum temperatures range from around 27°C in summer (January and February) to 12°C in winter (June and July). Temperatures occasionally exceed 35°C but rarely beyond 40°C in summer. during the recent historical period (since ca. 1980) there have been an average of 8 very hots days (> 35°C) per annum. Two years in the last decade had over 20 very hot days (2015 and 2016; both also intense drought years). Mean minimum temperatures range from 0°C in July to 13°C in February. Freezing nights (below 0°) occur regularly between May and October.

Mean annual rainfall is 274 ±80 mm/year. Rainfall peaks in March with a mean of 35 mm and there is less than 15 mm of rainfall per month from July to September. Extreme rainfall days (> 20 mm) are rare with 1.7 days. yr-1 since 1980.

Mean wind speed is approximately 6.5 km/h peaking in spring (October and November) and lowest in autumn (March and April). Mean wind speed has been relatively constant over the last four decades. The vast majority of wind is from north-westerly direction (**Figure 6-1**).

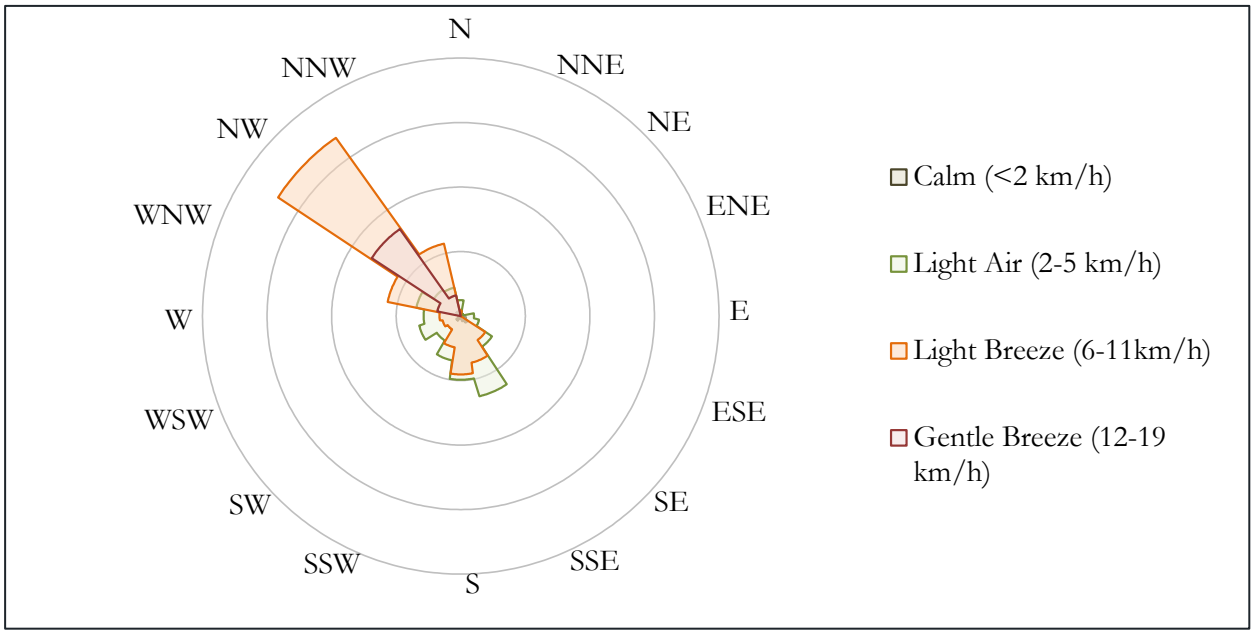


Figure 6-1 - Wind rose based on mean monthly wind speed and direction since 1980 near the Mura Solar PV site

6.1.1.1 Climate trends and projected climate change

Temperature

Mean annual temperature around the Project area has increased by approximately 1.0°C since the early 1980s thus showing an increasing trend of approximately 0.025°C per year. Temperatures are predicted to continue to rise under all SSPs. By 2050 median temperatures could increase from the current (last five years) mean (±16.0°C) to ±16.5°C under SSP1 through to ±17.4°C as under SSP5 (**Figure 6-2**).

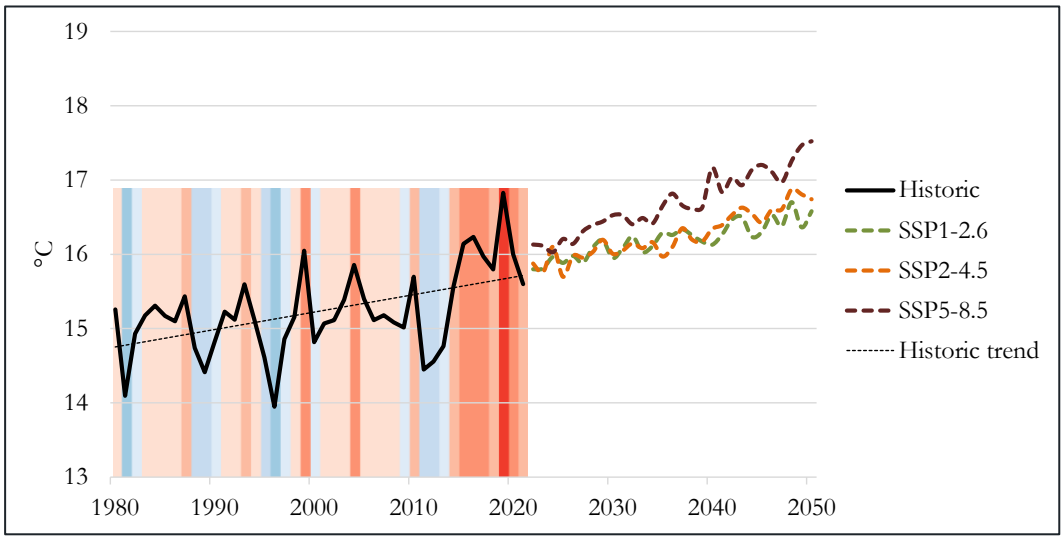


Figure 6-2 - Near-historical and projected mean annual temperature for the Mura Solar PV Project area

The near historical trend in very hot days shows a gradual increase with a sharper increase since ca. 2013; 2015 and 2016, both years during which an intense drought persisted, had over 20 very hot days each. The last decade has seen an average of 13.3 very hot days per year. A significant increase in the number of very hot days is projected under all three SSPs (**Figure 6-3**). The trend is particularly strong under SSP5. By 2050, the number of very hot days per annum is projected to range from ±21 days under SSP1 to ±27 days under SSP5; thus, more than doubling from the current number. By 2100, the number of very hot days could exceed 90 per annum under SSP5, 50 days per annum under SSP2 and 30 days per annum under SSP1.

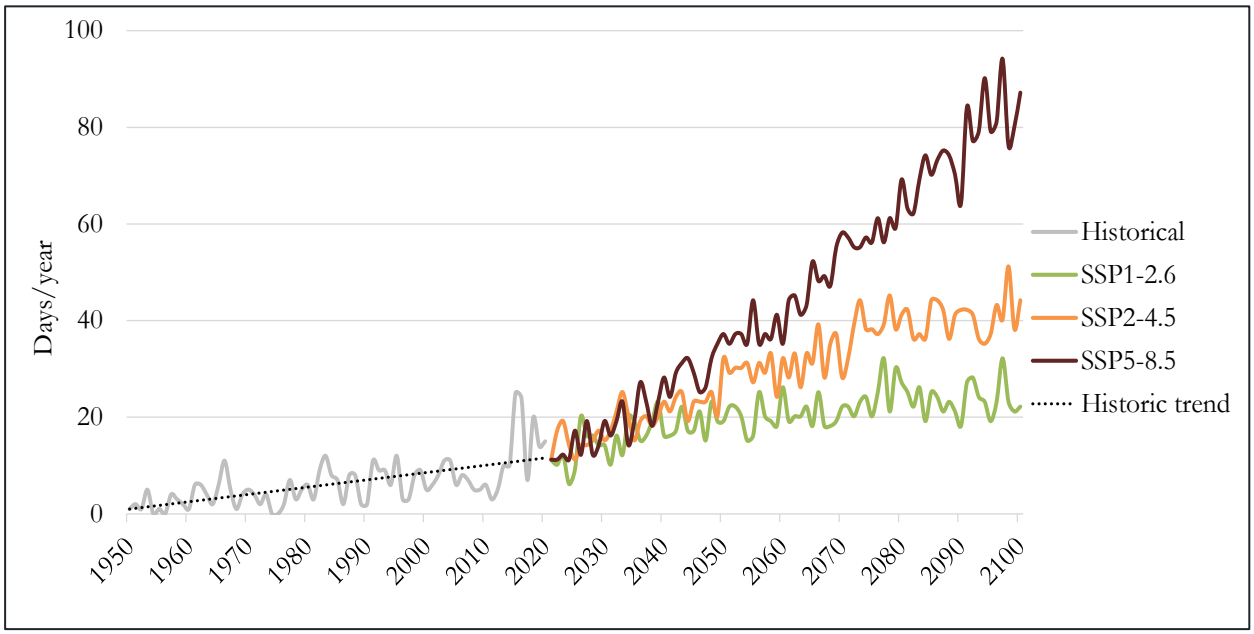


Figure 6-3 - Number of very hot days per annum between 1950 and 2020 and the projected number of very hot days up to 2100 under three SSP trajectories for the Mura Solar PV Project area

Precipitation

Near historical (since 1980) mean annual precipitation around the Project site shows a decreasing trend. There has been a strong recent decline; the last five consecutive years have had less than 250 mm per year with the lowest rainfall experience in 2019 (**Figure 6-4**). Projected annual precipitation shows a continued but weaker decreasing trend under the three SSP trajectories. Annual rainfall is likely to be between 150-250 mm by 2050; slightly higher than recent amounts but lower than the historical long-term average (**Figure 6-2**).

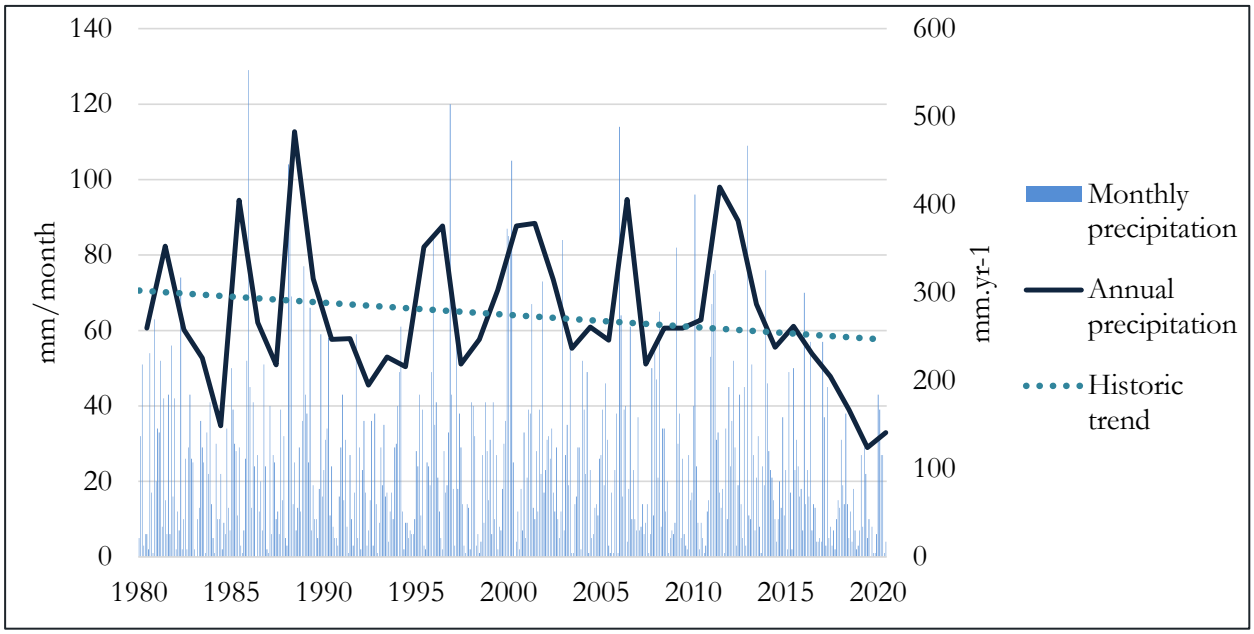


Figure 6-4 - Mean monthly precipitation and mean annual precipitation for the Mura Solar PV Project area

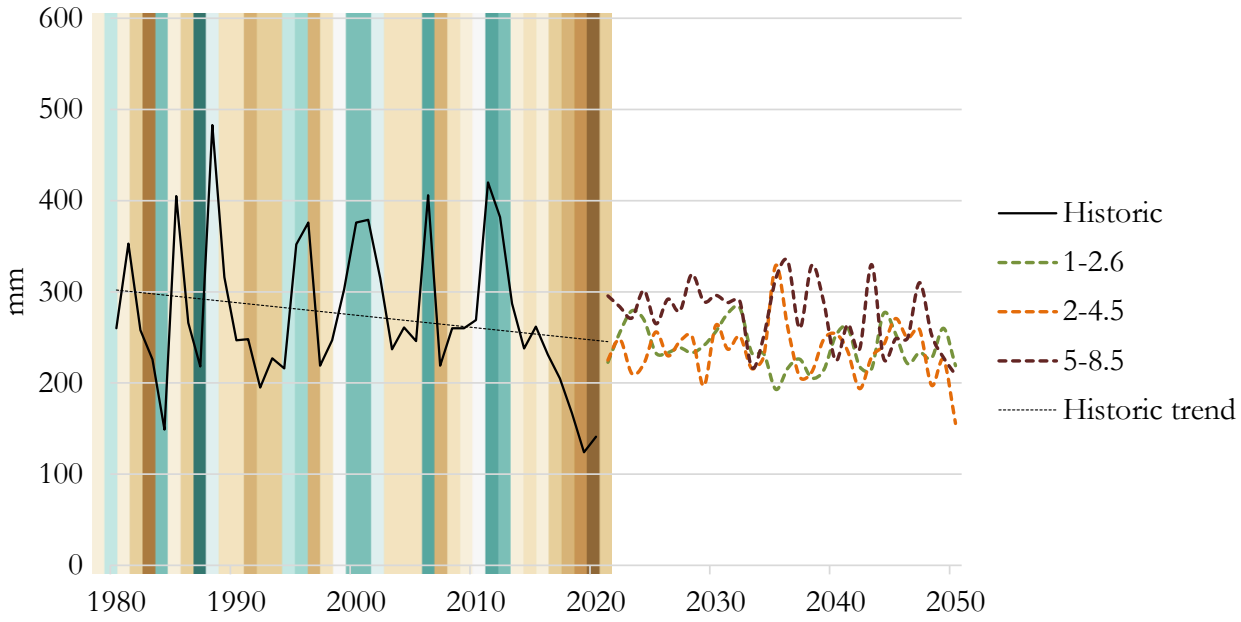


Figure 6-5 - Near historical mean annual precipitation and projected trends in precipitation under three SSP trajectories for the Mura Solar PV Project area

Because mean annual precipitation is so variable (**Figure 6-4**) and modelling precipitation is more challenging than temperature (due to several factors including topographic influence, isolated occurrence and non-linear interaction), it is useful to assess extreme rainfall events. Since the Project areas site is in an arid area with an average of < 2mm of precipitation a day, the number of days with 20 mm of rain becomes a good indicator of heavy rainfall days.

The Project area has experienced an average of 1.7 heavy rainfall days per annum since 1980, with five heavy rainfall days occurring during 2000. The number of heavy rainfall days up until 2050 is projected to be around 2-3 days per annum under the three SSPs assessed, and thus a slight increase from the current number (**Figure 6-6**). It can be concluded that rainfall is likely to decline slightly overall but may be more concentrated during storm events.

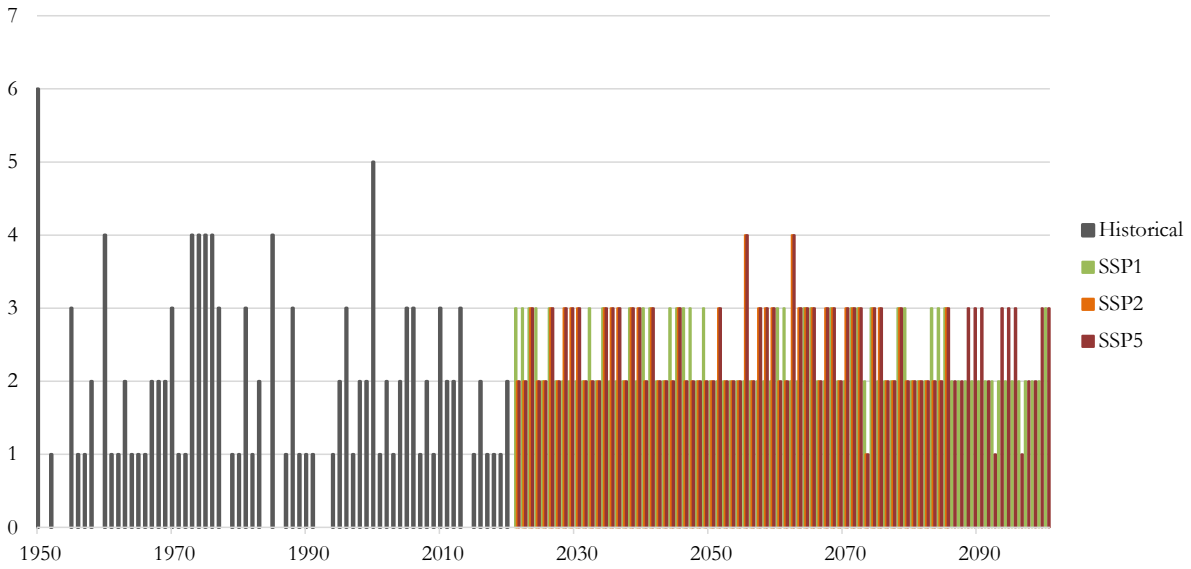


Figure 6-6 - Near-historical and projected number of heavy rainfall days per annum at the Mura Solar PV Project area. Copernicus Climate Change Service (C3S) and CMIP6

6.1.2 AGRICULTURAL POTENTIAL

*The following is extracted from the Agricultural Compliance Statement compiled by Johann Lanz and included as **Appendix G.1**.*

The arid climate (low rainfall of between 171 and 212 mm per annum and high evaporation of between 1,274 and 1,312 mm per annum) (Schulze, 2009) is the limiting factor for land capability, regardless of the soil capability and terrain. Moisture availability is very limiting to any kind of agricultural production. Moisture availability is insufficient for crop production without irrigation and the potential agricultural land use of the site is therefore limited to grazing. The land has a low long term grazing capacity of 28 hectares per large stock unit. Because climate is the limiting factor that controls production potential, it is the only aspect of the agro-ecosystem description that is required for assessing the agricultural impact of this development. All other agricultural potential parameters become irrelevant under the dominant limitation of aridity.

6.1.3 GEOLOGICAL CONTEXT

*The following is extracted from the Palaeontological Study compiled by Natura Viva cc and included as **Appendix G.8**.*

The geology of the project area is outlined on 1: 250 000 geological sheet 3122 Victoria West (Council for Geoscience, Pretoria) (**Figure 6-7**). Illustrated accounts of portions of the combined project area have already been provided in previous PIA reports by the author for the Nuweveld Cluster WEFs and Nuweveld Gamma Grid Connection (Almond 2020a, 2020b, Almond 2022c).

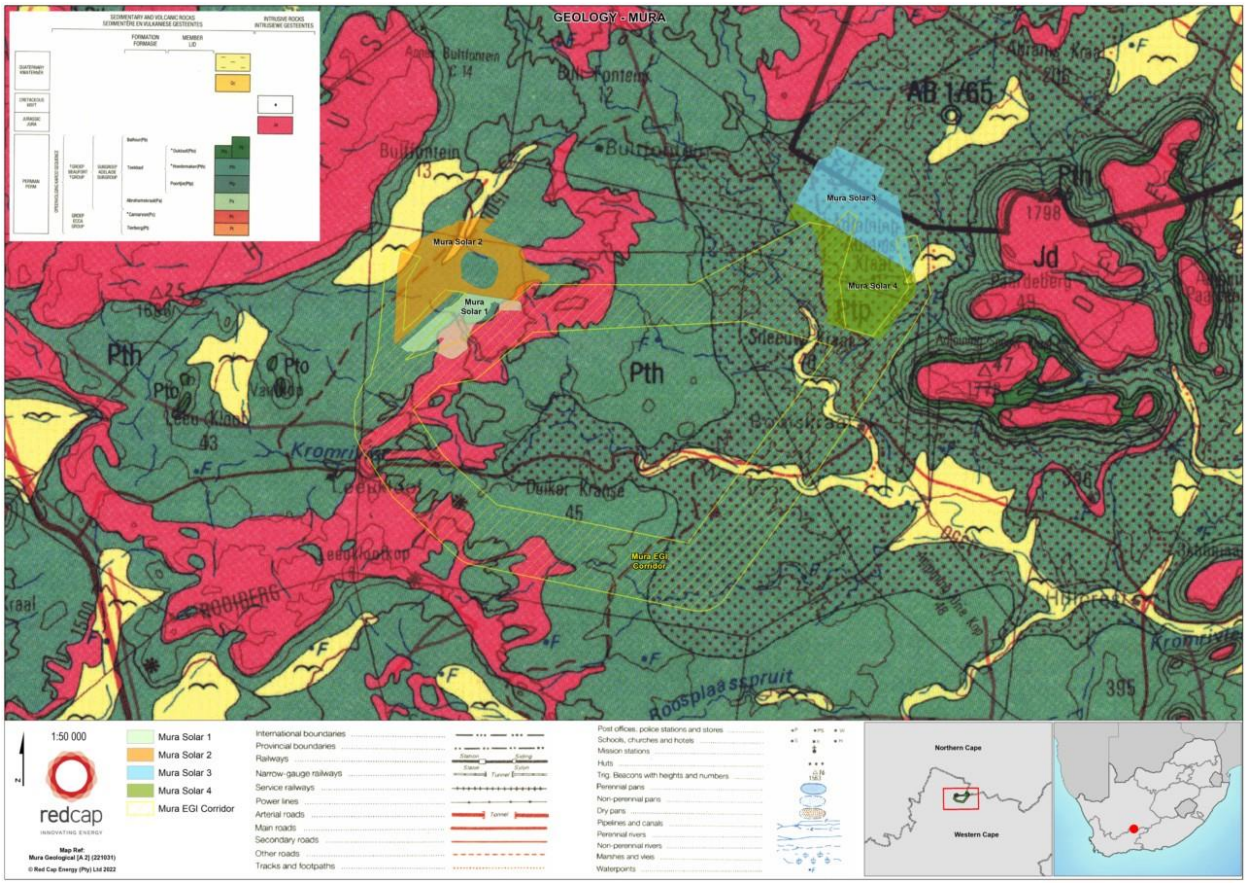


Figure 6-7 - Extract from 1: 250 000 geology sheet 3122 Victoria West showing the project area (the corridor is shown with the yellow polygon)

The project area is situated in the west-central sector of the Main Karoo Basin of the RSA and is largely underlain at depth by continental (fluvial / lacustrine) sediments of the Lower Beaufort Group / Adelaide Subgroup (Karoo Supergroup) of latest Middle to earliest Late Permian age (c. 260 to 256 Ma = million years ago). According to the current 1: 250 000 geological map, which probably requires revision, the Beaufort Group sedimentary succession represented within the project area is assigned to the lower part of the Teekloof Formation - viz. the sandstone-dominated, prominent-weathering Poortjie Member and the overlying mudrock-dominated, more recessive weathering Hoedemaker Member. Although this remains to be confirmed, it is considered likely that the bedrocks directly underlying the solar PV and EGI project footprints can be largely assigned to the upper part of the Poortjie Member and the lower part of the Hoedemaker Member. Large portions of the Beaufort Group outcrop have been extensively baked and mineralised by voluminous intrusions of the Early Jurassic Karoo Dolerite Suite in the vicinity, such as the major sills capping the Harpuisberg in the west, the Perdeberg in the east and the Taaibosberg to the north (Duncan & Marsh 2006). The palaeoenvironmentally and palaeobiologically critical boundary between the Middle and Late Permian Periods at c. 260 Ma lies within the lower part of the Poortjie Member (**Figure 6-9**). The Oukloof Member sandstone package overlying the Hoedemaker Member is not mapped within the project area itself but occurs just outside this on higher hillslopes on the Perdeberg in the east and Vaalkop in the west.

It is noted that the member-scale lithostratigraphy and associated biostratigraphical zonation of the Lower Beaufort Group succession in this sector of the Main Karoo Basin - including the long-distance correlation of the main channel sandstone packages such as the Poortjie Member - remains unresolved (cf Day & Rubidge 2020a, Almond 2022c). The diachronous contact between the Poortjie and Hoedemaker Members in the western sector of the study area is transitional over an interval some 25-30 m. It is marked here by the Reiersvlei Meanderbelt package identified by Smith (1987, 2021) and is of considerable palaeontological as well as palaeoenvironmental interest. The precise level of the contact is arbitrary to an extent and has been variously interpreted in maps and scientific literature. On the 1: 250 000 geological map (**Figure 6-7**) the entire Reiersvlei Meander Belt seems to have been incorporated within the upper Poortjie Member which extends well up the lower slopes of Perdeberg. Smith and Keyser (1995) place the contact at the top of the last thick, multistorey channel sandstone of the Poortjie Member (excluding the Reiersvlei package). The stratigraphic column in Maharaj et al. (2019) appears to place the contact at the incoming of thick reddish mudrock packages above Reiersvlei Meanderbelt 2, while the column in Smith et al. (2021) places it lower down within a red bed succession at the level of Meanderbelt 1 of the Reiersvlei package. Given these ambiguities, the stratigraphic position of the geological and fossil sites mentioned in this report provisionally follows that shown on the published 1: 250 000 geological map.

The Poortjie – Hoedemaker transition zone characterised by a succession of thin, single-storey channel sandstones and intervening, predominantly reddish-brown mudrocks (Smith & Keyser 1995, Paiva 2015, Maharaj et al. 2019, Smith et al. 2021). This stratigraphic interval records the transition from thick, multi-storey channel sandstones dominated by downstream accretion process typical of the Poortjie Member to laterally accreting, meandering river systems of the Hoedemaker Member (**Figure 6-8**). The transition is accompanied by more frequent development of crevasse splay deposits and calcareous palaesols on the floodplain driven by increased aridification in the Karoo Basin and aggradation of the Reiersvlei Meanderbelt sedimentary prism (Maharaj et al. 2019, Smith et al. 2021). In contrast, a subsidence-driven transition is favoured by Paiva (2015).

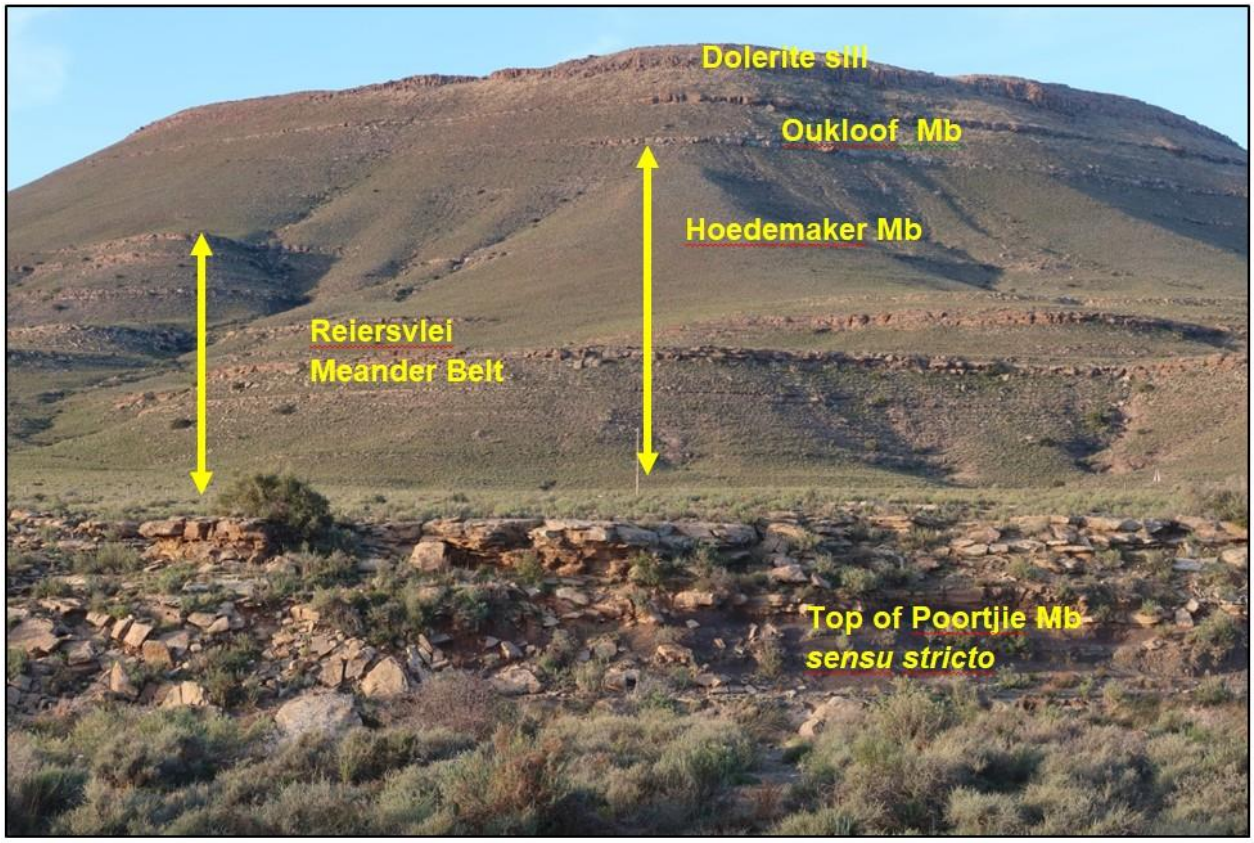


Figure 6-8 - South-western slopes of Perdeberg near Booiskraal homestead showing one possible interpretation of the main lithostratigraphic subunits of the lower Teekloof Formation that are represented in the broader project area

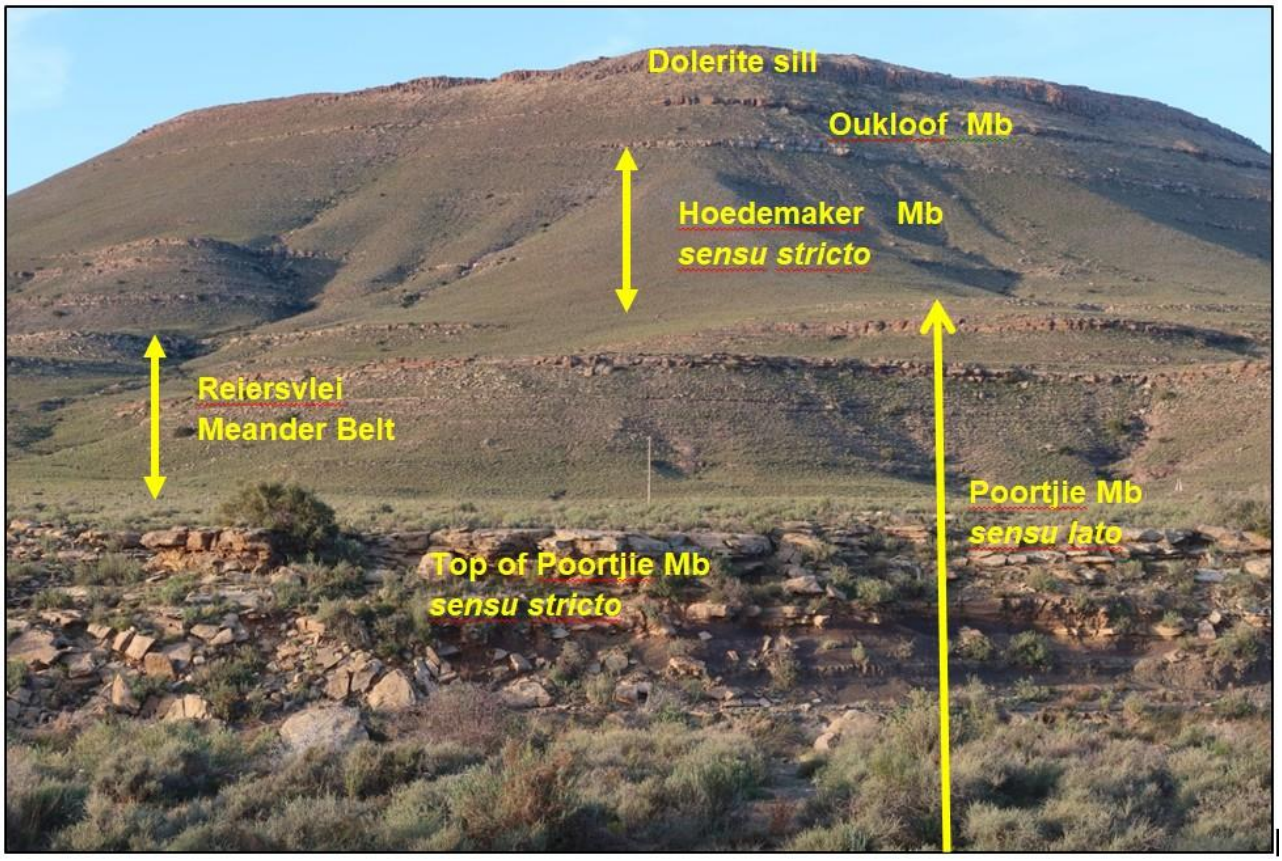


Figure 6-9 - Alternative stratigraphic subdivision of the Lower Beaufort Group succession on Perdeberg.

The Permian sediments and Jurassic intrusions within the combined project area are extensively mantled by a range of Late Caenozoic superficial deposits, limiting exposure levels of fresh (unweathered), potentially fossiliferous Permian sediments, especially in low-relief lowlands and on upland plateaux where the PV solar sites will be located. In addition to thick, consolidated (calcretised) to unconsolidated, gravelly to silty alluvial sediments along major active or defunct drainage lines (e.g. Kromrivier, Soutrivier and their various tributaries), these younger cover sediments include pan deposits (e.g. shallow brak-kolle), colluvial (slope) and eluvial (downwasted) surface gravels, pedocretes (e.g. calcrete), spring deposits and a spectrum of mainly sandy to gravelly soils. Coarse older alluvial deposits ("High Level Gravels") are not separately mapped within the project area at 1: 250 000 scale but elevated terrace gravels of Pleistocene and younger age are present along major drainage lines such as along the deeply-incised valley of the Kromrivier.

6.1.4 SURFACE WATER

The following is extracted from the Aquatic Biodiversity Assessment compiled by BlueScience (Pty) Ltd and included as ***Appendix G.3.***

The study area is mostly drained by smaller seasonal streams that feed into the larger Krom River. The rivers flow in a southeasterly direction towards the Sout River, a tributary of the Kariega River in the Groot/Gamtoos River System. The Krom River is a larger watercourse with some instream wetland habitat that tends to contain water for longer periods. The rivers are still in a natural ecological condition with little to no disturbance except for farm roads along the river.

Flow in the smaller tributaries in the upper catchment tends to be episodic (**Figure 6-10**), with very little to no flow in the rivers for much of the year. Flow typically only occurs for a short period following localised rainfall. These rainfall events tend to mostly occur in the higher rainfall months in late summer and into autumn. When flow occurs in the watercourses, it occurs as a high-flow event. This flow pattern is unlikely to change significantly due to longer-term climatic changes. The flow nature does, however, make erosion control measures in the watercourses, particularly on the slopes, essential mitigation.

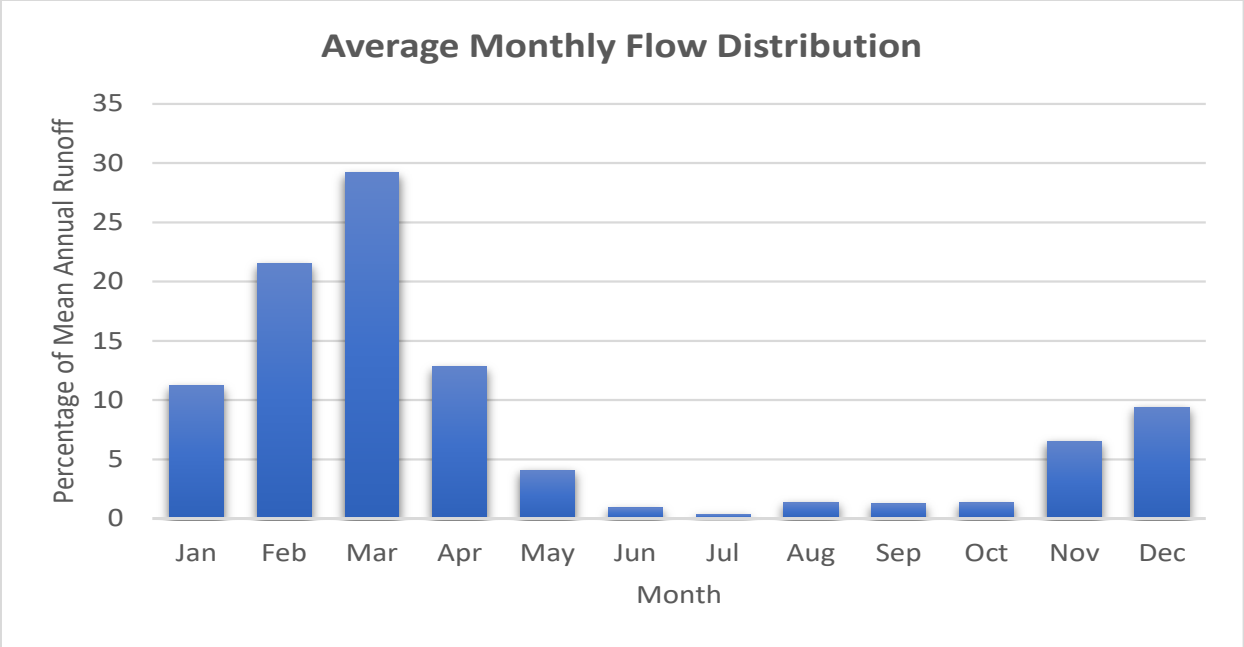


Figure 6-10 - Monthly flow distribution within the rivers in the study area, with the month flow shown as a percentage of the natural mean annual runoff (nMAR) for the catchment

6.2 BIOLOGICAL ENVIRONMENT

6.2.1 TERRESTRIAL BIODIVERSITY

The following is extracted from the Terrestrial Biodiversity Assessment compiled by 3Foxes Biodiversity Solutions and included as ***Appendix G.2.***

6.2.1.1 Vegetation

The whole of the Mura EGI Corridor is classified as falling within the Eastern Upper Karoo vegetation type (**Figure 6-11**). The site field assessment identifies three vegetation types which are described in **Section 6.2.3** below.

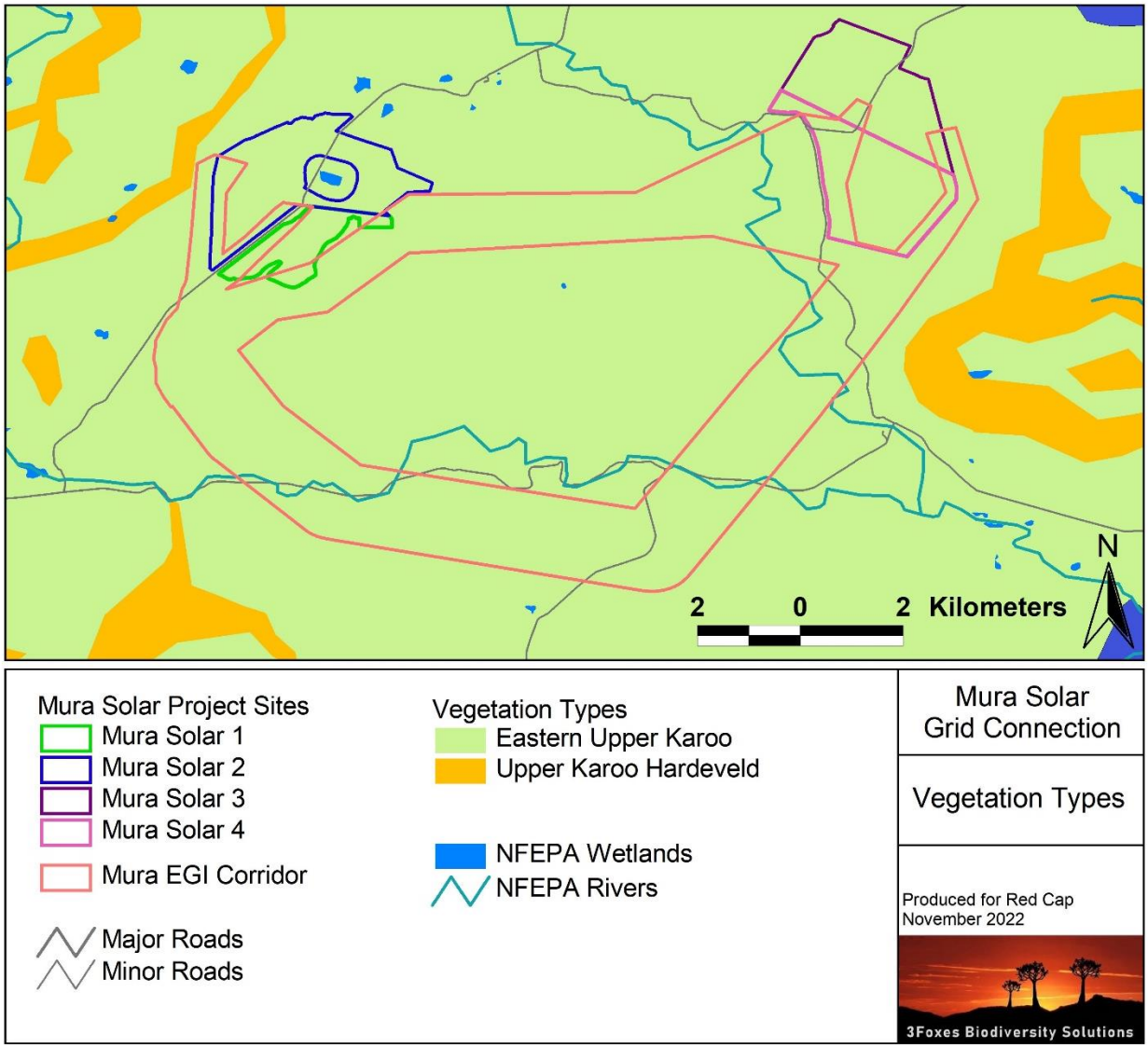


Figure 6-11 - Vegetation map of the broader Mura EGI Corridor

6.2.1.2 Critical Biodiversity Areas & Broad-Scale Processes

There is an extensive CBA located within the Mura EGI Corridor (**Figure 6-12**), that would be affected by both power line routes. Since this an extensive CBA that extends well beyond the grid corridor itself, there is no possibility for avoidance of the areas of CBA. A summary of the various underlying features that drive the selection of the CBA 1 areas within the Mura EGI Corridor are identified and discussed below in **Table 6-1**. The majority of the CBAs within the Western Cape are driven by the selection of areas of Eastern Upper Karoo, as well as water resource protection areas identified as Very High Sensitivity under the Shale Gas SEA and Karoo River Types. There are no CBAs within the Northern Cape section of the Mura EGI Corridor.

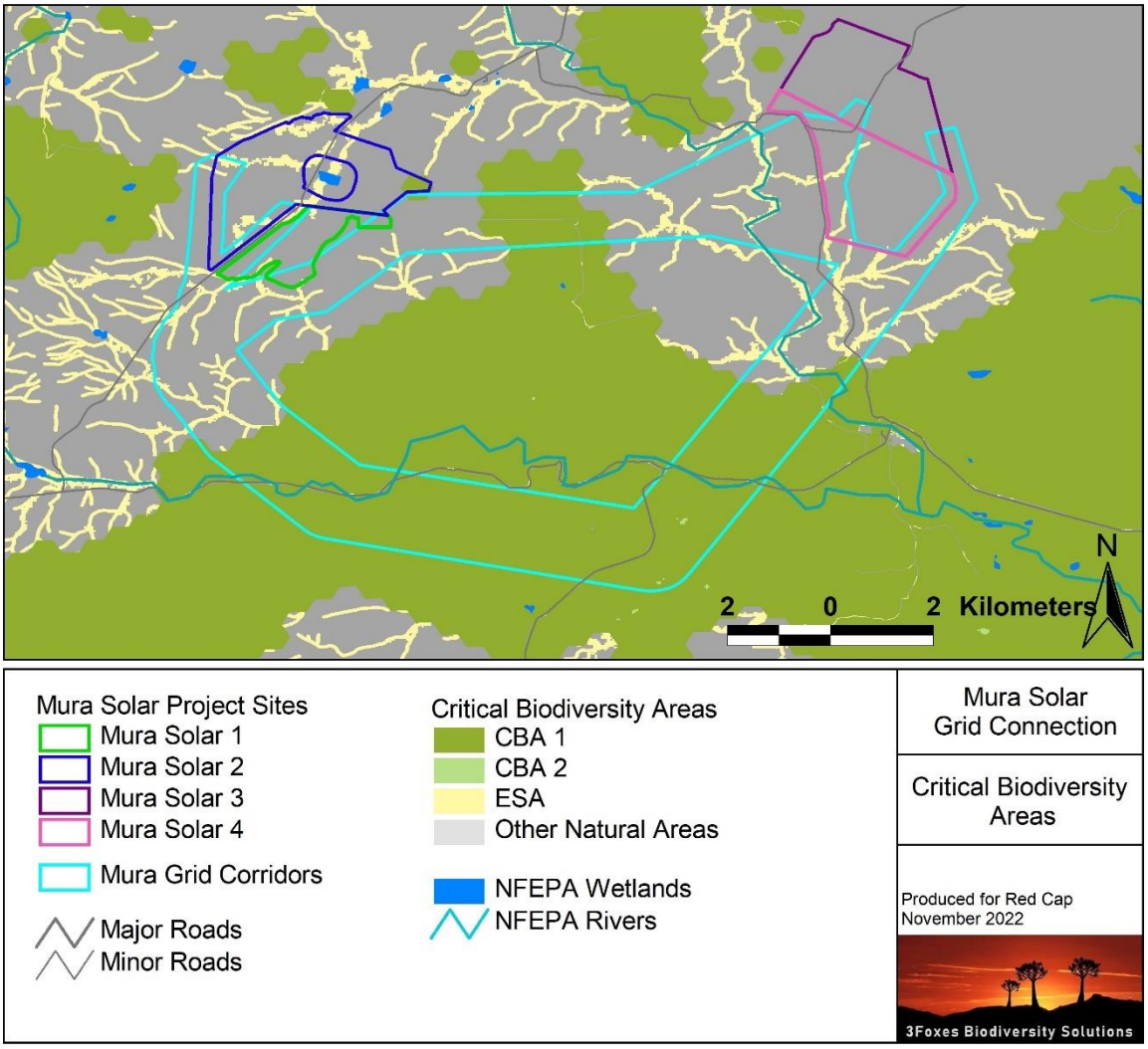


Figure 6-12 - Extract of the Western Cape Biodiversity Spatial Plan and Northern Cape CBA map for the Mura EGI Corridor and surrounds

Table 6-1 – Summary of various underlying drivers of the CBAs

CBA Basis	Feature Description & Irreplaceability	Consequence & Potential Impact Analysis
Eastern Upper Karoo	These areas have been selected in order to meet the representivity requirement for the Eastern Upper Karoo vegetation type. As this vegetation type is still largely intact and is classified as Least Threatened, it is considered to have low irreplaceability.	Habitat loss associated with the Mura EGI Corridor within these areas would not compromise the ability to meet future conservation targets for this vegetation type. There are still extensive tracts of intact similar habitat available in the area and the affected areas have low irreplaceability. As a result, the implications of the development for habitat loss

CBA Basis	Feature Description & Irreplaceability	Consequence & Potential Impact Analysis
		within the Eastern Upper Karoo are minimal and would not impact the conservation status of this vegetation type or the affected habitat types present within the study area in any meaningful manner.
Water Resource Protection	These areas have been designated CBA in order to protect drainage features or wetlands from development impact. This could be direct impact such as habitat loss within the wetlands or indirect impact such as damage through erosion and consequent siltation.	The development of the grid connection could potentially pose some threat to the integrity of the hydrological systems and processes operating within the affected CBA. However, it is important to note that the CBAs are based on large hexagonal planning units and actual features that require protection have not been mapped in detail. These features have however been mapped in detail here in this report in an ecological context and have also been mapped in the freshwater specialist study. The mapping, along with the required mitigation and avoidance measures suggested in this and the freshwater study, would ensure that impacts on the hydrological systems of the study area are minimised.
Shale Gas Very High Sensitivity (WC only)	These areas have been identified as being very high sensitivity in the Shale Gas SEA.	The sensitivities mapped in the Shale Gas SEA were specific to shale gas development and exploration and different development options such as power transmission pose very different risks to these areas. While these are generally still considered to represent more sensitive parts of the landscape, the potential impacts posed by the grid connection are very different from those posed by Shale Gas development, which has a far more intensive and intrusive nature compared to a power line. Areas considered unsuitable for Shale Gas development are not necessarily unsuitable for a power line development. The detailed, ground-truthed sensitivity mapping produced as part of this

CBA Basis	Feature Description & Irreplaceability	Consequence & Potential Impact Analysis
		study are considered to represent a more realistic representation of the sensitivity of the site and the actual development constraints for the power line.
Water Resource Protection	These areas have been designated CBA in order to protect drainage features or wetlands from development impact. This could be direct impact such as habitat loss within the wetlands or indirect impact such as damage through erosion and consequent siltation.	The development of the grid connection could potentially pose some threat to the integrity of the hydrological systems and processes operating within the affected CBA. However, it is important to note that the CBAs are based on large hexagonal planning units and actual features that require protection have not been mapped in detail. These features have however been mapped in detail here in this report in an ecological context and have also been mapped in the freshwater specialist study. The mapping, along with the required mitigation and avoidance measures suggested in this and the freshwater study, would ensure that impacts on the hydrological systems of the study area are minimised.

6.2.2 AQUATIC BIODIVERSITY

The following is extracted from the Aquatic Biodiversity Assessment compiled by BlueScience (Pty) Ltd and included as ***Appendix G.3.***

The larger Krom River corridor is mapped as aquatic CBA, with the smaller tributaries mapped as aquatic ESAs (**Figure 6-13**). The only mapped natural FEPA Wetlands and National Wetland Map areas are downstream of the study area in the larger Krom River.

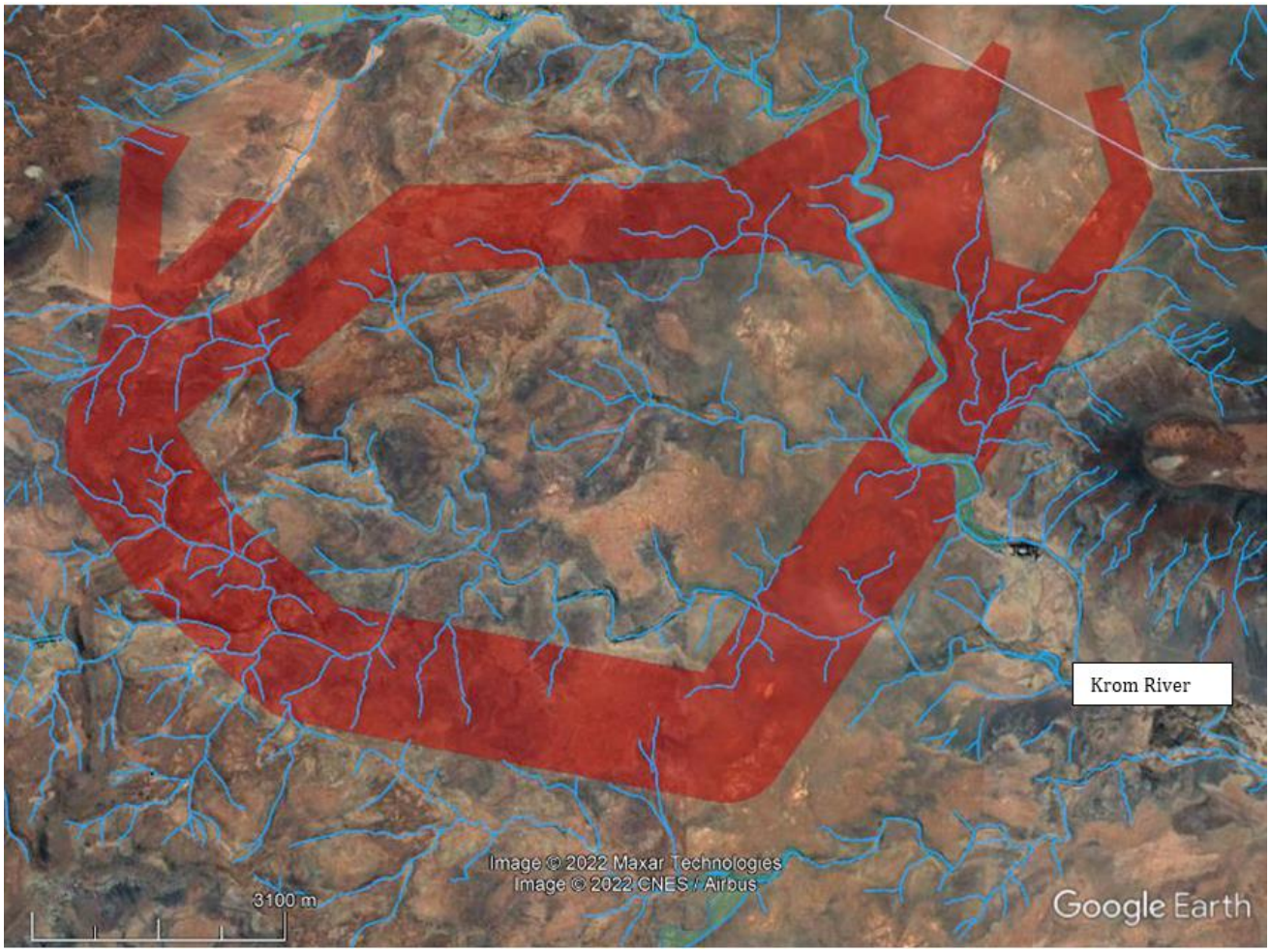


Figure 6-13 - Google Earth image with the mapped aquatic features shown as well as the proposed project location

6.2.2.1 Classification of aquatic features

To assess the condition and ecological importance and sensitivity of the watercourses, it is necessary to understand how they might have appeared under unimpacted conditions. This is achieved by classifying the rivers according to their ecological characteristics, so that they can be compared to ecologically similar rivers.

River typing or classification involves the hierarchical grouping of rivers into ecologically similar units so that inter- and intra-river variation in factors that influence water chemistry, channel type, substratum composition and hydrology are best accounted for. Any comparative assessment of river conditions should only be done between rivers that share similar physical and biological characteristics under natural conditions. Thus, the classification of rivers provides the basis for assessing river conditions to allow comparison between similar river types. The primary classification of rivers is a division into Ecoregions. Rivers within an ecoregion are further divided into sub-regions.

Ecoregions: groups of rivers within South Africa which share similar physiography, climate, geology, soils and potential natural vegetation. For this study, the ecoregional classification presented in

DWAF (1999), which divides the country's rivers into ecoregions, was used. The study area falls within the Great Karoo Ecoregion (**Table 6-2**).

Table 6-2 - Characteristics of the Great Karoo Ecoregion

Main Attributes	Characteristics
Terrain Morphology:	Plains: Moderate to Low Relief Lowlands; Hills and Mountains: Moderate and High Relief Open Hills, Lowlands; Mountains: Moderate to High Relief Closed Hills; Mountains: Moderate and High Relief; Table-Lands: Moderate and High Relief
Vegetation types	Valley Thicket; Spekboom Succulent Thicket (limited); Central Nama Karoo; Eastern Mixed Nama Karoo; Great Nama Karoo; Upper Nama Karoo; Bushmanland Nama Karoo (limited), Lowland Succulent Karoo; Upland Succulent Karoo; and Escarpment Mountain Renosterveld
Altitude	300-1700m; 1700-1900m (limited occurrence)
MAP	0 to 500m
Rainfall seasonality	Very late summer to winter
Mean annual temp.	10 to 20 °C
Median annual simulated runoff	<5 to 60 mm for quaternary catchment

Sub-regions: sub-regions (or geomorphological zones) are groups of rivers, or segments of rivers, within an ecoregion, which share similar geomorphological features, of which gradient is the most important. The use of geomorphological features is based on the assumption that this is a major factor in the determination of the distribution of the biota. **Table 6-3** provides the geomorphological and physical features of the rivers within the study area. From the Site Characterisation assessment, the geomorphological and physical characteristics of the channels can be classified as follows:

Table 6-3 - Geomorphological and physical features of the watercourses on site

Main Attributes	Characteristics	
River	Krom River	Minor unnamed tributaries & drainage features
Geomorph Zone	Lower Foothill Zone	
Lateral mobility	Semi-Confined by topography	
Channel form	Single to multiple channels	Simple single channel
Channel pattern	Braided channel with moderate sinuosity	Single channel, moderate to low sinuosity
Channel type	Bedrock, alluvial and gravel	

Main Attributes	Characteristics	
Channel modification	Channel is fairly natural with some flow and habitat modification	Natural with very small disturbances
Hydrological type	Seasonal to episodic	Episodic
Ecoregion	Great Karoo	
DWA catchment	L11A and L11D	
Vegetation type	Eastern Upper Karoo	
Rainfall region	Very late summer to autumn	

Wetlands can be broadly classified according to their flow and geomorphic characteristics. The wetlands are associated with the lower Krom River in the study area and are classified as channelled valley bottom wetlands. Flow into and out of the wetland areas is mostly associated with the watercourses within the study area as opposed to sub-surface flow.

Table 6-4 – Classification of wetland areas within study area

Main Attributes	Characteristics
Name	Valley bottom wetlands
System	Inland
Ecoregion	Great Karoo
Landscape setting	Channeled valley floor
Longitudinal zonation	Lower foothill
Drainage	With channel in- and outflow
Seasonality	Seasonally inundated
Modification	Largely natural to Moderately modified
Geology	Shale and siltstone of the Ecca Group; Karoo Sequence
Vegetation	Eastern Upper Karoo
Substrate	Bedrock, gravel and alluvium
Salinity	Fresh to brackish

6.2.2.2 Present Ecological Condition

Habitat Integrity of the Watercourses

The evaluation of Habitat Integrity provides a measure of the degree to which a river has been modified from its natural state. The methodology (DWAF, 1999) involves a qualitative assessment of the number and severity of anthropogenic perturbations on a river and the damage they potentially

inflict upon the system. These disturbances include both abiotic and biotic factors, which are regarded as the primary causes of the degradation of a river. The severity of each impact is ranked using a six-point scale from 0 (no impact) to 25 (critical impact). The Habitat Integrity Assessment is based on an assessment of the impacts of two components of the river, the riparian zone and the instream habitat. The total scores for the instream and riparian zone components are then used to place the habitat integrity of both in a specific habitat category (**Table 6-5**).

Table 6-5 - Instream Habitat Integrity assessment for the watercourses within the study area

Instream Criteria	Unnamed tributaries	Krom River	Riparian Category	Unnamed tributaries	Krom River
Water Abstraction	2	8	Vegetation Removal	2	6
Flow Modification	3	9	Exotic Vegetation	2	6
Bed Modification	3	8	Bank Erosion	3	5
Channel Modification	3	4	Channel Modification	2	5
Water Quality	2	5	Water Abstraction	2	6
Inundation	3	6	Inundation	3	5
Exotic Macrophytes	0	0	Flow Modification	3	7
Exotic Fauna	0	0	Water Quality	2	5
Rubbish Dumping	0	2			
Instream Integrity Class	**A**	**B/C**	**Riparian Integrity Category**	**A/B**	**B/C**

The habitat integrity assessment was divided into the smaller watercourses that have few modifications and the larger Krom River within the study area. The rivers within the study area are still in a natural ecological condition in their upper reaches with few modifications. The Krom River is more impacted by surrounding landuse activities and is in a largely natural to moderately modified ecological condition.

Table 6-6 - Habitat Integrity categories (From DWAF, 1999)

Category	Description	Score (%)
A	Unmodified, natural.	90-100

Category	Description	Score (%)
B	Largely natural with few modifications. A small change in natural habitats and biota may have taken place but the ecosystem functions are essentially unchanged.	80-90
C	Moderately modified. A loss and change of natural habitat and biota have occurred but the basic ecosystem functions are still predominantly unchanged.	60-79
D	Largely modified. Large loss of natural habitat, biota and ecosystem function has occurred.	40-59
E	The loss of natural habitat, biota and basic ecosystem functions is extensive.	20-39
F	Modifications have reached a critical level and the lotic system has been modified completely with an almost complete loss of natural habitat and biota.	0

Wetland Habitat Integrity

The Wetland PES Method (DWAF 2005) was used to establish the integrity of the wetlands in the study area and was based on the modified HI approach developed by Kleynhans (DWAF, 1999; Dickens et al, 2003). **Table 6-8** displays the criteria and results from the assessment of the habitat integrity of the wetlands within the study area. These criteria were selected based on the assumption that anthropogenic modification of the criteria and attributes listed under each selected criterion can generally be regarded as the primary causes of the ecological integrity of a wetland. The valley bottom wetlands have been slightly modified but are still in a largely natural ecological condition (Category B).

The WET-Health method was then used to determine the overall PES for the wetlands. PES scores were determined for geomorphology, hydrology, water quality and vegetation to generate the overall score and ecological category (**Table 6-9**). Modification to the indigenous vegetation being the most impacted component of the wetlands as a result of direct disturbances of adjacent land use activities (i.e. agriculture / grazing) and infrastructure (road) development.

Table 6-7 - Habitat integrity assessment and criteria for palustrine wetlands

Criteria	Relevance	Wetlands
Hydrologic		
Flow Modification	Abstraction, impoundments or increased runoff from developed areas. Change in flow regime, volume, velocity & inundation of habitats resulting in floristic changes or incorrect cues to biota.	3.4
Permanent Inundation	Consequence of impoundment resulting in destruction of natural wetland habitat and cues for wetland biota.	3.7
Water Quality		

Criteria	Relevance	Wetlands
Water Quality Modification	From point or diffuse sources such as upstream agriculture, human settlements and industry. Aggravated by volumetric decrease in flow delivered to the wetland.	3.8
Sediment Load Modification	Reduction due to entrapment by impoundments or increase due to land use practices such as overgrazing. Cause of unnatural rate of erosion, accretion, infilling of wetlands &habitat change.	3.2
Hydraulic/Geomorphic		
Canalisation	Desiccation or change to inundation of wetland and change in habitat	3.8
Topographic Alteration	Consequence of infilling, ploughing, dykes, trampling, bridges, roads, railway lines and other substrate disruptive activities that reduce or change wetland habitat	3.6
Biota		
Terrestrial Encroachment	Desiccation of wetland and encroachment of terrestrial plant species due to changes in hydrology or geomorphology. Change from wetland to terrestrial habitat	3.9
Indigenous Vegetation Removal	Direct destruction of habitat through farming activities, grazing or firewood collection affecting wildlife habitat and flow attenuation functions, organic matter inputs and increases potential for erosion.	3.8
Invasive Plants	Affects habitat characteristics through changes in community structure and water quality changes	4.5
Alien Fauna	Presence of alien fauna affecting faunal community structure.	3.5
Biota Over use	Overgrazing, over fishing, etc.	4.5
Category		**B**

Table 6-8 - Relation between scores given and ecological categories

Scoring Guidelines	Interpretation of Scores: Rating of Present Ecological Status Category (PESC)
Natural, unmodified – score=5.	CATEGORY A
	>4; Unmodified, or approximates natural condition.
Largely natural – score=4.	CATEGORY B
	>3 and <4; Largely natural with few modifications, with some loss of natural habitat.
Moderately modified- score=3.	CATEGORY C
	>2 and <3; moderately modified, but with some loss of natural habitats.

Scoring Guidelines	Interpretation of Scores: Rating of Present Ecological Status Category (PESC)
Largely modified – score=2.	CATEGORY D
	<2; largely modified. Large loss of natural habitat & basic ecosystem function
	OUTSIDE GENERALLY ACCEPTABLE RANGE
Seriously modified – rating=1.	CATEGORY E
	>0 and <2; seriously modified. Extensive loss of natural habitat & basic ecosystem function.
Critically modified – rating=0.	CLASS F
	0; critically modified. Modification reached critical levels with system completely modified.

Table 6-9 - WET-Health assessment of valley bottom wetland areas in the study area

Components	Method used for assessment	PES% Score	Ecological Category
Hydrology PES	WET-Health Hydro Module	85 %	B
Geomorphology PES	WET-Health Geomorph Module	88 %	A/B
Water quality PES	Landuse-WQ Model	91 %	A/B
Vegetation PES	WET-Health Veg Module	83 %	B
Overall Wetland PES	WET-Health default weightings	86 %	B

6.2.2.3 Ecological Importance and Sensitivity

The Ecological Importance and Ecological Sensitivity (EI&ES) assessment for both watercourses and wetlands consider several biotic and habitat determinants surmised to indicate either importance or sensitivity. The determinants are rated according to a four-point scale (**Table 6-10**).

Table 6-10 - Scale used to indicate either ecological importance or sensitivity

Scale	Definition
1	One species/taxon judged as rare or endangered at a local scale.
2	More than one species/taxon judged to be rare or endangered on a local scale.
3	One or more species/taxon judged to be rare or endangered on a Provincial/regional scale.
4	One or more species/taxon judged as rare or endangered on a National scale

The median of the resultant score is calculated to derive the EI&ES category (**Table 6-12**). The results of the EIS assessment are shown in **Table 6-13**. The EI&ES have been determined for the larger watercourses and the smaller unnamed tributaries separately.

Table 6-11 - Ecological importance and sensitivity categories (DWAF, 1999)

EISC	General description	Median
Very high	Quaternaries/delineations unique on a national and international level based on unique biodiversity. These rivers are usually very sensitive and have no or only a small capacity for use.	>3-4
High	Quaternaries/delineations unique on a national scale based on biodiversity. These rivers may be sensitive to flow modifications and may have substantial capacity for use.	>2-≤3
Moderate	Quaternaries/delineations unique on a provincial/ local scale due to biodiversity. These rivers are not very sensitive to flow modification and have substantial capacity for use.	>1-≤2
Low/ marginal	Quaternaries/delineations not unique on any scale. These rivers are generally not very sensitive to flow modifications and usually have substantial capacity for use.	≤1

Table 6-12 - Results of the EI&ES assessment of the watercourses in the study area

Biotic and Aquatic Habitat Determinants	Krom River	Smaller tributaries
Rare and endangered biota	1.5	2
Unique biota	2	1
Intolerant biota	2	2
Species/taxon richness	1.5	1.5
Diversity of aquatic habitat types or features	2.5	2
Refuge value of habitat type	2.5	2
Sensitivity of habitat to flow changes	2.5	3
Sensitivity of flow related water quality changes	2	2.5
Migration route/corridor for instream & riparian biota	2.5	1
National parks, wilderness areas, Nature Reserves & areas, PNEs	1.5	1.5
EIS CATEGORY	High	Moderate

The Krom River in the study area is deemed to be of a high ecological importance and sensitivity. This is due to the importance of larger river in providing a diversity of habitats and being important refugia for biota as well as corridors for the movement within the landscape. The smaller tributaries are of moderate ecological importance and sensitivity and tend to be more sensitive to flow and water quality changes. Indigenous fish and amphibian diversity in the rivers are likely to be relatively low. Potential fish and amphibian populations that may occur in the wetter Krom River are listed in Section 3.6 of the report (**Appendix G.3**).

The results from the wetland EIS assessment are provided in **Table 6-13**. The assessment of the ecosystem services supplied by the wetland areas (divided into Hydrological Functional Importance and Direct Human Benefits) is included in the table and was conducted according to the guidelines as described by Kotze et al (2005).

Table 6-13 - Results of the EIS assessment for the wetland areas

Ecological Importance	Valley bottom wetlands
Biodiversity support	2.17
Presence of Red Data species	1
Populations of unique species	2
Migration/breeding/feeding sites	3.5
Landscape scale	1.40
Protection status of the wetland	1
Protection status of the vegetation type	1
Regional context of the ecological integrity	2
Size and rarity of the wetland type/s present	1
Diversity of habitat types	2
Sensitivity of the wetland	1.93
Sensitivity to changes in floods	2.8
Sensitivity to changes in low flows/dry season	2
Sensitivity to changes in water quality	1
ECOLOGICAL IMPORTANCE & SENSITIVITY	**2.17**
Flood attenuation	3
Streamflow regulation	1
Sediment trapping	2.5
Phosphate assimilation	1
Nitrate assimilation	1.5
Toxicant assimilation	1
Erosion control	2
Carbon storage	1

Ecological Importance	Valley bottom wetlands
HYDROLOGICAL/FUNCTIONAL IMPORTANCE	**1.63**
Water for human use	1.5
Harvestable resources	1.5
Cultivated foods	0
Cultural heritage	0
Tourism and recreation	2
Education and research	1
IMPORTANCE OF DIRECT HUMAN BENEFITS	**1.00**
OVERALL IMPORTANCE (highest score of ecological, hydrological and direct human benefits)	**2.17**

The wetland features within the study area are considered of moderate ecological importance and sensitivity as they are closely associated with the larger Krom River, providing habitat and ecological corridors for the movement of biota.

6.2.2.4 Recommended Ecological Condition of Aquatic Ecosystems

Considering the moderately modified to largely natural ecological condition of the aquatic ecosystems within the study area and their moderate to high ecological importance and ecological sensitivities, the recommended ecological condition (REC) of these features would be that they remain in their current condition or be improved where possible. These rivers should not be allowed to degrade further. The proposed Grid Connection for the Mura PV Facilities will need to cross over the larger Krom River, its associated valley bottom wetland, as well as several of the smaller watercourses but is unlikely to result in any significant degradation of aquatic ecosystem integrity as the associated infrastructure can be placed outside of the recommended buffers or setback areas. If new access tracks have to traverse these areas, then the crossing should subject to a walkdown and approval by a qualified aquatic specialist.

6.2.2.5 Aquatic Habitat and Species of Concern

The watercourses in the study area are non-perennial, however, some rock pools and dams are likely to contain water for most of the year. As a result, no indigenous fishes occur for most of the river systems, with some indigenous fish, such as smallscale redfin *Psuedobarbus asper* (vulnerable), *moggel Labeobarbus umbratus* (least concern) and *chubbyhead barb Barbus anoplus* (least concern), occurring in the larger rivers where there are deep pools that contain water through the dry season.

The amphibian diversity within the study area is also likely to be relatively low. No species of conservation concern are thus known to occur in the study area from an aquatic perspective. The amphibian species likely to be present are quite widespread and of low conservation concern. These include the Karoo Dainty Frog *Cacosternum karooicum* (Data Deficient), Poynton's River Frog *Amietia poyntoni*, the Cape Sand Frog, *Tomopterna delalandii*, Pygmy Toad *Poyntonophrynus*

vertebralis and the Karoo Toad*, Vandijkophrynus gariepensis*. The latter two amphibian species are listed as “Not Threatened”.

A faunal species potentially in the area and associated with the watercourses in the landscape is the Riverine Rabbit, which is listed as Critically Endangered. The habitat preference of Riverine Rabbits is alluvial seasonal watercourses, browsing on *Pteronia erythrochaetha, Kochia pubescens, Salsola glabrescens and Mesembryanthemaceae*. They are unable to survive in heavily overgrazed or agriculturally transformed habitats (the presence of the Riverine Rabbit and suitable habitat is discussed within **Section 6.2.4** below).

6.2.3 PLANT SPECIES

The following is extracted from the Plant Species Compliance Statement compiled by 3Foxes Biodiversity Solutions and included as ***Appendix G.4.***

The whole of the Mura EGI Corridor is classified as falling within the Eastern Upper Karoo vegetation type (Figure 6-11). The results of the field assessment confirm that this is an oversimplification of the vegetation of the site and based on the fieldwork on the site and site verification, there are some dolerite hills present that can be considered to represent the Upper Karoo Hardeveld vegetation type, while the areas of riparian vegetation along the larger drainage systems of the corridor such as the Krom can be considered to represent the Southern Karoo Riviere vegetation type. These three vegetation types are described and illustrated briefly below.

Eastern Upper Karoo has an extent of 49 821 km^2 and is the most extensive vegetation type in South Africa and forms a large proportion of the central and eastern Nama Karoo Biome (**Figure 6-14**). This vegetation type is classified as Least Threatened, and about 2% of the original extent has been transformed largely for intensive agriculture. Eastern Upper Karoo is however poorly protected and less than 1% of the 21% target has been formally conserved. Mucina & Rutherford (2006) list eight endemic species for this vegetation type, which considering that it is the most extensive unit in the country, is not very high. As a result, this is not considered to represent a sensitive vegetation type.

Dominant and characteristic species observed within the areas of Eastern Upper Karoo vegetation include low woody shrubs such *as Pentzia globosa, Rosenia humulis, Asparagus capensis, Eriocephalus ericoides, Pteronia sordida, Pteronia incana, Plinthus karooicus, Helichrysum luciloides, Felicia muricata*, with a varying density of low succulent shrubs such as *Roepera lichtensteinii, Aridaria noctiflora* and *Ruschia spinosa*, with a variable grass layer dominated by *Aristida adscenionis, Stipagrostis ciliata, Stipagrostis obtusa, Enneapogon desvauxii* and *Tragus berteronianus*.

Figure 6-14 - Typical landscape present within the Mura EGI Corridor study area, corresponding with the Eastern Upper Karoo vegetation type

Although there are no expansive areas of Upper Karoo Hardeveld within the grid corridor, there are several minor ridges and the dolerite hills along the Krom Rivier (**Figure 6-15**) can generally be considered to represent this vegetation type. The Upper Karoo Hardeveld vegetation type is associated with 11 734 km^2 of the steep slopes of koppies, buttes mesas and parts of the Great Escarpment covered with large boulders and stones. The vegetation type occurs as discrete areas associated with slopes and ridges from Middelpos in the west and Strydenburg, Richmond and Nieu-Bethesda in the east, as well as most south-facing slopes and crests of the Great Escarpment between Teekloofpas and eastwards to Graaff-Reinet. Altitude varies from 1000-1900m. Mucina & Rutherford (2006) list 17 species known to be endemic to the vegetation type. This is a high number given the wide distribution of most karoo species and illustrates the relative sensitivity of this vegetation type compared to the surrounding Eastern Upper Karoo.

Upper Karoo Hardeveld is usually consists of very rocky ground and is often associated with steep slopes, with the result that it is considered vulnerable to disturbance as such areas may take a long time to recover if the topsoil is lost. Although this vegetation type contains a higher diversity of species than the adjacent areas of Eastern Upper Karoo, no red-listed plant species were observed within these areas during the field survey.

Figure 6-15 - Dolerite slope within the Mura EGI Corridor, along the Krom Rivier representative of the Upper Karoo Hardeveld vegetation type

The vegetation along the major drainage lines of the corridor can be considered to represent the Southern Karoo Riviere vegetation type (**Figure 6-16**). This vegetation type is associated with the rivers of the central karoo such as the Buffels, Bloed, Dwyka, Gamka, Sout, Kariega and Sundays Rivers. About 12% has been transformed as a result of intensive agriculture and the construction of dams. Although it is classified as Least Threatened, it is associated with rivers and drainage lines and as such represents areas that are considered ecologically significant. Within the grid corridor, these areas are of particular significance due to the association with the Riverine Rabbit which is a species of high conservation concern. Typical and dominant species observed from the drainage lines of the area includes *Vachellia karroo, Searsia lancea, Cenchrus ciliaris, Searsia burchellii, Melianthus comosus, Lycium oxycarpum, Sporobolus ioclados, Helichrysum pentzioides, Drosanthemum lique, Pentzia globosa, Salsola aphylla, Tribulis terrestris, Felicia muricata, Atriplex vestita, Roepera retrofractum, Cynodon dactylon, Chrysocoma ciliata, Stipagostis namaquensis, Lycium pumilum, Lycium cinereum, Artemisia africana, Tripteris spinescens, Exomis microphylla* and *Derverra denudata*.

Figure 6-16 - Riparian vegetation along the Krom Rivier considered to represent the Southern Karoo Riviere vegetation type

6.2.4 ANIMAL SPECIES

The following is extracted from the Animal Species Compliance Statement compiled by 3Foxes Biodiversity Solutions and included as ***Appendix G.5.***

In terms of the fauna that potentially occur at the site, the potential diversity is considered to be moderate and numbers approximately 38 mammals, 28 reptiles and about 6 frog and toads. Mammals observed at the site directly, indirectly or through the camera trapping include Steenbok, Kudu, Cape Hare, Cape Porcupine, Suricate, Bat-eared Fox, Cape Fox, Cape Mongoose, Yellow Mongoose, Common Genet, Aardwolf and Black-backed Jackal. Reptiles and amphibians observed on the site or in the immediate environment include Leopard Tortoise, Southern Tent Tortoise, Karoo Girdled Lizard, Spotted Sand Lizard, Southern Rock Agama, Cape Thick-toed Gecko, Variegated Skink, Ground Agama and Karoo Toad. Although the DFFE Screening Tool identified only the Karoo Dwarf Tortoise and Riverine Rabbit as being of potential concern at the site, there are several other fauna species of concern that occur in the wider area (**Table 6-14**). However, interrogation of these also suggests that none of these other species are likely to occur within the site as they all occur in habitats that are not well-represented within the grid corridor.

Table 6-14 - Faunal species conservation concern known from the broad area, and their likely presence within the site

Species	Wider area	PV footprint
Vaal Rhebok (NT)	Present on higher ground, especially the Nuweveld mountains.	Not observed within the corridor, but may move through the area on occasion. The corridor is

Species	Wider area	PV footprint
		however considered low sensitivity for this species.
Black-footed Cat (VU)	Previously recorded from within the Karoo National Park, but no recent records.	No recent records from the area and the regular presence of this species within the corridor is considered unlikely. The corridor is considered low sensitivity for this species.
Leopard (VU)	This species is generally confined to protected areas or mountainous terrain and may be present in the wider area.	The terrain within and near the site is highly unlikely to be attractive for this species which prefers rugged terrain with more cover than the site offers.
Riverine Rabbit (CR)	There are records from the Krom River and some of the larger tributaries.	Likely present within the larger habitat patches present along the Krom Rivier within the corridor.
Littledale's Whistling Rat (NT)	Occurs in the wider area and the arid parts of the Nama and Succulent Karoo and Namibia.	This species is associated with sandy soils and makes characteristic burrows that are relatively easily observed. Not observed within the corridor and considered unlikely to be present.
Karoo Dwarf Tortoise (NT)	Occasional records from the broad area. Associated with dolerite outcrops.	Potentially present as there is some suitable habitat within the corridor and there are some records from similar habitat nearby.

In terms of the two species identified by the Screening Tool, there is some habitats present within the corridor for both the Karoo Dwarf Tortoise and the Riverine Rabbit. The implications of the development for these two species are summarized below.

The Riverine Rabbit is endemic to the semi-arid central Karoo region of South Africa. It is associated with dense riparian scrub fringing the seasonal rivers of the region. This habitat specificity is assumed to be related to a dependence on soft and deep alluvial soils along the river courses for constructing stable breeding stops. Home range has been estimated as approximately 12 ha (Duthie 1989). Riverine Rabbits are nocturnal, spending daylight hours in a scrape beneath riparian vegetation. They are solitary, and will only be found in breeding pairs for short periods, or in female-juvenile pairs for rearing purposes (Duthie 1989).

Geographically, Riverine Rabbits occur in two separate populations, with a population centred on the Upper Karoo (the northern population) and a second more-recently discovered population in the Little Karoo (the southern population). Population estimates vary widely and it is clear that a reliable estimate of the overall population size has yet to be made. The 2016 red list assessment indicates that at the time, there were an estimated 12 subpopulations, three in the southern population and nine in the northern population.

Threats to this species include ongoing habitat degradation and fragmentation due to detrimental land-use practices (largely overgrazing and transformation for intensive agriculture), climate change and renewable energy development. It is estimated that 40–60% of the riparian habitat has been lost as a result of cultivation over the past century.

The Area of Occupancy of the Riverine Rabbit has been estimated at 2943 km^2 (Collins et al. 2016) and based on the current assessment, the areas potentially occupied by Riverine Rabbits within the corridor amounts to less than 2 km^2, this represents less than 0.1% of the overall Area of Occupancy of the Riverine Rabbit. The degree of conflict between the Riverine Rabbit and the development of the Mura grid infrastructure is likely to be low as there is no habitat in the areas where the switching stations would be located and the pylons are likely to be able to span the areas of habitat. The Krom Rivier at its widest in the corridor is approximately 300m wide and the pylons would be able to span the whole river and the adjacent floodplains without significant impact on the riparian vegetation that would be home to the Riverine Rabbit. As such, a significant amount of habitat loss related to the project is not likely and habitat loss is not likely to be a significant factor related to the project.

Chersobius boulengeri occurs in association with dolerite ridges and rocky outcrops of the southern Succulent and Nama Karoo biomes, and peripherally in the Albany Thicket biome in the southeast, at altitudes of approximately 800 to 1,500 m. The vegetation usually consists of dwarf shrubland that often contains succulent and grassy elements. The tortoises usually take shelter under rocks in vegetated areas or in rock crevices. However, these are quite specific in terms of their requirements with the result that suitable retreats for the species are not common. Females nest in summer and have single-egg clutches. No information exists on age at maturity and longevity, but based on the life history of Chersobius signatus (Loehr et al. 2007), female C. boulengeri are expected to mature at 10-12 years of age.

Due to their strong habitat association, populations are isolated on rocky outcrops with specialized vegetation. Recent surveys for this species indicate that many populations have disappeared and that population numbers have declined significantly (Hofmeyr et al. 2018). The reasons for the current population decline are not well known. However presumed threats to this species include habitat degradation, drought and agricultural overgrazing as well as climate change and increased levels of predation by crows in particular.

The motivation for the red-listing of *Cherobius boulengeri* as Endangered under criterion A4ace, based on an estimate of a reduction in population size of approximately 30% over the past 25 years (one generation), and a projected reduction of at least another 30% over the next 50 years (two generations), for a total reduction over three generations of approximately 60%.

It is not possible to provide a reliable estimate of the population size within the Mura EGI Corridor. Firstly, there are no reliable estimates of population density for this species that can be extrapolated across the range and secondly, the reported population declines appear to be widespread with the result that it is not possible to ascertain what proportion of the suitable habitat within the corridor would actually be occupied. However, in order to assess the relative importance of the area impacted by the power line, the whole of the EGI corridor has an area of 4328 ha (43.28 km2) which compares to the Area of Occurrence of this species of 13 5090 km2. The Mura EGI corridor therefore occupies less than 0.05% of the Area of Occurrence of this species and assuming a similar level of occupancy across the range, this would amount to less than 0.05% of the population. Again, assuming an even distribution of impact within the corridor for the access road and power

line, which would represent a worst-case scenario, the maximum footprint within areas mapped as potentially suitable for the Karoo Dwarf Tortoise would be 7ha. Direct habitat loss within the corridor would amount to less than 1% of the mapped suitable habitat present, with the result that direct habitat loss would be minimal and is not considered a significant threat resulting from the development.

6.2.5 AVIFAUNA

The following is extracted from the Avifaunal Impact Assessment compiled by WildSkies Ecological Services (Pty) Ltd and included as ***Appendix G.6****.*

6.2.5.1 Vegetation description

Functionally in avifaunal terms, the site can be classified as Karoo shrubland. Often more important than vegetation type in determining avifaunal diversity and abundance, are the micro habitats available for birds. Micro habitats are determined by multiple factors, including but not limited to vegetation type. Anthropogenic factors such as land use, construction of dams etc. are a significant factor. At the proposed site the micro habitats available to birds are: dams, Karoo shrubland, exotic trees (mostly at homesteads), rivers, ridge/cliff lines. These micro habitats are pictured in **Figure 6-17**.

Figure 6-17 - Photographs of micro habitats on and near site

6.2.5.2 Avifaunal community on site

Southern African Bird Atlas Project data

Up to approximately 220 species were recorded in the broader area by the first and second Southern Africa Bird Atlas Projects (www.sabap2.adu.org.za). These birds were not necessarily recorded on the Mura site itself but are an indication of which species could occur on site if conditions and habitats are right. Of the 220 species approximately 71 were classified in the top 200 at risk species by Retief et al (2014). Four species are regionally Endangered (*Ludwig's Bustard, Black Harrier Circus maurus, Martial Eagle Polemaetus bellicosus* & *Yellow-billed Stork Mycteria ibis*), five are Vulnerable, and 6 are Near-threatened. Two species (Ground Woodpecker *Geocolaptes olivaceus* & Curlew *Sandpiper Calidris ferruginea*) are Least Concern regionally but Near-threatened globally (IUCN 2022).

Pre-construction bird monitoring data

Whereas the atlas data described above shows which species could occur on the site since they have been recorded in the broader area, our own monitoring data confirms those species definitely occurring on the site. The species diversity on the proposed site itself is lower, due to its smaller size and lower habitat diversity.

A total of 88 bird species were recorded on site by all our pre-construction bird monitoring methods (Appendix 1 of the Avifauna Report in **Appendix G.6**). Five of these 88 species are regionally Red Listed: Ludwig's Bustard is Endangered; Verreaux's Eagle is Vulnerable; and Karoo Korhaan

Eupodotis vigorsii, Blue Crane *Grus paradisea* and Sclater's Lark *Spizocorys sclateri* are Near-threatened (Taylor et al, 2015).

Small Passerine Bird Data (walked transects)

Table 6-15 presents a summary (full programme of 6 months) results for those species for which > 10 individuals recorded) of the bird data collected by walked transects during the monitoring period (see Appendix 2 of the Avifauna Report in **Appendix G.6** for the full dataset). A total of 37 bird species were recorded by this method. One of the 37 species is regionally Red Listed, the Sclater's Lark (Near-threatened, Taylor et al, 2015). One record of a pair of these larks was made in spring on Area 2 (Mura 1 and Mura 2). The most abundant species was Black-headed Canary *Serinus alario*, followed by *Namaqua Sandgrouse Pterocles Namaqua* and Sickle-winged Chat *Cercomela sinuata*. Overall, this is a rather unremarkable bird species diversity, reflecting the relatively uniform nature of the habitat on site.

Large terrestrial and raptor data (driven transects)

Table 6-16 summarises the findings from driven transects on site across the 6 months (the full dataset can be seen in Appendix 3 of the Avifauna Report in **Appendix G.6**). In total, 9 species were recorded in the period. Three regionally Red Listed species are included: Karoo Korhaan (Near-threatened), Blue Crane (Near-threatened) and Ludwig's Bustard (Endangered). The most abundant species was Karoo Korhaan, which was predominantly recorded in pairs.

Incidental observations

Incidental records of priority bird species were made during both site visits and comprised a total of 13 species (**Table 6-17)** (Appendix 4 of the Avifaunal Impact Assessment (**Appendix G.6**) shows the full dataset). Five of the recorded species are regionally Red Listed (Taylor et al, 2015): Ludwig's Bustard is Endangered; Verreaux's Eagle is Vulnerable; and Karoo Korhaan, Blue Crane and Sclater's Lark are Near-threatened. These incidental data are not used formally as they are not the product of systematic sampling. They do however assist in assessing how frequently various species are seen, and in what abundance.

Focal sites

The two most important Focal Sites monitored by this programme are a Martial Eagle nest and a Verreaux's Eagle nest (both some distance off the proposed project sites now that certain areas have been screened out). The Martial Eagle nest became irrelevant when PV Area 1 was dropped from the project design as it is too far from the proposed areas to be relevant. The Verreaux's Eagle nest also became less relevant to the study once the PV Areas 3 and 4 closest to it were excluded from the project. The nest was active in 2021 according to farm workers but does not seem to have had successful breeding in the 2022 breeding season. The results are summarised in **Table 6-18**.

Table 6-15 - Summary data from walked transects on site

Species	Birds	Records	Birds/km
Black-headed Canary	760	104	18.10
Namaqua Sandgrouse	209	46	4.98
Sickle-winged Chat	157	96	3.74

Species	Birds	Records	Birds/km
Lark-like Bunting	119	38	2.83
Spike-heeled Lark	98	27	2.33
Rufous-eared Warbler	70	43	1.67
Capped Wheatear	51	41	1.21
Karoo Eremomela	51	24	1.21
Grey-backed Sparrow-Lark	47	6	1.12
Large-billed Lark	44	28	1.05
White-necked Raven	40	16	0.95
Karoo Long-billed Lark	33	29	0.79
Bokmakierie	29	21	0.69
Karoo Chat	28	23	0.67
Speckled Pigeon	28	7	0.67
Red-capped Lark	27	11	0.64
Pied Crow	23	10	0.55
Cape Bunting	22	9	0.52
Cape Sparrow	22	7	0.52
Mountain Wheatear	20	14	0.48
South African Shelduck	18	9	0.43
African Pipit	17	12	0.40
Yellow-bellied Eremomela	17	9	0.40
Karoo Scrub Robin	16	9	0.38
White-throated Canary	16	11	0.38
Black-eared Sparrow-Lark	12	1	0.29
Cape Turtle Dove	11	8	0.26
Namaqua Dove	10	5	0.24

Table 6-16 - Summary data from driven transects on site

Transect length (km)	Birds	Records	Birds/km
Karoo Korhaan	30	12	0.61
Blue Crane	10	3	0.20
Double-banded Courser	6	3	0.12
Ludwig's Bustard	4	3	0.08
Jackal Buzzard	2	2	0.04
Pied Crow	2	2	0.04
Temminck's Courser	2	1	0.04
African Harrier-Hawk	1	1	0.02
Rock Kestrel	1	1	0.02
Transect length (km)	**49**		

Table 6-17 - Summary of incidental observations recorded on site

Species	Birds	Records
Karoo Korhaan	104	46
Grey-winged Francolin	12	6
Ludwig's Bustard	12	10
Blue Crane	10	3
Double-banded Courser	6	3
Jackal Buzzard	3	3
Sclater's Lark	3	2
Verreaux's Eagle	2	2
Rock Kestrel	2	2
Spotted Eagle-Owl	1	1
Pale Chanting Goshawk	1	1
African Harrier-Hawk	1	1
Temminck's Courser	1	1
# Species	**13**	

Table 6-18 - Summary of Focal Site findings

Focal site	Type	Season 1	Season 2
1	Dam	Nothing seen	n/a
2	Dam	Egyptian Goose, Blacksmith Lapwing	n/a
3	Martial Eagle nest	Nothing seen	No records
4	Medium size nests	Nothing seen	No records
5	Dam	Egyptian Goose, SA Shelduck	2 Pied Avocet
6	Dam	SA Shelduck	4 Pied Avocet, 4 SA Shelduck
7	Dam	Egyptian Goose, Blacksmith Lapwing, SA Shelduck	Cape Teal x 2
8	Dam	Nothing seen	Nothing, dam dry
9	Cliff	Verreaux's Eagle occupied nest, Hamerkop nest	Inactive
10	Cliff & river	SA Shelduck, African Spoonbill, Blacksmith Lapwing, Egyptian Goose, African Black Duck	Jackal Buzzard nest active
11	Cliff	Nothing seen	No records
12	Cliff	Nothing seen	No records

Important Bird & Biodiversity Area (IBA) data

The closest Important Bird and Biodiversity Area (IBA - Marnewick et al, 2015) is approximately 35 kilometres south of the study area at its closest point, the Karoo National Park IBA. Although this is geographically quite distant, the avifaunal community is believed to be fairly similar and is discussed further below.

The Karoo National Park is in the semi-arid central Karoo and is approximately 90 000 hectares in size. The IBA contains the Nuweveld escarpment with peaks over 1900 metres above sea level and plains at 900m.a.s.l. The climate is one of extremes, with very hot summers and very cold winters, particularly on top of the escarpment. Average annual rainfall is 260mm p.a. Up to 231 bird species have been recorded in the IBA, which is extremely important for Namib-Karoo biome restricted species such as Black-headed Canary, Swee Waxbill *Coccopygia melanotis*, Cape Rockjumper *Chaetops frenatus*, Protea Seedeater *Crithagra leucoptera*, Cape Siskin *Crithagra totta*, Victorin's Warbler *Cryptillas victorini* and Hottentot Buttonquail *Turnix hottentottus*. The plains are particularly good for Ludwig's Bustard, Karoo Korhaan, Spike-heeled Lark, Karoo Lark *Calendulauda albescens*, Grey-backed Sparrow-lark *Eremopterix verticalis*, Tractrac Chat *Emarginata tractrac*, Karoo Chat *Emarginata schlegelii*, Karoo *Eremomela Eremomela gregalis*, Rufous-eared Warbler *Malcorus*

pectoralis, and Black-headed Canary. The riverine woodland along drainage lines holds Namaqua Warbler *Phragmacia substriata* and other species. The cliffs hold Verreaux's Eagle, Booted Eagle *Hieraaetus pennatus* and Black Stork Ciconia nigra.

IBA trigger species include: Martial Eagle, Blue Crane, Black Harrier, Secretarybird *Sagittarius serpentarius*, Kori Bustard *Ardeotis kori* and Ludwig's Bustard. Regionally threatened species are Verreaux's Eagle, Lanner Falcon *Falco biarmicus*, Black Stork, Karoo Korhaan and African Rock Pipit *Anthus crenatus*. Biome-restricted species that are common in the IBA include Karoo Long-billed Lark *Certhilauda semitorquata*, Karoo Chat, Namaqua Warbler, Pale-winged Starling *Onychognathus nabouroup*, Black-headed Canary, Layard's Tit-Babbler *Curruca layardi* and the locally common Karoo Korhaan. Uncommon species in this category include Ludwig's Bustard, Karoo Lark, Sclater's Lark, Black-eared Sparrow-lark *Eremopterix australis*, Tractrac Chat, Sickle-winged Chat, Karoo *Eremomela* and Cinnamon-breasted Warbler *Curruca subcoerulea*. The Beaufort West sewage works (within this IBA) is important for water birds particularly in dry times when little other surface water is present in the landscape. Greater Flamingo, Lesser Flamingo, South African Shelduck *Tadorna cana*, and Cape Shoveler *Spatula smithii* are regularly recorded here. Interestingly the town of Beaufort West itself is included in the IBA because there is a Lesser Kestrel *Falco naumanii* roost in trees in town.

Coordinated Avifaunal Roadcount (CAR) project

CAR counts are a census of birds (focussed on large terrestrial species) performed twice annually (in winter and summer) by volunteer birdwatchers driving set routes. The purpose is to provide population data for use in science, especially conservation biology, by determining findings about the natural habitats and the birds that use them. The closest CAR routes to the proposed site are approximately 51km south, below the escarpment. These data are too far from site to be of use.

Coordinated Waterbird Count (CWAC) project

There is one Coordinated Waterbird Count (CWAC) site approximately 16km north of the site (Slangfontein Dam) (Taylor et al, 1999). Bird species counted at this dam include all the usual waterfowl species such as Yellow-billed Duck *Anas undulata*, Egyptian Goose *Alopochen aegyptiaca*, South African Shelduck *Tadorna cana*, Cape Shoveler *Anas smithii*, and Red-billed Teal *Anas erythrorhyncha* (**Table 6-19**). None of these species were recorded in remarkable numbers. No flamingos were recorded at this dam to date, which is positive as flamingos would be susceptible to power line collision. **Table 6-19** summarises these data.

Table 6-19 - CWAC data from Slangfontein Dam

Common name	Taxonomic name	Min	Avg	Max
Duck, Yellow-billed	*Anas undulata*	44	44	44
Goose, Egyptian	*Alopochen aegyptiacus*	10	10	10
Greenshank, Common	*Tringa nebularia*	8	8	8
Heron, Black-headed	*Ardea melanocephala*	1	1	1
Heron, Grey	*Ardea cinerea*	1	1	1

Common name	Taxonomic name	Min	Avg	Max
Ibis, African Sacred	*Threskiornis aethiopicus*	10	10	10
Ibis, Hadeda	*Bostrychia hagedash*	1	1	1
Lapwing, Blacksmith	*Vanellus armatus*	9	9	9
Plover, Kittlitz's	*Charadrius pecuarius*	15	15	15
Plover, Three-banded	*Charadrius tricollaris*	3	3	3
Ruff, Ruff	*Philomachus pugnax*	8	8	8
Sandpiper, Curlew	*Calidris ferruginea*	14	14	14
Shelduck, South African	*Tadorna cana*	11	11	11
Shoveler, Cape	*Anas smithii*	2	2	2
Teal, Red-billed	*Anas erythrorhyncha*	55	55	55
Wagtail, Cape	*Motacilla capensis*	18	18	18

6.2.5.3 Description of Species of Conservation Concern for this site

Given the large number of species within the broader study area, it is necessary to prioritise the species most relevant to the proposed development to streamline the impact assessment process. Relevant to this study, Species of Conservation Concern (SCC) include regionally and globally Red Listed species (Taylor, 2015; IUCN, 2022) and endemic species, especially those that may be susceptible to solar energy impacts.

The SCC species were identified and are presented in **Table 6-20**. **Table 6-20** provides an annotated list of the identified species. The likelihood of each of these species occurring on the proposed site, the likely importance of the site for each species, and potential impacts of the proposed facility were also rated in the table.

Table 6-20 - Identified SCC for the proposed projects

Common name	Taxonomic name	Taylor et al 2015, IUCN 2022	Endemic /near	Likelihood of occurring on site	Relative importance of the site for species	Possible impacts	Overall risk
Ludwig's Bustard	*Neotis ludwigii*	EN, EN		Confirmed, likely forages on site frequently when conditions are right	Medium	Habitat destruction, Disturbance	High

Common name	Taxonomic name	Taylor et al 2015, IUCN 2022	Endemic /near	Likelihood of occurring on site	Relative importance of the site for species	Possible impacts	Overall risk
Verreaux's Eagle	*Aquila verreauxii*	VU, LC		Confirmed, resident several kilometres off site and likely forages on site occasionally	High	Habitat destruction, Disturbance	Medium
Karoo Korhaan	*Eupodotis vigorsii*	NT, LC		Confirmed, multiple pairs resident on site	Medium	Habitat destruction, Disturbance	High
Sclater's Lark	*Spizocorys sclateri*	NT, NT	1	Confirmed, one pair seen on site, likely occasional visitor	Medium	Habitat destruction, Disturbance	Medium
Sclater's Lark	*Spizocorys sclateri*	NT, NT	1	Confirmed, one pair seen on site, likely occasional visitor	Medium	Habitat destruction, Disturbance	Medium
Blue Crane	*Grus paradisea*	NT, VU	1	Confirmed, likely resident in broader area	Low	Habitat destruction, Disturbance	Low

'EN – Endangered; VU – Vulnerable; NT – Near-threatened; LC - Least Concern; RD (Regional, Global) – Regional Red List – Taylor et al, 2015; Global Red List – IUCN 2022.

Ludwig's Bustard (High risk)

The Ludwig's Bustard is classified as regionally Endangered by Taylor et al (2015). This physically large species is highly vulnerable to collision with overhead power (although not the scope of this report, still relevant as the proposed PV projects will give rise to new overhead power lines) and is also likely to be affected by disturbance and habitat destruction. This species was listed as globally Endangered in 2010 because of potentially unsustainable power line collision mortality, exacerbated by the current lack of proven mitigation and the rapidly expanding power grid (Jenkins et al. 2011). Ludwig's Bustard is a wide-ranging bird endemic to the south-western region of Africa (Hockey et al. 2005). Ludwig's Bustards are both partially nomadic and migratory (Allan 1994, Shaw 2013, Shaw et al, 2015), with a large proportion of the population moving west in the winter months to the Succulent Karoo. In the arid and semi-arid Karoo environment, bustards are also thought to move in response to rainfall, so the presence and abundance of bustards in any one area are not predictable.

Ludwig's Bustard was recorded on site on all site visits. Wildskies believe that small influxes of Ludwig's Bustards onto site could occur at times when conditions are right on site. This would result in temporary high risk of collision of the species with power lines. Based on the species' conservation status, the importance of this site as habitat, and its susceptibility to collision with overhead power lines, Wildskies consider this species to be at High risk at this site.

Verreaux's Eagle (Medium risk)

The Verreaux's Eagle has recently been up-listed in regional conservation status to Vulnerable (Taylor et al. 2015) in recognition of the threats it is facing. This species tends to occupy remote mountainous areas largely unaffected by development (until the advent of wind energy in SA). A pair can typically use several alternate nests in different seasons, varying from a few metres to 2.5km apart (in Steyn, 1989). Approximately 400 – 2 000 pairs exist in the Western and Northern Cape (Hockey et al. 2005). These eagles can exist at quite high density compared to other eagle species, with some territories as small as 10km² in the Karoo (Davies, 2010 – www.africanraptors.org – work done on Nuweveld Escarpment) and 10.3km² in the Matopos in Zimbabwe (Steyn, 1989). Davies found a range of territory size from 10 to 50km², with an average size of 24km² in the Karoo of South Africa, and nests were approximately 2 kilometres apart on average.

At the proposed site we have recorded a Verreaux's Eagle nest approximately 730m north of the edge of the EGI corridor (with an alternate nest approximately 400m from the corridor). We categorised a 2km radius around this nest as No-Go for solar PV development. This resulted in the impact avoidance measures taken by the developer in excluding the closest PV area from development. This in turn influenced where the EGI corridor needed to be to reach the PV areas. For the EGI corridor specifically, we categorised a 1km circular buffer around the nest (and the alternate) as No-Go for overhead lines.

This species is likely to be susceptible to four possible impacts: collision with overhead lines, electrocution on pylons, habitat destruction, and disturbance. Based on our data collected on site to date, we conclude that this species is at Medium risk.

Karoo Korhaan (High risk)

Karoo Korhaan is classified as Near-threatened regionally (Taylor et al, 2015). This species is suspected to have undergone a reduction in population and range (Taylor et al, 2015). Karoo Korhaan could be susceptible to two possible impacts at a solar PV facility: habitat destruction, and disturbance. We have recorded this species consistently on the proposed sites through all site visits, mostly in pairs and small family units. Based on these data we judge the species to be at High risk at the proposed site, primarily through habitat destruction and disturbance.

Sclater's Lark (Medium risk)

The Sclater's Lark is Near Threatened regionally and globally (Taylor et al, 2015, IUCN, 2022). This is an uncommon, localised, species that is found in the Karoo. There is currently no population estimate for the species', mostly due to incomplete survey data due to its remote habitats and inconspicuous nature. We recorded a single pair of Sclater's Lark once on Mura PV 3 and 4 in spring through walked transects. Two incidental records of the species were also made on Mura PV 3 and 4 in spring, a single bird, and a pair. These records were made within a few hundred metres of the EGI corridor, and we consider this species highly likely to occur in the corridor itself. This species could be susceptible to habitat destruction, and disturbance.

Blue Crane (Low risk)

The Blue Crane is classed as Near-threatened regionally by Taylor et al (2015) and Vulnerable globally (IUCN, 2021). It is almost endemic to South Africa (a small population exists in Namibia) and is the South African national bird. It has the most restricted range of any of the 15 crane species worldwide. The population is estimated at a minimum of 25 000 birds (Taylor et al, 2015). The 2015 Red Data book on birds downgraded the species conservation status from Vulnerable (Barnes, 2000) to Near-threatened (Taylor et al, 2015). Globally the status remained the same at Vulnerable (IUCN, 2022). The species population is divided into three sub-populations: the eastern grasslands (2600 cranes), the Karoo (10 800 cranes)(within which the site is located); and the Western Cape (12 100 cranes). Of these the Western Cape population appears to have shown growth in recent decades, whilst the eastern grasslands population has declined or at best been stable, and the Karoo population has been stable. This species is highly susceptible to collision with overhead power lines. At the proposed broader site (including within the EGI corridor) we have recorded the species infrequently and in low abundance to date. We do however expect to record a higher abundance at times and have judged the species to be at Medium risk on a precautionary basis.

6.3 SOCIAL AND ECONOMIC ENVIRONMENT

6.3.1 ARCHAEOLOGICAL AND CULTURAL HERITAGE

The following is extracted from the Heritage Impact Assessment compiled by ASHA Consulting (Pty) Ltd and included as ***Appendix G.7****.*

The broader Karoo region generally contains sparse archaeological traces from the Early (ESA), Middle (MSA) and Later Stone Ages (LSA). The vast majority of material tends to be what is referred to as background scatter. This can be defined as “widespread isolated artefacts whose distribution results from either primary or secondary causes” (Orton 2016:121).

ESA and MSA materials were found to be very rare in this mountain environment, but not absent (Orton 2022a). In this dry landscape, LSA archaeological sites are well-known to be focused most strongly on water sources. Where dolerite outcrops are close to water sources then these are strongly favoured for occupation. This pattern was well demonstrated locally by Orton (2021a, 2021b, 2021c, 2021d, 2022a, 2022b), but the density of sites found was quite low. These sites are usually scatters of stone artefacts (strongly dominated by hornfels with other materials being rare), often accompanied by ostrich eggshell fragments and sometimes pottery, but may also include fragments of bone and even archaeological deposits (the latter are unknown from the Nuweveld area though). Ostrich eggshell beads and lower grindstone are also rarely seen. Occasionally, the scatters were very dense and those sites must have either been occupied for a long period of time, or on many occasions. The flat plains that lack landscape features tend to also lack significant archaeological heritage resources. Webley and Hart (2010) examined a site to the east of Loxton and located just two flakes that they considered to be of MSA origin. Two WEF projects have been assessed to the north and northeast of the Mura study areas but these projects do not appear on SAHRIS and their reports could thus not be consulted.

An interesting aspect of Karoo archaeology is rock gongs. These are (usually) dolerite rocks that are naturally perched in such a way that when struck they release a ringing musical note. The gongs are identified by heavily worn patches where they have been repeatedly struck. Parkington et al. (2008) have studied a number of gongs from Nelspoort and Vosburg, some 55 km to the southeast and 140 km to the north-northeast of the present study area respectively, but Orton (2021b) recorded two

further examples in the Nuweveld within about 15 km to the west of the Mura study area, both of which were surrounded by extensive stone artefact scatters indicating occupation of the area.

Rock art sites occur in low density through the wider area, with three painted 'geometric tradition' sites and several engraved 'fine line' tradition sites on record from the Nuweveld (Orton 2021a, 2021b, 2021c, 2021d, 2022a, 2022b). Geometric tradition art is thought to have been produced by the Khoekhoen and the new records expand the known distribution of this tradition in the area (**Figure 6-18**). Parkington et al. (2008) have documented many engravings in the Karoo region. They do not map their work but do provide a historical map of engraving distribution which shows the densest concentration being to the northeast around the Kimberley region.

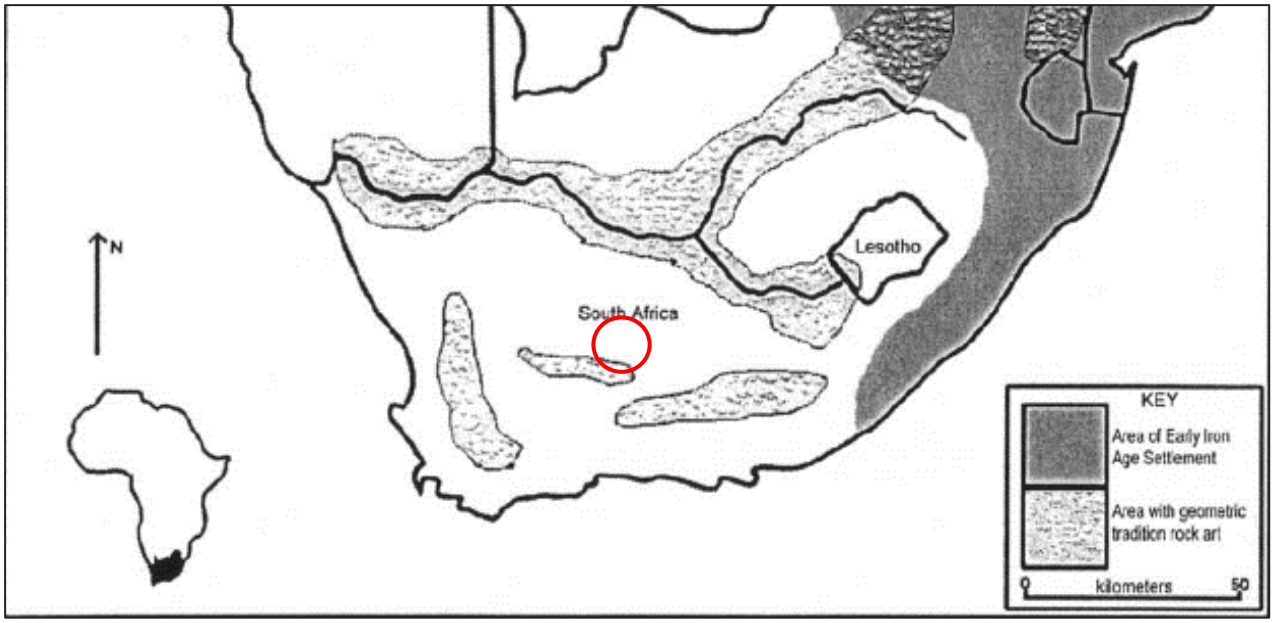


Figure 6-18 - Extract from a map showing the distribution of geometric tradition rock art. Source: Smith & Ouzman (2004: fig. 9)

Until Orton's (2021a, 2021b, 2021c, 2021d) recent surveys in the area, historical archaeological resources, too, were little known from the Nuweveld area. These surveys showed that 19th century occupation of the area was widespread with many small abandoned and ruined stone-walled farmsteads scattered along the water courses of the area. The structures included houses (both formal rectangular flat roofed houses and lobed dwellings that might have had temporary roofs), kraals, and various small outbuildings of unknown function but likely including storage spaces and chicken coops. At the southern end of the Nuweveld Mountains, in the Karoo National Park (KNP), Kaplan (2005, 2006) recorded several small, ruined stone structures which were said to be kraals, a homestead and shepherd's huts. One of them had a small scatter of late 19th to early 20th century historical artefacts associated with it. A stone-built lime kiln and some animal traps are also on record there (SANParks 2017). Other stone walled ruins are known from the KNP and, according to Anonymous (2016) some were demolished in order to reuse the stone to build the Klipspringer Pass. This pass was built from 1986 to 1992 (Goetze 1993).

These early packed stone structures are invariably collapsed reducing them to archaeological sites in terms of the NHRA definitions. While some with taller walls may have had a formal or informal and/or temporary roof over them, others may have been hartebeeshuise with A-frame-type roofs

made of branches and reeds placed above low stone or mud walls. Governor van Plettenberg, during his travels east to inspect the Colony, noted near the Sneeuwberg Mountains that the houses of the colonists consisted only of one room structures with low walls and straw roofs (Theal 1896-1911 cited in Böeseken 1975). In 1811 William Burchell illustrated a trekboer farmhouse (Van Zyl 1975), while Schoeman (2013) shows an image of such a historical stone dwelling still in use in the early 20th century (**Figure 6-19** and **Figure 6-20**).

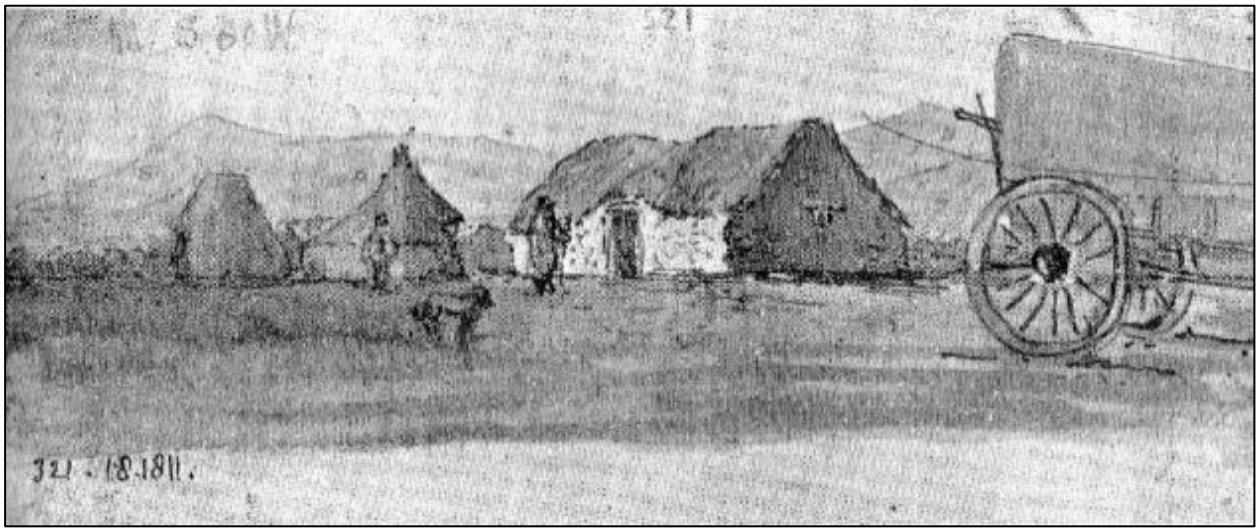


Figure 6-19 - Drawing of an early 19th century trekboer farmhouse by William Burchell. Source: Van Zyl (1975:103)

Figure 6-20 - A shepherd's hut photographed near Beaufort West in the early 20th century. Note the low, narrow doorway and informal roof structure. Source: Schoeman (2013:48)

The engraving tradition in the Karoo continued beyond the Stone Age as testified to by the many recent 'scratched' engravings that are known to occur. Horses are an extremely common subject in these recent engravings. Morris (1988) has reviewed the engravings of the Karoo and notes that they have been attributed by Battiss (1948) to Europeans and Griquas and by Fock (1979) to 'Hottentots'. Morris (1988) suggests that some were almost certainly made by early Baster and Trekboer immigrants and that the tradition continued into the 20th century. He also notes the inclusion of wagons and human figures in western clothing. Recent work in the Nuweveld has revealed a scattering of such images but with a very dense concentration located 43 km west-southwest of the Mura study area (Orton 2022a, 2022b). Notably, subject matter in the latter area included many Nine Men's Morris boards, a Morris Minor car and dates of 1924 and 1934 (the latter written as 30.7.34 but assumed to be 20th century). While some of these engravings are clearly less than 100 years old and not legally archaeological, they demonstrate a continuity of the engraving tradition and the sites can thus be considered as places associated with living heritage.

The Karoo has been a highly contested landscape at various times in the past. The Khoekhoen first migrated into South Africa about 2000 years ago. That they lived in the Karoo in precolonial times is testified to by the presence of geometric tradition rock art and precolonial kraals, while many historical records of their presence also exist. The only study to attempt to date the Khoekhoe occupation was by Sampson (2010) in an area about 160 km northeast of the Mura study area. Through dating potsherds associated with kraals he determined that the kraals – and by implication herding – dated to between about AD 1000 and AD 1750, shortly before the arrival of the Trekboers. Sampson (2010:847) suggests that there would have been tension between the indigenous San and the incoming Khoekhoen but considers that their interactions resulted in "a millennium of (probably uneasy) space-sharing with the locals."

Stone Age materials were generally found to be rare. The only finds made were ephemeral scatters of artefacts. The most interesting was a scatter of nine large artefacts made in what is probably wacke. The artefacts are patinated brown and seem likely, based on their size, to relate to the ESA (**Figure 6-21**). They were in an area with several ephemeral pans.

Figure 6-21 - A scatter of ESA flakes from waypoint 1398 within the eastern edge of Mura 4. Scale = 25 cm

In one area in the western part of the corridor there was a very light scattering of artefacts that were only lightly patinated and may be from the LSA (**Figure 6-22** and **Figure 6-23**). There was nothing else associated with them. In the southeast, overlooking a streambed, a low rock shelter as found to

contain a small number of hornfels artefacts, a hammerstone and some ostrich eggshell fragments and bones (**Figure 6-24**). Elsewhere in the corridor, Stone Age finds were limited to a few isolated background scatter artefacts of Pleistocene and/or Holocene age.

Figure 6-22 - Stone artefacts from waypoint 1321. Scale = 20 cm

Figure 6-23 - Stone artefacts from waypoint 1322. Scale = 20 cm

Figure 6-24 – The low rock shelter at Nuweveld waypoint 1795 (Orton 2021b)

Historical archaeological sites were somewhat more common than Stone Age sites. The smallest was a small cluster of rocks which may have been a cairn of some sort but whose function could not otherwise be determined. It did not seem like a grave and had a wine bottle base located alongside it (**Figure 6-25** and **Figure 6-26**).

Figure 6-25 - Small stone cairn/feature at waypoint 1396. This is just within the Mura 2 study area

Figure 6-26 - The base of a black glass wine bottle from waypoint 1396.

A number of stone-walled sites were found. These included some small house ruins, a stone barn, and other features of unknown function. These sites relate to early European occupation of the area. Very few artefacts were found with them. Only one of the house ruins (**Figure 6-27**) had a light scatter of glass, ceramics and metal associated with it (**Figure 6-28** and **Figure 6-29**). Another small ruin that is likely to have been a domestic shelter has been slightly damaged owing to a farm road having been built immediately adjacent to it (**Figure 6-30**). A small farm outpost along the main gravel rod in the south contained a few stone-walled features of indeterminate function (**Figure 6-31**) as well as what was assumed to have been a barn whose stone walls are far better preserved (**Figure 6-32**).

Figure 6-27 – Stone house run at waypoint 1320

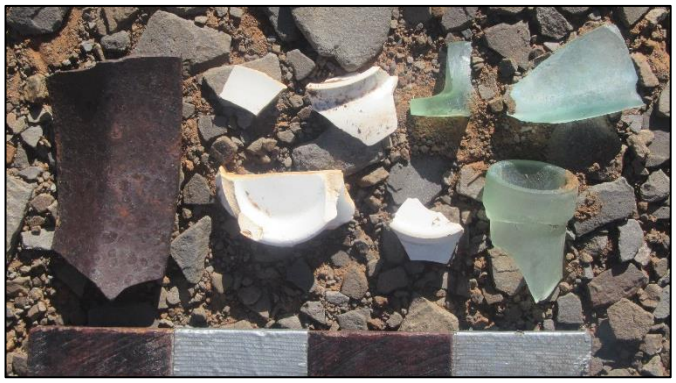


Figure 6-28 - Artefacts from waypoint 1320. They include refined white earthenware, glass and a fragment of iron potjie. Scale = 20 cm

Figure 6-29 - Lined industrial ware and other refined white earthenware from waypoint 1320. Scale = 10 cm

Figure 6-30 – Small stone-walled ruin adjacent to a farm track at waypoint 1391

Figure 6-31 - Two small stone-walled features in the southern part of the corridor (Nuweveld waypoint 1806)

Figure 6-32 - Stone-walled ruin in the southern part of the corridor (Nuweveld waypoint 1807)

6.3.1.1 Graves

No graves were seen in the corridor and, given the often hard substrate and general lack of occupation debris, none are expected to occur.

6.3.1.2 Historical aspects and the Built environment

Historical buildings occur widely across the Karoo with most dating to the 19th century. Orton et al. (2016:15-8) noted the following:

"*In the harsh, resource-scarce Karoo environment with its restricted range of materials, necessity often was the mother of invention when it came to constructing shelter, resulting in a unique regional vernacular building tradition that displays the creative and technical achievement required to fashion an existence there. This relied on both traditional and conventional artisanal skills since buildings were hand-crafted from sun-baked bricks, locally occurring timber and quarried or collected stone. The result was a variety of local styles that we refer to collectively as Karoo vernacular*."

This varied architecture is evident not only in the towns but also in remote areas. Two building traditions are unique to the Karoo. Corbelled buildings, which mainly occur to the north and west of the present study area and date between about 1813 and 1870, evolved from the need to build roofs without wooden beams (Kramer 2012). Isolated examples are mapped to the west and southwest of the present study area. The second tradition is known as Karoostyle and has been described by Marincowitz (2006). These buildings are typically simple rectangular structures with flat roofs and parapets. Flat roofs were often of the type referred to as 'brakdak' which consists of beams overlaid by sticks, reeds and then mud mixed with other materials such as manure or vegetation (Fagan 2008).

In rural areas buildings tend to be clustered into farm complexes with relatively few isolated structures. The complexes can include a variety of styles, while isolated structures are often small Karoostyle labourer's cottages. Due to the consolidation of farms into larger holdings in order to increase commercial viability, there are far fewer occupied farmsteads today than would have been the case in the past. Archaeological farm complexes generally outnumber historical ones showing that further back in time there were many more farming units.

Some farmsteads occur in the area but since all structures have been avoided by more than 1 km none were formally recorded. It was noted, however, that the complexes included various historical structures, kraals, arable lands and clusters or lines of trees. Examples of structures in the two nearest farmsteads to the corridor, Leeukloof in the south and Booiskraal in the southeast, and shown in **Figure 6-33** to **Figure 6-35**. Another unusual historical find was an agricultural implement that had been long abandoned and left outdoors (**Figure 6-36**).

Figure 6-33 - Structure in the Leeukloof Farm complex at Waypoint 1850

Figure 6-34 - Structure in the Leeukloof Farm complex at Waypoint 1850

Figure 6-35 - An unusual double story structure in the Booiskraal Farm complex at Waypoint 1794. Source: Orton (2021a: fig. 51)

Figure 6-36 - An old agricultural implement from waypoint 1390 that is assumed to be old enough to be a heritage object

6.3.1.3 Cultural landscapes and scenic routes

Cultural landscapes are the product of the interactions between humans and nature in a particular area. Sauer (1925) defined them thus: “The cultural landscape is fashioned from a natural landscape by a cultural group. Culture is the agent, the natural area is the medium, the cultural landscape the result”. The proposed corridor is a largely natural landscape with minimal anthropogenic input. It is very remote and isolated with a large part only accessible by the landowners. A public road crosses the southern part of the corridor in two places, with the implication that the proposed powerline would also cross the road in two places. The earliest layers to the cultural landscape are the archaeological traces of pre-colonial occupation and early farming, but these are very light. Aside from the three farmsteads that occur in the area (but all at least about 1 km outside the corridor), modern farming has only resulted in the addition of some jeep tracks and fences to the study area but these are not noticeable from a distance. As a result, the landscape in the vicinity of the corridor is currently a largely natural one with its cultural significance being due to its scenic qualities.

Although a visual impact assessment was not required by HWC for the project because of its very remote location, it is notable that the viewshed mapping shows that visibility of the proposed developments is largely restricted to within the greater valley with the mountains providing screening further afield (Lawson & Oberholzer 2022: map 5). Due to the height of the pylons, visibility within the valley will be widespread. Although the local road through the southern part of the study area will

be visually exposed to the powerline, especially at the two road crossing points, the R381 to the west will be entirely within the view shadow.

6.3.2 PALAEONTOLOGY

The following is extracted from the Palaeontological Study compiled by Natura Viva cc and included as ***Appendix G.8****.*

The continental (fluvial / lacustrine) sediments of the Poortjie Member and Hoedemaker Member of the Teekloof Formation that are mapped within the Mura PV Solar and EGI project areas are associated with important fossil assemblages of latest Middle Permian to earliest Late Permian age. According the latest biostratigraphic zonation of the Main Karoo Basin by Smith et al. (2020) these assemblages are assigned to the *Endothiodon* Assemblage Zone (AZ) within the upper part of the Poortjie Member as well as most, if not all, of the Hoedemaker Member (Day & Smith 2020) (See biostratigraphic chart in Figure 28. N.B. It remains uncertain whether or not older fossil assemblages of the *Tapinocephalus* Assemblage Zone are represented here within the lower part of the Poortjie Member - see discussion below). The *Endothiodon* AZ fossil assemblages include a wide range of vertebrates (bony fish, temnospondyl amphibians, true reptiles, several therapsid subgroups – especially dicynodonts), non-marine molluscs, invertebrate and vertebrate trace fossils (including tetrapod trackways and burrows) as well as petrified wood, palynomorphs and other plant remains of the Glossopteris Flora. The fossils are variously associated with channel sandstones (including basal breccio-conglomerates) as well as crevasse splay sandstones (e.g. rippled palaeosurfaces) and - especially - overbank mudrock facies with calcretised palaeosol horizons. They have been reviewed in the publications listed above as well as by Smith et al. (2012), supplemented by recent PIA reports by the present author for the Red Cap Nuweveld and Hoogland WEFs and grid connections (See References).

Lower *Endothiodon* AZ (*Lycosuchus – Eunotosaurus* Subzone) assemblages are associated with the upper Poortjie Member beds while the *Tropidostoma – Gorgonops* Subzone is represented within the overlying Hoedemaker Member. The Reiersvlei Meanderbelt transition zone has yielded good material of Endothiodon low down (Maharaj et al. 2019) and probably belongs, at least in part, within the lower part of the *Endothiodon* AZ where this genus of sizeable dicynodont tends to be most abundant.

Mapping of Beaufort Group vertebrate fossil sites by Nicolas (2007) (**Figure 6-38**) shows a high concentration of fossil sites to the SE of Loxton reflecting, in part, fieldwork by the Council for Geoscience in the Booiskraal – Perdeberg area (Dr Colin MacRae, late 1900s) as well as the long history of palaeontological recording by Professor R. Smith from the Hoedemaker Member at sites like Dunedin (Quaggafontein 82) and Leeukloof 43 (cf Smith 1993). Historical fossil sites are not indicated within the present project area on the 1: 250 000 Victoria West geology sheet, apart from a single Pristerognathus AZ site (now Endothiodon AZ) from the Poortjie Member to the SW of Perdeberg.

A key skull specimen of the large therocephalian *Pristerognathus* studied by J. van den Heever (1987) was collected from the Poortjie Member on the lower slopes of Perdeberg (R. Smith, pers, comm., 2022). Rich assemblages of small dicynodonts (especially *Diictodon*) within the Hoedemaker Member on the Farm Leeukloof 43, within the Nuweveld East Wind Farm project area just west of the present project area, are the subject of on-going benchmark taphonomic studies on Beaufort Group tetrapods by Dr Smith of Wits University (e.g. Smith 1993). A few additional sites

with skulls and postcrania of small- to large-bodied dicynodonts, including *Diictodon* and probable *Endothiodon*, tetrapod burrow casts, plant stem casts and invertebrate trace fossil assemblages have been recorded from the Hoedmaker Member beds close to or within the western end of the Gamma Gridline Corridor during recent PIAs for the Red Cap Nuweveld East Wind Farm and Grid Connection (Almond 2020a, 2020b, 2022c).

Fossil material recorded during the recent site visit to the combined Mura PV Solar and EGI project areas is tabulated in Appendix 1 of the Paleontological Study (**Appendix G.8**), together with GPS locality data, a provisional Field Rating and any recommended mitigation.

The main fossil groups recorded from the upper Poortjie Member – lower Hoedemaker Member beds within the Mura project and EGI areas include:

- Several skulls and partially-articulated postcrania of small-bodied dicynodonts, most or all of which are probably Diictodon (by far the commonest taxon within the stratigraphic units represented here);
- Highly fragmentary, and mostly unidentifiable, reworked bones within channel breccia lenses;
- Rare isolated bones (mostly fragmentary) of medium- to large tetrapods whose identity is currently equivocal; options include dinocephalian or therocephalian therapsids, pareiasaur parareptiles or large-bodied dicynodonts such as Endothiodon (see further discussion below);
- Straight, inclined to helical (or combined) tetrapod burrow casts;
- Low-diversity invertebrate trace fossil assemblages (Scoyenia Ichnofacies), often associated with wave-rippled surfaces and microbial mat textures (microbially-induced sedimentary structures or MISS) associated with damp or wet depositional settings. These may occasionally occur with possible (but unconfirmed) temnospondyl amphibian finger probes.
- Rare occurrences of carbonaceous plant stem or leaf compressions within both mudrock and sandstone facies as well as reedy plant stem casts in sandstones.

In general, fossils are very sparsely distributed within both the Poortjie Member and Hoedemaker Member outcrops within the present project areas and the great majority of the material is of modest scientific or conservation value. No fossils have been recorded within the Late Caenozoic superficial sediments here. Recorded Lower Beaufort Group fossil sites are mainly concentrated in scattered areas of good mudrock exposure which are mostly found along major drainage lines and on gullied hillslopes. The PV solar project areas are generally flat with very low levels of bedrock exposure due to the pervasive blanket of superficial deposits (eluvial gravels, soils) found here. No fossil sites are recorded within the Mura project areas.

Tapinocephalid dinocephalians are an essentially Middle Permian group of therapsid megaherbivores that have only been recorded hitherto as high up as the lower Poortjie Member within the Lower Beaufort succession (Day et al. 2015a, 2015b, Day & Rubidge 2020). The fragmentary new Abrams Kraal 206 fossil material is recorded at an elevation of c.1440 m amsl. which probably corresponds to the upper part of the Poortjie Member (at least as mapped by the Council for Geoscience) on the western and southern slopes of Perdeberg. This assumes that the Teekloof Formation beds around Perdeberg are more-or-less flat-lying, as appears to be the case in the field, and there are no intervening major dolerite intrusions or faults influencing bedrock elevation. The Poortjie Member sensu lato succession on the western slopes of Perdeberg near Booiskraal homestead is at least 130 m thick (c.1360-1390m amsl.) (cf Le Roux & Keyser 1988 who record Poortjie Member thicknesses on sheet 3122 Victoria West of 130 m in the west thinning to c. 80m in the east). The upper Poortjie Member elsewhere is characterised by faunas of the lower

Endothiodon Assemblage Zone (*Lycosuchus – Eunotosaurus* Subzone) which extends into the earliest Late Permian and is not known to include dinocephalians (Day & Smith 2020).

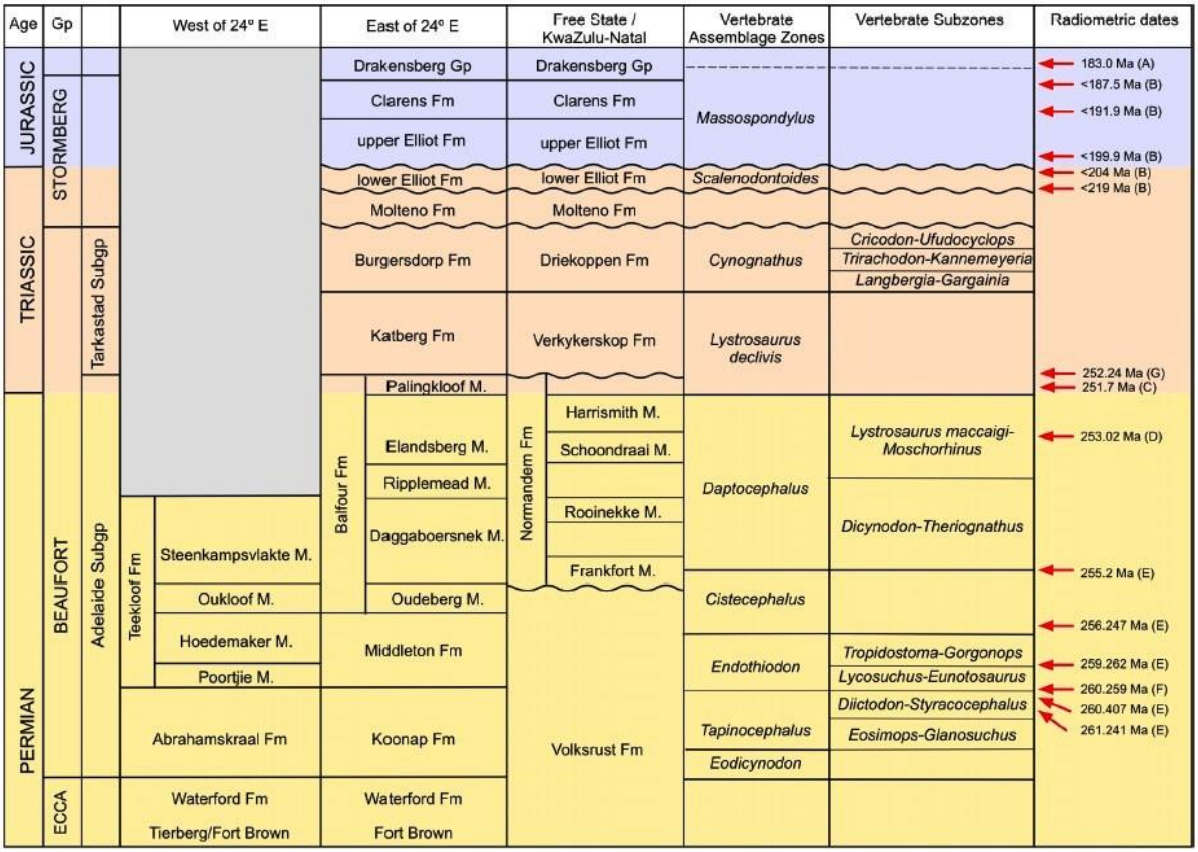


Figure 6-37 - Chart showing the latest, revised fossil biozonation of the Lower Beaufort Group of the Main Karoo Basin (abstracted from Smith et al. 2020).

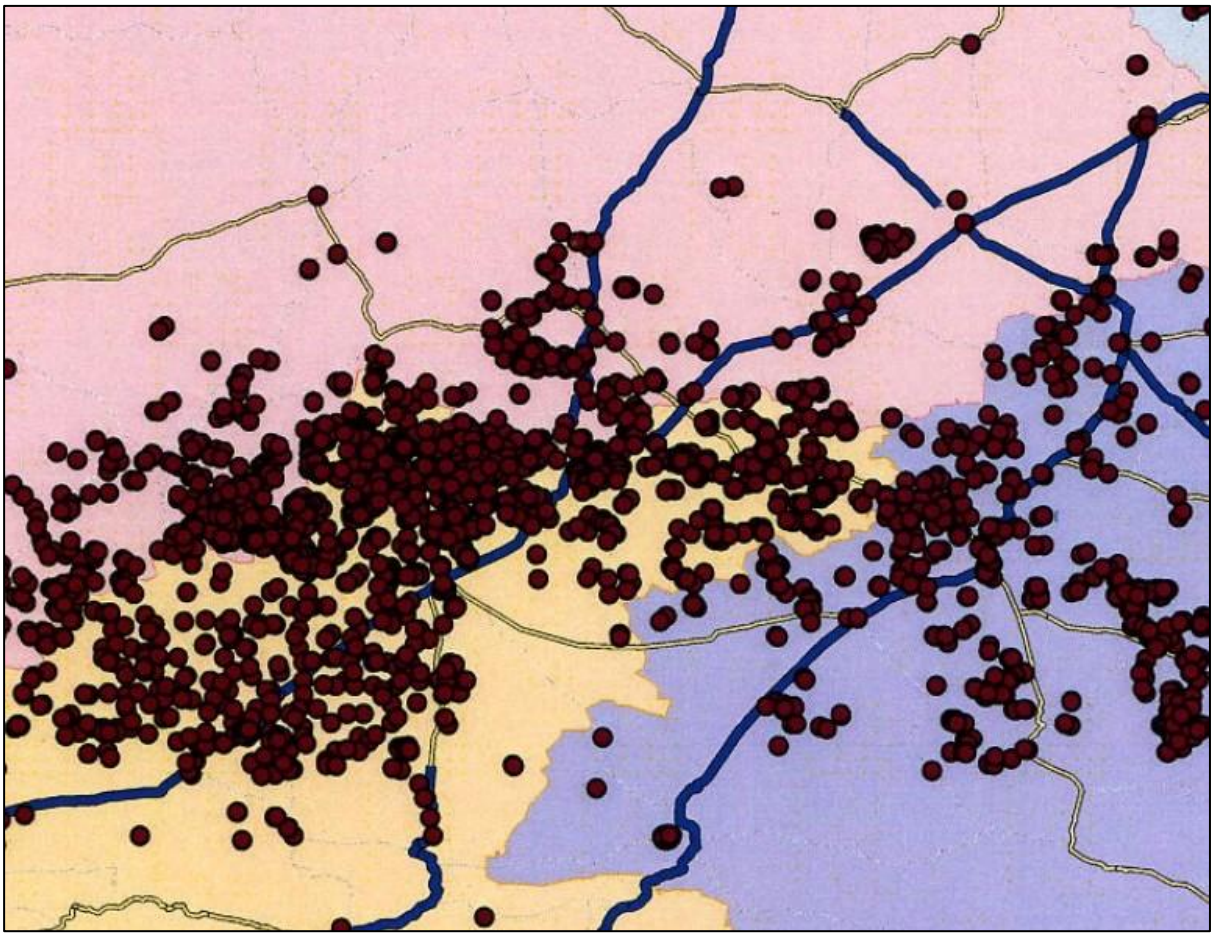


Figure 6-38 - Distribution map of recorded vertebrate fossil sites within the Lower Beaufort Group of the Great Karoo between Loxton (LOX), Victoria West (VIC W) and Beaufort West (BW)

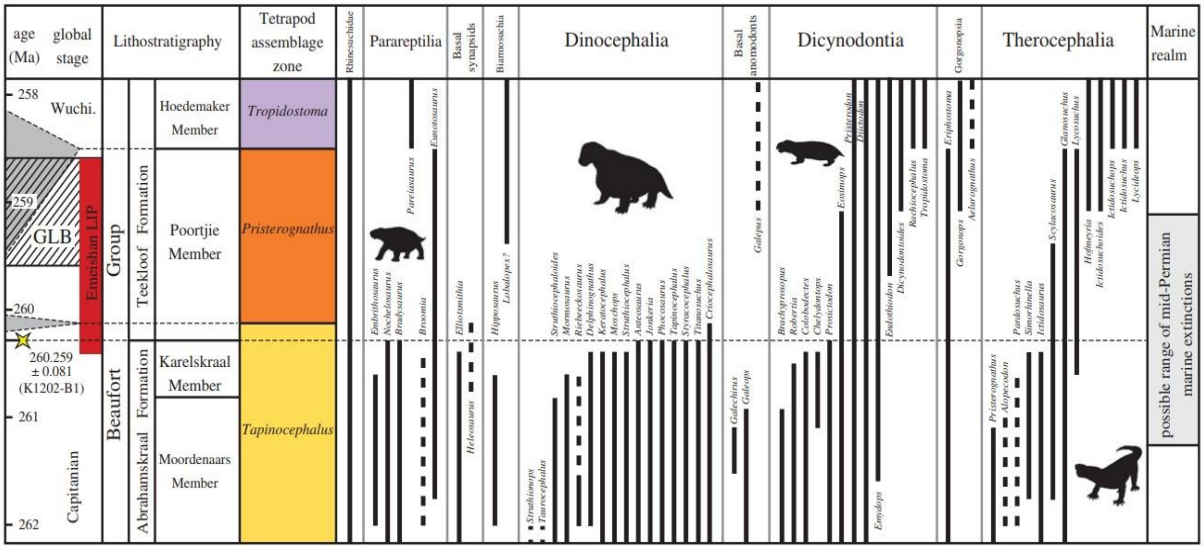


Figure 6-39 - Chart showing the ranges of known terrestrial tetrapod genera from the Middle to Late Permian of the Main Karoo Basin (From Day et al. 2015b)

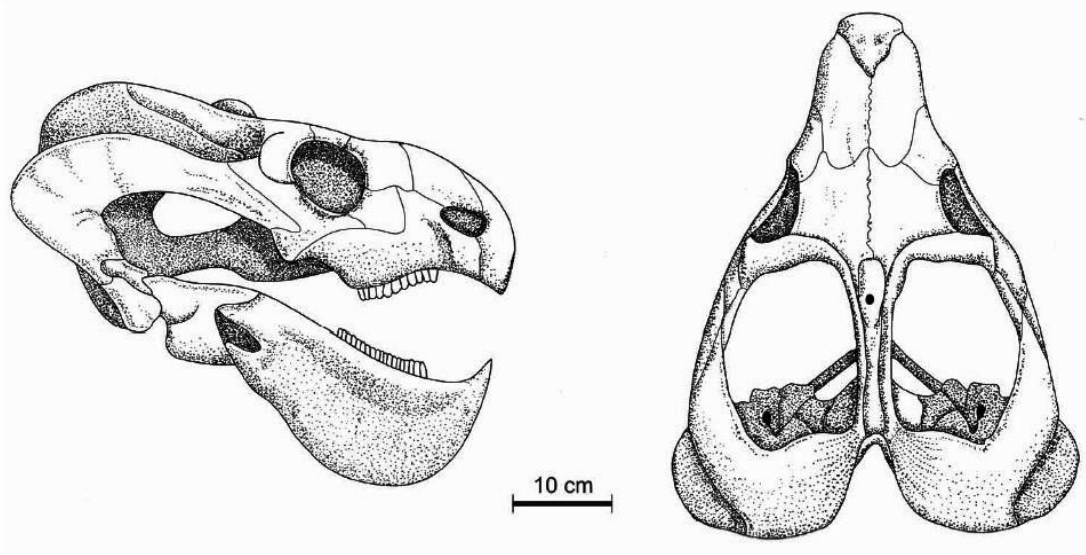


Figure 6-40 - Skull of the medium-sized dicynodont therapsid Endothiodon which occurs especially abundantly within the lower part of the Endothiodon Assemblage Zone

6.3.3 TRAFFIC

*The following is extracted from the Traffic Impact Assessment compiled by Athol Schwarz and included as **Appendix G.9**. A combined report that includes all four of the proposed solar developments and the relevant Grid Connection (this project) was compiled for the project.*

6.3.3.1 Road Network

The existing road network adjacent to the proposed developments is well established. Consisting predominantly of the lower order gravel roads, which provides access to the local towns and the major commercial centres within South Africa.

The most relevant roads within the study area, which provide access to the proposed developments from the surrounding towns, are shown in **Figure 6-41** and are delineated below.

The main roads utilised to access the site are summarised below.

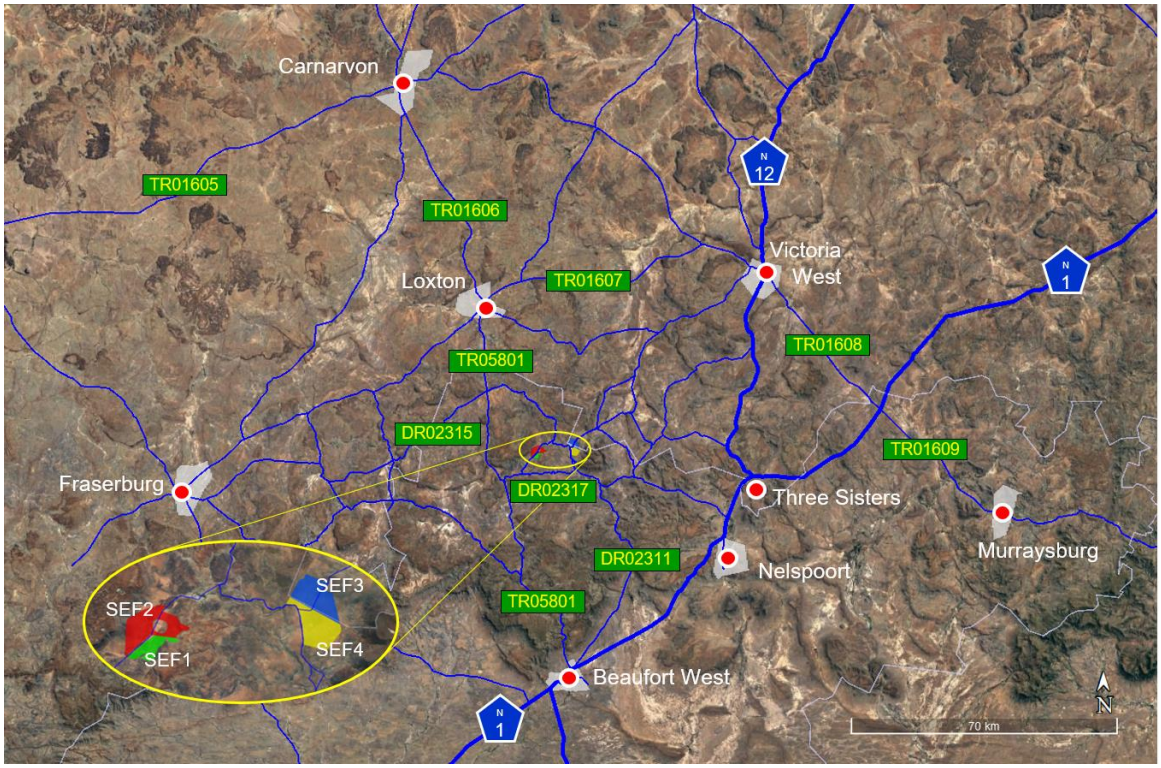


Figure 6-41 – Road Network

TR 05801 (R381)

The TR 05801 starts at the N1, north of Beaufort West (Western Cape) and ends at TR 01607 in Loxton (Northern Cape).

According to the Western Cape Road Information System, the Functional Classification of this road is a Class 2. The road is situated in a 20 m wide servitude, sections of the road are paved, the surfacing and width details of this road are provided in **Table 6-21**.

Table 6-21 - TR05801 - Road Details

Start km	End km	Surface Type	Width	Shoulder Width	Shoulder Type
0	10.07	Surfaced	7.20	2.00	Unsurfaced
10.07	13.28	Surfaced	8.60	2.00	Unsurfaced
13.28	23.80	Gravel	7.00		
23.80	32.96	Surfaced	7.20	0.9	Unsurfaced
32.96	38.20	Surfaced	6.80	0.9	Unsurfaced
38.20	95.75	Gravel	8.50		
95.75	111.00	Gravel			

OP 08881

The OP 08881 is 36.9 km long, starting at the DR 02317 before ending at the farm Slangfontein. This road will be used to access Mura 3 and Mura 4. This road was not included in the site inspection. Thus, the author cannot comment on the condition or the viability of using this route.

Road A

This is a private road that is to be used as the main access route to Nuweveld WEF East, Nuweveld Collector Substation, Mura 1 and Mura 2. This road was not included in the site inspection. Thus, the author cannot comment on the condition or the viability of using this route.

6.3.3.2 Transportation Routes

Commuter Routes

The towns in this part of the country are few and far between. There are several towns within a 200 km radius of the proposed development from which the workforce is to be drawn. These include Beaufort West, Carnarvon, Fraserburg, Hutchinson, Loxton, Murraysburg, Nelspoort and Victoria West. The anticipated commuting routes to the proposed development from the surrounding towns are highlighted in magenta, as shown in **Figure 6-42**.

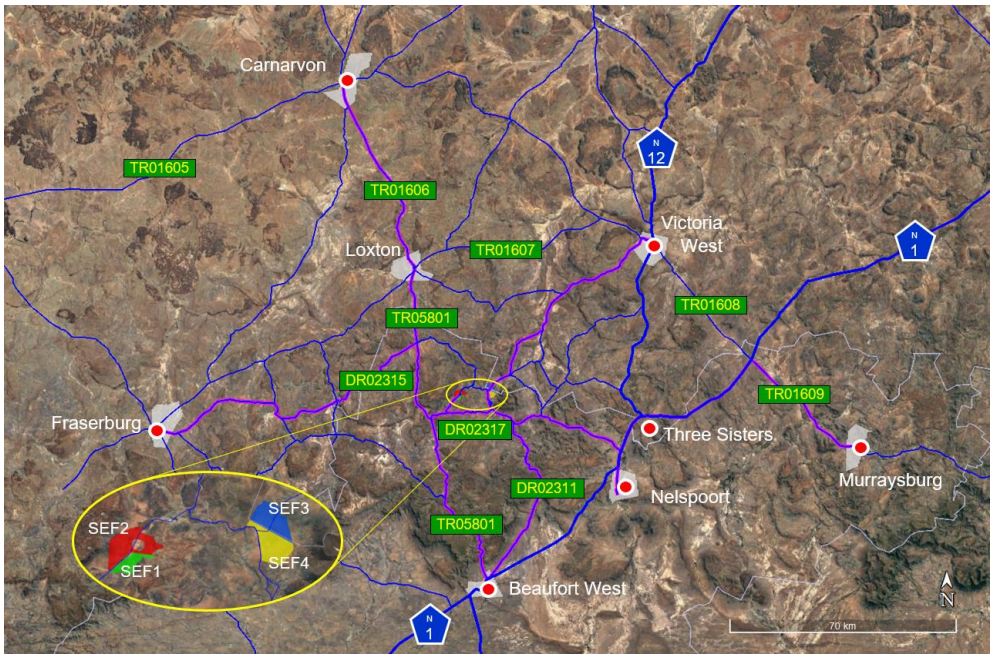


Figure 6-42 - Surrounding Towns

The proportionality of the workforce on the proposed developments from the surrounding towns, are based on the 'working-age' population in the town, modified by a 'weighting factor' which is calculated based on the distance travelled to the proposed development from the relevant town. The expected proportion of the workforce from the surrounding communities is depicted in **Table 6-22**.

Table 6-22 - Distribution of the Workforce

Town	Population	Travel Distance	Proportion (%)

Beaufort West	21376	78 km	67%
Carnarvon	4107	128 km	8%
Fraserburg	1854	139 km	3%
Loxton	604	65 km	2%
Murraysburg	2814	165 km	4%
Nelspoort	1212	83 km	4%
Victoria West	4978	106 km	11%

It should be noted that the town of Hutchinson, was excluded from the table as the proportionality was extremely low, less than 0.25%.

6.3.4 VISUAL

The following is extracted from the Visual Impact Assessment compiled by Quinton Lawson and Bernard Oberholzer and included as ***Appendix G.10****.*

6.3.4.1 Landscape setting

The landscape and scenic features of the study area are similar to those for the Nuweveld wind farms. The EGI would lie within an expansive semi-arid landscape, with widely scattered farmsteads usually nestled among tree copses. The large farms mainly support merino sheep, and occasionally dorper sheep, goats and horses, as well as game, such as small antelope.

6.3.4.2 Geology and landforms

The landscape in this part of the Great Karoo has been eroded over time, the once deeply buried Beaufort Group mudstones and sandstones and the dolerite intrusions having been exposed to form the present-day Karoo landscape.

The regional plateau is characterised by horizontal sills and dykes of erosion-resistant dolerite forming steep slopes in places, boulder-strewn mesas and flat-topped koppies that are the main scenic features of the study area. The gentler, lower hillslopes and plains consist of more easily weathered mudstone, with occasional narrow ledges of harder sandstone. The flattish plains, where the solar projects are located, are at around 1400-1500m elevation, and the surrounding dolerite ridges and mesas around 1600-1700m elevation (**Figure 6-43**).

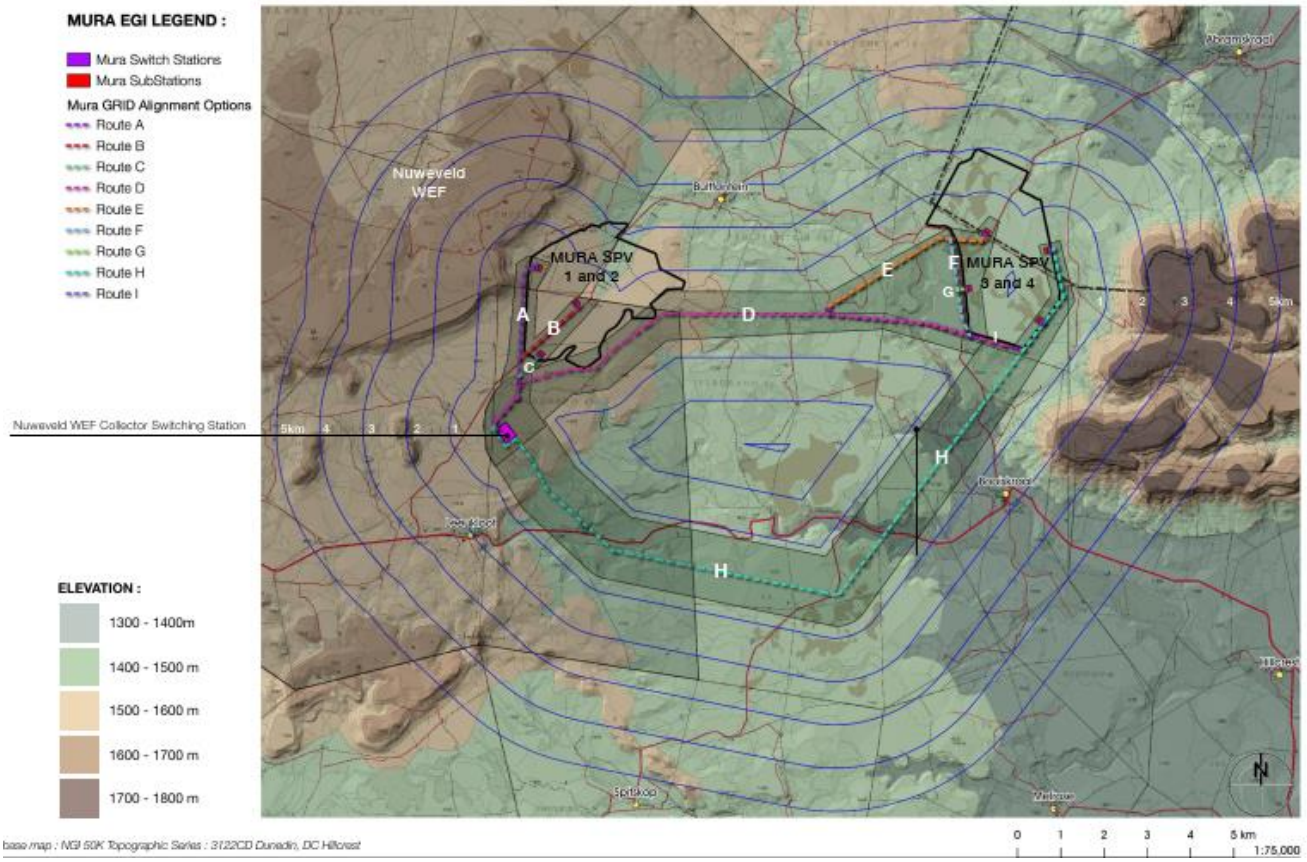


Figure 6-43 – Layout and Physiography

6.3.4.3 Land use

There are a few scattered farmsteads in the surroundings, within the viewshed, which form green oases in the semi-arid landscape. The farmsteads are on average 5 to 10km+ apart, linked by narrow gravel roads. The farms are generally extensive in area and support mainly sheep farming and game.

6.3.4.4 Sense of place

The flat-topped hills and dolerite ridges are a characteristic feature of the Great Karoo in an otherwise fairly featureless, parched landscape, an area noted mainly for its empty, uncluttered landscapes, stillness, red sunsets, dark nights and starry skies.

The most scenic areas tend to be the dolerite koppies and the river courses, particularly in the vicinity of Leeukloof and Booiskraal (**Figure 6-44** to **Figure 6-47**).

Figure 6-44 - Typical mesas and plains with succulent shrub vegetation of the study area

Figure 6-45 - Scenic poort near Leeukloof

Figure 6-46 - Scenic poort east of Leeukloof near to where the grid crosses the Krom River

Figure 6-47 - Scenic kloof between Leeukloof and Booiskraal

6.3.5 SOCIAL

The following is extracted from the Socio-Economic Impact Assessment compiled by Independent Economic Researchers and included as ***Appendix G.11.*** *A combined report that includes all four of the proposed solar developments and the relevant Grid Connection (this project) was compiled for the project.*

Most of the overall area proposed for the development of solar energy facilities is within Ward 7 of the BWLM, in the CKDM of the Western Cape Province. Note however that Ward 7 covers a particularly large area of 8,175 square kilometres and extends as far as the town of Merweville which is over 100km from the proposed Solar Facilities. Mura 3 is located in Ward 3 of the ULM, in the PkSDM of the Northern Cape Province. The nearest major towns include Beaufort West in the Western Cape (50km) and Victoria West in the Northern Cape (65km). Smaller towns nearby

include Loxton (27km) and Nelspoort (46km). Towns and settlements in the wider area include Carnarvon, Hutchinson, Fraserberg, Leeu-Gamka, Merweville, Murraysburg and Riebton, all located between 60–130km from the project site. Some of these towns are relatively less accessible given the condition of minor provincial roads.

6.3.5.1 Current land uses

Current land uses in the wider rural area, where the solar facilities would be located, are focused on extensive agriculture with small stock primarily in the form of sheep, game farming, some tourism and conservation primarily in the form of the Karoo National Park. The farms are large and homesteads are few and far between to maintain economically viable farm units. Small communities are housed on the farms and work as farm labourers or in associated tourism ventures. Away from the towns there are few other sources of enterprise or employment.

Drought has been experienced to varying degrees in different parts of the study area, with many of the farms surrounding Loxton and Beaufort West are currently in the initial stages of recovery from a severe drought. During the drought, farming became unviable for those without access to a permanent source of groundwater. Consequently, many farmers sold their livestock or moved them to other parts of the region or country. This reduction in agricultural activity resulted in retrenchments which have been particularly disruptive to affected communities given that farm labourers typically reside on-farm in this area. This resulted in an influx of job seeker, particularly in Beaufort West. In 2021, many farmers experienced their first rainfall in several years. This has resulted in increased agricultural activity and renewed demand for farm labour in the area.

6.3.5.2 Demographics

BWLM had a population of 51 177 in 2021, up from 49 586 in 2011, which translates to a population growth rate of around 0.3% per annum over the ten-year period (**Figure 6-48).** This is lower than the annual growth rate for the CKDM, which was 0.6% over the same period. BWLM had an average household size of 3.9 in 2021.

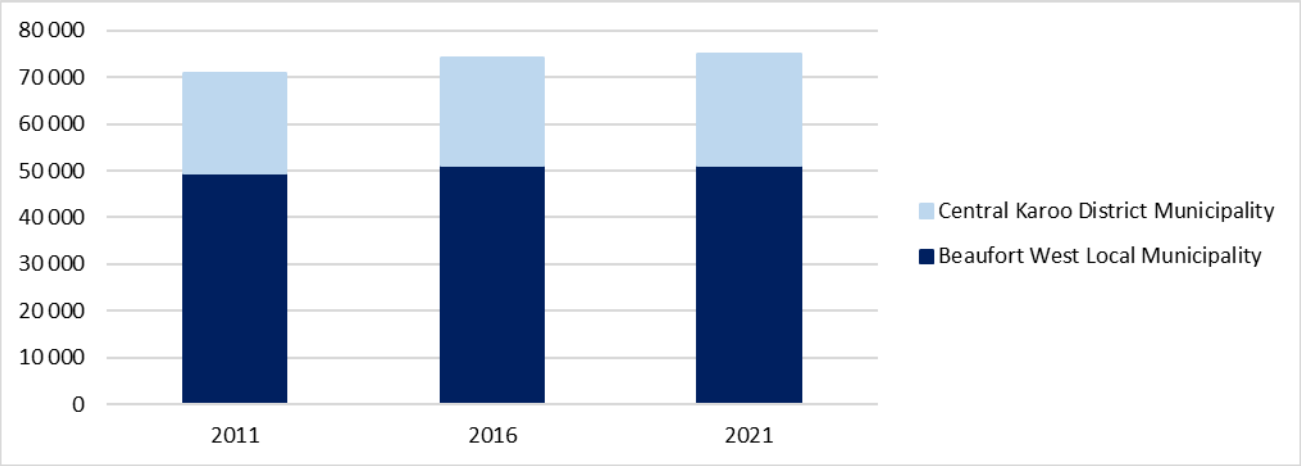


Figure 6-48 - Population trends in the CKDM and BWLM

Population trends in the CKDM and the BWLM

Up-to-date statistics are not available for ULM. But based on the population growth rate between 2011 and 2016 (average of 0.92% per annum), the 2019 population was estimated to be 20,007

(**Figure 6-49**). The average growth rate for PkSDM was estimated to be 0.98% per year over the 2011–2019 period, based on available statistics for these years, which indicate that the PkSDM had a population size of 200,835 in 2019.

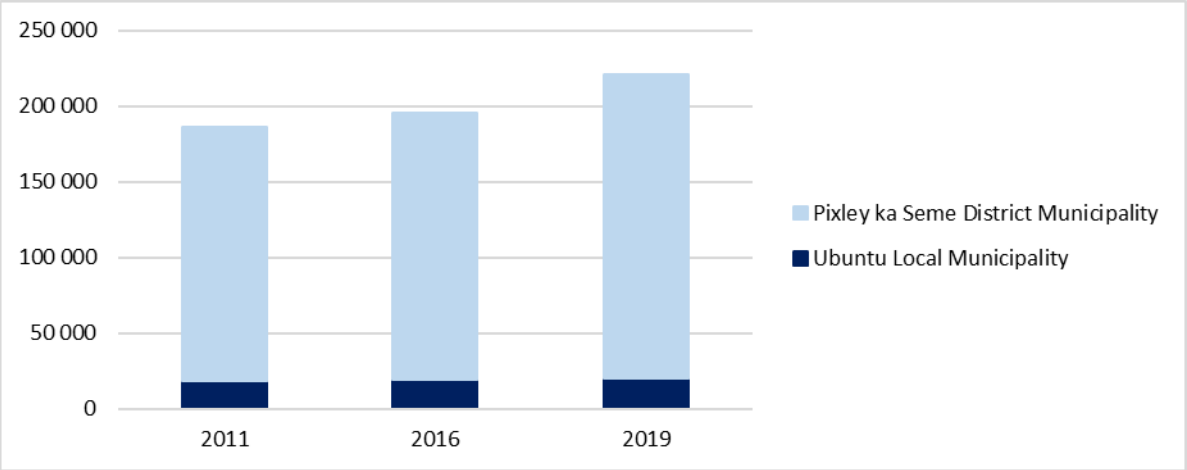


Figure 6-49 - Population trends in the PkSDM and the ULM

Around 53.1% of BWLM's population are female. According to statistics published by the Western Cape Government, this proportion is similar to that of the CKDM's population – 52.8%. In the case of the ULM, around 50.4% of the population are female (based on 2016 figures), which is also roughly in line with the PkSDM's 50.6% (also 2016 figures).

Recent population estimates are not available at the settlement level, but the 2011 census gives some indication of the towns nearby the study site, as outlined in **Table 6-23**. Beaufort West had a population of 20,053 in 2011, while Loxton had a population of 1,044, Fraserburg 3,029 and Nelspoort 1,696.

Table 6-23 - Population groups in the towns surrounding the study site, 2011

Population Group	Beaufort West	Loxton	Fraserburg	Nelspoort
Black African	1 452	28	145	288
Coloured	15 624	895	2 569	1 375
Indian or Asian	107	3	18	14
White	2 741	113	288	13
Other	129	5	9	6
Total	20 053	1 044	3 029	1 696

Between 2011 and 2016, BWLM's dependency ratio showed a decreasing trend over time as an ever-larger proportion of the population was falling into the working age group (**Figure 6-50**). The dependency ratio decreased from 59.7 in 2011 to 56.7 in 2019. The Western Cape Provincial Government had previously projected that it would continue to reduce to 55.1 by 2024. However,

more recent information suggests that this trend reversed between 2016 and 2019, with an increase in the dependency ratio to a high of 64.4% in 2021. Interviews with municipal representatives indicate that this could be due to higher than anticipated rates of in-migration over the period. As the net change in population has been negligible in recent years this would imply out-migration as well.

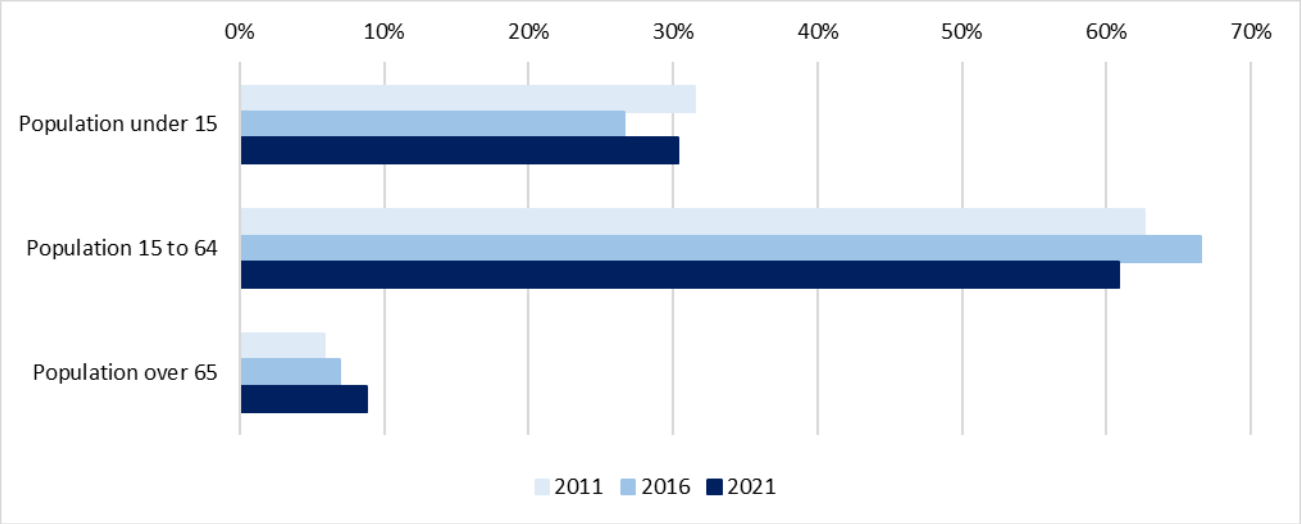


Figure 6-50 - Age cohorts over time in the BWLM

Between 2011 and 2016, the population of the ULM appeared to be following a similar trajectory to that of the BWLM (**Figure 6-51**). Post-2016 data are not available to confirm whether this trend has continued or, as in the case of BWLM, reversed. As in BWLM, the dependency ratio in the ULM fell from 64 in 2011 to 50 in 2016, with an increasingly large portion of the younger population falling into the working age category.

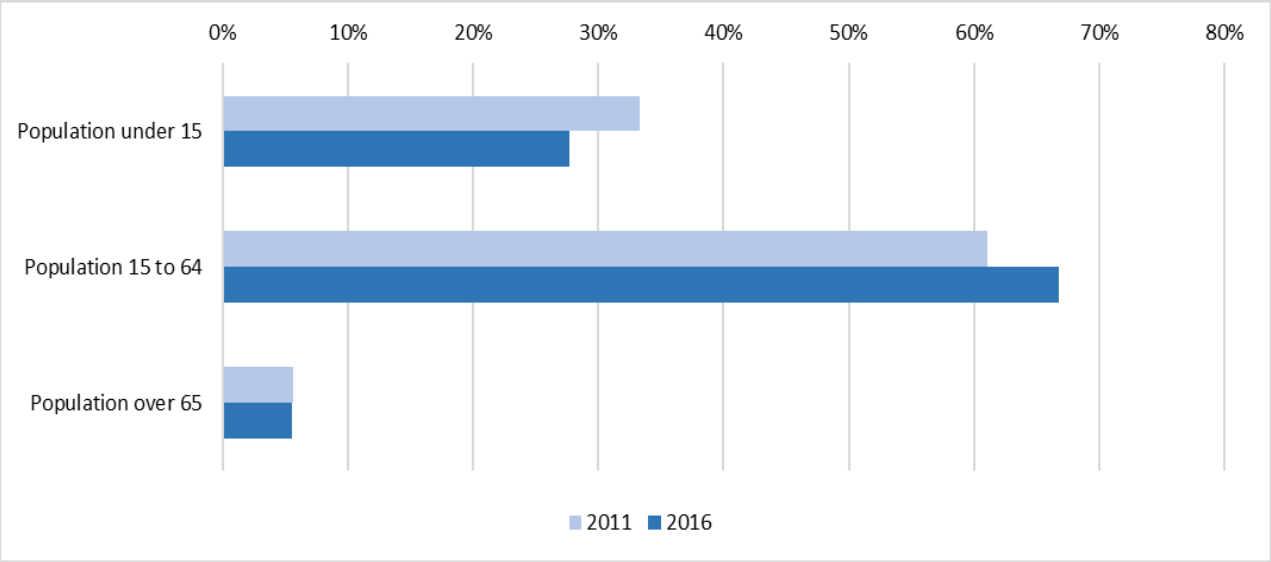


Figure 6-51 - Age cohorts over time in the ULM

6.3.5.3 Employment and sectors

BWLM's unemployment rate was around 24.2% in 2019, which is the highest unemployment rate in the CKD. The local municipality's trend has for the most part been consistent with that of the district

municipality as well as that of the province at least since 2008 (**Figure 6-52**). Western Cape Treasury estimates that unemployment will fall to 22.4% in 2020 (WCPG, 2021a). Reducing unemployment in a year like 2020 seems challenging however, given that Quantec Research estimates that 725 jobs were lost in BWLM in 2020 (1,066 in the wider CKDM) (WCPG, 2021b).

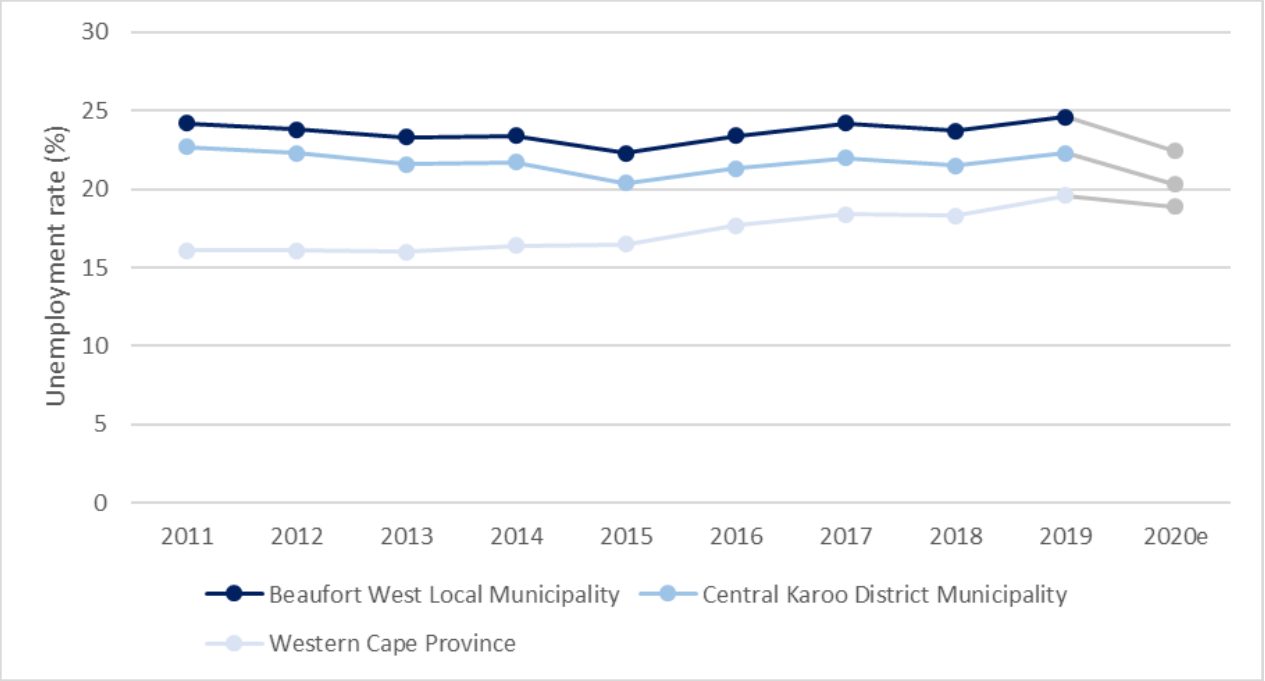


Figure 6-52 - The unemployment rate in BWLM and CKDM over time

Recent employment data are not available for ULM, PkSDM or KHLM. The 2011 census revealed that in that year the unemployment rate in ULM was 29.1% and in PkSDM, 28.3%. The youth unemployment rate in 2011 was 34.8% in ULM and 35.4% in PkSDM. For the KHLM, unemployment data is outlined in **Figure 6-53**, which shows that the unemployment rate peaked around 2003 and has been falling since. However, recent data is not available and there is reason to suspect that this trend may not have continued following the impact of the COVID-19 pandemic and lockdown restrictions, which have tended to increase unemployment in other places where the impact has been measured.

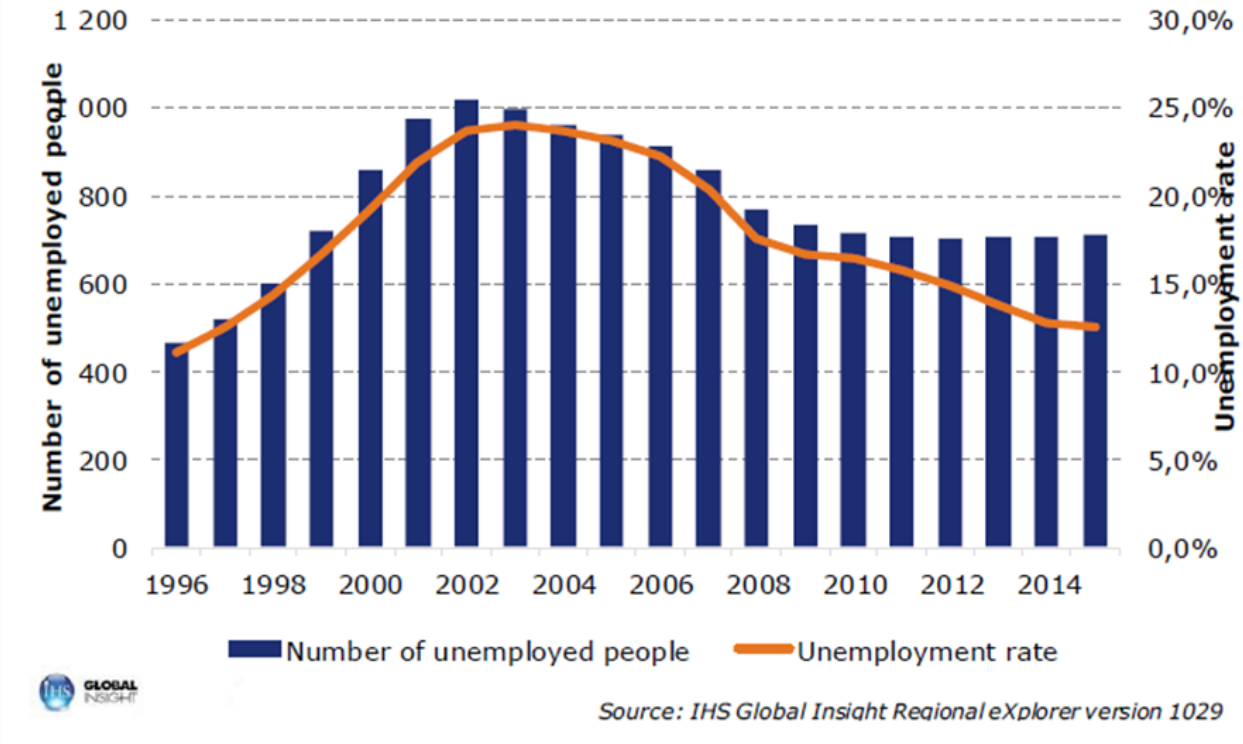


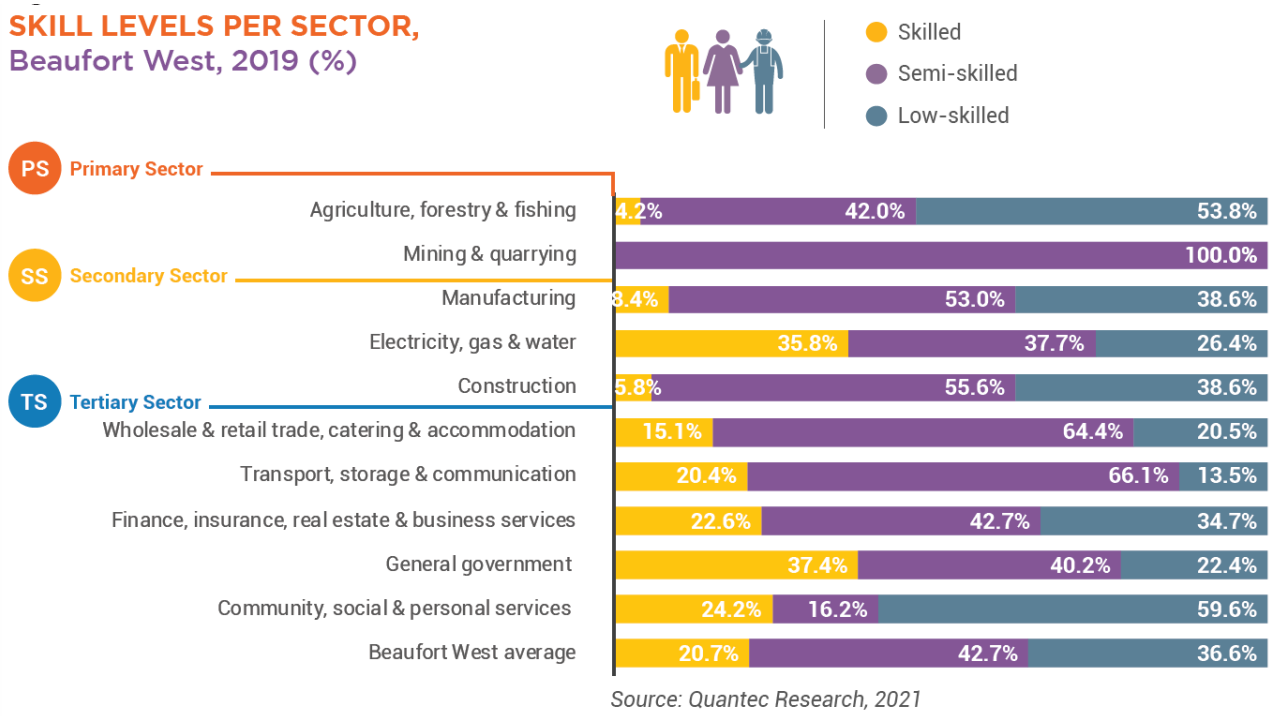
Figure 6-53 - The unemployment rate in KHLM over time

The sector which contributes most to employment in BWLM is wholesale and retail trade, catering and accommodation. This sector contributed 3,165 of the total of the area's 12,552 jobs in 2019, and 31 more jobs than in 2018. The second highest number of jobs was in agriculture, forestry and fisheries which employed 2,421 people in that year (the same number estimated in 2018). **Table 6-24** outlines each sector's employment numbers in 2019 and shows the change in job numbers between 2014 and 2018.

Table 6-24 - Sectoral contribution to employment and net employment growth per sector in BWLM

	GDPR			Employment		
	R Million value 2019	Trend 2015 –2019	Real GDPR growth 2020e	Number of jobs 2019	Ave ann. change 2015 - 2019	Net change 2020e
Primary Sector	225.3	-2.8	10.7	2 423	77	-73
Agriculture, forestry & fishing	223.7	-2.9	10.8	2 421	77	-73
Mining & quarrying	1.6	0.5	-17.6	2	0	0
Secondary sector	278.6	-0.3	-12.8	787	-11	-94
Manufacturing	67.4	0.4	-10.3	249	-2	-16
Electricity, gas & water	120.3	0.2	-6.2	65	0	-3
Construction	90.9	-1.3	-22.0	473	-9	-75
Tertiary sector	1 727.3	0.5	-6.3	9 342	70	-558
Wholesale & retail trade, catering & accommodation	346.4	-0.2	-11.3	3 165	41	-280
Transport, storage & communication	382.2	-1.2	-16.9	649	-1	-38
Finance, insurance, real estate & business services	287.9	2.2	-3.6	1 277	2	-86
General government	500.3	1.0	1.0	2 319	7	26
Community, social & personal services	210.5	0.7	-2.9	1 932	21	-180
Beaufort West	2 231.2	-0.1	-4.8	12 552	136	-725

Most jobs in BWLM fall into the semi-skilled (42.7%) and low-skilled (36.6%) categories with skilled jobs making up only 20.7% of jobs in the area (**Figure 6-54**). Higher-skill positions are concentrated in the electricity, gas and water sector, as well as in general government, finance and community services-related sectors.



Source: Quantec Research, 2021

Figure 6-54 - Sectoral contribution to employment and net employment growth per sector in BWLM

6.3.5.4 Education levels

The proportion of people over the age of 20 years who have obtained a matric certificate increased in the 2011 to 2016 period at both the local and district municipality scales (**Figure 6-55**). This indicates that basic education levels have improved in the study area during this time. The proportion of people who have obtained some form of higher education has however decreased over the same period, at both the local and district municipality scales. This metric, previously published by StatsSA, is not available for either ULM or PkSDM in recent years.

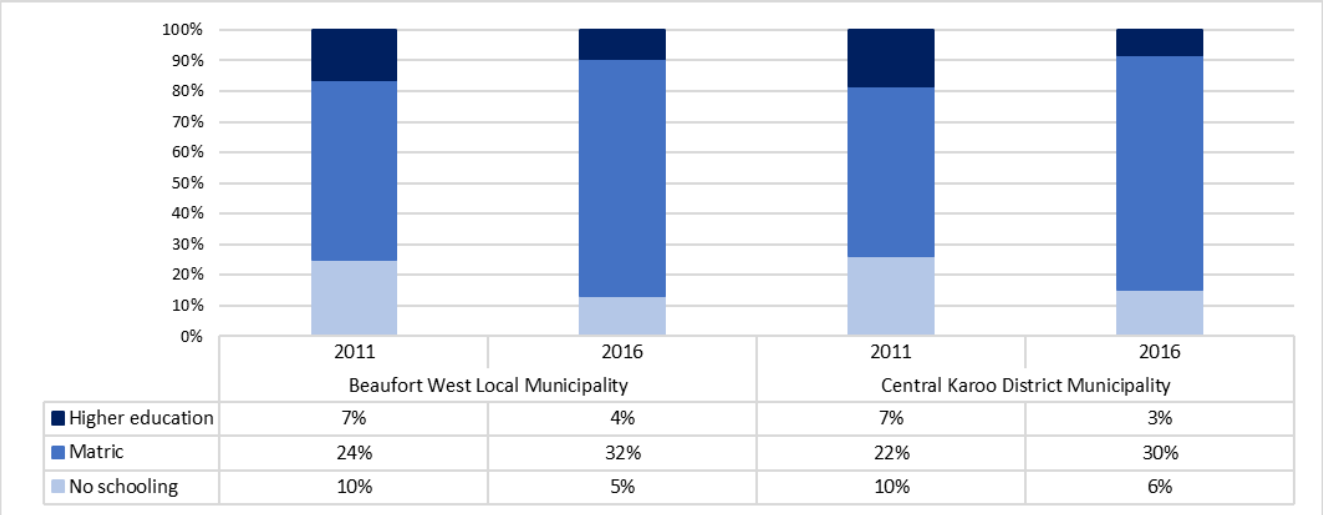


Figure 6-55 - Education levels in those over 20 years old in BWLM and CKDM, 2011 and 2016

Statistics published by the Western Cape Government indicate that both learner enrolment and learner retention have been increasing gradually in recent years (WCPG, 2021a). This is a promising trend. However, while the demand for education has risen, supply has decreased according to the measure of the number of public ordinary schools, which decreased by one per year over the 2018–2019 period. This combination of trends has resulted in higher learner-teacher ratios in the municipality, at 1:33.2 in 2019 (higher than the provincial average of 1:30.5 and the national average of 29.3). In 2020 the ratio reduced slightly to 1:31.

According to StatsSA the proportion of people in ULM over the age of 20 years with no schooling fell from 16% to 12% over the 2011–2016 period. For the PkSDM this figure decreased similarly from 15% to 12%. At the same time, the proportion of people who have attained a matric certificate had increased for both ULM and PkSDM during these years. The proportion of people who had attained some form of higher education had meanwhile fallen (**Figure 6-56**). More recent data has not been published on the above-reported metrics at either the district or local municipality-level in the Northern Cape.

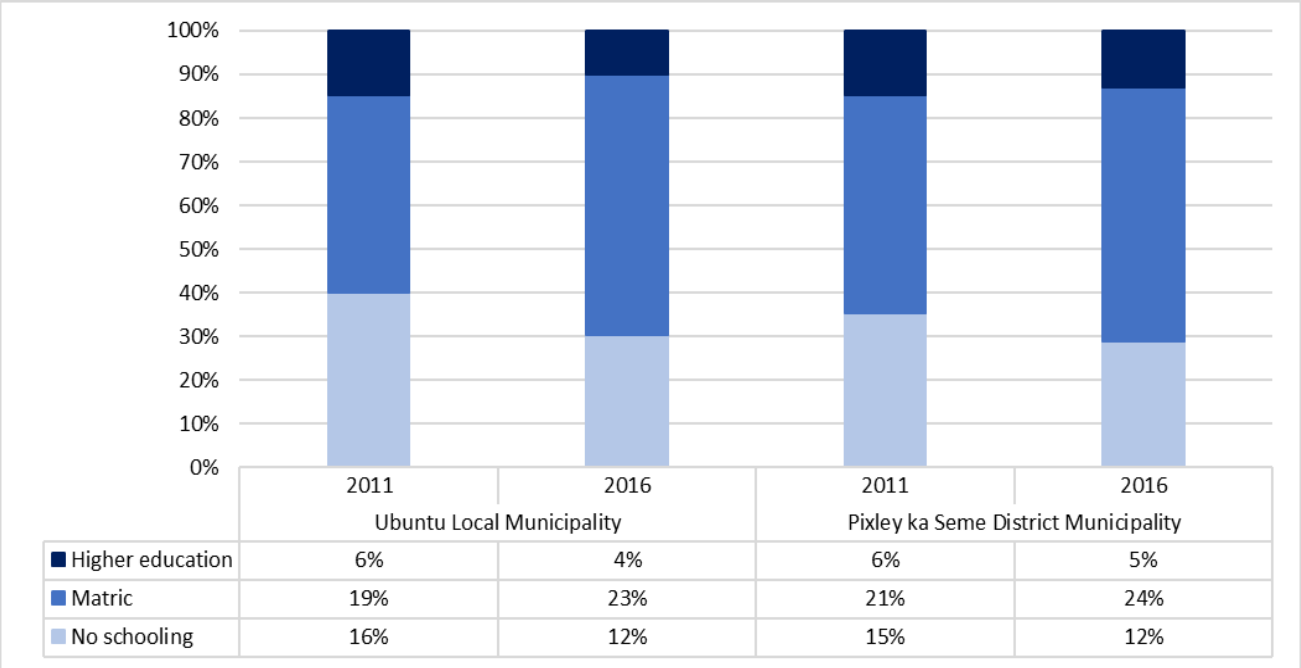


Figure 6-56 - Education levels in those over 20 years old in ULM and PkSDM, 2011 and 2016

6.3.5.5 Availability of municipal services

Access to basic services has fluctuated over time both at the local and district municipality levels, except in the case of water. The data in **Figure 6-57** was assembled based on statistics generated by StatsSA for 2011 and 2016, as well as 2019–2020 statistics generated by Quantec and reported in the Western Cape Treasury's 2020 and 2021 socio-economic profiles for Beaufort West. According to this data, a greater proportion of households had access to a flush toilet connected to sewerage, weekly refuse removal and electricity and lighting in 2016 as compared to 2011 throughout the local and district municipalities. This improvement was somewhat reversed in the 2016–2019 period, with relatively more households not having access to electricity for lighting, flush toilets and weekly refuse removal in recent years.

The proportion of households with piped water inside their dwelling fell from 81% to 78% in BWLM and from 77% to 74% in CKDM between 2011 and 2016, but then saw an increased to 98% in 2019 for both BWLM and CKDM. Interviews with municipal representatives suggest that in-migration of poor families has led to the expansion of informal settlements where the provision of service delivery remains relatively low.

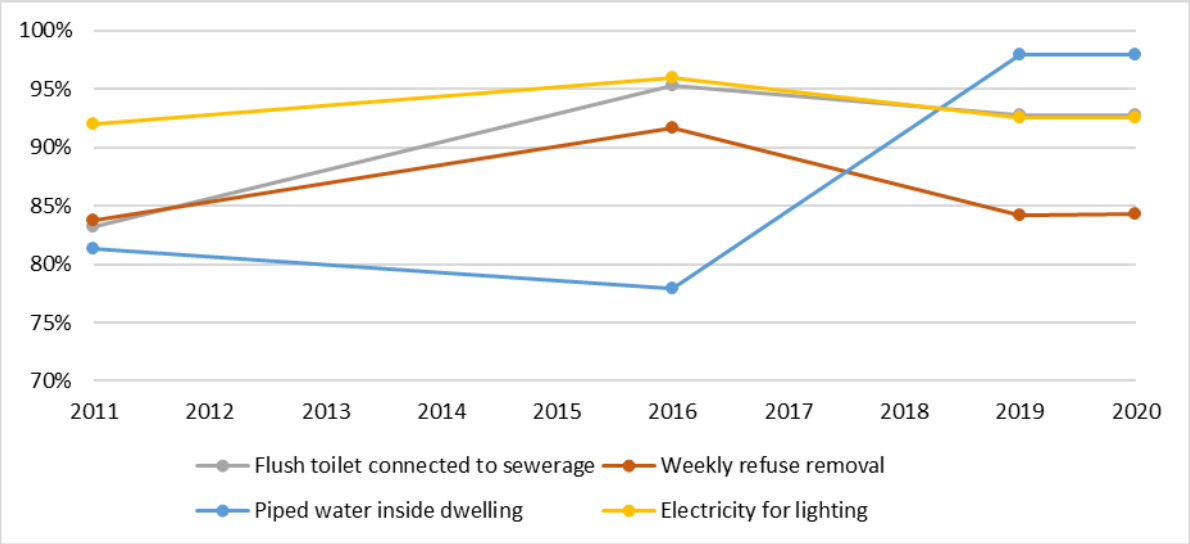
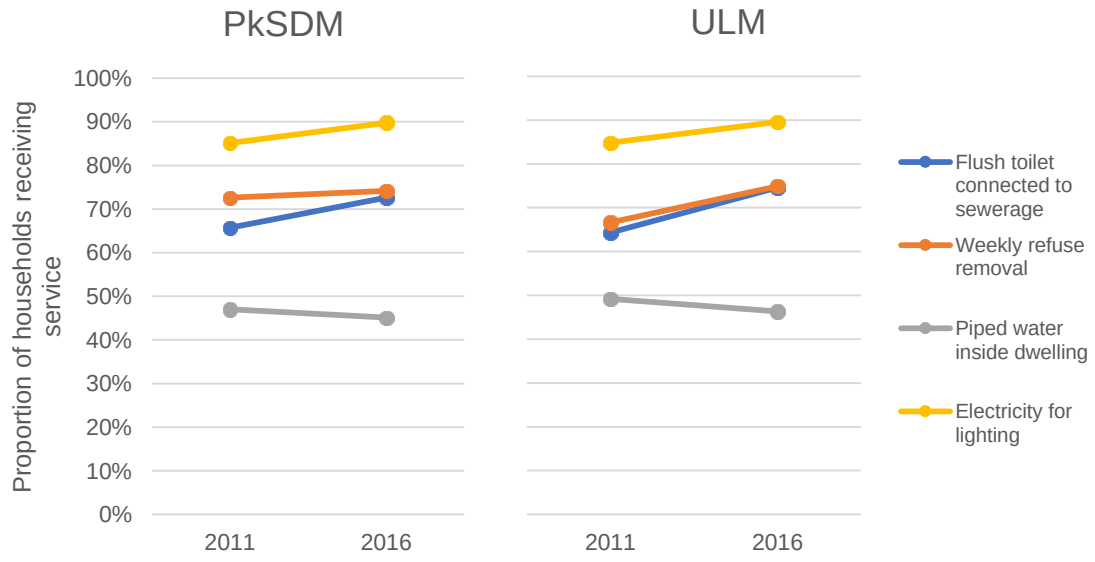


Figure 6-57 - Access to key municipal services in BWLM and CKDM, 2011, 2016 and 2019

According to the Western Cape Government, there are relatively few informal houses in either the BWLM or in the CKDM. In the BWLM, 97.9% of households live in formal dwellings, which is a slightly higher proportion of households than the CKDM with 97.0% (WCPG, 2021a).

Data for the Northern Cape are comparatively limited. For the 2011–2016 period, **Figure 6-58** shows that service delivery in ULM and PkSDM had improved in all areas except in terms of the number of households who have access to piped water inside their dwellings. This was likely the result of water provision not keeping pace with the growing number of households in the local as well as the district municipality. More recent figures are not available.



Source: Stats SA, 2012; Stats SA, 2017

Figure 6-58 - Access to key municipal services in ULM and PkSDM, 2011 and 2016

6.3.5.6 Health

Assessing access to health services is key to understanding well-being and poverty. Chronic lower respiratory disease is the leading cause of death in the Central Karoo District (9.5% of deaths in 2018), followed by Tuberculosis (TB) (8.8%), Cerebrovascular disease (6.9%), Hyperintensive diseases (5.5%) and Diabetes melitus (5.5%) (WCPG, 2021b).

According to StatsSA, 75% of South Africans rely on public health services, while the remaining 25% make use of private facilities. The number and types of public healthcare facilities available in BWLM and CKDM are outlined in **Figure 6-59**.

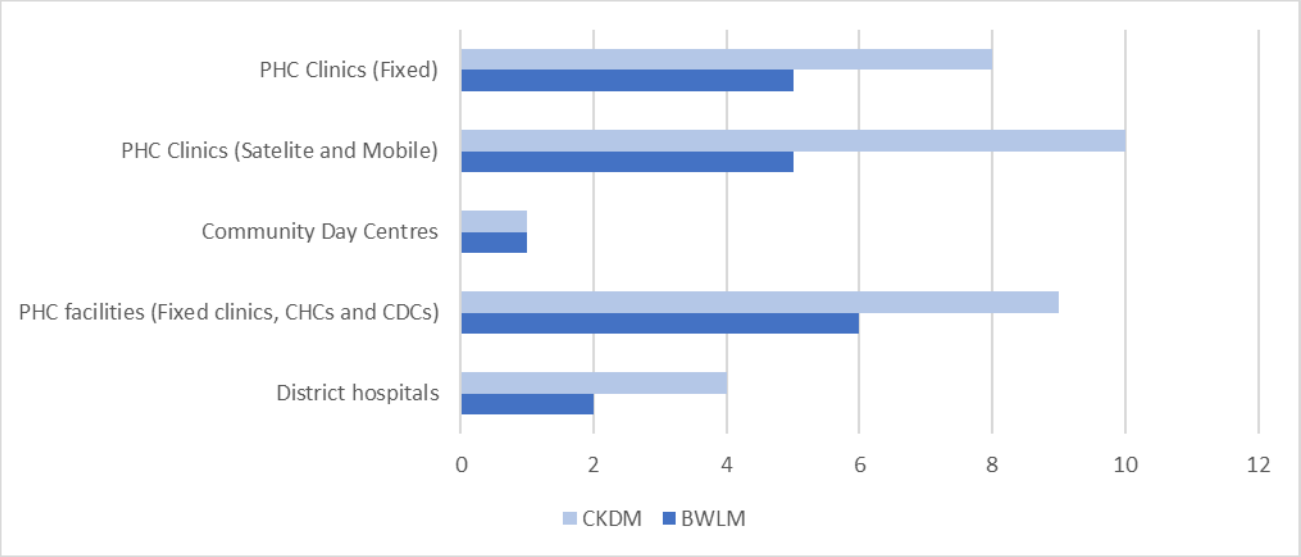


Figure 6-59 - Public healthcare facilities in the study area

BWLM's latest IDP revision notes the importance of providing preventative care for HIV/AIDS and Tuberculosis (TB) to vulnerable communities. This preventative care is provided by government and consists primarily of condom distributions and campaigns to encourage the practice of safe sex. In terms of providing treatment, government provides antiretroviral therapy (ART) to people living with HIV. There were a total of 1,558 people receiving ART in BWLM in 2020/21, up from 1,524 in 2019/20. The total number in the CKDM was 2,037 in 2020/21, down from 2,050 in 2019/20. The CKDM socio-economic profile, published by the Western Cape Treasury, notes that the number of newly registered ART patients remained relatively stable at 142 in 2019/20 and 147 in 2020/21.

Direct provision of public health services is complemented by service provision more broadly. This is noted in the PkSDM Health Profile, with inadequate provision of basic services such as water and wastewater treatment highlighted as factors that contribute to heightened incidences of illness.

The following healthcare facilities provide treatment in the BWLM:

- Murraysburg Primary Healthcare Centre (PHC)
- Nelspoort PHC
- Nieuveldpark PHC
- Kwa Mandlenkosi PHC
- Hillside Clinic PHC (constructed in 2016/17)
- Merweville Satellite Clinic
- Beaufort West CDC

- Murraysburg Mobile Clinic
- Nelspoort Mobile Clinic
- Beaufort West Mobile Clinic
- Merweville Mobile Clinic
- Beaufort West District Hospital
- Murraysburg District Hospital
- Nelspoort Specialised Hospital

Similar to the BWLM, communities living in the ULM also face challenges with respect to HIV/AIDS and TB. According to the latest available information, the ULM currently has 3 clinics and 2 Community Health Centres, no district hospital (for Pikley ka Seme District these are located in the Emthanjeni, Siyancuma and Siyathemba Local Municipalities), no Mobile Clinics and no Satellite Clinics (HST, no date). The ULM IDP identifies the following issues in the local health sector:

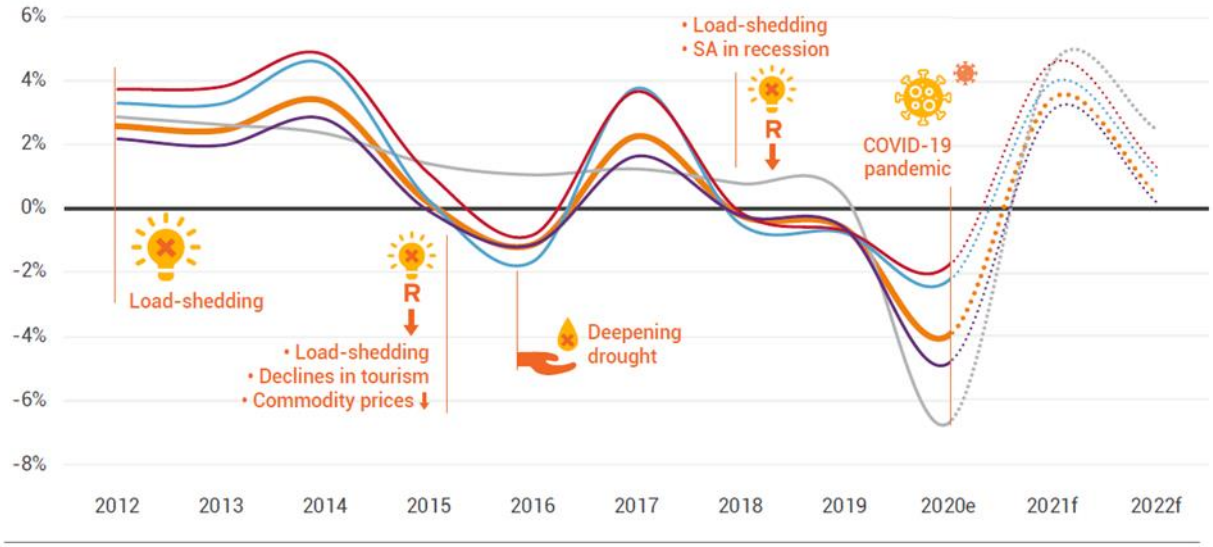
- “Inadequate health facilities
- Limited medical staff (Doctors & Nurses)
- Limited equipment’s
- Underutilized facility
- Shortage of ambulances” (ULM, 2021)

The latest available information indicates that the KHM has 3 PHC clinics and 2 Mobile Clinics.

Municipalities continue to address health issues facing communities through the provision of health services and through the continued training of Community Health Workers. In addition to treating HIV/AIDS, facilities provide immunisation for children (CKDM’s immunisation rate was 74.9% in 2016). Other challenges faced by communities include a higher than anticipated neo-natal mortality rate – 13.4 neonatal deaths per 1000 live births for CKDM in 2019, up from 14 in 2016 (the target had been set at 6 or less). The neonatal death rate for BWLM is lower, at 8.4 deaths per live birth.

6.3.5.7 Local and regional socio-economic growth and development plans/priorities

The Central Karoo District has experienced low levels of economic growth in recent years, with fluctuating GDPR growth patterns seen since 2014 in the district economy and all local economies within. Quantec Research estimates that the BWLM experienced 4.8% decline in 2020, in line with the 4% decline in CKDM’s GDPR growth rate and a 6.7% decline in that of the Western Cape. Several reasons for this low and erratic growth are outlined in **Figure 6-60**. They include the COVID-19 pandemic, drought and load shedding.



	2012	2013	2014	2015	2016	2017	2018	2019	2020e	2021f	2022f
Western Cape	2.9%	2.6%	2.4%	1.4%	1.1%	1.2%	0.8%	0.4%	-6.7%	4.6%	2.5%
Central Karoo District	2.6%	2.4%	3.3%	0.2%	-1.1%	2.3%	-0.2%	-0.6%	-4.0%	3.5%	0.5%
Laingsburg	3.3%	3.3%	4.5%	0.3%	-1.6%	3.8%	-0.5%	-0.7%	-2.2%	4.0%	1.0%
Prince Albert	3.7%	3.8%	4.8%	1.1%	-0.8%	3.7%	-0.1%	-0.7%	-1.8%	4.6%	1.3%
Beaufort West	2.2%	2.0%	2.8%	-0.1%	-1.1%	1.7%	-0.2%	-0.6%	-4.8%	3.2%	0.2%

Source: Quantec Research, 2021; Urban-Econ based on Quantec, SARB, Stats SA and BFAP, 2021 (e denotes estimate, f denotes forecast)

Figure 6-60 - GDPR growth in the local economies of the Central Karoo District

In terms of future economic development goals, the 2021-2022 review of the 2017-2022 IDP of the BWLM is most instructive. According to this plan, the Municipal Strategic Programme is aligned to 5 Key Performance Areas:

- KPA 1: Basic service delivery and infrastructure development
- KPA 2: Economic development
- KPA 3: Institutional development and municipal transformation
- KPA 4: Financial viability and management
- KPA 5: Good governance and community participation

KPA 2 above (economic development) is linked to the following strategies:

- To use municipal and government funded projects as means to create jobs and reduce poverty
- To facilitate development and growth of SMME's
- To establish and strengthen LED Structures
- To facilitate Education and Skills Development for Cooperatives & SMME's
- To provide SMME Support and Capacity building
- To manage and enhance the performance of the municipality

At the district level, the CKDM IDP 2017-2022, 2nd Review 2021–2022, highlights the following projects, identified in the District LED Strategy:

- Infrastructure development to increase access for businesses and households;

- Business support programmes to retain existing businesses and encourage start-up or relocating businesses to enter the area;
- Spatial planning to promote land acquisition and property development for businesses and households;
- Skills programmes to respond to business and government for greater productivity and efficiency; and
- Social development programmes to increase participation in the local economy and build better lifestyles for the community.

The CKDM IDP goes on to mention the importance of establishing an LED unit to coordinate activities, as well as the Economic Recovery Plan being drafted to respond to the economic impact of the COVID-19 pandemic.

The ULM 2017-2022 & 2020/21 Draft IDP outlines the following strategic objectives associated with National Key Performance Area 2: Local Economic Development:

  - a. Private Sector Investment Upliftment & Acceleration
  - b. Public Sector Investment Upliftment & Acceleration
  - c. Tourism Upliftment & Acceleration
  - d. Agriculture & Agri-processing Upliftment & Acceleration
  - e. Industry Upliftment & Acceleration
  - f. Commerce Upliftment & Acceleration
  - g. SMME Upliftment & Acceleration
  - h. Industrial & Commercial Economic Zone Establishment" (ULM, 2021: 44)

The Key Performance Areas put forward in the 2017–2022 KHLM IDP, 2021–2022 Review are as follows:

- KPA 1: Basic service delivery
- KPA 2: Local Economic development
- KPA 3: Financial viability
- KPA 4: Institutional development and municipal transformation
- KPA 5: Good governance and community participation

In the area of KPA 2: Local Economic Development, the following strategic objectives are listed:

- Transform Urban areas to vibrant economic centres that are safe and secure
- Promote growth and diversification of the local economy
- Promote BBBEE development
- Promote healthy living and working environments
- Promote social cohesion through economic and social development

7 SITE SENSITIVITY VERIFICATION

Specialist assessments were conducted in accordance with the Procedures for the Assessment and Minimum Criteria for Reporting on identified Environmental Themes, which were promulgated in Government Notice No. 320 of 20 March 2020 and in Government Notice No. 1150 of 30 October 2020 (i.e. “the Protocols”), or Appendix 6 of the EIA Regulations, depending on which legislation apply to the assessment under consideration. A summary of the DFFE screening tool, the applicable legislation as well as the specialist sensitivity verification are detailed in **Table 7-1** below. The site verification process is discussed in the section below.

Table 7-1 - Assessment Protocols and Site Sensitivity Verifications

Specialist Assessment	Assessment Protocol	DFFE Screening Tool Sensitivity	Specialist Sensitivity Verification
Agricultural Compliance Statement	*Protocol for the specialist assessment and minimum report content requirements of environmental impacts on agricultural resources by onshore wind and/or solar photovoltaic energy generation facilities where the electricity output is 20 megawatts or more*	High Sensitivity	Low Sensitivity
Terrestrial Biodiversity Impact Assessment	*Protocol for the Specialist Assessment and Minimum Report Content Requirements for Environmental Impacts on Terrestrial Biodiversity*	Very High Sensitivity	Low Sensitivity
Aquatic Biodiversity Impact Assessment	*Protocol for the Specialist Assessment and Minimum Report Content Requirements for Environmental Impacts on Aquatic Biodiversity*	Very High Sensitivity	Low Sensitivity
Plant Species	*Protocol for the Specialist Assessment and Minimum Report Content Requirements for Environmental Impacts on Terrestrial Plant Species*	Medium Sensitivity	Low Sensitivity
Animal Species	*Protocol for the Specialist Assessment and Minimum Report Content Requirements for Environmental Impacts on Terrestrial Animal Species*	High Sensitivity	Low Sensitivity
Avifauna Impact Assessment	*Protocol for the Specialist Assessment and Minimum Report Content Requirements for Environmental Impacts on Terrestrial Animal Species*	No Sensitivity Identified	Medium Sensitivity
Archaeological and Cultural Heritage Impact Assessment	*Site Sensitivity Verification Requirements where a specialist Assessment is required but no Specific Assessment Protocol has been prescribed*	Low Sensitivity	Medium Sensitivity

Specialist Assessment	Assessment Protocol	DFFE Screening Tool Sensitivity	Specialist Sensitivity Verification
Palaeontology Impact Assessment	*Site Sensitivity Verification Requirements where a specialist Assessment is required but no Specific Assessment Protocol has been prescribed*	Very High Sensitivity	Low Sensitivity
Visual (Landscape) Impact Assessment	*Site Sensitivity Verification Requirements where a specialist Assessment is required but no Specific Assessment Protocol has been prescribed*	No Sensitivity Identified	Medium Sensitivity
Social Impact Assessment	*Site Sensitivity Verification Requirements where a specialist Assessment is required but no Specific Assessment Protocol has been prescribed*	No Sensitivity Identified	Low to Medium Sensitivity
RFI Theme	*Site Sensitivity Verification Requirements where a specialist Assessment is required but no Specific Assessment Protocol has been prescribed*	High Sensitivity	Low Sensitivity

7.1 AGRICULTURAL POTENTIAL

Agricultural sensitivity is a direct function of the capability of the land for agricultural production. All arable land that can support viable crop production, is classified as high (or very high) sensitivity. This is because there is a scarcity of arable production land in South Africa and its conservation for agricultural use is therefore a priority. Land which cannot support viable crop production is much less of a priority to conserve for agricultural use and is rated as medium or low agricultural sensitivity.

However, the verification of agricultural sensitivity of the power line route has very little relevance to this assessment. It is important to recognise that the agricultural sensitivity of land, in terms of a particular development, is not only a function of the screening tool sensitivity, which equates to agricultural potential, but is also a function of the severity of the impact which that development poses to agriculture. This is not recognised in the screening tool classification of sensitivity and is therefore a limitation to that sensitivity. This is relevant for transmission lines, because their agricultural impact is usually negligible (see impact assessment section), regardless of the agricultural sensitivity of the land which they traverse. Therefore, in the context of overhead power lines, almost no land can be considered to have high agricultural sensitivity. In this assessment, only the footprint of the switching stations is of relevance.

The screening tool classifies agricultural sensitivity according to only two independent criteria – the land capability rating and whether the land is used for cropland or not. All cropland is classified as at least high sensitivity, based on the logic that if it is under crop production, it is indeed suitable for it, irrespective of its land capability rating.

The screening tool sensitivity categories in terms of land capability are based upon the Department of Agriculture's updated and refined, country-wide land capability mapping, released in 2016. The data is generated by GIS modelling. Land capability is defined as the combination of soil, climate

and terrain suitability factors for supporting rain fed agricultural production. It is an indication of what level and type of agricultural production can sustainably be achieved on any land, based on its soil, climate and terrain. The higher land capability values (≥8 to 15) are likely to be suitable as arable land for crop production, while lower values are only likely to be suitable as non-arable grazing land.

A map of the proposed corridor, overlaid on the screening tool sensitivity, is given in **Figure 7-1** but as noted above, the screening tool sensitivity of the power line corridor is largely irrelevant to agricultural impact.

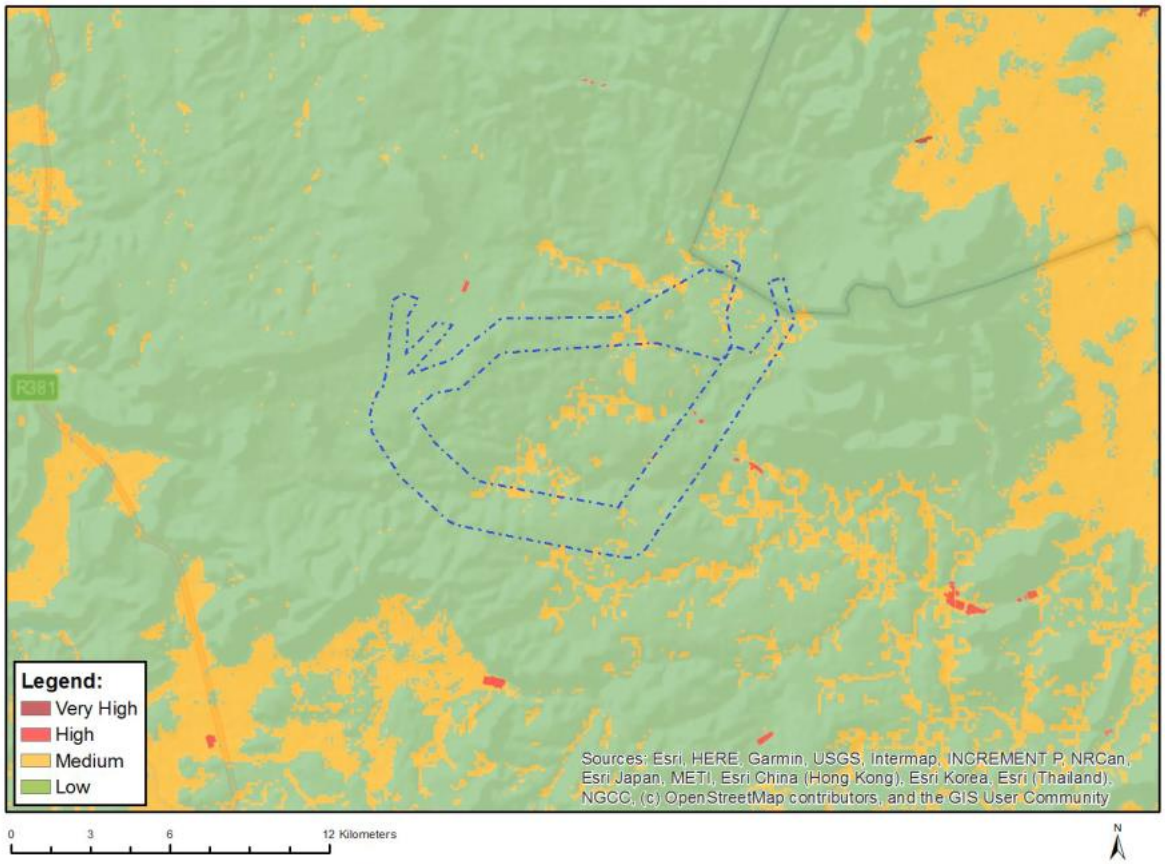


Figure 7-1 - Map of Agriculture Sensitivity

Source: DFFE Screening Report

The high agricultural sensitivity of the site, as identified by the screening tool, is disputed by this assessment and is confirmed as being of low sensitivity. The motivation for confirming the sensitivity is predominantly that the climate data (low rainfall of between 171 and 212 mm per annum and high evaporation of between 1,274 and 1,312 mm per annum) proves the area to be arid and therefore of limited land capability. Moisture availability is completely insufficient for viable rainfed crop production. In addition, the land type data shows the dominant soils to be shallow on underlying rock and hardpan carbonate. A low agricultural sensitivity is entirely appropriate for the site, which is unsuitable for crop production.

7.2 TERRESTRIAL BIODIVERSITY

The output of the DFFE Screening Tool for the Terrestrial Biodiversity Theme is illustrated in **Figure 7-2** and indicates that the Mura EGI Corridor falls predominately within an areas classified as Very High Sensitivity due to the presence of areas of CBA 1, CBA 2 and ESA within the study area.

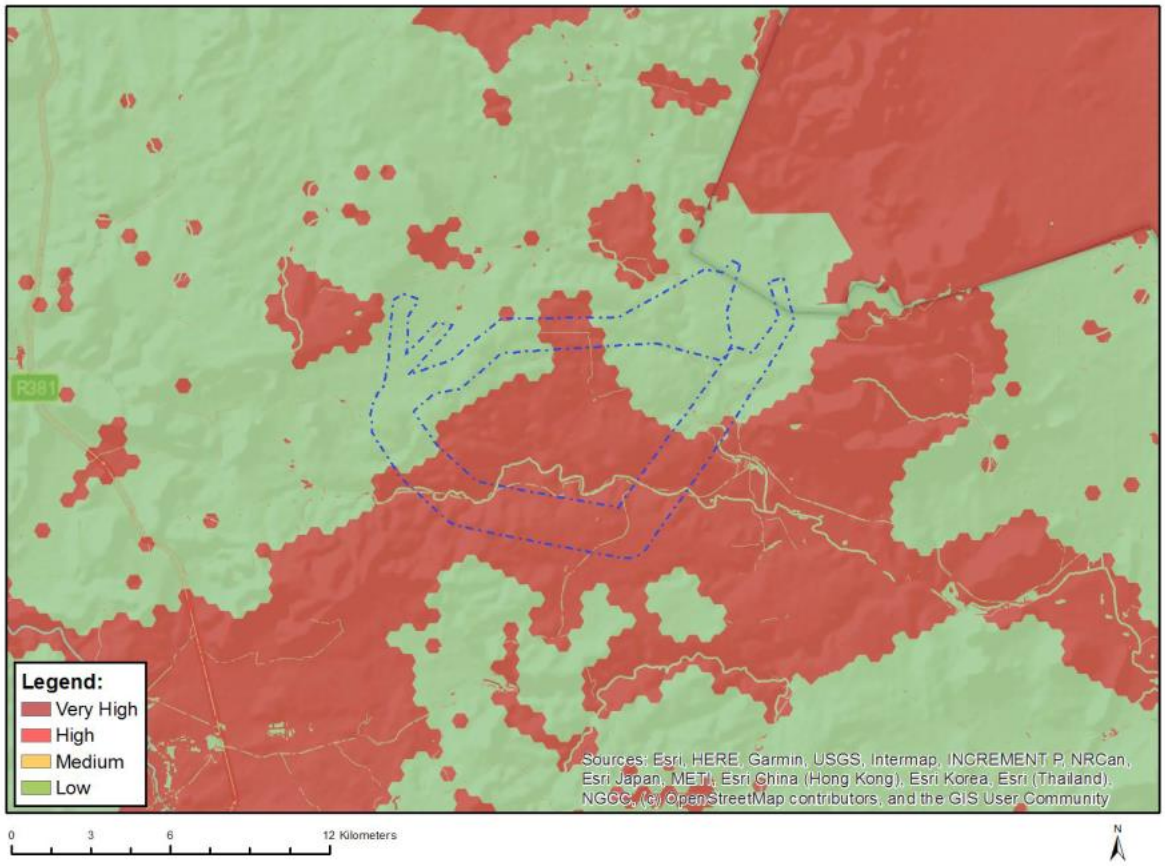


Figure 7-2 - Map of Terrestrial Biodiversity Sensitivity

Source: DFFE Screening Report

The Mura Grid Corridor was visited several times for the current study. An initial field assessment took place on the 22 March 2022 and follow-up field assessments were undertaken on the 07-08 June 2022 and 19 October 2022.

The majority of the CBAs within the Western Cape are driven by the selection of areas of Eastern Upper Karoo, as well as water resource protection areas identified as Very High Sensitivity under the Shale Gas SEA and Karoo River Types. There are no CBAs within the Northern Cape section of the Mura EGI Corridor. The DFFE Screening Tool identified *Isolepis expallescens* and *Sensitive species 945* as two plant species of concern. Neither of these species were observed within the corridor and it is considered unlikely that either species is present, with the result that the corridor is considered Low Sensitivity for these two species (refer to the Plant Species Compliance Statement for the corridor for more details).

In order to ensure the maintenance of ecological processes within the grid corridor and the minimisation of impacts on terrestrial biodiversity, a constraints map for the corridor was produced (**Figure 7-3**). This should be used to inform the grid routing and ensure that impacts on the

sensitive features of the site are maintained within acceptable limits. It should be noted that the constraints mapping applies to the physical footprint of the development (i.e pylon and switching stations placements and access roads), but no-go features can be traversed by the overhead lines themselves. There are numerous constraints operating across the corridor, associated firstly with the major drainage features of the corridor and associated Riverine Rabbit habitat and secondly with the mountains, slopes and dolerite outcrops of the corridor which are ecologically significant in their own right, but also represent Karoo Dwarf Tortoise habitat. The development footprint within the high sensitivity areas should be reduced to the minimum possible. The major drainage features with areas of confirmed Riverine Rabbit habitat are mapped as no-go features as this is a restricted habitat that is vulnerable to disturbance and is home to a species with very high conservation concern. The areas of Karoo Dwarf Tortoise habitat have been mapped as high sensitivity since this habitat does not have confirmed Karoo Dwarf Tortoise observations and it would not be highly threatened by the development of the power line through these areas. As a result, the sensitivity of Karoo Dwarf Tortoise habitat is considered to be somewhat lower than the areas of optimal Riverine Rabbit habitat. Provided that the development footprint can avoid/be minimised within the areas identified as High sensitivity, the grid connection would be considered acceptable and would generate a low impact on fauna, flora and terrestrial biodiversity generally.

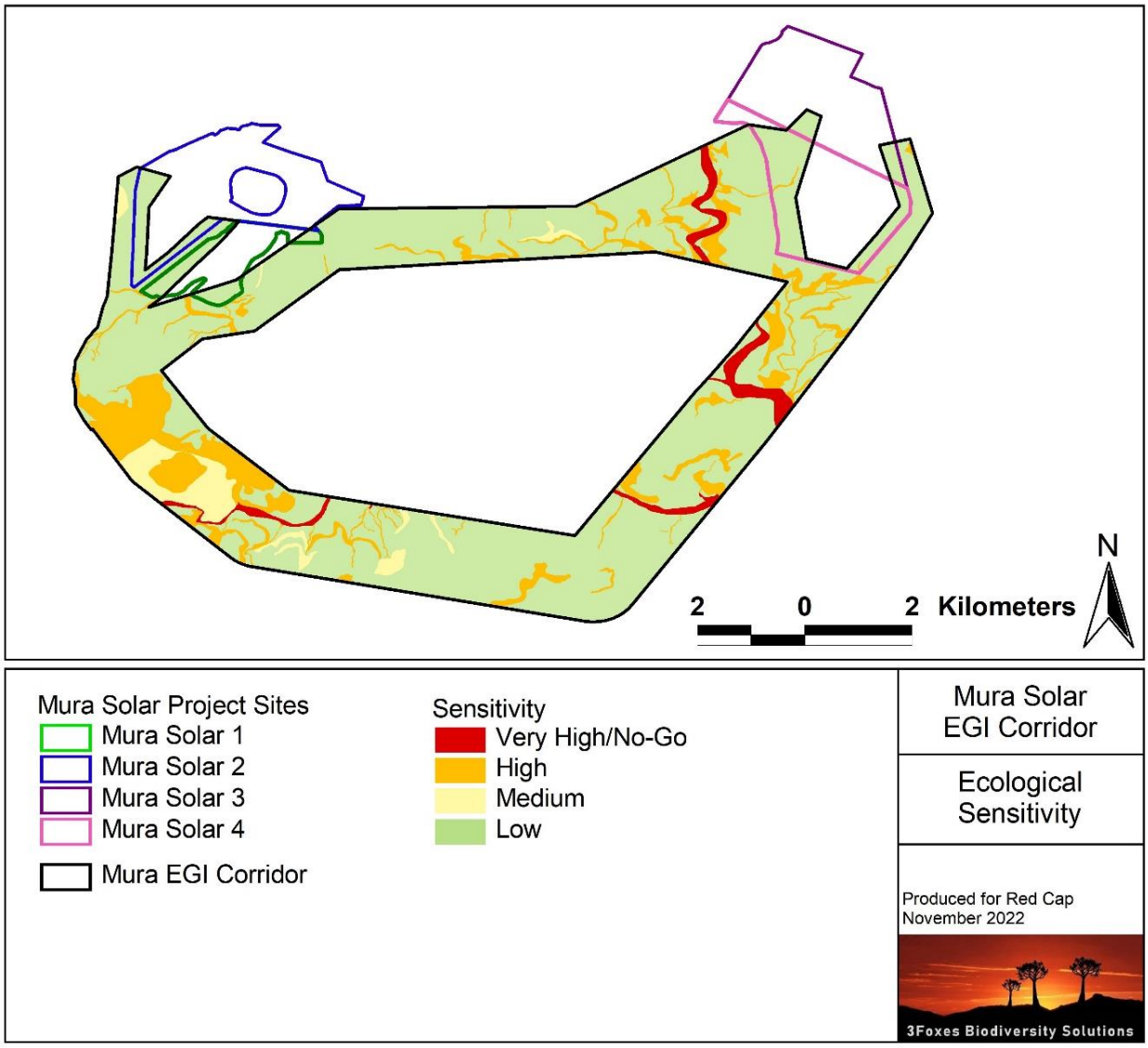


Figure 7-3 - Ecological constraints map for the Mura EGI Corridor for all infrastructure

7.3 AQUATIC BIODIVERSITY

The DFFE Screening Tool map for the Aquatic Biodiversity at the Mura EGI Corridor (**Figure 7-4**) indicates the area to be of very high sensitivity. The very high sensitivity is linked to aquatic CBAs that are associated with larger rivers that contain instream wetland habitat. These larger river channels will need to be crossed by the proposed Grid Connection infrastructure. The aquatic ecosystem assessment disagrees with the DFFE screening tool, and confirms that the wider area is

of low sensitivity, with only the larger rivers being of very high sensitivity.

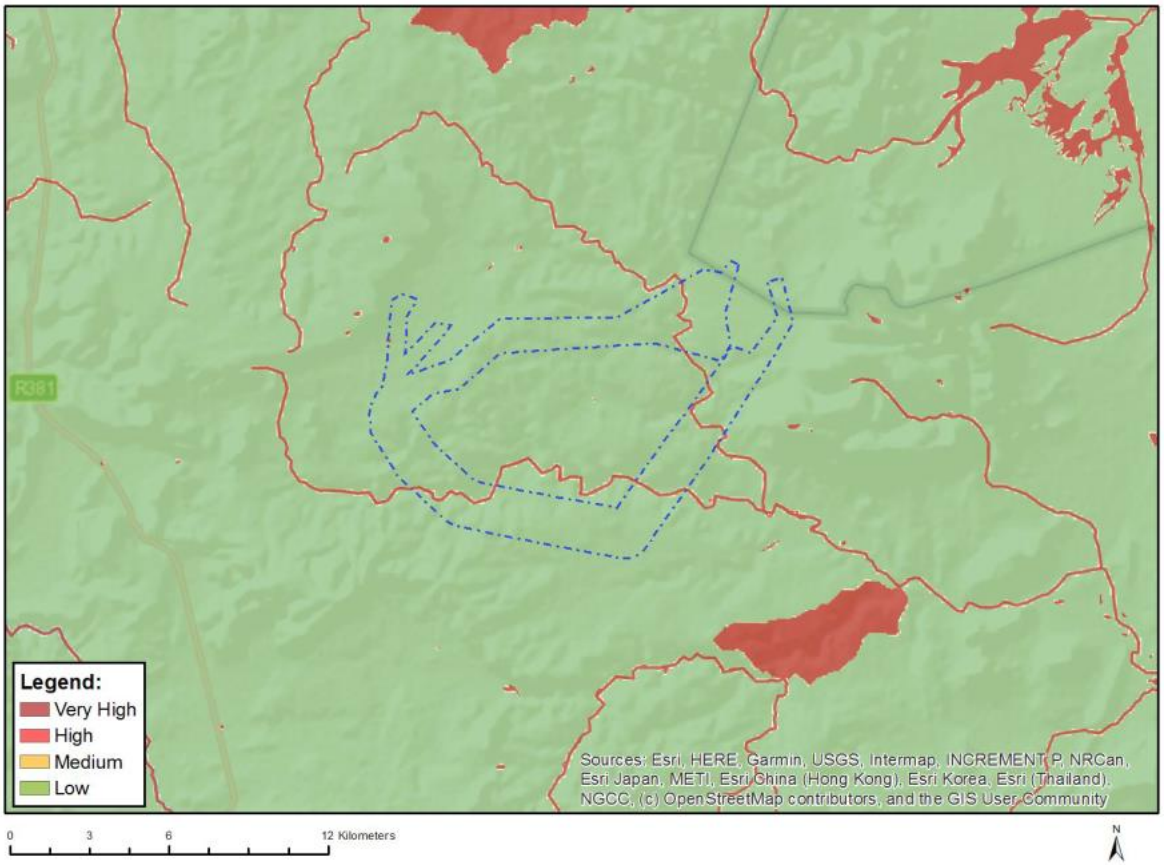


Figure 7-4 - Map of Aquatic Biodiversity Sensitivity

Source: DFFE Screening Report

Table 7-2 contains a summary of the aquatic ecological condition, ecological importance and sensitivity and recommended ecological category as well as the sensitivity and associated buffers for the aquatic features, based on the field assessment.

Table 7-2 - Summary of condition, ecological importance and sensitivity of aquatic features together with recommended buffers

Aquatic feature	PES	EIS	REC	Sensitivity	Recommended buffer
Krom River	B/C	High	B/C	High	35m and surrounding valley bottom and floodplain wetland and buffer
Small tributaries	A/B	Moderate	A/B	Medium	35
Valley bottom wetlands	B	Moderate	B	Medium	35

Based on the PES, EI&ES and REC above, aquatic sensitivity and recommended buffers have been mapped to protect these ecosystems. The recommended buffer area between the aquatic features and the project components is 35m from the centre of these streams or along the delineated edge of the wide associated floodplain area. The buffer areas are an area of protection recommended as a

development setback for the proposed Grid Connection that are intended to reduce the edge effect and direct impacts on the integrity and functionality of the aquatic ecosystems.

As there is some flexibility relating to the exact location of the pylons and switching stations, it is easy to mitigate the potential impact by locating them outside of the freshwater features. Where the proposed grid connection needs to cross the watercourses mapped as being of high sensitivity, the powerline would be able to span the watercourse such that the pylons could still be constructed outside of the watercourse and the recommended buffer. The proposed switching stations may not be placed within the areas of high sensitivity areas.

Thus, it is usually the associated access track that potentially impacts more on the freshwater features where they need to cross freshwater features. Such crossings and disturbances of the aquatic features need to be minimised and mitigated as far as possible. Existing access roads should be utilised where possible through the watercourse to prevent new crossings from being constructed. A walk-down should be conducted by a specialist to identify the most suited new crossing positions should a new crossing be required. The new crossing structures should be properly designed to not result in blockage in the watercourses or erosion.

Figure 7-5 indicates the aquatic sensitivity layers and their associated recommended buffers for the proposed grid connection. The no-go areas (red lines) are areas of high aquatic sensitivity that should be avoided for the pylon placements and switching stations. New access tracks through these areas should be kept to a minimum and microsited. The medium sensitivity (yellow areas) should ideally be avoided, or adequately mitigated.

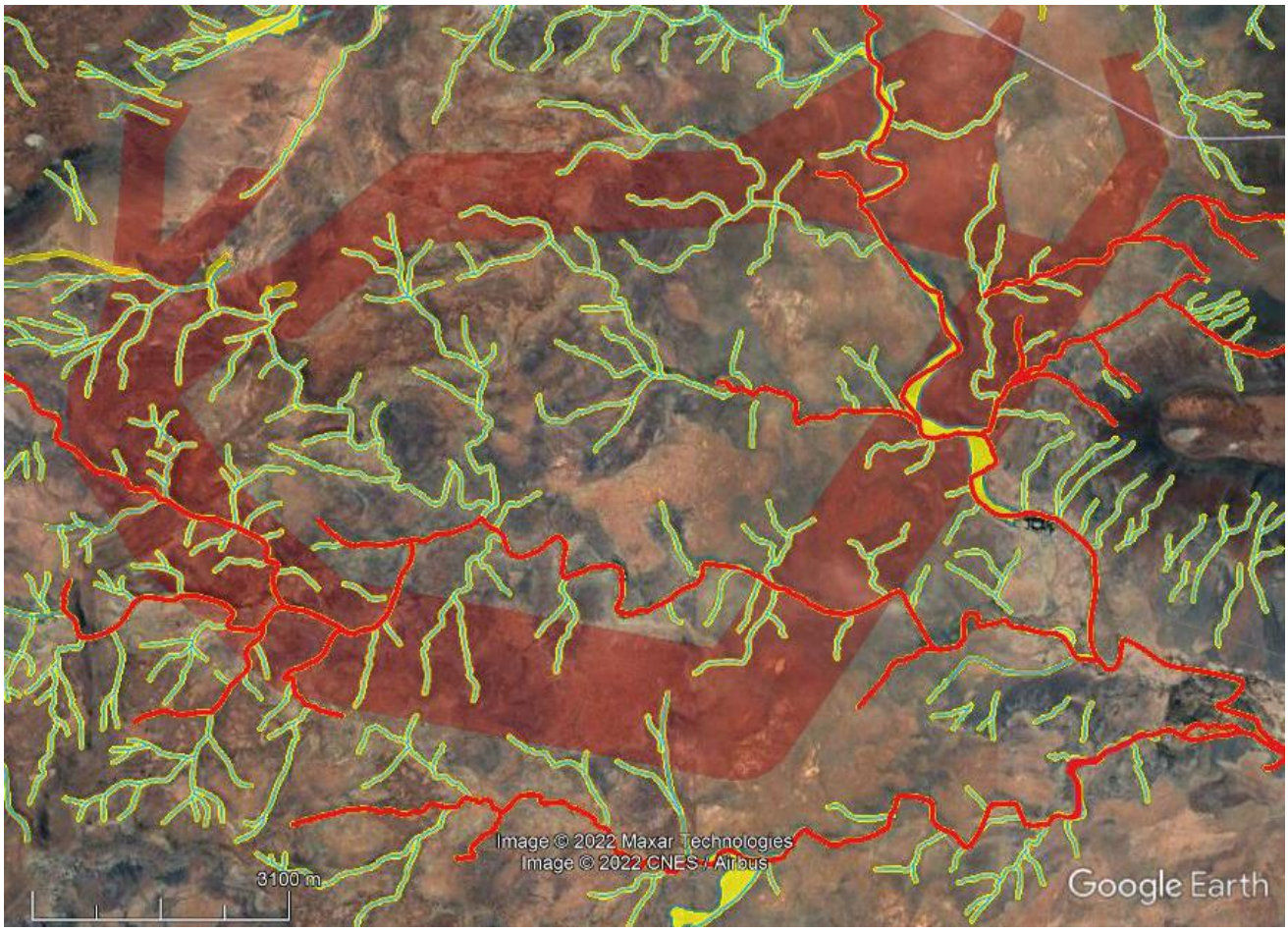


Figure 7-5 - Recommended aquatic buffers areas and associated aquatic ecosystem sensitivity mapping

7.4 PLANT SPECIES

The DFFE Screening Tool indicates that the site falls within an area with Medium Sensitivity under the Plant Species Theme (**Figure 7-6**) due to the potential presence of two plant species of concern, *Isolepis expallescens* and *Sensitive species 945*. Neither of these species were observed within the corridor and it is considered unlikely that either species is present, with the result that the corridor is considered Low Sensitivity for these two species. The site verification was able to confirm this low sensitivity and no plant SCC were observed on the site, therfore the corridor is considered to be low sensitivity for the plant species theme.

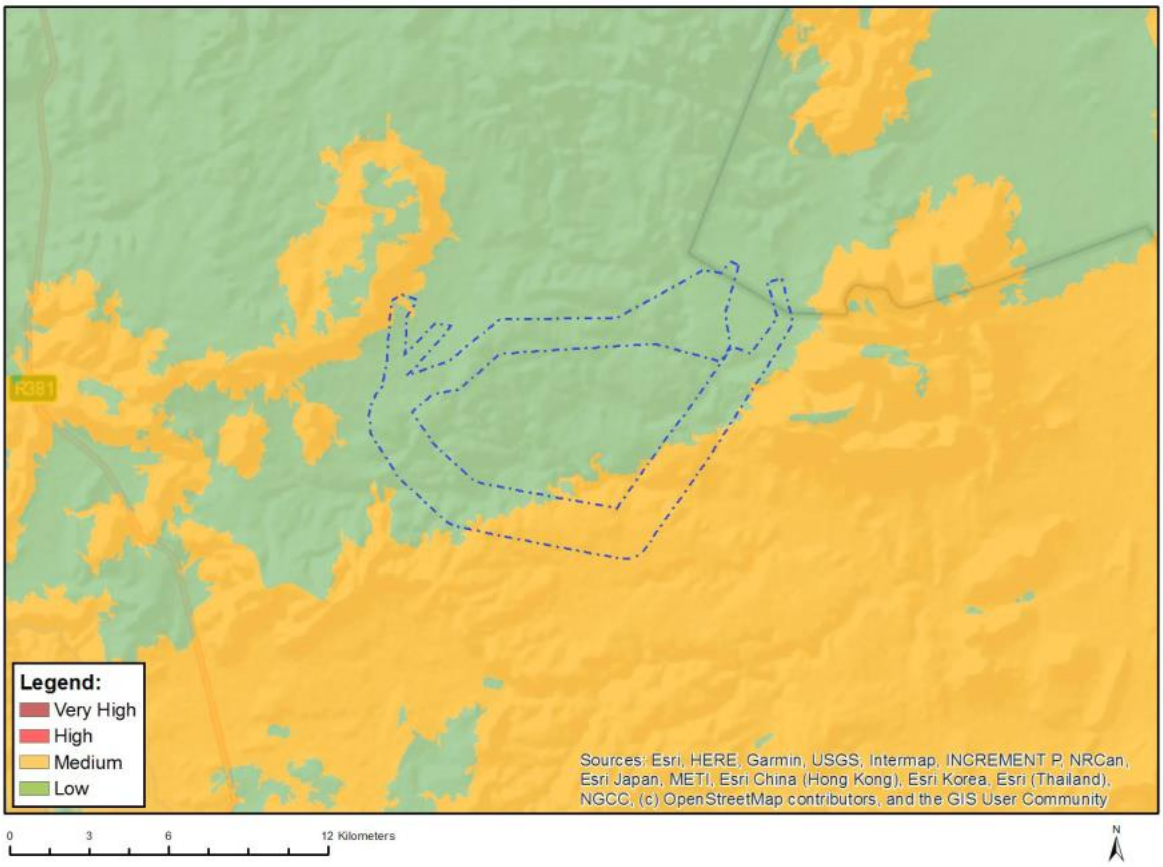


Figure 7-6 - Map of Plant Species Sensitivity

Source: DFFE Screening Report

The Mura Grid Corridor was visited several times for the current study. An initial field assessment took place on the 22 March 2022 and follow-up field assessments were undertaken on the 07-08 June 2022 and 19 October 2022. A full species list for the site was developed during the field sampling and attention was paid to the possible presence of any flora of concern within the corridor. Sensitive species and habitats within the corridor were recorded where present and mapped with a GPS if necessary. In addition to the sampling specifically within the corridor, the PV areas which

also overlap to some degree with the corridor were also sampled in detail for the associated studies for the PV facilities.

The only plant species of potential concern observed during the site surveys was *Rhinephyllum broomii*[9] which is classified as Data Deficient. According to SANBI, this species is "A poorly known taxon from the central parts of the Karoo Basin, it has been recorded from only three collection localities with an extent of occurrence of 5388 km². Only one recent record of this species exists, nothing is known about the current status and trends of the population, it is potentially threatened by livestock overgrazing and trampling and also possibly by future shale gas fracking." Its' range has been listed as being from Carnarvon to Fraserburg Road and Beaufort West, where the habitat is listed as "bare stony, gentle slopes, in shale". This is a seldom observed species and SANBI notes that "Nothing is known about the population size and current status there is only one recent record for this species collected from Carnarvon in 2013, this record has no notes on population status or abundance. Other records predate 1950 and are from Fraserburg and Beaufort West." A small population of this species numbering approximately 30 individuals was observed near but not within the southern corridor, on a small shale outcrop near to the Krom River. Since the site falls outside of the corridor, the Mura EGI Corridor would not affect this species in any way.

7.5 ANIMAL SPECIES

The DFFE Screening Tool indicates that the site has a high sensitivity (**Figure 7-7**) due to the potential presence of the Karoo Dwarf Tortoise *Tortoise Chersobius boulengeri* (EN) and Riverine Rabbit *Bunolagus monticularis* (CR) within the project site.

[9] *A record of this observation has been submitted to iNaturalist and can be viewed at the following link: https://www.inaturalist.org/observations/129512390*

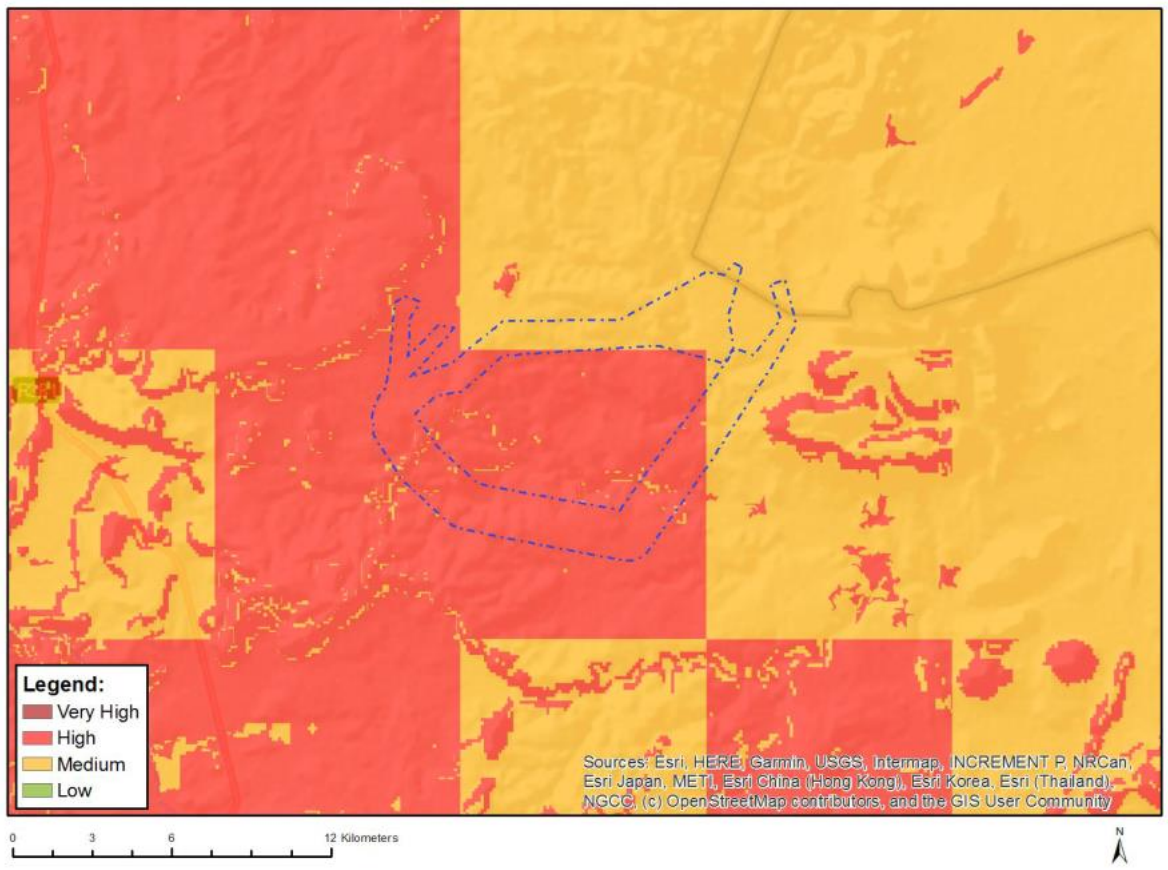


Figure 7-7 - Map of Animal Species Sensitivity

Source: DFFE Screening Report

The Mura Grid Corridor was visited several times for the current study. An initial field assessment took place on the 22 March 2022 and follow-up field assessments were undertaken on the 07-08 June 2022 and 19 October 2022. The Site Verification concludes a medium sensitivity of the site for the Riverine Rabbit and Karoo Dwarf Tortoise.

7.6 AVIFAUNA

The DFFE Screening Tool does not have a sensitivity rating for the Avian Theme.

Based on a site verification survey, two seasons of pre-construction bird monitoring (in accordance with best practice), and extensive previous work in the area for the Nuweveld Wind Farms, WildSkies draw the following conclusions:

- The two listed species: Ludwig's Bustard; and Verreaux's Eagle occur on the proposed site:
  - Ludwig's Bustard has been recorded as follows on site: twice on drive transects in spring (1 and 3 birds); four times as incidental records of single birds and pairs. The species can be expected to forage on site at times. However no evidence of breeding was recorded.
  - Verreaux's Eagle has been recorded twice (both single birds) incidentally and has a nest approximately 730m north of the EGI corridor edge, and an alternate nest approximately 400m north of the edge.

Based on the on-site work Wildskies confirms that the site is of Medium sensitivity for avifauna.

During the screening phase, the following sensitive areas on site for avifauna were identified. Two sensitive avifaunal feature categories were identified on the site:

- **Dams:** A buffer of 250m has been applied to the dams identified on site and the resulting areas are classified as High sensitivity for new infrastructure (**Table 7-3**). One exception is applicable at a small dam in the far west of the EGI corridor (west of Mura 1 and 2) where it has been agreed between specialist and applicant that the EGI corridor may infringe on the buffer area.
- **Bird nests:** Wildskies have assigned a No-Go buffer for new infrastructure of 1km to the two Verreaux's Eagle nests (**Table 7-3**). No new overhead power line may be built within this area.

Table 7-3 – Avifaunal sensitivity features for solar areas

Category	Feature
No Go	▪ Dams plus 250m buffer ▪ Verreaux's Eagle nest x 2 (1 alternate) plus 2 000m buffer

Avifaunal constraints are presented in **Figure 7-8** for the full site.

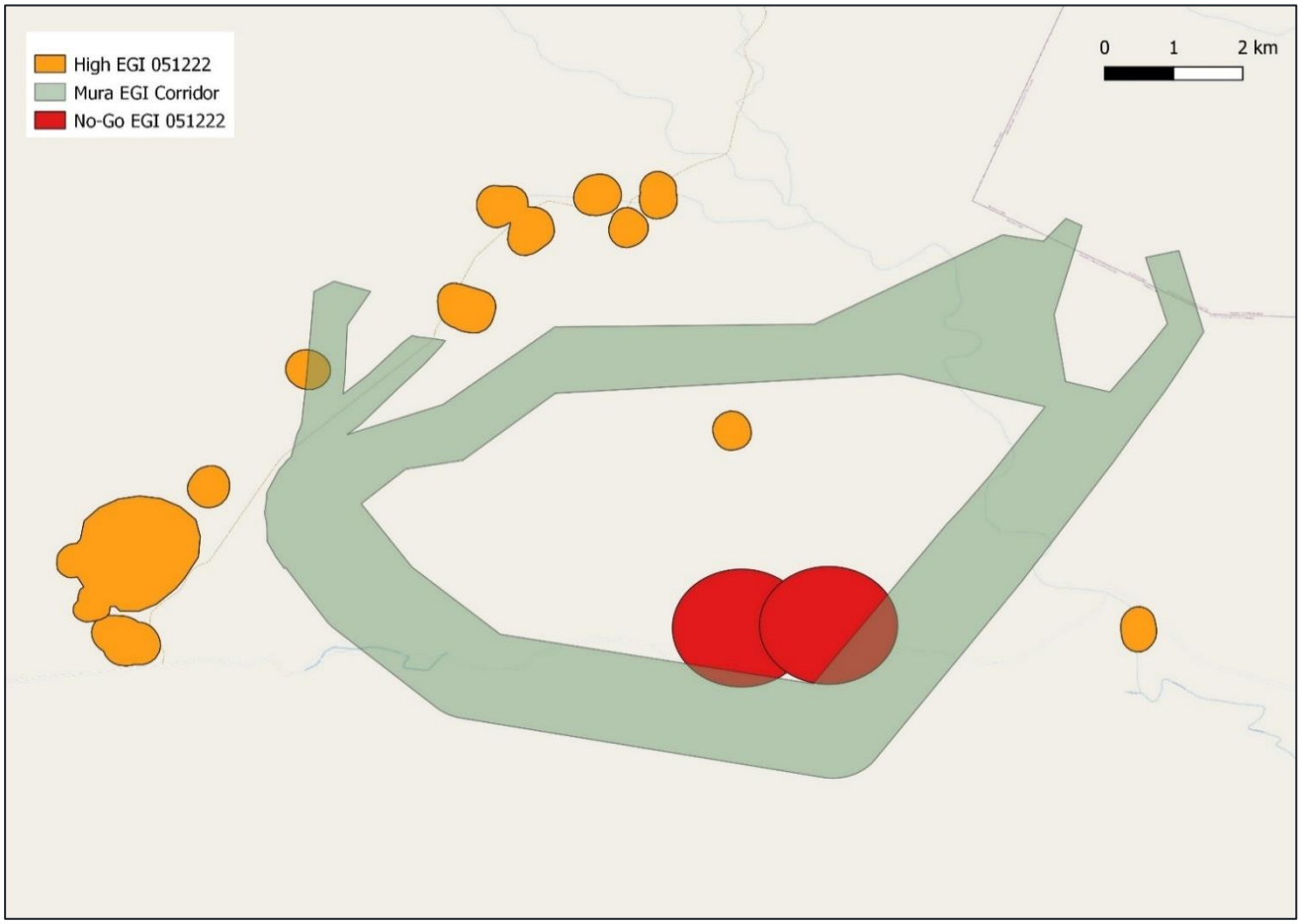


Figure 7-8 - Avifaunal sensitivity of the overall site

7.7 ARCHAEOLOGICAL AND CULTURAL HERITAGE

The output of the DFFE Screening Tool for the Archaeological and Heritage Theme is illustrated in **Figure 7-9** and indicates that Mura EGI Corridor is located in an area classified as low. The heritage specialist thus disputes the uniform low sensitivity of the broader study area noting that several areas of medium to high sensitivity are present. Also, the wider landscape can be considered as at least medium sensitivity. In sum, the overall sensitivity is best considered to be medium.

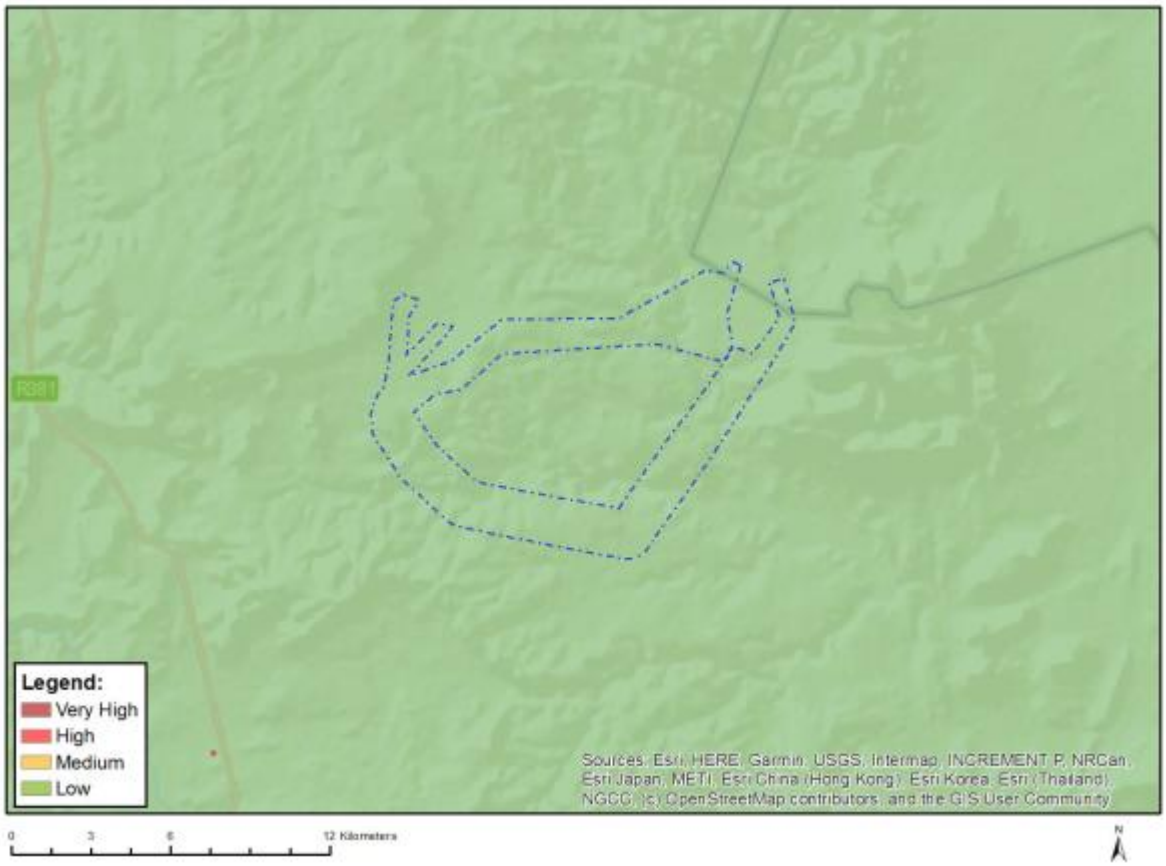


Figure 7-9 - Map of Archaeological and Heritage Sensitivity

Source: DFFE Screening Report

Section 38(3)(b) of the NHRA requires an assessment of the significance of all heritage resources. In terms of Section 2(vi), ‘‘cultural significance’’ means aesthetic, architectural, historical, scientific, social, spiritual, linguistic or technological value or significance. The reasons that a place may have cultural significance are outlined in Section 3(3) of the NHRA.

Although archaeological resources of up to grade IIIB occur within the corridor, it is likely that all will be avoided by the final alignment. These resources have variable cultural significance at the local level for their historical, social and scientific values.

Graves are deemed to have high cultural significance at the local level for their social value. They are allocated a grade of IIIA but are unlikely to occur.

The cultural landscape is largely a natural landscape with aesthetic value and is rated as having medium cultural significance at the local level. It can be graded IIIB.

Known heritage resources are mapped and graded in

The map show the following heritage grading requirements:

- Grade IIIA (red) is regarded as No-Go;
- Grade IIIB (orange) is high sensitivity; and
- Grade IIIC/GPA/GPB (yellow) are medium.

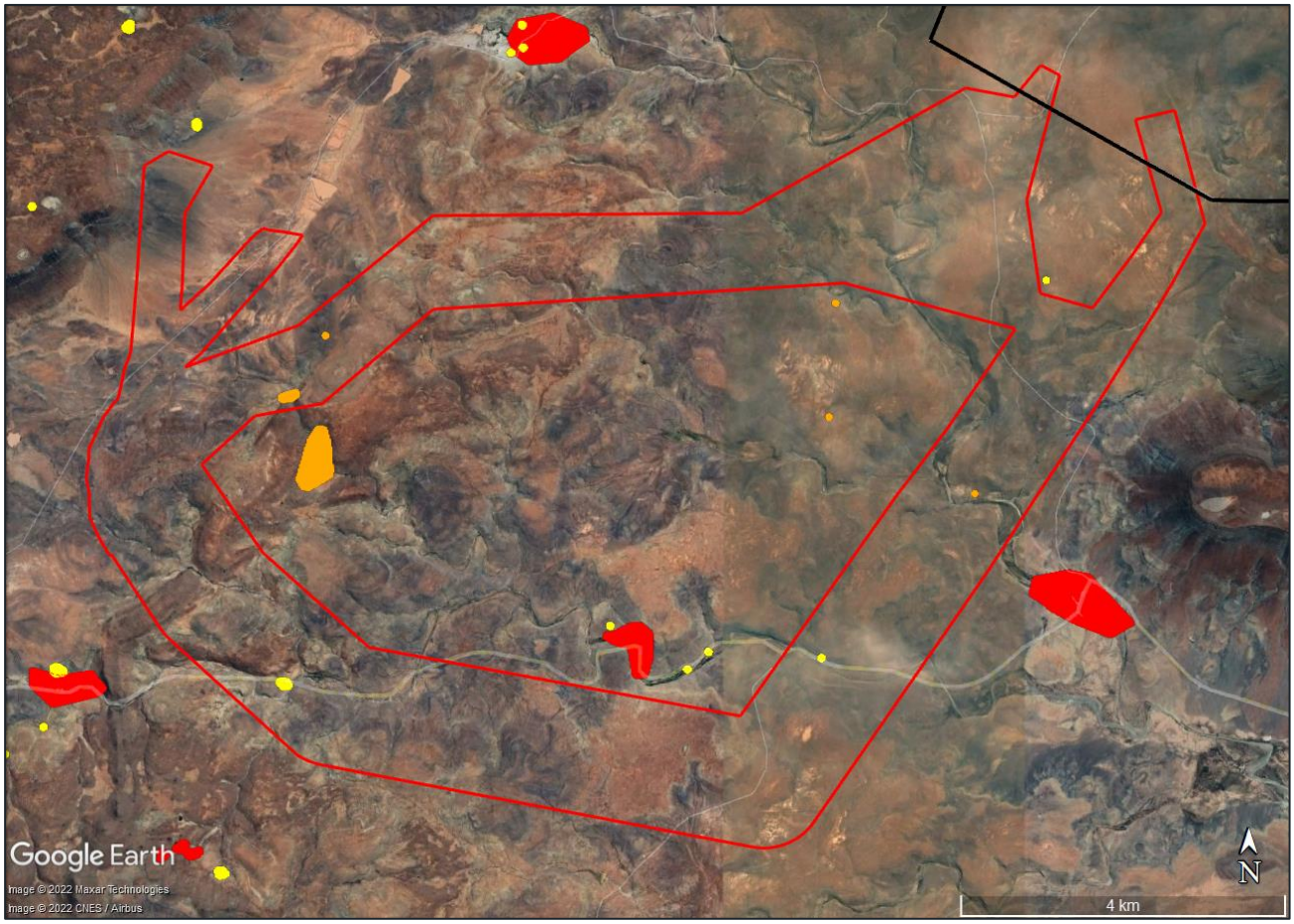


Figure 7-10 - Grade map of the corridor and surrounds. Note that it is constructed using data from several projects but that only those sites within the mapped corridor appear in this report

7.8 PALAEONTOLOGY

Provisional site sensitivity mapping for palaeontology using the DFFE National Web-Based Environmental Screening Tool (as well as the SAHRIS Palaeosensitivity Map) suggests that Mura EGI Corridor falls within a Very High Sensitivity (**Figure 7-11**). Small sectors of the project areas that are underlain by substantial alluvial deposits along major drainage lines are assigned a Medium Palaeosensitivity while areas underlain by dolerite intrusions are palaeontologically Insensitive.

A Low Palaeosensitivity for the Mura EGI corridor is inferred in this report on the basis of:

- Desktop analysis of relevant geological maps and palaeontological databases, including previous PIA studies in the region by the author (e.g. Nuweveld WEF cluster and Grid Connection);

- A six-day palaeontological heritage site visit to the combined Mura project area which yielded only a very sparse scatter of fossil sites (mostly of low scientific / conservation value) within the Lower Beaufort Group bedrocks and no Late Caenozoic sites;
- Generally low to very low levels of bedrock exposure, especially within the low-relief Mura Solar 1-4 project areas. Most fossil sites occur in gullied hillslopes and along major drainage lines which form only a very minor part of the combined project area;
- Dolerite intrusions which have compromised fossil preservation in some sectors of the combined project area.

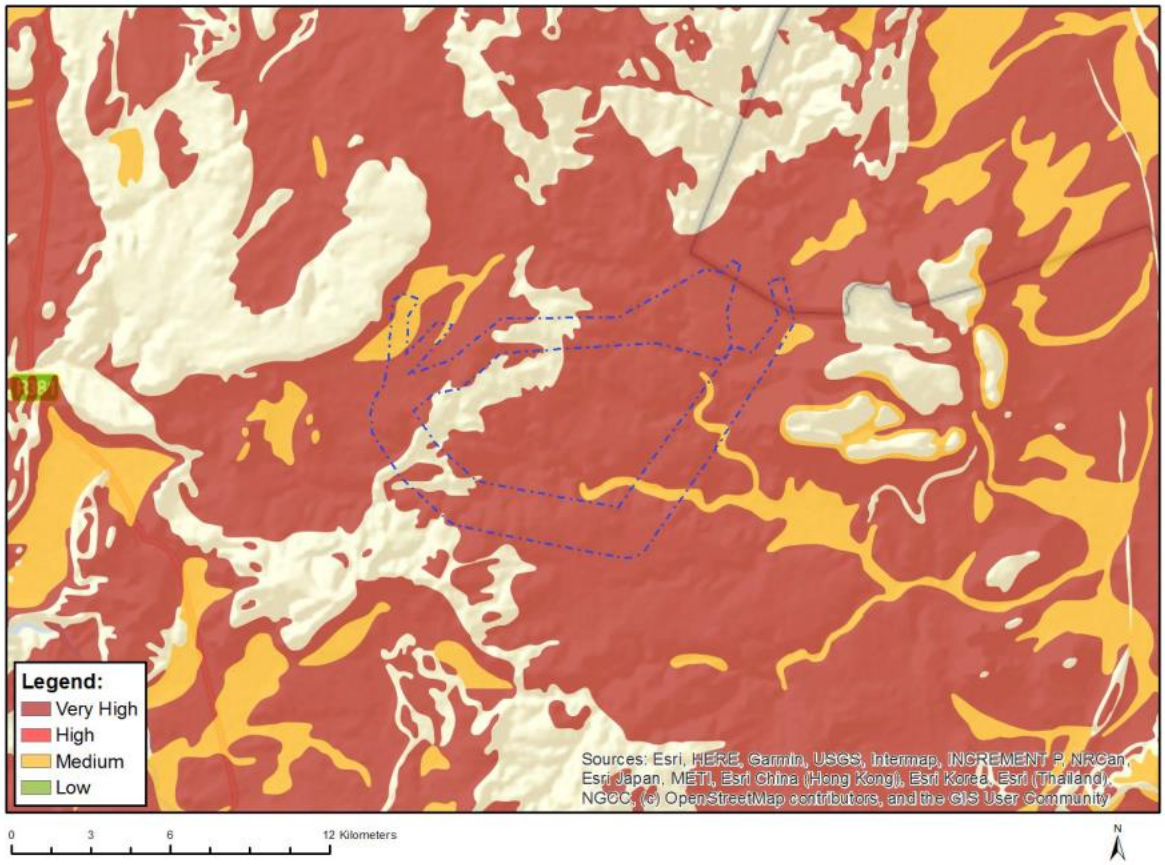


Figure 7-11 - Map of Palaeontology Sensitivity

Source: DFFE Screening Report

7.9 VISUAL

The DFFE Screening Tool does not have a sensitivity rating for the Visual Theme.

Visibility

Estimated degrees of visibility based on the scale of the EGI pylons, from various receptors, are indicated in **Table 7-4** and **Table 7-5**.

Table 7-4 – Degrees of Visibility of Proposed EGI and Switching Stations

Very high visibility	0-500m	Prominent feature within the observer's view frame
High visibility	500m-1km	Relatively prominent within observer's view frame
Moderate visibility	1-2km	Only prominent as part of the wider landscape
Low visibility	2-4km	Visible as a minor element in the landscape
Very low visibility	>4km	Hardly visible with the naked eye in the distance

Table 7-5 - Viewing Distances and Potential Visibility from Receptors

View-point		Latitude	Longitude	Distance to corridor	Visibility
M1	District road near Booiskraal	31.869404 S	22.605483 E	1.85 km	Moderate visibility
M2	Near Booiskraal	31.865353 S	22.600844 E	1.23 km	Moderate visibility
M3	Scenic area of District Road	31.72103 S	22.538570 E	510 m	High visibility
M4	Southern end of PV1 and PV2	31.837717 S	22.481653 E	0 m	Very high visibility
M5	Bultontein	31.804099 S	2.528376 E	2.31 km	Low visibility
M5a	Farm road near Bultfontein	31.802193 S	22.531826 E	2.49 km	Low visibility
M6	Scenic area of farm road near PV4	31.812172 S	22.573683 E	290 m	Very high visibility

Visual Exposure

The viewshed, or zone of visual influence, potentially extends for some 5km, but is partly restricted by topography in some directions, where parts of the surrounding area would be in a view shadow (**Figure 7-12**). The viewsheds of the proposed EGI tends to be fairly localised.

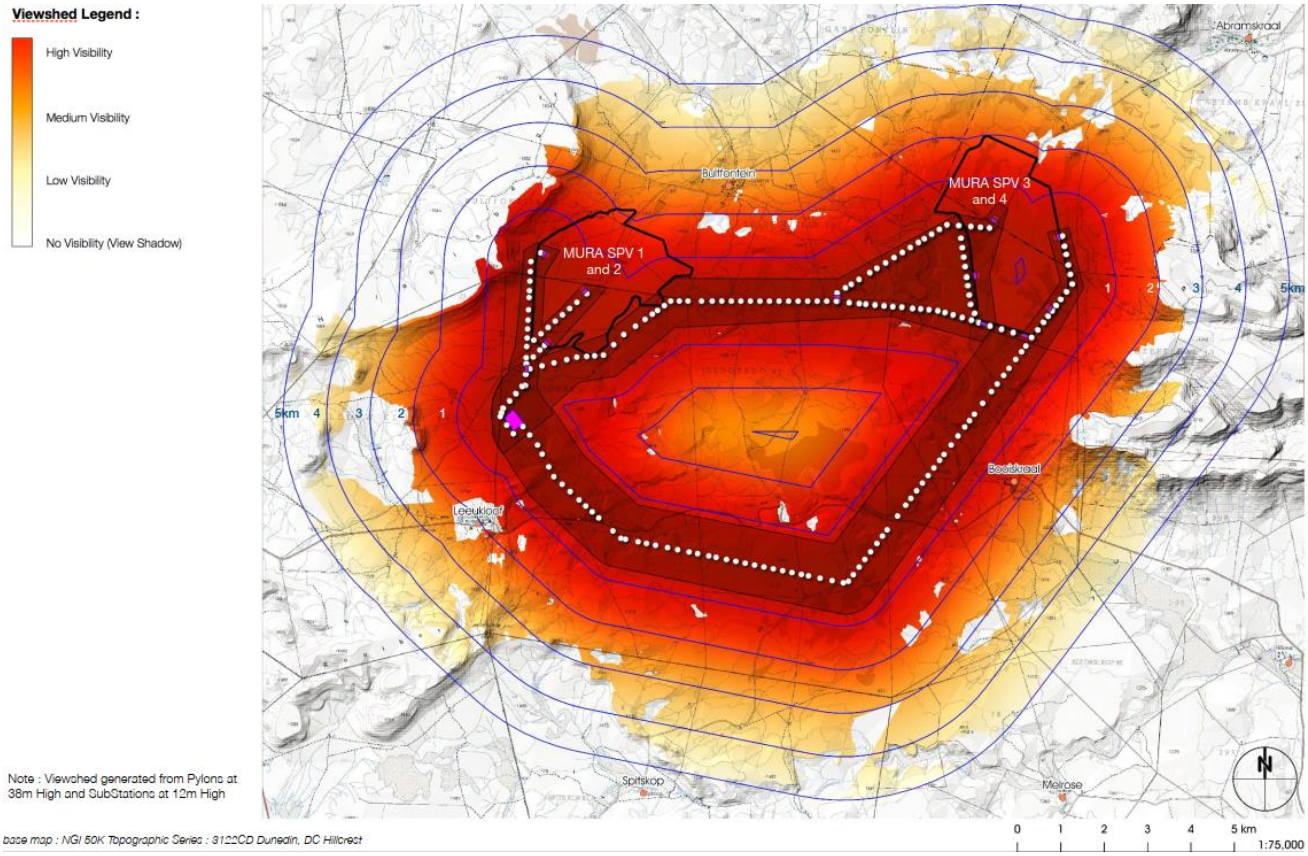


Figure 7-12 – Nominal Viewshed

Visual Absorption Capacity (VAC)

This relates to the potential of the landscape to screen the proposed EGI from view. The largely treeless landscape provides little screening effect. In most cases, clumps of trees around farmsteads tend to reduce visibility by receptors.

Landscape Integrity

Landscape integrity tends to be enhanced by scenic or rural quality and intactness of the landscape, as well as absence of other visual intrusions. Cultural landscapes, such as rural or farming scenes also have visual or scenic value. On the other hand, industrial activity and visual 'clutter', including substations and powerlines, detract from these scenes. The sites for the proposed EGI generally has an uncluttered, expansive landscape with pastoral scenes.

Visually Sensitive Resources

Natural and cultural landscapes, or scenic resources, form part of the 'National Estate' and may have local, regional or even national significance, usually, but not only, of tourism importance. **Figure 7-13** indicates landscape features of interest Visual Impact Intensity.

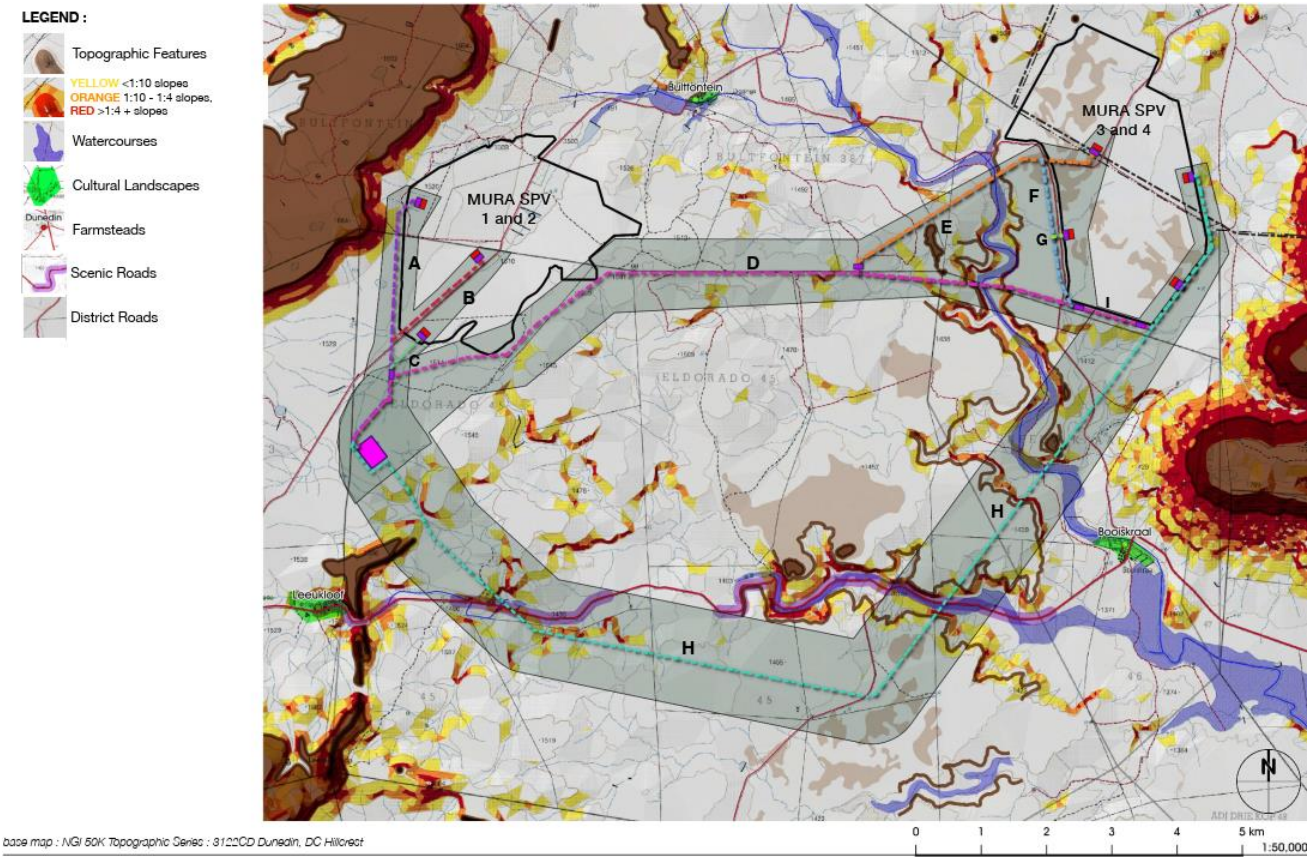


Figure 7-13 – Visual features

The overall potential visual impact intensity (or magnitude) is determined in **Table 7-6** below by combining all the factors above, namely visual exposure, visibility, visual absorption capacity, landscape integrity and visually sensitive resources.

Table 7-6 – Visual Impact Intensity

Visual Criteria	Comments	EGI Powerline	Switching Stations
Visual exposure	Limited viewshed of the EGI	Medium-low	Low
Visibility	Visible in the distance from a few farmsteads.	Low	Low
Visual absorption capacity (VAC)	Visually exposed plains, and therefore low VAC.	Medium	Low
Landscape integrity / intactness	Effect on rural / pastoral farming character.	Medium	Medium
Landscape / scenic sensitivity	Effect on scenic resources, mainly rivers.	Medium	Low
Impact intensity	Summary	Medium	Low-medium

Visual Sensitivity Mapping

Landscape features of visual or scenic value, along with potential sensitive receptors in the surroundings, are described in **Table 7-7** below. Visual features are indicated on **Figure 7-13**.

Table 7-7 - Typical Scenic Features and Sensitive Receptors

Landscape features within study area	
Topographic features	Characteristic landforms include the mesas and koppies formed from horizontal dolerite sills and vertical dolerite dykes. These features contribute to the scenic value, providing visual interest or contrast in the open Karoo landscape.
Water Features	In the dry landscape, drainage features and the larger dams provide scenic and amenity value.
Cultural landscapes	Green patches of cultivated land and tree copses in alluvial valleys form part of the cultural landscape. Archaeological sites also form part of the cultural landscape, covered elsewhere in the Heritage Assessment.
Receptors within study area	
Protected Areas	Visual significance is increased by the protection status of reserves. There are no known proclaimed nature reserves, private reserves, or game farms in the vicinity of the proposed EGI.
Guest farms	Private guest farms and guest accommodation in the area are important for the local tourism economy and tend to be sensitive to loss or degradation of scenic quality. Booiskraal is the closest at about 1km from the EGI corridor.
Human settlements, farmsteads	Except for the nearby farmsteads, there are no other settlements within the study area.
Scenic and arterial routes	Much of the route between Leeukloof and Booiskraal has scenic features.

Scenic resources and sensitive receptors within the study area have been categorised into no-go, high sensitivity, medium and low visual sensitivity zones, for the proposed solar PV facilities, as indicated in **Table 7-8** below.

Table 7-8 – Sensitivity Categories

Category	**Feature**
No Go	Areas or features considered of such sensitivity or importance that any adverse effects upon them may be regarded as a fatal flaw.
High	Development to be limited and remain within acceptable limits of change determined by the specialist, and comply with restrictions or mitigation measures identified by the specialist.
Medium	Areas considered to be developable, but to remain within acceptable limits of change as determined by the specialist, and comply with restrictions or mitigation measures identified by the specialist.

Low	Low sensitivity areas that are considered to be developable. However specialists may still wish to define acceptable limits of change where necessary.

The visual sensitivity categories in relation to the mapping are outlined in **Table 7-9** and **Table 7-10** below and indicated on **Map 7** (pylons) and **Map 8** (overhead powerline).

Table 7-9 – Visual Sensitivity Buffers for 132kV Grid: Pylon Placement and Switching Stations

Scenic Resources	Very high sensitivity (No-go)	High visual sensitivity	Medium visual sensitivity	Low visual sensitivity
Topographic features (peaks)	within 100m	within 150m	within 250m	-
Linear topo features (ridges)	-	within 150m	within 250m	
Steep slopes	Slopes > 1:4	Slopes > 1:6	Slopes> 1:10	-
Scenic water features	within 50m	Within 100m	within 150m	-
Protected Landscapes / Sensitive Receptors				
Private reserves /guest farms	-	-	-	-
Farmsteads	-	-	-	-
Scenic routes, poorts, passes	within 100m	within 150m	within 250m	-
Main district roads	within 50m	within 75m	within 100m	-

Table 7-10 – Visual Sensitivity Buffers for 132kV grid: Overhead Powerlines and Access Roads

Scenic Resources	Very high sensitivity (No-go)	High visual sensitivity	Medium visual sensitivity	Low visual sensitivity
Topographic features (peaks)	within 100m	within 150m	within 250m	-
Linear topo features (ridges)	-	within 150m	within 250m	
Steep slopes	Slopes > 1:4	Slopes > 1:6	Slopes> 1:10	-
Scenic/linear water features	-	Within 100m	within 150m	-
Protected Landscapes / Sensitive Receptors				
Private reserves /guest farms	-	-	-	-
Farmsteads	-	-	-	-
Scenic routes, poorts, passes	-	within 150m	within 250m	-
Main district roads	-	within 75m	within 100m	-

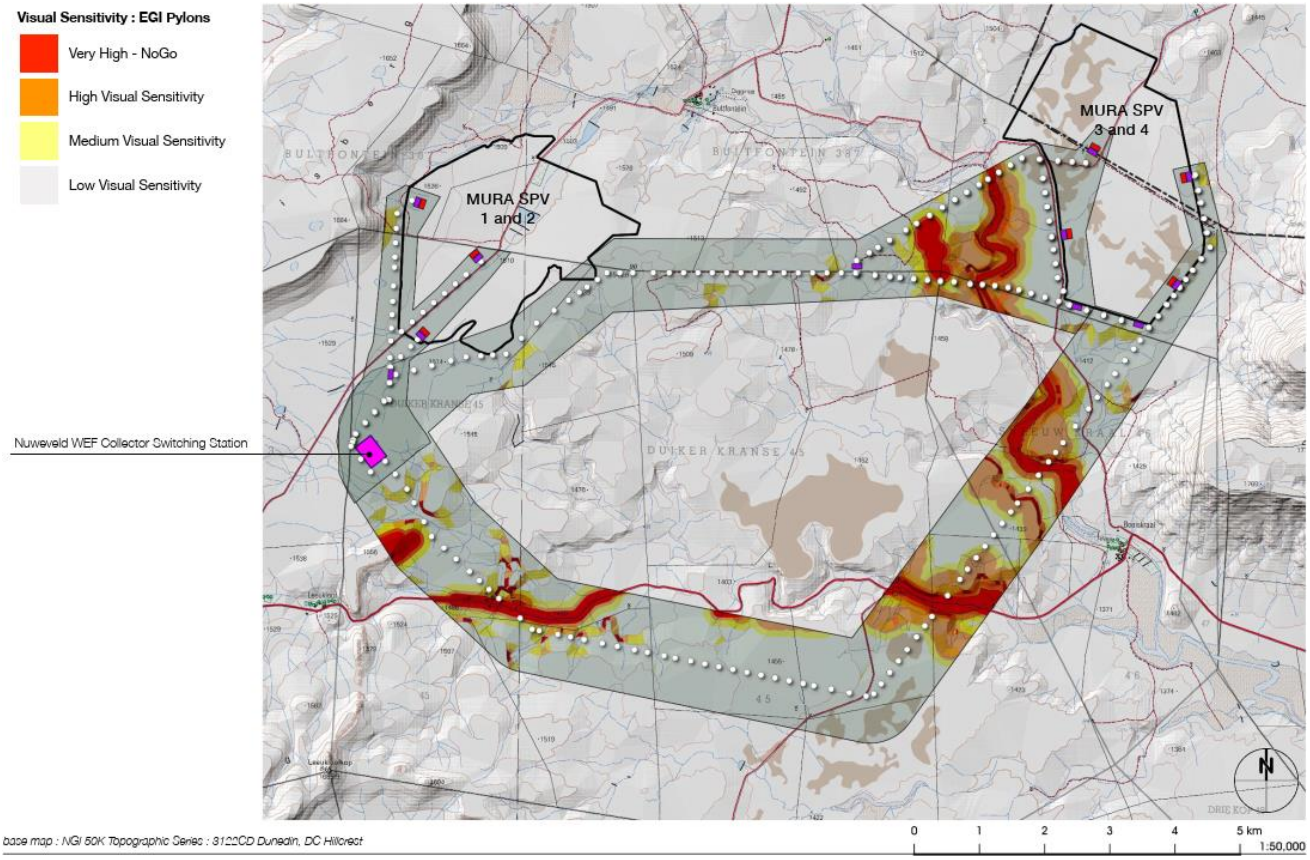


Figure 7-14 – Visual Sensitvity – EGI pylons

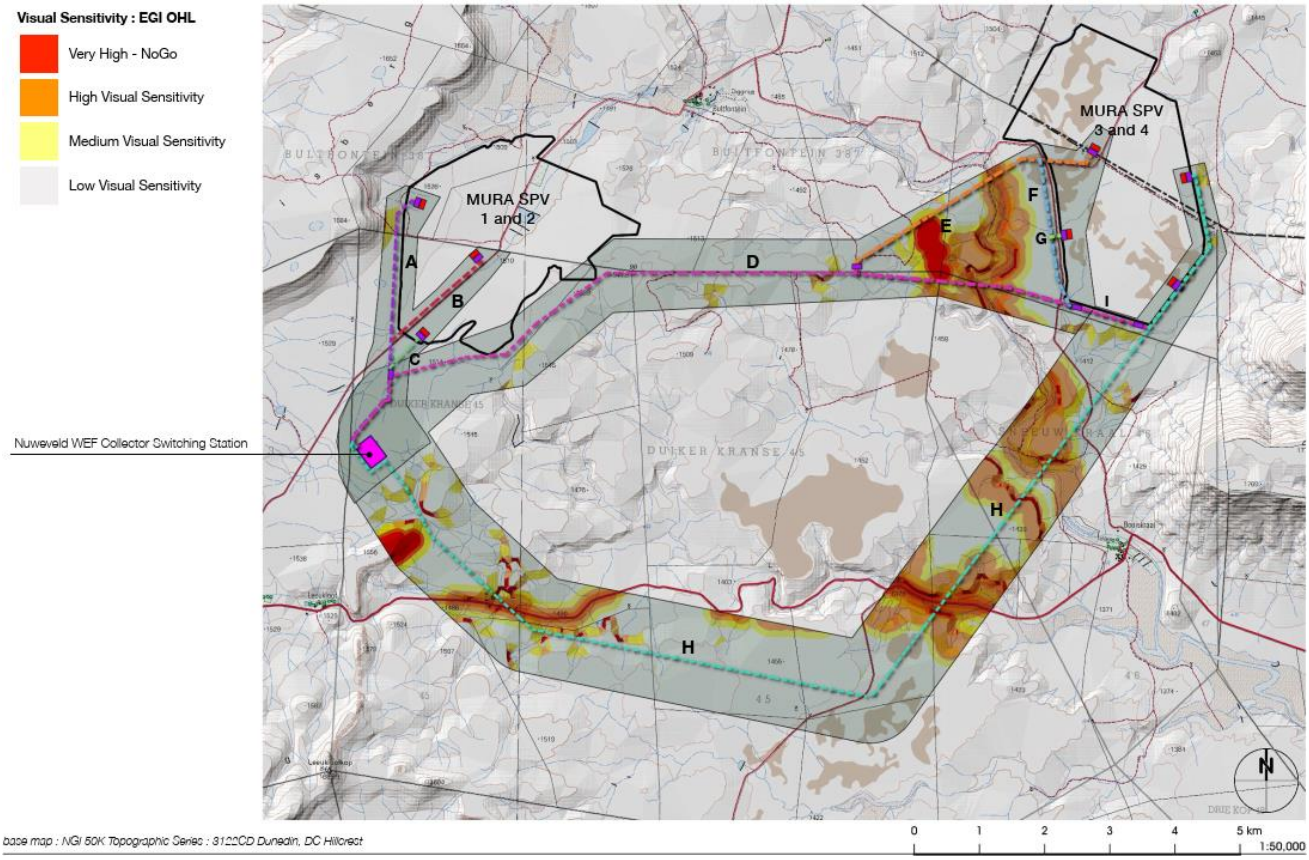


Figure 7-15 – Visual Sensitvity – EGI Powerline

7.10 SOCIAL

No preliminary socio-economic sensitivities or sensitivity rating was identified or provided based on the DFFE Screening Tool (i.e. a preliminary sensitivity rating was not provided that could then be confirmed or altered based on further assessment).

It was determined by the specialist that the site would have a low to medium sensitivity rating based on the following:

- The planning documents relevant to the site do not identify significant or inherent constraints to appropriate development. Considered as a whole, the planning documents reviewed recognise the importance of integrated and diversified economic development that makes optimal use of the area's comparative advantages and creates economic opportunities. The concept of a renewable energy project is therefore broadly supported provided environmental impacts and impacts on other land uses and potentials are acceptable.
- Tourism facilities and attractions in the areas are very limited and sparsely distributed reducing tourism sensitivities. However, it should be recognised that the area is relatively isolated with wilderness quality and limited signs of civilisation which contributes to its tourism potential. It has a remote sense of place which makes it more sensitive to potential impacts on tourism and also on surrounding landowners and communities.
- Given its remote and relatively isolated location, the site would be relatively sensitive to the influx of people, including job seekers, that may be associated with the project. The influx of large

numbers of people are not thought likely and these risks should be manageable and are common to most larger projects.

- The area is sensitive, in a positive sense, to increased economic opportunities as they are much needed as reflected in low employment and income levels. Projects that can provide such opportunities are therefore to be encouraged where possible.

8 ENVIRONMENTAL IMPACT ASSESSMENT

This Chapter identifies the perceived environmental and social effects associated with the proposed Project. The assessment methodology is outlined in **Section 2.5**. The issues identified stem from those aspects presented in **Section 6** of this document as well as the Project description provided in **Section 3**.

The impact assessment is based on the corridor at all Project phases. This section assesses the corridor and the recommendations thereof have been utilised to determine the grid line route within the corridor and placement of associated infrastructure.

Furthermore, a decommissioning assessment will be considered as part of the decommissioning process that will be subject to a separate authorisation and impact assessment process. Any decommissioning impacts will be assessed at this stage. The impact assessment in this section encompasses the geographical, physical, biological, social, economic, heritage and cultural aspects in accordance with Appendix 1 of GNR 326.

8.1 AGRICULTURAL POTENTIAL ASSESSMENT

An Agricultural Compliance Statement is not required to formally rate agricultural impacts. It is only required to indicate whether or not the proposed development will have an unacceptable impact on the agricultural production capability of the site.

An agricultural impact is a temporary or permanent change to the future production potential of land. The significance of the agricultural impact is directly proportional to the extent of the change in production potential. If a development will not change the future production potential of the land, then there is no agricultural impact.

The proposed overhead power lines will have negligible agricultural impact, regardless of their route and design and the agricultural potential of the land they traverse. All agricultural activities can continue completely unhindered underneath the power lines. This is because their direct, permanent, physical footprint that has any potential to interfere with agriculture (pylon bases and servitude track, where it is needed), is insignificantly small. There will therefore be no reduction in future agricultural production potential underneath the power lines. The only potential source of impact is minimal disturbance to the land (erosion and topsoil loss) during construction (and decommissioning). This impact can be completely mitigated with standard, generic mitigation measures that are included in the DFFE Generic EMPrs.

The only impact of this development is the loss of grazing land on the switching station sites of up to 13 hectares. The significance of the loss of agricultural land is a direct function of two things, firstly the amount of land that will be lost and secondly, the production potential of the land that will be lost. In this case the amount of land loss is small and the production potential of the land is very limited. Therefore, the agricultural impact of the proposed development is assessed as being of very low significance.

8.2 TERRESTRIAL BIODIVERSITY ASSESSMENT

8.2.1 CONSTRUCTION PHASE

The development of the Mura EGI Connection would result in a number of potential impacts on Terrestrial Biodiversity during the phase of the development. During construction, the major impact would likely be habitat loss and anthropogenic disturbance as indicated in **Table 8-1**.

Table 8-1 – Impact on CBAs and ecological processes during the construction phase

Potential Impact: CBAs and Ecological Processes	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character
Without Mitigation	2	3	3	4	4	**48**	**Moderate**	(-)
With Mitigation	2	2	3	4	2	**22**	**Low**	(-)
Mitigation and Management Measures	▪ Minimise the development footprint as far as possible. ▪ Locate temporary-use areas such as construction camps and lay-down areas in low sensitivity or previously disturbed areas. ▪ Avoid mapped No-Go areas in the placement of pylons, switching stations and access tracks. ▪ Minimise the development footprint in areas mapped as high sensitivity (i.e. near watercourses and other ecologically significant features). ▪ Clearly demarcate riparian areas near to the development footprint as No-Go areas with appropriate signage and barriers. ▪ Appropriate design of roads and other infrastructure to minimise faunal impacts and allow fauna to pass over, through or underneath these features as appropriate. ▪ The fencing around the switching stations should not have any electrified strands within 30cm of the ground as this may result in tortoises being electrocuted. Alternatively, guard wires or mesh can be placed outside of the fence to prevent tortoises from accessing the electrified fence. ▪ Monitoring of construction activities to ensure that the development footprint within CBAs is restricted to the authorised development footprint.							

8.2.2 OPERATIONAL PHASE

The development of the Mura EGI Connection would result in a number of potential impacts on Terrestrial Biodiversity during the operational phase of the development. During operation, the levels of disturbance along the grid route would be significantly reduced as compared to the construction phase, but there may still be some disturbance related to operational and maintained activities as indicated in **Table 8-2**.

Table 8-2 – Impact on CBAs and ecological processes during the operational phase

Potential Impact: CBAs and Ecological Processes	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character
Without Mitigation	2	2	3	4	3	33	Moderate	(-)
With Mitigation	1	2	3	4	2	20	Low	(-)
Mitigation and Management Measures	▪ All service vehicles on site should adhere to a low speed limit on site. Heavy vehicles should be restricted to 30km/h and light vehicles to 40km/h. ▪ Service staff should remain within the power line footprint areas and access routes and should not be allowed to wander into the veld. ▪ No fauna including tortoises should be disturbed or removed from the veld. ▪ A log should be kept detailing and fauna-related incidences or mortalities that occur on site, including roadkill, electrocutions etc. These should be reviewed annually by the Environmental Officer and used to inform operational management and mitigation measures.							

8.3 AQUATIC BIODIVERSITY IMPACT ASSESSMENT

8.3.1 CONSTRUCTION PHASE

There were several aquatic biodiversity related impacts identified during the construction phase. These include:

- Disturbance or modification of aquatic habitat (**Table 8-3** and **Table 8-6**);
- Increased water use(**Table 8-5**); and
- Water quality impacts (**Table 8-4**).

The indirect impacts expected on the aquatic biodiversity include:

- Degradation of aquatic ecosystem integrity (**Table 8-3**).

Table 8-3 – Impact on aquatic ecosystem integrity during the construction phase

Potential Impact: Aquatic ecosystem integrity Disturbance of aquatic habitats within the watercourses with the associated impact to sensitive aquatic biota	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character
Without Mitigation	2	1	1	2	2	12	Very Low	(-)
With Mitigation	1	1	2	1	1	5	Very Low	(-)

Mitigation and Management Measures	▪ Locate pylons and switching stations outside of high-sensitivity areas and limit the placement of infrastructure in areas of medium aquatic sensitivity where possible. ▪ Using existing disturbed areas (e.g. access tracks) where possible. New service tracks with crossings through the high-sensitivity crossings should be kept to a minimum. ▪ A walk-down should be conducted by a specialist to identify the most suited new crossing positions over high sensitivity areas. New crossing structures should be properly designed to not result in blockage in the watercourses or erosion. ▪ Construction sites and laydown areas should be placed at least 35m away from the delineated aquatic features ▪ Apply the generic EMPr for power line and substation development.

Table 8-4 – Impact of water quality deterioration during the construction phase

Potential Impact: Water quality deterioration Increased sedimentation and risks of contamination of surface water runoff during construction	**Magnitude**	**Extent**	**Reversibility**	**Duration**	**Probability**	**Significance**		**Character**
Without Mitigation	2	1	1	2	1	**6**	**Very Low**	(-)
With Mitigation	2	1	1	1	1	**5**	**Very Low**	(-)
Mitigation and Management Measures	▪ Locate pylons and switching stations outside of high-sensitivity areas and limit the placement of infrastructure in areas of medium aquatic sensitivity where possible. ▪ Using existing disturbed areas (e.g. access tracks) where possible. New service tracks with crossings through the high-sensitivity crossings should be kept to a minimum. ▪ A walk-down should be conducted by a specialist to identify the most suited new crossing positions over high sensitivity areas. New crossing structures should be properly designed to not result in blockage in the watercourses or erosion. ▪ Construction sites and laydown areas should be placed at least 35m away from the delineated aquatic features ▪ Apply the generic EMPr for power line and substation development.							

Table 8-5 – Impact of water availability during the construction phase

Potential Impact: Water availability Demand for water for construction could place stress on the existing available water resources	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character
Without Mitigation	2	2	3	3	2	**20**	**Low**	(-)
With Mitigation	2	1	1	2	2	**12**	**Very Low**	(-)
Mitigation and Management Measures	▪ Source water from legal supply sources only (e.g. new or existing water allocation to the property and/or municipal supply)							

Table 8-6 – Impact of decrease in habitat integrity during the construction phase

Potential Impact: Decrease in habitat integrity Removal of aquatic vegetation	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character
Without Mitigation	2	1	3	2	2	**16**	**Low**	(-)
With Mitigation	1	1	1	2	1	**5**	**Very Low**	(-)
Mitigation and Management Measures	▪ Locate pylons and switching stations outside of high-sensitivity areas and limit the placement of infrastructure in areas of medium aquatic sensitivity where possible. ▪ Using existing disturbed areas (e.g. access tracks) where possible. New service tracks with crossings through the high-sensitivity crossings should be kept to a minimum. ▪ A walk-down should be conducted by a specialist to identify the most suited new crossing positions over high sensitivity areas. New crossing structures should be properly designed to not result in blockage in the watercourses or erosion. ▪ Construction sites and laydown areas should be placed at least 35m away from the delineated aquatic features ▪ Apply the generic EMPr for power line and substation development.							

8.3.2 OPERATIONAL PHASE

There were several aquatic biodiversity related impacts identified during the operational phase. These include:

- Aquatic habitat disturbance (**Table 8-7** and **Table 8-8**)

The indirect impacts expected on the aquatic biodiversity include:

- Degradation of ecological condition of aquatic ecosystems (**Table 8-7** and **Table 8-8**);
- Erosion (**Table 8-7** and **Table 8-8**); and
- Alien riparian vegetation invasion (**Table 8-7** and **Table 8-8**).

Table 8-7 – Impact on aquatic ecosystem integrity during the operational phase

Potential Impact: Aquatic ecosystem integrity Ongoing disturbance and degradation of aquatic features and associated vegetation along access tracks or adjacent to the infrastructure	**Magnitude**	**Extent**	**Reversibility**	**Duration**	**Probability**	**Significance**		**Character**
Without Mitigation	1	1	1	2	3	**15**	**Very Low**	(-)
With Mitigation	1	1	1	2	2	**10**	**Very Low**	(-)
Mitigation and Management Measures	▪ Access project infrastructure during maintenance activities using existing established roads and access tracks. Ensure road crossings structures are properly designed to not result in blockage in the watercourses or erosion. ▪ Invasive alien plant growth and signs of erosion should be monitored and managed on an ongoing basis. ▪ Stormwater runoff from access tracks must be monitored and managed to prevent erosion from taking place. Should erosion occur, it should immediately be remediated.							

Table 8-8 – Impact on aquatic ecosystem integrity during the operational phase

Potential Impact: Aquatic ecosystem integrity Disturbance of cover vegetation and soil and modified runoff characteristics that have the potential to result in erosion and invasion of disturbed areas with alien vegetation	**Magnitude**	**Extent**	**Reversibility**	**Duration**	**Probability**	**Significance**		**Character**
Without Mitigation	2	1	3	2	3	**24**	**Low**	(-)
With Mitigation	1	1	1	2	2	**10**	**Very Low**	(-)
Mitigation and Management Measures	▪ Access project infrastructure during maintenance activities using existing established roads and access tracks. Ensure road crossings structures are properly designed to not result in blockage in the watercourses or erosion. ▪ Invasive alien plant growth and signs of erosion should be monitored and managed on an ongoing basis. ▪ Stormwater runoff from access tracks must be monitored and managed to prevent erosion from taking							

Potential Impact: Aquatic ecosystem integrity Disturbance of cover vegetation and soil and modified runoff characteristics that have the potential to result in erosion and invasion of disturbed areas with alien vegetation	Magnitude	Extent	Reversibility	Duration	Probability	Significance	Character
	place. Should erosion occur, it should immediately be remediated.						

8.3.3 DECOMMISSIONING PHASE

There were several aquatic biodiversity related impacts identified during the decommissioning phase. These include:

- Disturbance of aquatic habitat habitats (**Table 8-9**); and
- Water quality impacts (**Table 8-10**).

Table 8-9 – Impact on loss of aquatic ecosystem integrity during the decommissioning phase

Potential Impact: Aquatic ecosystem integrity Increased disturbance of aquatic habitat due to the increased activity on the site	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character
Without Mitigation	2	1	1	2	2	**12**	**Very Low**	(-)
With Mitigation	1	1	1	2	1	**5**	**Very Low**	(-)
Mitigation and Management Measures	▪ Minimise works within aquatic ecosystems as far as possible. ▪ Rehabilitate disturbed areas. ▪ Laydown areas should be placed at least 35m away from the delineated aquatic features. ▪ Apply the generic EMPr for power line and substation development to decommissioning activities.							

Table 8-10 – Impact on aquatic ecosystem integrity during the decommissioning phase

Potential Impact: Aquatic ecosystem integrity Increased sedimentation and risks of contamination of surface water runoff	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character
Without Mitigation	2	1	1	2	2	**12**	**Very Low**	(-)
With Mitigation	1	1	1	2	1	**5**	**Very Low**	(-)
Mitigation and Management Measures	▪ Minimise works within aquatic ecosystems as far as possible.							

Potential Impact: Aquatic ecosystem integrity Increased sedimentation and risks of contamination of surface water runoff	Magnitude	Extent	Reversibility	Duration	Probability	Significance	Character
	▪ Rehabilitate disturbed areas. ▪ Laydown areas should be placed at least 35m away from the delineated aquatic features. ▪ Apply the generic EMPr for power line and substation development to decommissioning activities.						

8.4 PLANT SPECIES ASSESSMENT

Due to low sensitivity of the site, only a plant compliance statement was undertaken for this project. As such, an impact assessment was not complied however the following avoidance and mitigation measures should be included in the EMPr for the Mura EGI Corridor in order to avoid, reduce and manage impacts on vegetation and plant species:

- Develop and implement alien vegetation, soil erosion, revegetation and rehabilitation management plans based on the site attributes and environmental constraints. This can be developed post-authorisation once the project is certain to go ahead.
- Ensure that all vegetation-related preconstruction permits have been obtained, and surveys and walk-throughs have been conducted prior to the commencement of construction activity.
- Preconstruction walk-through of the final development footprint to check the final footprint areas and access road routes to verify that sensitive habitats are being avoided as much as possible and also provide certainty as to the zero expected impact on plant SCC.
- Annual rehabilitation activities in line with the Generic EMPr requirements (for example, any erosion problems observed on-site should be rectified as soon as possible using appropriate revegetation and erosion control works).

The following Monitoring and management actions should be included in the EMPr:

- Ensure that all vegetation-related preconstruction permits, surveys and walk-throughs have been conducted prior to the commencement of construction activity.
- Monitoring of vegetation clearing during construction by the ECO to ensure that any protected plant within the development footprint area are translocated to safety where necessary.
- Annual monitoring of runoff and erosion along the service road beneath the constructed power lines to ensure that the road is not causing degradation through runoff and erosion damage. There should be follow-up erosion control and alien vegetation clearing where required.

8.5 ANIMAL SPECIES ASSESSMENT

8.5.1 CONSTRUCTION PHASE

The development of the Mura EGI Connection may result in a number of potential impacts on the Riverine Rabbit and Karoo Dwarf Tortoise during the construction phase of the development.

During construction, the major impact would likely be disturbance, due to the increased levels of traffic at the site that would increase collision risk with rabbits, which is a known major cause of mortality for this species. Furthermore, the noise and disturbance associated with construction

activity may deter rabbits from the affected areas where these are in close proximity to areas where Rabbits are present. The impact of the disturbance to the Riverine Rabbit is indicated in **Table 8-11**.

During construction, the increased levels of traffic within as well as to and from the corridor would likely increase collision risk with tortoises. Furthermore, the construction activities would result in some habitat loss and degradation within areas of suitable habitat. The impact of the disturbance to the Karoo Dwarf Tortoise is indicated **Table 8-14**.

Table 8-11 – Impact of disturbance to the riverine rabbit during the construction phase

Potential Impact: Disturbance to the Riverine Rabbit	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character
Without Mitigation	3	2	3	2	3	**30**	**Low**	(-)
With Mitigation	2	2	2	2	3	**24**	**Low**	(-)
Mitigation and Management Measures	▪ Avoid mapped No-Go areas in the placement of pylons and access tracks. ▪ Where any new roads or overhead lines (and associated pylon placement) traverse areas mapped as High Riverine Rabbit habitat sensitivity, the route should be microsited by a suitably qualified ecological specialist before construction commences to ensure any potential impacts are minimised. Existing tracks through these areas should be used where present. ▪ Clearly demarcate riparian areas near to the development footprint as No-Go areas with appropriate signage and barriers. ▪ All vehicles should adhere to a low speed limit on site. Heavy vehicles should be restricted to 30km/h and light vehicles to 40km/h. ▪ During construction, driving between sunset and sunrise should be reduced as far possible as this is when Riverine Rabbits are most active and the risk of collisions is highest. ▪ Should rabbits be killed by traffic, then the traffic management to and from the site should be reviewed in collaboration with the EWT Drylands Programme, to identify additional mitigation and avoidance that should be implemented to further reduce roadkill. ▪ No dogs should be allowed on site and precautions to ensure that there is poaching or other direct faunal disturbance on site should be implemented.							

Table 8-12 – Impact of disturbance to the Karoo Dwarf Tortoise during the construction phase

Potential Impact: Disturbance to the Karoo Dwarf Tortoise	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character
Without Mitigation	2	2	3	2	4	36	Moderate	(-)
With Mitigation	2	2	3	2	3	27	Low	(-)
Mitigation and Management Measures	▪ Limit the placement of pylons and access tracks in areas mapped as being of high SEI for the Karoo Dwarf Tortoise as far as possible. ▪ The pylons located within and near (<1km) the areas of mapped Karoo Dwarf Tortoise habitat should be of a design that discourages the use of the pylons for nesting by crows. ▪ All vehicles should adhere to a low-speed limit on site. Heavy vehicles should be restricted to 30km/h and light vehicles to 40km/h. ▪ Construction staff should remain within the construction footprint and access routes and should not be allowed to wander into the veld. ▪ No fauna including tortoises should be disturbed or removed from the veld. ▪ No holes or trenches should be left open for extended periods as tortoises may fall in and become trapped. Trenches should have soils ramps present that allow for tortoises and other fauna to escape. Holes should also be checked regularly for tortoises and other fauna that may have fallen in. ▪ Search and Rescue before construction clearing of areas of high-quality habitat withing the development footprint as identified and mapped during a preconstruction walk-through of the power line.							

8.5.2 OPERATIONAL PHASE

During operation, impacts would be significantly reduced, but occasional anthropogenic disturbance associated with maintenance activities along the power line would potentially impact the Riverine Rabbit while increased traffic within, to and from the site which may increase vehicle-related mortality. The impact of the disturbance to the Riverine Rabbit is indicated in **Table 8-13**.

During operation, impacts would likely be reduced, but occasional anthropogenic disturbance associated with maintenance activities along the power line would potentially impact the Karoo Dwarf Tortoise. In addition, the power line could increase the abundance of corvids near the power line, resulting in increased Karoo Dwarf Tortoise predation. The impact of the disturbance to the Karoo Dwarf Tortoise is indicated **Table 8-14**.

Table 8-13 – Impact of disturbance to the riverine rabbit during the operational phase

Potential Impact: Disturbance to the Riverine Rabbit	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character
Without Mitigation	2	1	3	4	3	**30**	**Low**	(-)
With Mitigation	2	1	1	4	2	**16**	**Low**	(-)
Mitigation and Management Measures	▪ Driving within or to and from the site, should be restricted between sunset and sunrise to essential vehicles and services only. ▪ All vehicles travelling along the power line access road to adhere to a low speed limit of not more than 40km/h. ▪ No additional disturbance to occur within the riparian areas during operation. ▪ Any erosion problems along the power line access road should be remedied at least annually.							

Table 8-14 – Impact of disturbance to the Karoo Dwarf Tortoise during the operational phase

Potential Impact: Disturbance to the Karoo Dwarf Tortoise	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character
Without Mitigation	2	2	3	4	3	**33**	**Moderate**	(-)
With Mitigation	2	2	1	4	2	**18**	**Low**	(-)
Mitigation and Management Measures	▪ Crow nests identified during annual surveys and located within 1km of suitable Karoo Dwarf Tortoise habitat should be removed. ▪ Apply additional mitigation in consultation with a terrestrial ecologist to prevent roadkill mortalities and / or discourage predation of Karoo Dwarf Tortoise by crow if monitoring demonstrates these aspects to be the cause of persistent impacts on this species. ▪ Conduct annual surveys along the powerline to census crow nesting sites, and log tortoise carcasses observed along the powerline and especially under any crow nests if present.							

8.5.3 DECOMMISSIONING PHASE

The potential impacts on the Riverine Rabbit and Karoo Dwarf Tortoise during the decommissioning phase is similar that to the construction phase of the development and is indicated in **Table 8-15** and **Table 8-16** respectfully.

Table 8-15 – Impact of disturbance to the riverine rabbit during the decommissioning phase

Potential Impact: Disturbance to the Riverine Rabbit	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character
Without Mitigation	2	2	3	2	3	27	Low	(-)
With Mitigation	2	2	3	2	2	18	Low	(-)
Mitigation and Management Measures	▪ All vehicles should adhere to a low speed limit on site. Heavy vehicles should be restricted to 30km/h and light vehicles to 40km/h. ▪ During decommissioning, driving between sunset and sunrise should be reduced as far possible as this is when Riverine Rabbits are most active and the risk of collisions is highest. ▪ Ensure that riparian areas near to the development footprint are clearly demarcated as no-go areas with appropriate signage and barriers. ▪ No dogs should be allowed on site and precautions to ensure that there is poaching or other direct faunal disturbance on site should be implemented. ▪ Where any roads or overhead lines traverse areas mapped as High Riverine Rabbit habitat sensitivity, any remaining open and disturbed areas after decommissioning should be rehabilitated with local plant species appropriate for the affected habitat. ▪ Should rabbits be killed by traffic, then the traffic management to and from the site should be reviewed in collaboration with the EWT Drylands Programme, to identify additional mitigation and avoidance that should be implemented to further reduce roadkill.							

Table 8-16 – Impact of disturbance to the Karoo Dwarf Tortoise during the decommissioning phase

Potential Impact: Disturbance to the Karoo Dwarf Tortoise	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character
Without Mitigation	2	2	3	2	3	27	Low	(-)
With Mitigation	2	2	3	2	2	18	Low	(-)
Mitigation and Management Measures	▪ All vehicles should adhere to a low-speed limit on site. Heavy vehicles should be restricted to 30km/h and light vehicles to 40km/h.							

	▪ Decommissioning staff should remain within the power line footprint areas and access routes and should not be allowed to wander into the veld. ▪ No fauna including tortoises should be disturbed or removed from the veld. ▪ No holes or trenches should be left open for extended periods as tortoises may fall in and become trapped. Trenches should have soils ramps present that allow for tortoises and other fauna to escape. Holes should also be checked regularly for tortoises and other fauna that may have fallen in. ▪ No litter or other material from the power line or decommissioning activity should be left lying around as tortoises and other fauna may become trapped in fibres, plastic and other waste material.

8.6 AVIFAUNA IMPACT ASSESSMENT

8.6.1 CONSTRUCTION PHASE

There were two avifauna related impacts identified during the construction phase. These are:

- Habitat destruction associated with the construction of the project (**Table 8-17**):
  - During the construction phase of this project, a certain amount of habitat destruction and alteration will take place. The amount of habitat that will be affected by the project will be 58 hectares
- Disturbance of birds & displacement effects (**Table 8-18**):
  - Disturbance of avifauna during the construction of the projects is likely to occur. Disturbance of breeding birds is typically of greatest concern. In this regard any breeding sites of sensitive bird species would be the most important. Wildskies have identified one Verreaux's Eagle breeding within the EGI corridor to be relevant. The risk at this receptor has been largely avoided through the classification of a 1km No-Go buffer around the nest (and its' alternate).

Table 8-17 – Impact of destruction of habitat during the construction phase

Potential Impact: Destruction of habitat Habitat destroyed or altered in such a way as to render it unavailable to birds	**Magnitude**	**Extent**	**Reversibility**	**Duration**	**Probability**	**Significance**		**Character**
Without Mitigation	3	1	3	4	5	**55**	**Moderate**	(-)
With Mitigation	4	1	3	4	5	**60**	**Moderate**	(-)
Mitigation and Management Measures	▪ The identified No-Go areas on site should be avoided by the proposed infrastructure. The identified High sensitivity areas should also be avoided as far as possible. One exception in High sensitivity areas is applicable at a small dam in the far west of the EGI corridor (west of Mura 1 and 2) where it has been							

	agreed between specialist and applicant that the EGI corridor may infringe on the buffer area. ▪ A pre-construction avifaunal walk down should be conducted to confirm final layout and identify any sensitivities that may arise between the conclusion of the Environmental Authorisation process and construction. ▪ General good environmental practice should be implemented during construction in terms of control of vehicles, staff, minimising the impact on the receiving environment as much as possible. ▪ Overhead conductors or earth wires should be fitted with the best available Eskom approved anti bird collision line marking device available at the time of construction. Should new more effective BFDS come available the developer needs to be ready to procure and fit these. ▪ The proposed pylon designs all provide for sufficient clearance between phase and phase, and phase and earthed components, to mitigate the risk of eagle electrocution. In addition, we recommend the use of a monopole structure with the standard Eskom Bird Perch on all pole tops to further provide safe perching substrate well above the dangerous hardware. Any deviation from these approved structures should be cleared with an avifaunal specialist.

Table 8-18 – Impact of disturbance of birds during the construction phase

Potential Impact: Disturbance of birds Birds are disturbed during construction impacting on breeding, foraging	**Magnitude**	**Extent**	**Reversibility**	**Duration**	**Probability**	**Significance**		**Character**
Without Mitigation	2	3	1	2	3	**24**	**Low**	(-)
With Mitigation	2	3	1	2	3	**24**	**Low**	(-)
Mitigation and Management Measures	▪ The identified No-Go areas on site should be avoided by the proposed infrastructure. The identified High sensitivity areas should also be avoided as far as possible. One exception in High sensitivity areas is applicable at a small dam in the far west of the EGI corridor (west of Mura 1 and 2) where it has been agreed between specialist and applicant that the EGI corridor may infringe on the buffer area. ▪ A pre-construction avifaunal walk down should be conducted to confirm final layout and identify any sensitivities that may arise between the conclusion of the Environmental Authorisation process and construction. ▪ General good environmental practice should be implemented during construction in terms of control of							

	vehicles, staff, minimising the impact on the receiving environment as much as possible. ■ Overhead conductors or earth wires should be fitted with the best available Eskom approved anti bird collision line marking device available at the time of construction. Should new more effective BFDS come available the developer needs to be ready to procure and fit these. ■ The proposed pylon designs all provide for sufficient clearance between phase and phase, and phase and earthed components, to mitigate the risk of eagle electrocution. In addition, we recommend the use of a monopole structure with the standard Eskom Bird Perch on all pole tops to further provide safe perching substrate well above the dangerous hardware. Any deviation from these approved structures should be cleared with an avifaunal specialist.

8.6.2 OPERATIONAL PHASE

There were two avifauna related impacts identified during the operational phase. These are:

- Collision of birds with overhead lines (**Table 8-19**):
  - Overhead power lines pose a collision risk to large terrestrial species such as bustards, cranes and korhaans in particular. Unfortunately the line marking devices currently available have proven less effective for Ludwig's Bustards (present in the study area) and so the significance of this impact cannot be reduced below Medium at this time. Research into more effective devices is ongoing and it is conceivable that a more effective device will be available for use on this project by the time of construction. Overhead conductors or earth wires should be fitted with the best available Eskom approved anti bird collision line marking device available at the time of construction. Should new more effective BFDS come available they should be procured and fit.
- Electrocution of birds on pylons (**Table 8-20**):
  - Large eagles would typically be at risk of electrocution on pylons in this largely treeless landscape, where they will almost certainly perch frequently on any available pylons. The proposed pylon designs all provide for sufficient clearance between phase and phase, and phase and earthed components, to mitigate the risk of eagle electrocution. Wildskies recommend the use of a monopole structure with the standard Eskom Bird Perch on all pole tops to further provide safe perching substrate well above the dangerous hardware.

Table 8-19 – Impact of collision of birds with overhead lines during the operational phase

Potential Impact: Collision of birds with overhead lines Birds in flight collide with the lines and are killed either by the impact or by the subsequent impact with the ground.	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character
Without Mitigation	4	3	5	4	4	64	High	(-)

With Mitigation	2	3	5	4	3	42	Moderate	(-)
Mitigation and Management Measures	▪ Overhead conductors or earth wires should be fitted with the best available Eskom approved anti bird collision line marking device available at the time of construction. Should new more effective BFDS come available the developer needs to be ready to procure and fit these. ▪ The proposed pylon designs all provide for sufficient clearance between phase and phase, and phase and earthed components, to mitigate the risk of eagle electrocution. In addition, we recommend the use of a monopole structure with the standard Eskom Bird Perch on all pole tops to further provide safe perching substrate well above the dangerous hardware. Any deviation from these approved structures should be cleared with an avifaunal specialist. ▪ Once operational, if facility staff identify any bird nesting which interferes with operations this should be reported on fully through the sites incident reporting system. A suitably qualified ornithologist should be consulted for any case specific reactive mitigation measures. All nest management measures should only be undertaken in compliance with national and provincial environmental legislation in this regard.							

Table 8-20 – Impact of electrocution of birds during the operational phase

Potential Impact: electrocution of birds Birds perched on pylons are electrocuted when they bridge critical clearances	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character
Without Mitigation	4	3	5	4	4	64	High	(-)
With Mitigation	1	3	5	4	2	26	Low	(-)
Mitigation and Management Measures	▪ Overhead conductors or earth wires should be fitted with the best available Eskom approved anti bird collision line marking device available at the time of construction. Should new more effective BFDS come available the developer needs to be ready to procure and fit these. ▪ The proposed pylon designs all provide for sufficient clearance between phase and phase, and phase and earthed components, to mitigate the risk of eagle electrocution. In addition, we recommend the use of a monopole structure with the standard Eskom Bird Perch on all pole tops to further provide safe perching substrate well above the dangerous hardware. Any deviation from these approved structures should be cleared with an avifaunal specialist. ▪ Once operational, if facility staff identify any bird nesting which interferes with operations this should be reported							

	on fully through the sites incident reporting system. A suitably qualified ornithologist should be consulted for any case specific reactive mitigation measures. All nest management measures should only be undertaken in compliance with national and provincial environmental legislation in this regard.

8.6.3 DECOMMISSIONING PHASE

There were avifauna related impacts identified during the decommissioning phase. These include:

- Disturbance of birds & displacement effects (**Table 8-21**):
  - Disturbance of avifauna during the decommissioning of the projects is likely to occur. Disturbance of breeding birds is typically of greatest concern. In this regard any breeding sites of sensitive bird species would be the most important. Wildskies have not identified any such breeding sites at this stage, other than those identified during screening and where impacts have been avoided in the project design Disturbance of avifauna during the decommissioning of the projects is likely to occur. Disturbance of breeding birds is typically of greatest concern. In this regard any breeding sites of sensitive bird species would be the most important. We have identified one Verreaux's Eagle breeding within the EGI corridor to be relevant. The risk at this receptor has been largely avoided through the classification of a 1km No-Go buffer around the nest (and its' alternate).

Table 8-21 – Impact of disturbance of birds during the decommissioning phase

Potential Impact: Disturbance of birds Birds are disturbed during decommissioning impacting on breeding, foraging	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character
Without Mitigation	2	3	1	2	3	**24**	**Low**	(-)
With Mitigation	2	3	1	2	3	**24**	**Low**	(-)
Mitigation and Management Measures	▪ All decommissioning activities should be strictly managed according to generally accepted environmental best practice standards, so as to avoid any unnecessary impact on the receiving environment.							

8.7 ARCHAEOLOGICAL AND CULTURAL HERITAGE IMPACT ASSESSMENT

8.7.1 CONSTRUCTION PHASE

8.7.1.1 Impacts to archaeological resources

Direct impacts to archaeological resources would occur during the construction phase when equipment is brought onto site and excavations for foundations, services and roadworks commence. Because significant archaeological sites are rare within the corridor and expected to be easily avoided by the final alignment, the impact magnitude is very low. There is still a small chance that

archaeological materials may be impacted though and the significance calculates to low negative (**Table 8-22**).

Table 8-22 – Impact to archaeological resources during the construction phase

Potential Impact: Archaeological resources	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character
Without Mitigation	1	1	5	5	2	**24**	**Low**	(-)
With Mitigation	1	1	5	5	1	**12**	**Very Low**	(-)
Mitigation and Management Measures	▪ Conduct a pre-construction survey of the final alignment to check for sites that may need to be avoided or excavated. ▪ Report any chance finds found							

8.7.1.2 Impacts to graves

Direct impacts to graves would occur during the construction phase when equipment is brought onto site and excavations for foundations, services and roadworks commence. Because graves are not known or expected within the corridor, the impact magnitude is very low. The chances of graves being present and impacted are very low and the significance calculates to very low negative (**Table 8-23**).

Table 8-23 – Impact to graves during the construction phase

Potential Impact: Graves	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character
Without Mitigation	1	1	5	5	1	**12**	**Very Low**	(-)
With Mitigation	1	1	5	5	1	**12**	**Very Low**	(-)
Mitigation and Management Measures	▪ Report any chance finds found							

8.7.1.3 Impacts to the cultural landscape

Direct impacts to the cultural landscape would occur during the construction phase when construction equipment is brought onto the site and construction activity commences. The very remote location means that the magnitude is low but because impacts would definitely occur if the project goes ahead the significance calculates to moderate negative (**Table 8-24**).

Table 8-24 – Impact to cultural landscape during the construction phase

Potential Impact: Cultural landscape	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character
Without Mitigation	2	2	3	2	5	45	Moderate	(-)
With Mitigation	2	2	3	2	5	45	Moderate	(-)
Mitigation and Management Measures	▪ Keep the construction duration as short as possible. ▪ Reuse existing farm tracks where possible. ▪ Ensure that the smallest area possible is cleared for construction. ▪ Ensure that any areas not required during operation are rehabilitated.							

8.7.2 OPERATIONAL PHASE

8.7.2.1 Impacts to the cultural landscape

Direct impacts to the cultural landscape would occur during the operation phase due to the presence of the facility in the landscape. The magnitude is again low because of the remoteness of the site and, despite the long duration of impact (for the lifetime of the project), the significance calculates to moderate negative (**Table 8-25**).

Table 8-25 – Impact to cultural landscape during the operational phase

Potential Impact: Cultural landscape	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character
Without Mitigation	2	2	3	4	5	55	Moderate	(-)
With Mitigation	2	2	3	4	5	55	Moderate	(-)
Mitigation and Management Measures	▪ Ensure that all maintenance activities remain within the approved footprint. ▪ Ensure that night time light pollution from substations is minimised.							

8.7.3 DECOMMISSIONING PHASE

8.7.3.1 Impacts to the cultural landscape

Direct impacts to the cultural landscape would occur during the decommissioning phase when construction equipment is brought onto the site and decommissioning activities commence. The very

remote location means that the magnitude is low but because impacts would definitely occur if the project is decommissioned the significance calculates to moderate negative (**Table 8-26**).

Table 8-26 – Impact to cultural landscape during the decommissioning phase

Potential Impact: Cultural landscape	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character
Without Mitigation	2	2	3	2	5	45	Moderate	(-)
With Mitigation	1	2	3	2	5	40	Moderate	(-)
Mitigation and Management Measures	▪ Keep the decommissioning duration as short as possible. ▪ Ensure that the site is fully rehabilitated after the facility has been removed.							

8.8 PALAEONTOLOGY IMPACT ASSESSMENT

8.8.1 CONSTRUCTION PHASE

The potential impact on fossil heritage resources within the project footprint that are of scientific and conservation value are indicated in **Table 8-27**.

If any substantial new fossil sites are revealed during the Construction Phase of the developments they should be handled using the Chance Fossil Finds Protocol included in the EMPr (**Appendix H**). If no new fossils are found then no mitigation is required.

Table 8-27 – Impact on fossil heritage resources during the construction phase

Potential Impact: Loss of fossil heritage resources	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character
Without Mitigation	2	1	5	5	2	26	Low	(-)
With Mitigation	2	1	5	5	1	13	Very Low	(-)
Mitigation and Management Measures	▪ Implement the Chance Fossil Finds Protocol							

Once any new fossil finds have been collected there will be no significant further impacts on local palaeontological heritage. Therefore the impact assessment is only applicable to the construction phase. The operation and de-commissioning phases of the development will NOT impact the palaeontology.

8.9 TRAFFIC ASSESSMENT

8.9.1 CONSTRUCTION PHASE

There were several traffic related impacts identified during the construction phase. These include:

- Increased Road Incidents
  - The impact of increased traffic volumes on public roads will cause congestion and increase the potential of incidents on the road network within the study area (**Table 8-28**).
- Road Degradation
  - The impact of increased traffic volumes on the public roads will increase the potential for localised road network degradation within the study area (**Table 8-29**).
- Dust
  - The larger the vehicle, the more dust is likely to be generated. This dust hinders the drivers wishing to over-take without a clear view for over-taking, resulting in drivers taking unnecessary chances, which could result in unfavourable consequences. The impact of increased traffic volumes on the unpaved public roads will generate dust (**Table 8-30**).
- Intersection Safety
  - The impact due to the increased traffic volumes at intersections will increase the potential risk of accidents at the intersections, resulting in serious injuries or even fatalities, especially at the intersection on the main roads, when vehicles from the site needing to cross over oncoming traffic (**Table 8-31**).

Table 8-28 – Impact of increased road incidents during the construction phase

Potential Impact: Increased Road Incidents The increased traffic volumes on the public roads will increase the potential of incidents on the road network within the study area	**Magnitude**	**Extent**	**Reversibility**	**Duration**	**Probability**	**Significance**		**Character**
Without Mitigation	4	3	5	2	4	**56**	**Moderate**	(-)
With Mitigation	4	3	5	2	3	**42**	**Moderate**	(-)
Mitigation and Management Measures	▪ Post relevant road signage along affected routes. ▪ Create local WhatsApp Group, notifying other road users of expected deliveries and associated routes. ▪ Traffic Management Plan (TMP) is to be compiled once the contractor has been appointed and all the relevant details of the construction process are known. The TMP needs to address, inter alia: • clearly defined route/s to the site for specific vehicles needed to transport equipment and materials • scheduled deliveries to avoid local congestion;							

	▪ Ensure all vehicles are roadworthy, visible, adequately marked, and operated by an appropriately licenced operator. ▪ The developer shall ensure that the contractor provides the necessary driver training to key personnel to minimise the potential of incidents on the public road network. ▪ The developer shall ensure that the contractor erects temporary signs warning motorists of construction vehicles on the approaches to the access road.

Table 8-29 – Impact of road degradation during the construction phase

Potential Impact: Road degradation The increased traffic volumes on public roads will increase the potential for localised road network degradation within the study area.	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character
Without Mitigation	3	3	3	2	4	**44**	**Moderate**	(-)
With Mitigation	3	3	3	2	3	**33**	**Moderate**	(-)
Mitigation and Management Measures	▪ Create a local WhatsApp Group for the local community and post notices of road conditions and proposed alternatives. Developer to contribute to the maintenance of the public roads in the area during the construction phase of the development/s. ▪ A photographic record of the road condition should be maintained throughout the various phases of the development/s. This provides an objective assessment and mitigates any subjective views from road users. ▪ Upgrade unpaved roads to a suitable condition for proposed construction vehicles. ▪ Ensure that the roads are left in the same or better condition, post-construction. ▪ All remedial work or modifications to any of the public roads shall be done in consultation with and have the approval of the local road's authority (as is standard practice, this will be finalised during and be a requirement of the municipal planning approval process. ▪ The treacherous section of the gravel road, through the De Jager's Pass and Molteno Pass, is safety concern that need to be addressed by the developer in consultation with the local roads authority. ▪ The route for construction vehicles from the TR 01606/7 to the TR05801 should not unduly impact the local community of Loxton and should avoid the commercial centre of Loxton. ▪ The developer shall ensure that the condition of the roads impacted by construction of the development is left in a similar or better state once the construction phase is complete. ▪ All vehicles delivering equipment and material to the proposed development using the Molteno Pass and De							

	Jager's Pass, shall be limited to a gross vehicle mass not exceeding ten tonnes.

Table 8-30 – Impact of dust during the construction phase

Potential Impact: Dust The increased traffic volumes on unpaved public roads will generate more dust. The higher the speed and the larger the vehicle, the more dust is likely to be generated. This dust hinders the drivers wishing to over-take without a clear view of over-taking, resulting in drivers taking unnecessary chances, which could result in unfavourable consequences	**Magnitude**	**Extent**	**Reversibility**	**Duration**	**Probability**	**Significance**		**Character**
Without Mitigation	3	3	1	2	4	**36**	**Moderate**	(-)
With Mitigation	3	3	1	2	3	**27**	**Low**	(-)
Mitigation and Management Measures	▪ Reduce travel speed for construction vehicles on the gravel road to reduce dust ▪ Dust suppression of the roads in the immediate vicinity of the site where feasible ▪ Regular preventative maintenance of roads within the immediate vicinity of the site should be conducted over weekends to minimise the impact on the average construction period.							

Table 8-31 – Impact of intersection safety during the construction phase

Potential Impact: Intersection safety The increased traffic volumes at intersections will increase the potential risk of accidents at the intersections, resulting in serious injuries or even fatalities, especially at the intersection on the main roads, when slow moving vehicles from the site need to cross over fast travelling oncoming traffic.	**Magnitude**	**Extent**	**Reversibility**	**Duration**	**Probability**	**Significance**		**Character**
Without Mitigation	4	3	5	2	4	**56**	**Moderate**	(-)
With Mitigation	4	3	5	2	3	**42**	**Moderate**	(-)
Mitigation and Management Measures	▪ Compile TMP. ▪ Reduce speed at intersections and use appropriate traffic warning signs ▪ Identify alternative routes where possible ▪ Request the assistance of local law enforcement ▪ Ensure that all construction vehicles are roadworthy, visible, adequately marked, and operated by an appropriately licenced operator. ▪ Provide drivers with advanced driver training.							

8.9.2 OPERATIONAL PHASE

The traffic related impacts identified during the operational phase, include:

- Intersection Safety
  - Due to the increased traffic volumes at intersections this will increase the potential risk of accidents at the intersections, resulting in serious injuries or even fatalities especially at the intersection on the main roads, when vehicles from the site need to cross over oncoming traffic.

Table 8-32 – Impact of intersection safety during the operational phase

Potential Impact: Intersection safety The increased traffic volumes at intersections will increase the potential risk of accidents at the intersections, resulting in serious injuries or even fatalities, especially at the intersection on the main roads, when slow moving vehicles from the site need to cross over fast travelling oncoming traffic.	**Magnitude**	**Extent**	**Reversibility**	**Duration**	**Probability**	**Significance**		**Character**
Without Mitigation	1	3	5	2	3	**33**	**Moderate**	(-)
With Mitigation	1	3	5	2	3	**33**	**Moderate**	(-)
Mitigation and Management Measures	▪ Compile TMP. ▪ Reduce speed at intersections and use appropriate traffic warning signs ▪ Identify alternative routes where possible ▪ Request the assistance of local law enforcement ▪ Ensure that all construction vehicles are roadworthy, visible, adequately marked, and operated by an appropriately licenced operator. ▪ Provide drivers with advanced driver training.							

8.10 VISUAL IMPACT ASSESSMENT

8.10.1 CONSTRUCTION PHASE

There were visual related impacts identified during the construction phase. These include:

- Visual effect of construction activities on scenic resources and sensitive receptors (**Table 8-33**).

Table 8-33 – Impact of visual effect of construction activities on scenic resources and sensitive receptors during the construction phase

Potential Impact: Visual effect of construction activities on scenic resources and sensitive receptors Visual intrusion of cranes, heavy vehicles and construction activities for the erection of pylons and switching stations. Visual intrusion on access / haul roads. Noise and dust from construction activity affecting sense of place.	**Magnitude**	**Extent**	**Reversibility**	**Duration**	**Probability**	**Significance**		**Character**
Without Mitigation	3	2	3	2	4	**40**	**Moderate**	(-)
With Mitigation	3	2	3	2	3	**30**	**Low**	(-)
Mitigation and Management Measures	▪ Pylons and switching stations to be located in low-lying visually unobtrusive positions, outside no-go areas where possible. ▪ Existing roads and tracks to be used where possible and kept as narrow as practical. ▪ Disturbed areas to be rehabilitated / revegetated as soon as possible during or after the construction phase. ▪ Construction camps to be located away from main district roads. ▪ Stockpiles to be located within approved construction footprints. ▪ Dust and noise control measures to conform with the EMPr.							

8.10.2 OPERATIONAL PHASE

There were visual related impacts identified during the operational phase. These include:

- Visual intrusion on scenic resources and sensitive receptors (**Table 8-34**).

Table 8-34 – Impact of visual intrusion on scenic resources and sensitive receptors during the operational phase

Potential Impact: Visual intrusion on scenic resources and sensitive receptors Potential visual intrusion of pylons and switching stations on the open rural landscape and sensitive receptors. Change in the pastoral character and sense of place of the local area.	**Magnitude**	**Extent**	**Reversibility**	**Duration**	**Probability**	**Significance**		**Character**
Without Mitigation	3	2	3	5	4	**52**	**Moderate**	(-)
With Mitigation	3	2	3	5	3	**39**	**Moderate**	(-)
Mitigation and Management Measures	▪ Consideration given to screening switching stations with vegetation.							

	▪ Signage and lighting to be kept to a minimum.

8.10.3 DECOMISSIONING PHASE

There were visual related impacts identified during the operational phase. These include:

- Visual intrusion of activities to remove infrastructure (**Table 8-35**).

Table 8-35 – Impact of visual intrusion of activities to remove infrastructure during the decommissioning phase

Potential Impact: Visual intrusion of activities to remove infrastructure Visual effect of construction activities to remove infrastructure at the end of the life of the infrastructure, including pylons and switching stations. (The infrastructure would however be very long term).	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character
Without Mitigation	3	1	3	2	4	36	Moderate	(-)
With Mitigation	3	1	3	2	3	27	Low	(-)
Mitigation and Management Measures	▪ Structures to be removed and re-used or recycled at the end of its life. ▪ Disturbed areas, including maintenance roads no longer required, to be rehabilitated / revegetated as soon as possible after the decommissioning phase.							

8.11 SOCIAL IMPACT ASSESSMENT

8.11.1 CONSTRUCTION PHASE

The following impacts have been identified for the construction phase, as relevant for assessment based on the guidelines for socio-economic specialist inputs, the nature of the project, stakeholder inputs and the receiving environment:

- Impacts from expenditure on the construction and operation of the project (**Table 8-36**);
- Impacts associated primarily with the influx of people including job seekers (**Table 8-37**);
- Impacts on tourism (**Table 8-38**); and
- Impacts on surrounding landowners and communities (**Table 8-39**).

Table 8-36 – Impact on regional employment and household income during the construction phase

Potential Impact: Regional employment and household income	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character
Without Mitigation	3	3	3	2	5	55	Moderate	(+)

With Mitigation	4	3	3	2	5	60	Moderate	(+)
Mitigation and Management Measures	▪ Setting targets for how much local labour should be used based on the needs of the applicant and the availability of existing skills and people that are willing to undergo training. Opportunities for the training of unskilled and skilled workers from local communities should be maximized, including those from adjacent farms who have indicated that they would like to benefit from the proposed project and its related opportunities. ▪ Using local sub-contractors where possible and requiring that contractors from outside the local area that tender also meet targets for how many locals are given employment. ▪ Exploring ways to enhance local community benefits with a focus on broad-based BEE and preferential procurement.							

Table 8-37 – Impact of influx of people during the construction phase

Potential Impact: Influx of people	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character
Without Mitigation	4	2	3	2	3	33	Moderate	(-)
With Mitigation	2	2	3	2	3	27	Low	(-)
Mitigation and Management Measures	▪ A 'locals first' policy with regard to construction and operational labour needs. ▪ The community should be able to contact the site manager or his/her representative to report any issues which they may have. The site manager and his/her representative should be stationed within the area and should therefore be available on hand to deal with and address any concerns which may be raised. ▪ A complaints register should be available on site to any individual who may have a particular complaint with regards to the construction or operations processes. ▪ The applicant and the contractors should develop a Code of Conduct for the project. The code should identify what types of behaviour and activities by workers are not permitted in agreement with surrounding landowners and land managers. For example, access to land that is not part of the development will not be allowed. ▪ The applicant and the contractor should implement a Tuberculosis and HIV/AIDS awareness programme for all construction workers at the outset of the construction phase.							

Table 8-38 – Impact on tourism during the construction phase

Potential Impact: Tourism	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character
Without Mitigation	3	2	3	2	3	30	Low	(-)
With Mitigation	2	2	3	2	3	27	Low	(-)
Mitigation and Management Measures	▪ Impacts on tourism are dependent on how the site is developed and managed to minimise negative biophysical impacts. The measures recommended in other specialist reports to these impacts (primarily the minimisation of visual, heritage, traffic and ecological impacts) would thus also minimise tourism impacts.							

Table 8-39 – Impact of surrounding landowners and communities during the construction phase

Potential Impact: Surrounding landowners and communities	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character
Without Mitigation	4	2	3	2	4	44	Moderate	(-)
With Mitigation	3	2	3	2	3	30	Low	(-)
Mitigation and Management Measures	▪ No construction workers, with the exception of security personnel, should be allowed to stay on the site overnight. ▪ The community should be able to contact the site manager to report any issues which they may have. The site manager should be stationed within the area and should therefore be available on hand to deal with and address any concerns which may be raised. ▪ A complaints register should be available on site to any individual who may have a particular complaint with regards to the construction or operations processes. ▪ The applicant should develop a Code of Conduct for the project. The Code should identify what types of behaviour and activities by workers are not permitted in agreement with surrounding landowners and land managers. ▪ The movement of workers on and off the site should be closely managed and monitored by the contractors. In this regard the contractors should be responsible for making the necessary arrangements for transporting workers to and from site on a daily basis. ▪ The applicant should implement measures to assist and, if needed, fairly compensate potentially affected							

	surrounding landowners whereby damages to farm property, stock theft or significant disruptions to farming activities can be minimized or reduced. Measures should be agreed on before construction commences. ■ The EMPr must outline procedures for managing and storing waste on site, specifically plastic waste that poses a threat to livestock if ingested.

8.11.2 OPERATIONAL PHASE

The following impacts have been identified for the operational phase, as relevant for assessment based on the guidelines for socio-economic specialist inputs, the nature of the project, stakeholder inputs and the receiving environment:

- Impacts from expenditure on the construction and operation of the project (**Table 8-40**);
- Impacts on local socio-economic development, enterprise development and shareholding (**Table 8-41**);
- Impacts associated primarily with the influx of people including job seekers (**Table 8-42**);
- Impacts on tourism (**Table 8-43**); and
- Impacts on surrounding landowners and communities (**Table 8-44**).

Table 8-40 – Impact on regional employment and household income during the operational phase

Potential Impact: Regional employment and household income	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character
Without Mitigation	2	3	3	4	5	60	Moderate	(+)
With Mitigation	3	3	3	4	5	65	High	(+)
Mitigation and Management Measures	■ Setting targets for how much local labour should be used based on the needs of the applicant and the availability of existing skills and people that are willing to undergo training. Opportunities for the training of unskilled and skilled workers from local communities should be maximized, including those from adjacent farms who have indicated that they would like to benefit from the proposed project and its related opportunities. ■ Using local sub-contractors where possible and requiring that contractors from outside the local area that tender also meet targets for how many locals are given employment. ■ Exploring ways to enhance local community benefits with a focus on broad-based BEE and preferential procurement.							

Table 8-41 – Impact of funding of local socio-economic development during the operational phase

Potential Impact: Funding of local socio-economic development	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character
Without Mitigation	1	3	3	4	5	55	Moderate	(+)
With Mitigation	2	3	3	4	5	60	Moderate	(+)
Mitigation and Management Measures	▪ The applicant must establish a communications committee early on in the project to ensure inclusive planning and regular feedback from stakeholders. ▪ Community development should be guided by a community needs analysis, drawn up by a third party and based on local socio-economic conditions, a review of planning documents such as the IDP, and discussions with local government and community representatives. Interventions should be planned in collaboration with other energy developers in the area where relevant. ▪ Close liaison with local municipal managers, local councillors and other stakeholders involved in socio-economic development is required to ensure that any projects are integrated into wider socio-economic development strategies and plans.							

Table 8-42 – Impact of influx of people during the operational phase

Potential Impact: Influx of people	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character
Without Mitigation	2	2	3	4	3	33	Moderate	(-)
With Mitigation	1	2	3	4	3	30	Low	(-)
Mitigation and Management Measures	▪ A 'locals first' policy with regard to construction and operational labour needs. ▪ A complaints register should be available on site to any individual who may have a particular complaint with regards to the construction or operations processes. ▪ Close coordination with the municipality is required, including regular meetings.							

Table 8-43 – Impact on tourism during the operational phase

Potential Impact: Tourism	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character
Without Mitigation	2	2	3	4	3	33	Moderate	(-)
With Mitigation	1	2	3	4	3	30	Low	(-)
Mitigation and Management Measures	▪ Impacts on tourism are dependent on how the site is developed and managed to minimise negative biophysical impacts. The measures recommended in other specialist reports to these impacts (primarily the minimisation of visual, heritage, traffic and ecological impacts) would thus also minimise tourism impacts.							

Table 8-44 – Impact of surrounding landowners and communities during the operational phase

Potential Impact: Surrounding landowners and communities	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character
Without Mitigation	3	2	3	4	3	36	Moderate	(-)
With Mitigation	2	2	3	4	2	22	Low	(-)
Mitigation and Management Measures	▪ A complaints register should be available on site to any individual who may have a particular complaint with regards to the construction or operations processes.							

8.11.3 DECOMMISSIONING PHASE

The ratings provided below are the same as those provided for the construction phase of the project. This is because the assessment assumes that decommissioning will involve a similar process. However, it should be noted that decommissioning may not necessarily occur after the 20-year minimum life cycle of the project. Instead, the facility may undergo a regeneration/refurbishment in which Solar Arrays other project elements are upgraded or replaced. This would result in temporary positive impacts including those from additional expenditure and temporary employment, as well as risks. Following the regeneration, operational impacts similar to those experienced during the first 20 years of operations would continue to occur.

The impact associated with the decommissioning phase of the project includes:

- Impacts from expenditure on the construction and operation of the project (**Table 8-45**);
- Impacts associated primarily with the influx of people including job seekers (**Table 8-46**);
- Impacts on tourism (**Table 8-47**); and
- Impacts on surrounding landowners and communities (**Table 8-48**).

Table 8-45 – Impact on regional employment and household income during the decommissioning phase

Potential Impact: Regional employment and household income	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character
Without Mitigation	3	3	3	2	5	55	Moderate	(+)
With Mitigation	4	3	3	2	5	60	Moderate	(+)
Mitigation and Management Measures	▪ Setting targets for how much local labour should be used based on the needs of the applicant and the availability of existing skills and people that are willing to undergo training. Opportunities for the training of unskilled and skilled workers from local communities should be maximized, including those from adjacent farms who have indicated that they would like to benefit from the proposed project and its related opportunities. ▪ Using local sub-contractors where possible and requiring that contractors from outside the local area that tender also meet targets for how many locals are given employment. ▪ Exploring ways to enhance local community benefits with a focus on broad-based BEE and preferential procurement.							

Table 8-46 – Impact of influx of people during the decommissioning phase

Potential Impact: Influx of people	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character
Without Mitigation	4	2	3	2	3	33	Moderate	(-)
With Mitigation	2	2	3	2	3	27	Low	(-)
Mitigation and Management Measures	▪ A 'locals first' policy with regard to construction and operational labour needs. ▪ The community should be able to contact the site manager or his/her representative to report any issues which they may have. The site manager and his/her representative should be stationed within the area and should therefore be available on hand to deal with and address any concerns which may be raised. ▪ A complaints register should be available on site to any individual who may have a particular complaint with regards to the construction or operations processes.							

	▪ The applicant and the contractors should develop a Code of Conduct for the project. The code should identify what types of behaviour and activities by workers are not permitted in agreement with surrounding landowners and land managers. For example, access to land that is not part of the development will not be allowed. ▪ The applicant and the contractor should implement a Tuberculosis and HIV/AIDS awareness programme for all construction workers at the outset of the construction phase. ▪ Arrangements must be made to enable workers from outside the area to return home over the weekends or at regular intervals. This would reduce the risk posed by non-local construction workers to local family structures and social networks. ▪ Condoms should be freely available to employees and all contractor workers. ▪ Introduce alcohol testing on a weekly basis for construction workers. ▪ The contractor should make the necessary arrangements for ensuring that all non-local construction workers are transported back to their place of residence once the construction phase is completed. ▪ Close coordination with the municipality is required, including regular meetings.

Table 8-47 – Impact on tourism during the decommissioning phase

Potential Impact: Tourism	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character
Without Mitigation	3	2	3	2	3	**30**	**Low**	(-)
With Mitigation	2	2	3	2	3	**27**	**Low**	(-)
Mitigation and Management Measures	▪ Impacts on tourism are dependent on how the site is developed and managed to minimise negative biophysical impacts. The measures recommended in other specialist reports to these impacts (primarily the minimisation of visual, heritage, traffic and ecological impacts) would thus also minimise tourism impacts.							

Table 8-48 – Impact of surrounding landowners and communities during the decommissioning phase

Potential Impact: Surrounding landowners and communities	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character
Without Mitigation	4	2	3	2	4	**44**	**Moderate**	(-)
With Mitigation	3	2	3	2	3	**30**	**Low**	(-)
Mitigation and Management Measures	▪ No construction workers, with the exception of security personnel, should be allowed to stay on the site overnight. ▪ The community should be able to contact the site manager to report any issues which they may have. The site manager should be stationed within the area and should therefore be available on hand to deal with and address any concerns which may be raised. ▪ A complaints register should be available on site to any individual who may have a particular complaint with regards to the construction or operations processes. ▪ The applicant should develop a Code of Conduct for the project. The Code should identify what types of behaviour and activities by workers are not permitted in agreement with surrounding landowners and land managers. ▪ The movement of workers on and off the site should be closely managed and monitored by the contractors. In this regard the contractors should be responsible for making the necessary arrangements for transporting workers to and from site on a daily basis. ▪ The applicant should implement measures to assist and, if needed, fairly compensate potentially affected surrounding landowners whereby damages to farm property, stock theft or significant disruptions to farming activities can be minimized or reduced. Measures should be agreed on before construction commences. ▪ The EMPr must outline procedures for managing and storing waste on site, specifically plastic waste that poses a threat to livestock if ingested.							

9 CUMULATIVE IMPACT ASSESSMENT

Although the objective of the NEMA BA process is to undertake an impact and risk assessment process, inclusive of cumulative impacts, which is essential to assessing and managing the environmental and social impacts of projects, it may be insufficient for identifying and managing the incremental impacts on areas or resources used or directly affected by a given development from other existing, planned, or reasonably defined developments at the time the risks and impacts are identified.

IFC PS 1 recognizes that, in some instances, cumulative effects need to be considered in the identification and management of environmental and social impacts and risks. For private sector management of cumulative impacts, IFC considers good practice to be two pronged:

- Effective application of and adherence to the mitigation hierarchy in environmental and social management of the specific contributions by the project to the expected cumulative impacts; and
- Best efforts to engage in, enhance, and/or contribute to a multi-stakeholder, collaborative approach to implementing management actions that are beyond the capacity of an individual project proponent.

Even though Performance Standard 1 does not expressly require, or put the sole onus on, private sector clients to undertake a cumulative impact assessment (CIA), in paragraph 11 it states that the impact and risk identification process "*will take into account the findings and conclusions of related and applicable plans, studies, or assessments prepared by relevant government authorities or other parties that are directly related to the project and its area of influence" including "master economic development plans, country or regional plans, feasibility studies, alternatives analyses, and cumulative, regional, sectoral, or strategic environmental assessments where relevant*."

Cumulative impacts are those that result from the successive, incremental, and/or combined effects of an action, project, or activity when added to other existing, planned, and/or reasonably anticipated future ones. For practical reasons, the identification and management of cumulative impacts are limited to those effects generally recognized as important on the basis of scientific concerns and/or concerns of affected communities (IFC GPH).

Evaluation of potential cumulative impacts is an integral element of an impact assessment. In reference to the scope for an impact assessment, IFC's Performance Standards specify that "*Risks and impacts will be analysed in the context of the project's area of influence. This area of influence encompasses…areas potentially impacted by cumulative impacts from further planned development of the project, any existing project or condition, and other project-related developments that are realistically defined at the time the Social and Environmental Assessment is undertaken; and (iv) areas potentially affected by impacts from unplanned but predictable developments caused by the project that may occur later or at a different location.*" (IFC 2006).

A cumulative impact assessment is the process of (a) analysing the potential impacts and risks of proposed developments in the context of the potential effects of other human activities and natural environmental and social external drivers on the chosen Valued Environmental and Social Components (VECs) over time, and (b) proposing concrete measures to avoid, reduce, or mitigate such cumulative impacts and risk to the extent possible (IFC GPH).

Cumulative impacts with existing and planned facilities may occur during construction and operation of the proposed Mura EGI Corridor. While one project may not have a significant negative impact on

sensitive resources or receptors, the collective impact of the projects may increase the severity of the potential impacts.

Therefore, a number of renewable energy developments within the surrounding area which have submitted applications for environmental authorisation (some of which have been approved and others now operational). It is important to note that the existence of an approved EA does not directly equate to actual development of the project.

The surrounding projects that have not already been awarded Preferred Bidder (PB) status under the REIPPPP Bid window 5 or the Risk Mitigation IPP procurement programme (RMIPPPP), are still subject to the REIPPPP bidding process or subject to securing an off taker of electricity through an alternative process. Some of the surrounding proposed WEFs secured EAs several years ago but have not obtained PB status (or a private off taker agreement) and as such have not been developed.

These existing surrounding projects of varying approval status have been detailed in **Figure 9-1**. Given the site's location within the Beaufort West REDZ, it is considered to be located within the renewable energy hub that is developing in this focus area.

Projects within 30 km of the Mura sites includes:

- The three approved Nuweveld Wind Farm Projects
- The four proposed Hoogland Wind Farm Projects
- The approved Nuweveld gridline
- The two proposed gridline connections proposed as part of the Hoogland Wind Farm Projects
- The proposed Gamma gridline project
- The proposed WKN Wind Farm Projects (Soutrivier and Taaibos)

Potential cumulative impacts identified are summarised below. Other planned or existing projects that can interact with the Project will be identified during stakeholder engagement and finalisation of the BAR process.

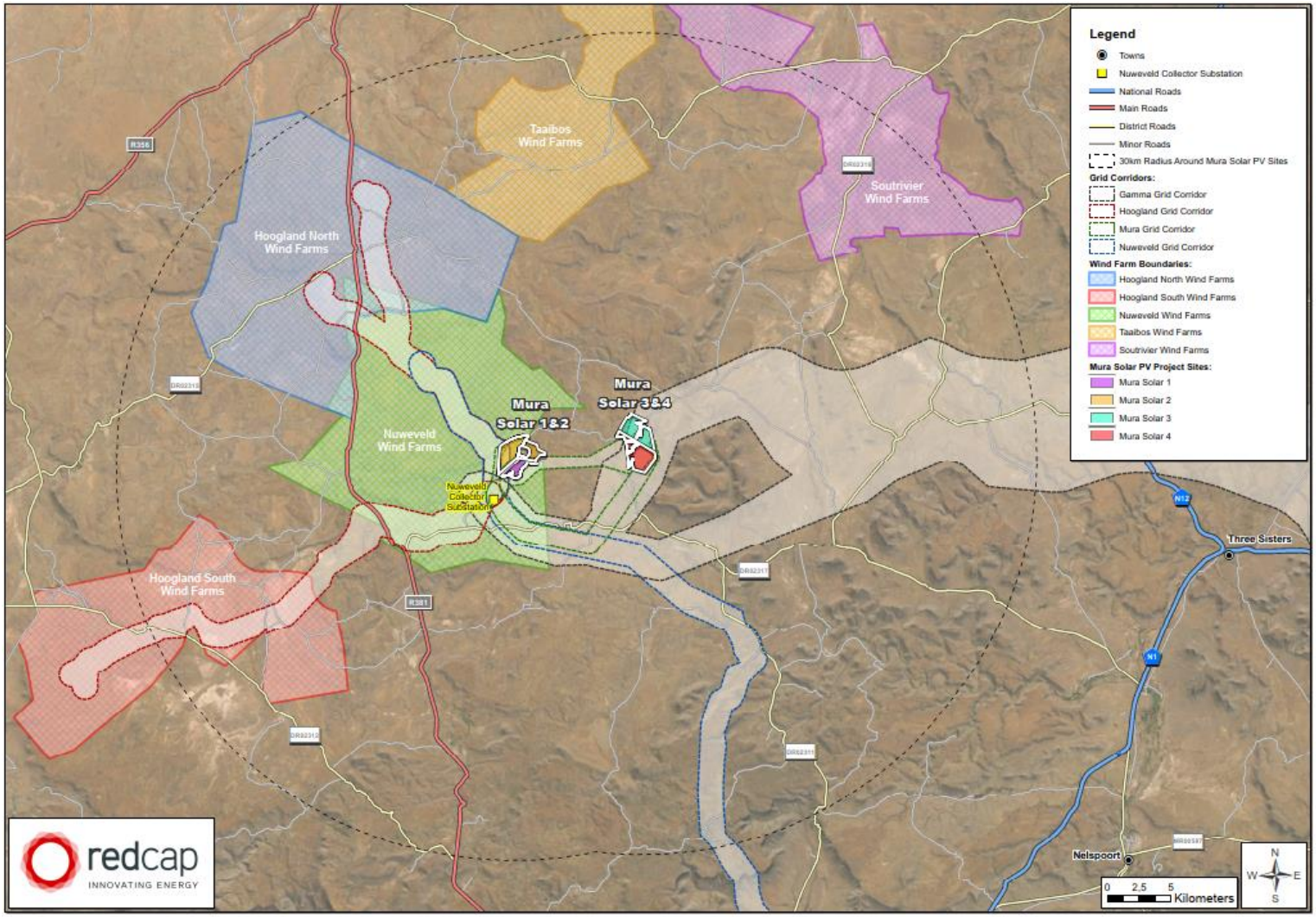


Figure 9-1 - Renewable Energy Projects with 30km of the Mura Solar Development

9.1 AGRICULTURAL POTENTIAL

The potential cumulative agricultural impact of importance is a regional loss of future agricultural production potential. The defining question for assessing the cumulative agricultural impact is this:

What level of loss of future agricultural production potential is acceptable in the area, and will the loss associated with the proposed development, when considered in the context of all past, present or reasonably foreseeable future impacts, cause that level in the area to be exceeded?

Because this grid connection itself leads to insignificant loss of production potential, its cumulative impact must also logically be insignificant. It therefore does not make sense to conduct a more formal assessment of the development's cumulative impacts as per DFFE requirements for cumulative impacts. Many times, more electricity grid infrastructure than currently exists, or is currently proposed, can be accommodated before acceptable levels of change in terms of loss of production potential are exceeded. In reality the landscape in this environment could be covered with power lines and agricultural production potential would not be affected.

Due to the considerations discussed above, the cumulative impact of loss of future agricultural production potential can confidently be assessed as being of very low significance and therefore not having an unacceptable negative impact on the area. In terms of cumulative impact, the proposed development is therefore acceptable, and it is recommended that it be approved.

9.2 TERRESTRIAL BIODIVERSITY

In terms of cumulative impacts in and around the site, there are no built PV or wind energy facilities within 30km of the corridor to date. The three Nuweveld WEFs west of the corridor have been authorised and there is also the Hoogland North and Hoogland South WEFs which have not yet been authorised and lie adjacent and to the north and west of the Nuweveld site. The total footprint from these projects is estimated at 600ha, while the Mura suite of PV projects associated with the current EGI Corridor would cover an area of approximately 1400 ha. While it is clear that there is a node of renewable energy development starting to develop south of Loxton, there are no facilities built to date and the current level of transformation in the area remains low. The contribution of the Mura EGI Corridor at 60 ha therefore considered to represent a low contribution and is therefore considered acceptable.

In terms of specific cumulative impacts, impacts on the Riverine Rabbit and Karoo Dwarf Tortoise would be a concern. However, the contribution of the Mura EGI Corridor to cumulative impact on these two species would be low as the total footprint within the associated habitats would be low and would not be likely to impact the viability of local populations of these species. As the broader area is still largely intact, and most direct impacts are associated with the relatively short, transient, construction phase, cumulative impacts associated with the current project are considered low and acceptable.

The development of the Mura EGI Corridor infrastructure would result in habitat loss and an increase in overall cumulative impacts on fauna and flora in the area. The contribution of the Mura EGI Corridor at less than 60ha is not considered highly significant, especially given the linear nature of the development. Although the area currently experiences a relatively low level of impact, there are numerous renewable developments authorised or currently being planned in the area and it is likely that cumulative impacts will increase into the future. The affected vegetation types are however all still largely intact and the grid connection would not significantly increase cumulative

impacts on these vegetation types at the national scale. The assessment of the cumulative impact of the project is indicated in Table 9-1.

Table 9-1 – Cumulative impact on broad scale ecological processes

Potential Impact: Habitat loss and impact on broad scale ecological processes	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character
Without Mitigation	2	3	3	4	2	**24**	**Low**	(-)
With Mitigation	1	2	3	4	2	**20**	**Low**	(-)
Mitigation and Management Measures	▪ Avoid mapped No-Go areas in the placement of pylons, switching stations and access tracks. ▪ Minimise the development footprint in areas mapped as high sensitivity (i.e. near watercourses and other ecologically significant features). ▪ Clearly demarcate riparian areas near to the development footprint as No-Go areas with appropriate signage and barriers.							

9.3 AQUATIC BIODIVERSITY

Land use in the area currently consists mostly of low-density livestock farming due to the limited water supply and poor carrying capacity of the cover vegetation. Current land and water use impacts on the watercourses and surrounding area are, therefore, low to very low.

Figure 9-1 shows the renewable energy projects within 30km of the proposed PV projects. These projects include 4 Hoogland wind farms (proposed), 3 Nuweveld wind farms (Approved EA), Gamma Grid, Mura EGI, Soutrivier WEF, and Taaibos WEF. The projects all lie within the catchment of the Krom and larger Sout River in the Gamtoos River System and thus do have some potential to result in cumulative impacts. These impacts can however be easily mitigated.

The assessment of the cumulative impact of the projects during the various phases are indicated in **Table 9-2** to **Table 9-4**.

Table 9-2 – Cumulative impact on aquatic ecosystem integrity during the operational phase

Potential Impact: Aquatic ecosystem integrity Increased disturbance of aquatic habitat due to the increased activity	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character
Without Mitigation	2	1	3	3	3	**27**	**Low**	(-)
With Mitigation	2	2	2	2	2	**16**	**Low**	(-)
Mitigation and Management Measures	▪ Minimise works within aquatic ecosystems as far as possible.							

	▪ Construct in the dry season. This is only relevant to works adjacent to the larger watercourses that have instream wetland habitat and are mapped as having a high sensitivity in the aquatic ecological sensitivity mapping. ▪ Share the infrastructure or use existing disturbed areas (e.g. roads and access tracks). ▪ Infrastructure and access tracks are designed to mitigate the stormwater runoff impacts leaving the developed areas. Ensure road crossings structures are properly designed to not result in blockage in the watercourses or erosion. ▪ Monitor invasive alien plant growth and signs of erosion on an ongoing basis to ensure that the disturbed areas do not become infested with invasive alien plants. ▪ Apply the generic EMPr for power line and substation development.

Table 9-3 – Cumulative impact of Water quality deterioration during the construction phase

Potential Impact: Water quality deterioration Increased sedimentation and risks of contamination of surface water runoff during construction	**Magnitude**	**Extent**	**Reversibility**	**Duration**	**Probability**	**Significance**		**Character**
Without Mitigation	2	1	3	2	1	**8**	**Very Low**	(-)
With Mitigation	2	1	1	2	1	**6**	**Very Low**	(-)
Mitigation and Management Measures	▪ Minimise works within aquatic ecosystems as far as possible. ▪ Construct in the dry season. This is only relevant to works adjacent to the larger watercourses that have instream wetland habitat and are mapped as having a high sensitivity in the aquatic ecological sensitivity mapping. ▪ Share the infrastructure or use existing disturbed areas (e.g. roads and access tracks). ▪ Infrastructure and access tracks are designed to mitigate the stormwater runoff impacts leaving the developed areas. Ensure road crossings structures are properly designed to not result in blockage in the watercourses or erosion. ▪ Monitor invasive alien plant growth and signs of erosion on an ongoing basis to ensure that the disturbed areas do not become infested with invasive alien plants. ▪ Apply the generic EMPr for power line and substation development.							

Table 9-4 – Cumulative impact on water availability during the construction phase

Potential Impact: Water availability Increased water use in the construction phases	**Magnitude**	**Extent**	**Reversibility**	**Duration**	**Probability**	**Significance**		**Character**
Without Mitigation	2	2	3	3	2	**20**	**Low**	(-)
With Mitigation	2	1	1	2	1	**6**	**Very Low**	(-)
Mitigation and Management Measures	▪ Minimise works within aquatic ecosystems as far as possible. ▪ Construct in the dry season. This is only relevant to works adjacent to the larger watercourses that have instream wetland habitat and are mapped as having a high sensitivity in the aquatic ecological sensitivity mapping. ▪ Share the infrastructure or use existing disturbed areas (e.g. roads and access tracks). ▪ Infrastructure and access tracks are designed to mitigate the stormwater runoff impacts leaving the developed areas. Ensure road crossings structures are properly designed to not result in blockage in the watercourses or erosion. ▪ Monitor invasive alien plant growth and signs of erosion on an ongoing basis to ensure that the disturbed areas do not become infested with invasive alien plants. ▪ Apply the generic EMPr for power line and substation development.							

9.4 PLANT SPECIES

Cumulative impacts associated with the Mura EGI Corridor are assessed in the Terrestrial Biodiversity Assessment (**Section 9.2**) and are not assessed in detail here. From a plant species and vegetation perspective, the Mura EGI Corridor would have very low impact on plant SCC and the Eastern Upper Karoo vegetation type is little impacted by energy reticulation and renewable energy development to date. As a result, the contribution of the Mura EGI Corridor towards cumulative impact on plant SCC and vegetation is considered acceptable

9.5 ANIMAL SPECIES

In terms of broader cumulative impacts on the Riverine Rabbit, the increase in renewable energy development in the Loxton area is a potential concern. The primary avenues of potential impact would likely be from collisions with vehicles due to the increase in traffic in the area; habitat loss and increase in disturbance due to human activity and turbine noise. Although there are currently no built or preferred bidders in the area, there are numerous planned and approved projects in the area including the adjacent Nuweveld suite of projects as well as the nearby Hoogland North projects. The Riverine Rabbit is considered absent from the Nuweveld site but was confirmed present within the Hoogland project area.

The current Mura suite of PV projects would add to the traffic and possibly some habitat loss. There is however no Riverine Rabbit habitat within the Mura PV footprint areas and habitat loss from the Mura EGI Corridor would also be low, with the result that additional traffic impact is likely the only significant manner in which the Mura project would contribute towards cumulative impacts on the Riverine Rabbit. Consequently, the contribution of the Mura PV projects and the associated EGI corridor to cumulative impact on the Riverine Rabbit is relatively low and is considered acceptable, as indicated in **Table 9-5**.

Table 9-5 – Cumulative impact of disturbance to the Riverine Rabbit

Potential Impact: Disturbance to the Riverine Rabbit	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character
Without Mitigation	2	2	2	4	3	**30**	**Low**	(-)
With Mitigation	2	2	1	4	2	**18**	**Low**	(-)
Mitigation and Management Measures	▪ Avoidance of areas of mapped optimal Riverine Rabbit during construction and maintenance activities. ▪ Adherence to the speed limits of 40km/h for light vehicles and 30km/h for heavy vehicles when off of public roads. ▪ Erosion and alien vegetation management along the power line, with annual surveys and annual implementation of clearing and erosion remediation.							

In terms of broader cumulative impacts on the Karoo Dwarf Tortoise, the increase in renewable energy development in the Loxton area is a potential concern for the Karoo Dwarf Tortoise. The primary impact would likely be from habitat loss and possibly an increase in predation rates. Although there are currently no built or preferred bidders in the area, there are numerous planned and approved projects in the area including the adjacent Nuweveld suite of projects as well as the nearby Hoogland North projects.

The development would contribute to cumulative impacts on the Karoo Dwarf Tortoise due to habitat loss and habitat degradation. The additional contribution of the grid line to habitat loss would however be relatively low as there would be significant avoidance of optimal Karoo Dwarf Tortoise habitat. It is possible that there would be some habitat degradation within Karoo Dwarf Tortoise habitat due to the presence of the service road beneath the grid line, but a more likely source of habitat degradation would be from increased levels of crow predation in areas in proximity to the grid line. The extent over which this latter effect would take place is considered to be relatively limited as there are existing power and telephone lines in several sections of the corridor and it would also likely run adjacent to roads in numerous other sections. The cumulative impact of the disturbance to the Karoo Dwarf Tortoise is indicated in **Table 9-6**.

Table 9-6 – Cumulative impact of disturbance to the Karoo Dwarf Tortoise

Potential Impact: Disturbance to the Karoo Dwarf Tortoise	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character
Without Mitigation	2	2	3	4	2	22	Low	(-)
With Mitigation	2	2	1	4	2	18	Low	(-)
Mitigation and Management Measures	▪ Rehabilitation of disturbed areas and annual monitoring and management of erosion and alien vegetation along the power line. ▪ Annual monitoring and action to ensure that crow nests are removed from the line where present.							

9.6 AVIFAUNA

The assessment of the cumulative impact on avifauna is indicated in **Table 9-7** and **Table 9-8**.

Table 9-7 – Cumulative impact on collision of birds with overhead lines

Potential Impact: Destruction of habitat Birds in flight collide with the lines and are killed either by the impact or by the subsequent impact with the ground	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character
Without Mitigation	4	3	5	4	4	64	High	(-)
With Mitigation	2	3	5	4	3	42	Moderate	(-)
Mitigation and Management Measures	▪ Overhead conductors or earth wires should be fitted with the best available Eskom approved anti bird collision line marking device available at the time of construction. Should new more effective BFDS come available the developer needs to be ready to procure and fit these. ▪ The proposed pylon designs all provide for sufficient clearance between phase and phase, and phase and earthed components, to mitigate the risk of eagle electrocution. In addition, we recommend the use of the standard Eskom Bird Perch on all pole tops to further provide safe perching substrate well above the dangerous hardware. Any deviation from these approved structures should be cleared with an avifaunal specialist.							

Table 9-8 – Cumulative impact on destruction of habitat

Potential Impact: Destruction of habitat Habitat destroyed or altered in such a way as to render it unavailable to birds	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character
Without Mitigation	3	1	3	4	5	55	Moderate	(-)
With Mitigation	3	1	3	4	5	55	Moderate	(-)
Mitigation and Management Measures	▪ Overhead conductors or earth wires should be fitted with the best available Eskom approved anti bird collision line marking device available at the time of construction. Should new more effective BFDS come available the developer needs to be ready to procure and fit these. ▪ The proposed pylon designs all provide for sufficient clearance between phase and phase, and phase and earthed components, to mitigate the risk of eagle electrocution. In addition, we recommend the use of the standard Eskom Bird Perch on all pole tops to further provide safe perching substrate well above the dangerous hardware. Any deviation from these approved structures should be cleared with an avifaunal specialist.							

9.7 HERITAGE

Cumulative impacts would occur through the construction, operation and decommissioning of many projects in the same area. **Figure 9-1** shows the projects within 30km considered in the assessment of cumulative impacts. In terms of archaeology, the magnitude and probability would increase but mitigation would still bring the significance down from moderate negative to very low negative (**Table 9-9**). Graves are unlikely to be impacted and mitigation would reduce the impact significance from low negative to very low negative (**Table 9-10**). Cumulative impacts to the landscape are likely to be moderate negative both before and after mitigation for both the construction (**Table 9-11**) and decommissioning (**Table 9-13**) phases. The operation phase impact significance could potentially be high negative before mitigation (**Table 9-12**).

Table 9-9 – Cumulative impact to archaeological resources during the construction phase

Potential Impact: Archaeological resources	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character
Without Mitigation	2	1	5	5	3	39	Moderate	(-)
With Mitigation	1	1	5	5	1	12	Very Low	(-)

Mitigation and Management Measures	▪ Implement the Chance Finds Protocol

Table 9-10 – Cumulative impact to graves during the construction phase

Potential Impact: Graves	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character
Without Mitigation	1	1	5	5	2	24	Low	(-)
With Mitigation	1	1	5	5	1	12	Very Low	(-)
Mitigation and Management Measures	▪ Report any chance finds							

Table 9-11 – Cumulative impact to cultural landscape during the construction phase

Potential Impact: Cultural landscape	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character
Without Mitigation	3	3	3	2	5	55	Moderate	(-)
With Mitigation	2	2	3	2	5	45	Moderate	(-)
Mitigation and Management Measures	▪ Keep the construction duration as short as possible. ▪ Ensure that the smallest area possible is cleared for construction. ▪ Ensure that any areas not required during operation are rehabilitated.							

Table 9-12 – Cumulative impact to cultural landscape during the operational phase

Potential Impact: Cultural landscape	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character
Without Mitigation	3	3	3	4	5	65	High	(-)
With Mitigation	2	2	3	4	5	55	Moderate	(-)
Mitigation and Management Measures	▪ Ensure that all maintenance activities remain within the approved footprint. ▪ Ensure that night time light pollution is minimised.							

Table 9-13 – Cumulative impact to cultural landscape during the decommissioning phase

Potential Impact: Cultural landscape	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character
Without Mitigation	3	3	3	2	5	**55**	**Moderate**	(-)
With Mitigation	1	2	3	2	5	**40**	**Moderate**	(-)
Mitigation and Management Measures	▪ Keep the decommissioning duration as short as possible. ▪ Ensure that the site is fully rehabilitated after the facility has been removed.							

9.8 TRAFFIC

The cumulative impact on the safety and road network integrity impacts have been assessed.

Cumulative impacts during the construction phase have been assessed as follows:

- Increased Road Incidents
  - The impact of increased traffic volumes on public roads will cause congestion and increase the potential of incidents on the road network within the study area (**Table 9-14**).
- Road Degradation
  - The impact of increased traffic volumes on the public roads will increase the potential for localised road network degradation within the study area (**Table 9-15**).
- Dust
  - The larger the vehicle, the more dust is likely to be generated. This dust hinders the drivers wishing to over-take without a clear view for over-taking, resulting in drivers taking unnecessary chances, which could result in unfavourable consequences. The impact of increased traffic volumes on the unpaved public roads will generate dust (**Table 9-16**).
- Intersection Safety
  - The impact due to the increased traffic volumes at intersections will increase the potential risk of accidents at the intersections, resulting in serious injuries or even fatalities, especially at the intersection on the main roads, when vehicles from the site needing to cross over oncoming traffic (**Table 9-17**).

Table 9-14 – Cumulative impact of increased road incidents during the construction phase

Potential Impact: Increased Road Incidents The increased traffic volumes on the public roads will increase the potential of incidents on the road network within the study area	**Magnitude**	**Extent**	**Reversibility**	**Duration**	**Probability**	**Significance**		**Character**
Without Mitigation	4	3	5	2	4	**56**	**Moderate**	(-)
With Mitigation	4	3	5	2	3	**42**	**Moderate**	(-)
Mitigation and Management Measures	▪ Post relevant road signage along affected routes. ▪ Create local WhatsApp Group, notifying other road users of expected deliveries and associated routes. ▪ Traffic Management Plan (TMP) is to be compiled once the contractor has been appointed and all the relevant details of the construction process are known. The TMP needs to address, inter alia: • clearly defined route/s to the site for specific vehicles needed to transport equipment and materials • scheduled deliveries to avoid local congestion; ▪ Ensure all vehicles are roadworthy, visible, adequately marked, and operated by an appropriately licenced operator. ▪ The developer shall ensure that the contractor provides the necessary driver training to key personnel to minimise the potential of incidents on the public road network. ▪ The developer shall ensure that the contractor erects temporary signs warning motorists of construction vehicles on the approaches to the access road.							

Table 9-15 – Cumulative impact of road degradation during the construction phase

Potential Impact: Road degradation The increased traffic volumes on public roads will increase the potential for localised road network degradation within the study area.	**Magnitude**	**Extent**	**Reversibility**	**Duration**	**Probability**	**Significance**		**Character**
Without Mitigation	3	3	3	2	4	**44**	**Moderate**	(-)
With Mitigation	3	3	3	2	3	**33**	**Moderate**	(-)
Mitigation and Management Measures	▪ Create a local WhatsApp Group for the local community and post notices of road conditions and proposed alternatives. Developer to contribute to the maintenance of the public roads in the area during the construction phase of the development/s. ▪ A photographic record of the road condition should be maintained throughout the various phases of the							

	development/s. This provides an objective assessment and mitigates any subjective views from road users. ▪ Upgrade unpaved roads to a suitable condition for proposed construction vehicles. ▪ Ensure that the roads are left in the same or better condition, post-construction. ▪ All remedial work or modifications to any of the public roads shall be done in consultation with and have the approval of the local road's authority (as is standard practice, this will be finalised during and be a requirement of the municipal planning approval process. ▪ The treacherous section of the gravel road, through the De Jager's Pass and Molteno Pass, is safety concern that need to be addressed by the developer in consultation with the local roads authority. ▪ The route for construction vehicles from the TR 01606/7 to the TR05801 should not unduly impact the local community of Loxton and should avoid the commercial centre of Loxton. ▪ The developer shall ensure that the condition of the roads impacted by construction of the development is left in a similar or better state once the construction phase is complete. ▪ All vehicles delivering equipment and material to the proposed development using the Molteno Pass and De Jager's Pass, shall be limited to a gross vehicle mass not exceeding ten tonnes.

Table 9-16 – Cumulative impact of dust during the construction phase

Potential Impact: Dust The increased traffic volumes on unpaved public roads will generate more dust. The higher the speed and the larger the vehicle, the more dust is likely to be generated. This dust hinders the drivers wishing to over-take without a clear view of over-taking, resulting in drivers taking unnecessary chances, which could result in unfavourable consequences	**Magnitude**	**Extent**	**Reversibility**	**Duration**	**Probability**	**Significance**		**Character**
Without Mitigation	3	3	1	2	4	**36**	**Moderate**	(-)
With Mitigation	3	3	1	2	3	**27**	**Low**	(-)
Mitigation and Management Measures	▪ Reduce travel speed for construction vehicles on the gravel road to reduce dust ▪ Dust suppression of the roads in the immediate vicinity of the site where feasible ▪ Regular preventative maintenance of roads within the immediate vicinity of the site should be conducted over weekends to minimise the impact on the average construction period.							

Table 9-17 – Cumulative impact of intersection safety during the construction phase

Potential Impact: Intersection safety The increased traffic volumes at intersections will increase the potential risk of accidents at the intersections, resulting in serious injuries or even fatalities, especially at the intersection on the main roads, when slow moving vehicles from the site need to cross over fast travelling oncoming traffic.	**Magnitude**	**Extent**	**Reversibility**	**Duration**	**Probability**	**Significance**		**Character**
Without Mitigation	4	3	5	2	4	**56**	**Moderate**	(-)
With Mitigation	4	3	5	2	3	**42**	**Moderate**	(-)
Mitigation and Management Measures	▪ Compile TMP. ▪ Reduce speed at intersections and use appropriate traffic warning signs ▪ Identify alternative routes where possible ▪ Request the assistance of local law enforcement ▪ Ensure that all construction vehicles are roadworthy, visible, adequately marked, and operated by an appropriately licenced operator. ▪ Provide drivers with advanced driver training.							

Cumulative impacts during the operational phase have been assessed as follows:

- Intersection Safety
  - Due to the increased traffic volumes at intersections this will increase the potential risk of accidents at the intersections, resulting in serious injuries or even fatalities especially at the intersection on the main roads, when vehicles from the site need to cross over oncoming traffic.

Table 9-18 – Cumulative impact of intersection safety during the construction phase

Potential Impact: Intersection safety The increased traffic volumes at intersections will increase the potential risk of accidents at the intersections, resulting in serious injuries or even fatalities, especially at the intersection on the main roads, when slow moving vehicles from the site need to cross over fast travelling oncoming traffic.	**Magnitude**	**Extent**	**Reversibility**	**Duration**	**Probability**	**Significance**		**Character**
Without Mitigation	1	3	5	2	3	**33**	**Moderate**	(-)
With Mitigation	1	3	5	2	3	**33**	**Moderate**	(-)
Mitigation and Management Measures	▪ Compile TMP. ▪ Reduce speed at intersections and use appropriate traffic warning signs ▪ Identify alternative routes where possible ▪ Request the assistance of local law enforcement							

	▪ Ensure that all construction vehicles are roadworthy, visible, adequately marked, and operated by an appropriately licenced operator. ▪ Provide drivers with advanced driver training.

9.9 VISUAL

Figure 9-1 indicates other similar renewable energy projects, either existing or proposed, in order to assess cumulative visual impacts within a 30km radius of the proposed Mura solar project. The proposed Hoogland WEF, and Nuweveld WEF by Redcap fall within this radius. Only parts of the Nuweveld WEF would potentially be seen in combination with the proposed Mura solar projects, although the nature of the topography would largely screen these projects from each other. Cumulative Impacts have been assessed in the Cumulative Visual Impact summary in Table 16.

Table 9-19 – Cumulative impact of visual impact of renewable energy projects within 30km

Potential Impact: Visual effect of renewable energy projects within 30km Combined visual effect of existing and proposed renewable energy projects on scenic resources and sensitive receptors	**Magnitude**	**Extent**	**Reversibility**	**Duration**	**Probability**	**Significance**		**Character**
Without Mitigation	3	3	3	5	4	**56**	**Moderate**	(-)
With Mitigation	3	3	3	5	4	**56**	**Moderate**	(-)
Mitigation and Management Measures	▪ Mitigation only achievable by means of avoidance or reduction in the extent of energy facilities.							

9.10 SOCIAL

Assessment of cumulative impacts considered Mura 1, 2, 3 and 4 SEFs; Hoogland 1, 2, 3 and 4 WEFs; Nuweveld North, East and West WEFs, Taaibos WEFs, Soutrivier WEFs, as well as the Mura, Hoogland, Nuweveld and Gamma Grid Corridors. The following cumulative impacts have been identified in terms of socio-economic:

- Impacts on regional employment and household income associated with project activities and expenditure (**Table 9-20**):
  - The projects would generate construction expenditure which would accrue to construction workers. The cumulative annual operational spend would be equivalent to 53% of BWLM's Regional Gross Domestic Product (RGDP) and 37% of CKDM's RGDP. Note however that only a portion of operational expenditure would occur within the local and regional areas in accordance with REIPPPP requirements, with most of the impact likely to be experienced at the provincial level in the case of the Mura Development.
  - The projects would generate temporary jobs during construction and the operational phase. For reference, the number of jobs which would accrue to locals represents about 2–3% of the total jobs in BWLM as of 2019.
- Impacts associated with the funding of local socio-economic development, enterprise development and shareholding (**Table 9-21**):

- The total cumulative funding of local socio-economic and enterprise development associated with the projects in the area would generate a substantial amount of economic activity.

- Impacts associated primarily with the influx of people (**Table 9-22**):
  - The projects in the area would increase in the likelihood of a larger influx of people to the area whether they have jobs secured or are job seekers. This would result in a higher risk of social problems associated with influx particularly during construction.
  - It is expected that adequate accommodation will be available. With adequate forewarning, it is also likely that businesses will respond to the opportunity and add accommodation stock if needed.
- Impacts on tourism (**Table 9-23**):
  - The projects in the area would result in an increase in tourism risk but also tourism opportunities from business tourism, particularly during construction.
  - The significance of this impact is rated as Moderate Positive.
- Impacts on surrounding landowners and communities (**Table 9-24**):
  - The assessment partially draws on the findings of other specialist studies including the TIA and VIA.

Table 9-20 – Cumulative impact on regional employment and household income

Potential Impact: Regional employment and household income	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character
Without Mitigation	4	3	3	4	5	**70**	**High**	(+)
With Mitigation	5	3	3	5	5	**80**	**High**	(+)
Mitigation and Management Measures	▪ Setting targets for how much local labour should be used based on the needs of the applicant and the availability of existing skills and people that are willing to undergo training. Opportunities for the training of unskilled and skilled workers from local communities should be maximized, including those from adjacent farms who have indicated that they would like to benefit from the proposed project and its related opportunities. ▪ Using local sub-contractors where possible and requiring that contractors from outside the local area that tender also meet targets for how many locals are given employment. ▪ Exploring ways to enhance local community benefits with a focus on broad-based BEE and preferential procurement.							

Table 9-21 – Cumulative impact of funding of local socio-economic development

Potential Impact: Funding of local socio-economic development	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character
Without Mitigation	3	3	3	4	5	65	High	(+)
With Mitigation	4	3	3	5	5	75	High	(+)
Mitigation and Management Measures	▪ The applicant must establish a communications committee early on in the project to ensure inclusive planning and regular feedback from stakeholders. ▪ Community development should be guided by a community needs analysis, drawn up by a third party and based on local socio-economic conditions, a review of planning documents such as the IDP, and discussions with local government and community representatives. Interventions should be planned in collaboration with other energy developers in the area where relevant. ▪ Close liaison with local municipal managers, local councillors and other stakeholders involved in socio-economic development is required to ensure that any projects are integrated into wider socio-economic development strategies and plans.							

Table 9-22 – Cumulative impact of influx of people

Potential Impact: Influx of people	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character
Without Mitigation	4	2	3	4	4	52	Moderate	(-)
With Mitigation	3	2	3	4	4	48	Moderate	(-)
Mitigation and Management Measures	▪ A 'locals first' policy with regard to construction and operational labour needs. ▪ A complaints register should be available on site to any individual who may have a particular complaint with regards to the construction or operations processes. ▪ Close coordination with the municipality is required, including regular meetings.							

Table 9-23 – Cumulative impact on tourism

Potential Impact: Tourism	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character
Without Mitigation	4	2	3	4	3	**39**	**Moderate**	(-)
With Mitigation	3	2	3	4	3	**36**	**Low**	(-)
Mitigation and Management Measures	▪ Impacts on tourism are dependent on how the site is developed and managed to minimise negative biophysical impacts. The measures recommended in other specialist reports to these impacts (primarily the minimisation of visual, heritage, traffic and ecological impacts) would thus also minimise tourism impacts.							

Table 9-24 – Cumulative impact of surrounding landowners and communities

Potential Impact: Surrounding landowners and communities	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character
Without Mitigation	5	2	3	2	4	**48**	**Moderate**	(-)
With Mitigation	4	2	3	2	3	**33**	**Moderate**	(-)
Mitigation and Management Measures	▪ A complaints register should be available on site to any individual who may have a particular complaint with regards to the construction or operations processes.							

10 SENSITIVITY MAPPING AND DEVELOPMENT ENVELOPE

The EGI corridor, as indicated in **Section 3.1**, was assessed by the specialists as part of desktop assessments and subsequent fieldwork. The outcomes of their assessments are outlined in **Sections 7**, **8** and **9** of this report. The specialists provided their sensitivity layers indicating the various sensitivities present on site in line with the mapping criteria detailed below (**Table 10-1)**.

Table 10-1 - Mapping criteria utilised by the specialists for the assessment

No-Go	Areas or features that are considered of such sensitivity or importance that any adverse effects upon them may be regarded as a fatal flaw.
High	Areas or features that are considered to have high sensitivity. Development in these areas must be limited and must remain within any acceptable limits of change as determined by the specialist. Development should also comply with any other restrictions or mitigation measures identified by the specialist.
Medium	Medium sensitivity areas are considered to be developable; however, the nature of the effects should remain within any acceptable limits of change as determined by the specialist. Development should also comply with any other restrictions or mitigation measures identified by the specialist.
Low	Low sensitivity areas that are considered to be developable however specialists may still wish to define acceptable limits of change should they deem this necessary.

The environmental sensitivities identified on site are included in **Table 10-2**. The specialists were requested to split their mapping into two types: 1) overheads lines and 2) pylons, switching stations and access tracks. Utilising the sensitivity layers (which includes the required buffers) provided by the specialists, a preliminary consolidated environmental sensitivity map showing the “No-Go” areas (**Figure 10-1**) has been compiled. From this, the preliminary grid alignment, pylon placement and switching station locations were determined within the Corridor. The grid alignment and associated infrastructure avoids all no-go areas, as discussed in **Section 8**. It should however be noted that all specialists have indicated that any grid alignment, pylon placement and switching station location can be considered acceptable within the corridor, if the no-go areas are avoided.

The preliminary grid alignment, pylon placement, switching station locations are shown in **Figure 10-2**.

Table 10-2 - Environmental Sensitivities identified by specialists

Discipline	Infrastructure Type and Sensitivity Criteria		Exceptions
	Overhead lines	Access tracks, switching stations and pylons	
Aquatic Ecology		NO-GO: ▪ 35m buffer of the Krom Rivier and surrounding valley bottom and floodplains wetlands	Limited-service tracks may be constructed through these features. A walk-down should be conducted by a specialist to

Discipline	Infrastructure Type and Sensitivity Criteria		Exceptions
	Overhead lines	Access tracks, switching stations and pylons	
		▪ 35m buffer of small tributaries ▪ 35m buffer of valley bottom wetlands	identify the most suited new crossing positions should a new crossing be required. The new crossing structures should be properly designed to not result in blockage in the watercourses or erosion.
Heritage	NO-GO: ▪ Grade IIIA features	NO-GO: ▪ Grade IIIA features with 50 m buffer	
	HIGH: ▪ Grade IIIB features	HIGH: ▪ Grade IIIB features with 50 m buffer	
	MEDIUM: ▪ Grade IIIC/GPA/GPB features	MEDIUM: ▪ Grade IIIC/GPA/GPB features with 50 m buffer	
Avifauna	NO-GO: ▪ 1km buffer around a Verreaux Eagle nest	NO-GO: ▪ 1km buffer around a Verreaux Eagle nest	
	HIGH: ▪ 250m buffer around dams	HIGH: ▪ 250m buffer around dams	One exception is applicable at a small dam in the far west of the EGI corridor (west of Mura 1 and 2) where it has been agreed between specialist and applicant that the EGI corridor may infringe on the buffer area.
Terrestrial Ecology		NO-GO: ▪ Optimal Riverine Rabbit Habitat ▪ Hills	
		HIGH: ▪ Slopes (dwarf tortoise habitat) ▪ Minor drainage ▪ Sub-optimal habitat	
Visual	NO-GO:	NO-GO:	

Discipline	Infrastructure Type and Sensitivity Criteria		Exceptions
	Overhead lines	Access tracks, switching stations and pylons	
	▪ Topographic features within 100m ▪ Steep slopes > 1:4 ▪ Scenic routes, ports, and passes within 100m ▪ Scenic water features within 50m ▪ District roads within 50m	▪ Topographic features within 100m	
	HIGH: ▪ Topographic features within 150m ▪ Steep slopes > 1:6 ▪ Linear topo features (peaks) within 150m ▪ Scenic water features within 100m ▪ Scenic routes, ports, and passes within 150 ▪ District roads within 75m	HIGH: ▪ Topographic features within 150m ▪ Steep slopes > 1:2 ▪ Scenic routes, ports, and passes within 150m ▪ Scenic water features within 100m ▪ District roads within 75m ▪ Linear topo features (peaks) within 150m	
	MEDIUM: ▪ Topographic features within 250m ▪ Steep slopes > 1:10 ▪ Scenic routes, ports, and passes within 250m ▪ Scenic water features within 150m ▪ District roads within 75m ▪ Linear topo features (peaks) within 250m	MEDIUM: ▪ Topographic features within 250m ▪ Scenic routes, ports, and passes within 250m ▪ Scenic water features within 150m ▪ District roads within 100m ▪ Linear topo features (peaks) within 250m	

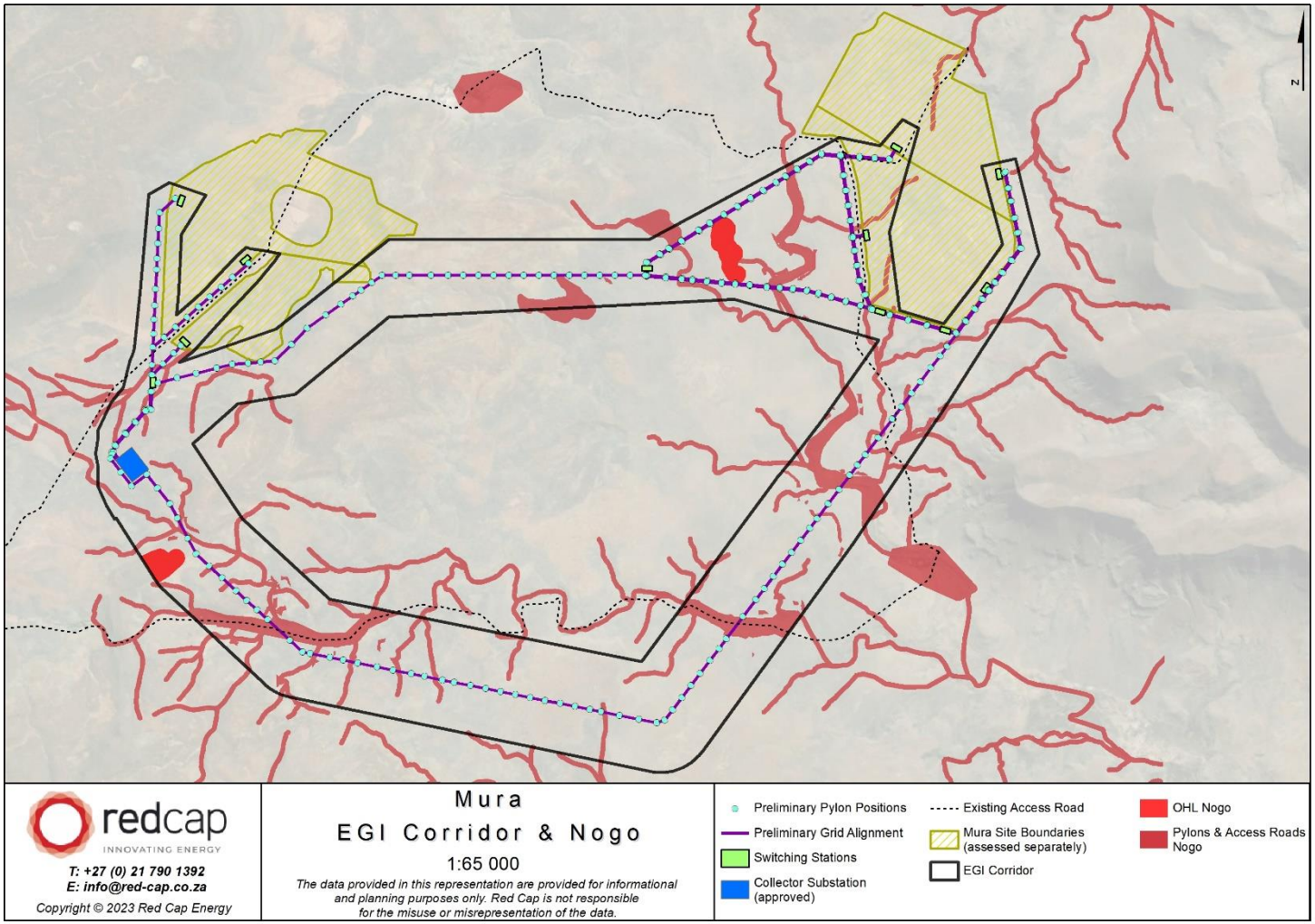


Figure 10-1 - Combined No-Go Sensitivity Map and for the Mura EGI Corridor

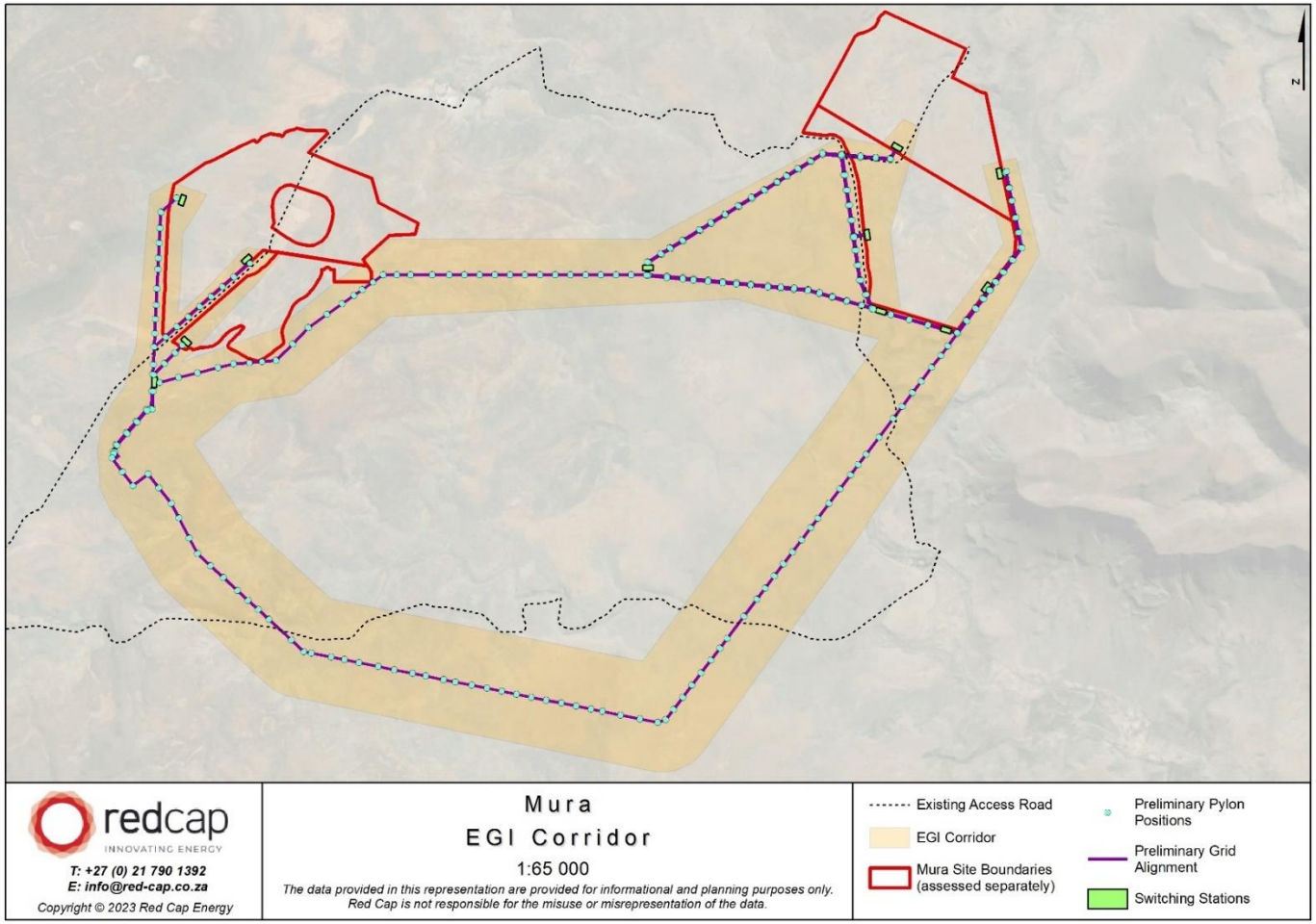


Figure 10-2 – Proposed gridline alignment, preliminary pylon positions and switching stations the locations within Mura EGI Corridor

11 ENVIRONMENTAL IMPACT STATEMENT

The essence of any impact assessment process is aimed at ensuring informed decision-making, environmental accountability, and to assist in achieving environmentally sound and sustainable development. In terms of NEMA, the commitment to sustainable development is evident in the provision that "development must be socially, environmentally and economically sustainable…. and requires the consideration of all relevant factors…". NEMA also imposes a duty of care, which places an obligation on any person who has caused, is causing, or is likely to cause damage to the environment to take reasonable steps to prevent such damage. In terms of NEMA's preventative principle, potentially negative impacts on the environment and on people's environmental rights (in terms of the Constitution of the Republic of South Africa, Act No. 108 of 1996) should be anticipated and prevented, and where they cannot be prevented altogether, they must be minimised and remedied in terms of "reasonable measures".

In assessing the environmental feasibility of the proposed construction of the proposed Project, the requirements of all relevant legislation have been considered. The identification and development of appropriate mitigation measures that should be implemented to minimise potentially significant impacts associated with the project, has been informed by best practice principles, past experience, and the relevant legislation (where applicable).

The conclusions of this BA are the result of comprehensive assessments. The BAR will be subject to public review, which will be undertaken according to the requirements of NEMA with every effort made to include representatives of all stakeholders within the process. The BAR will be updated and finalised taking into consideration all comments received during the public review period before being submitted to the CA for consideration.

11.1 IMPACT SUMMARY

A summary of the identified impacts and corresponding significance ratings for the proposed Mura EGI Corridor is provided in **Table 11-1** below. With the implementation of the mitigation measures prescribed by the specialists, the impacts are generally rated as Moderate to Very Low.

Table 11-1 – Impact Summary

Aspect	Impact Description	Phase	Character	Without Mitigation		With Mitigation	
Terrestrial Biodiversity	CBAs and Ecological Processes	C	(-)	48	Moderate	22	Low
	CBAs and Ecological Processes	O	(-)	33	Moderate	20	Low
Aquatic Biodiversity	Decrease in aquatic ecosystem integrity	C	(-)	12	Very Low	5	Very Low
	Water quality deterioration	C	(-)	6	Very Low	5	Very Low
	Water availability	C	(-)	20	Low	12	Very Low

Aspect	Impact Description	Phase	Character	Without Mitigation		With Mitigation	
	Decrease in habitat integrity	C	(-)	16	Low	5	Very Low
	Aquatic ecosystem integrity	O	(-)	15	Very Low	10	Very Low
	Aquatic ecosystem integrity	O	(-)	24	Low	10	Very Low
	Loss of aquatic habitat and biota	D	(-)	12	Very Low	5	Very Low
	Aquatic ecosystem integrity	D	(-)	12	Very Low	5	Very Low
Animal Species	Disturbance to the Riverine Rabbit	C	(-)	30	Low	24	Low
	Disturbance to the Karoo Dwarf Tortoise	C	(-)	36	Moderate	27	Low
	Disturbance to the Riverine Rabbit	O	(-)	30	Low	16	Low
	Disturbance to the Karoo Dwarf Tortoise	O	(-)	33	Moderate	18	Low
	Disturbance to the Riverine Rabbit	D	(-)	27	Low	18	Low
	Disturbance to the Karoo Dwarf Tortoise	D	(-)	27	Low	18	Low
Avifauna	Destruction of habitat	C	(-)	55	Moderate	60	Moderate
	Disturbance of birds	C	(-)	24	Low	24	Low
	Collision of birds with overhead lines	O	(-)	64	High	42	Moderate
	Electrocution of birds	O	(-)	64	High	26	Low
	Disturbance of birds	D	(-)	24	Low	24	Low
Archaeological and Cultural Heritage	Archaeological resources	C	(-)	24	Low	12	Very Low
	Graves	C	(-)	12	Very Low	12	Very Low
	Cultural landscape	C	(-)	45	Moderate	45	Moderate
	Cultural landscape	O	(-)	55	Moderate	55	Moderate

Aspect	Impact Description	Phase	Character	Without Mitigation		With Mitigation	
	Cultural landscape	D	(-)	45	Moderate	40	Moderate
Palaeontology	Loss of fossil heritage resources	C	(-)	26	Low	13	Very Low
Traffic	Increased Road Incidents	C	(-)	56	Moderate	42	Moderate
	Road degradation	C	(-)	44	Moderate	33	Moderate
	Dust	C	(-)	36	Moderate	27	Low
	Intersection safety	C	(-)	56	Moderate	42	Moderate
	Intersection safety	O	(-)	33	Moderate	33	Moderate
Visual	Visual effect of construction activities on scenic resources and sensitive receptors	C	(-)	40	Moderate	30	Low
	Visual intrusion on scenic resources and sensitive receptors	O	(-)	52	Moderate	39	Moderate
	Visual intrusion of activities to remove infrastructure	D	(-)	36	Moderate	27	Low
Social	Regional employment and household income	C	(+)	55	Moderate	60	Moderate
	Influx of people	C	(-)	33	Moderate	27	Low
	Tourism	C	(-)	30	Low	27	Low
	Surrounding landowners and communities	C	(-)	44	Moderate	30	Low
	Regional employment and household income	O	(+)	60	Moderate	65	High
	Funding of local socio-economic development	O	(+)	55	Moderate	60	Moderate
	Influx of people	O	(-)	33	Moderate	30	Low
	Tourism	O	(-)	33	Moderate	30	Low
	Surrounding landowners and communities	O	(-)	36	Moderate	22	Low
	Regional employment and household income	C	(+)	55	Moderate	60	Moderate

Aspect	Impact Description	Phase	Character	Without Mitigation		With Mitigation	
	Influx of people	C	(-)	33	Moderate	27	Low
	Tourism	C	(-)	30	Low	27	Low
	Surrounding landowners and communities	C	(-)	44	Moderate	30	Low

11.2 SPECIALIST CONCLUSIONS

11.2.1 AGRICULTURAL POTENTIAL

The conclusion of this assessment is that the proposed development will have very low agricultural impact and will therefore be acceptable in terms of its impact on the agricultural production capability of the site. The only impact of this development is the loss grazing land of up to 48 hectares for the project. This is assessed as being of very low significance because the amount of land lost is small and the production potential of the land is very limited.

The power line itself has insignificant agricultural impact because all agricultural activities that are viable in this environment, can continue completely unhindered underneath the power line and there will therefore be no loss of agricultural production potential underneath it.

The only potential source of impact from the power line is minimal disturbance to the land (erosion and topsoil loss) during construction (and decommissioning). This impact can be completely mitigated with standard, mitigation measures that are included in the DFFE Generic EMPrs.

From an agricultural impact point of view, it is recommended that the development be approved.

The conclusion of this assessment on the acceptability of the proposed development and the recommendation for its approval is not subject to any conditions, other than recommended mitigation as per the EMPr.

11.2.2 TERRESTRIAL BIODIVERSITY

There are no impacts associated with the development of the Mura EGI Corridor on terrestrial biodiversity that cannot be mitigated to an acceptable level. As such, should all the proposed mitigation be implemented, the Mura EGI Corridor development is deemed acceptable from a terrestrial ecological impact perspective. In terms of cumulative impacts, the affected area has not been significantly impacted by renewable energy development to date and the contribution of the current power line development to cumulative impact is considered low and acceptable. It is thus the reasoned opinion of the specialist that the Mura EGI Corridor development should be authorised subject to the various mitigation and avoidance measures as indicated.

11.2.3 AQUATIC BIODIVERSITY

The study area is in the upper reaches of several tributaries of the Krom River, a tributary of the Sout River in the Groot / Gamtoos River System. The Screening Tool map for the Aquatic Biodiversity Combined Sensitivity at the site indicates most of the wider area to be of low sensitivity, with only the main channels of the larger rivers mapped as being of very high sensitivity. The very high sensitivity is linked to aquatic Critical Biodiversity Areas that are associated with larger rivers that contain instream wetland habitat. These larger river channels will need to be crossed by the

proposed Grid Connection infrastructure. The findings of this assessment largely agree with the screening tool mapping.

The study area does not lie within a FEPA River Subcatchment. The only natural instream wetland areas within the study area are within the larger channel of the Krom River downstream of the site that has been mapped in the FEPA Wetland mapping as Upper Nama Karoo unchanneled valley-bottom wetlands. These wetlands are also mapped in the National Wetland Map (version 5) as valley-bottom wetland. All other FEPA wetland mapping within the study area comprises artificial wetlands associated with farm dams. The watercourses are all mapped as aquatic ESAs (ESA1). Some aquatic ESAs (ESA2) occur where there is localised disturbance within the watercourses, such as at the track/road crossings. Within the terrestrial CBAs, the watercourses have also been mapped as aquatic CBAs.

The rivers and wetlands within the study area are still in a natural ecological condition with few modifications. The Krom River is more impacted by surrounding landuse activities and is in a largely natural to moderately modified ecological condition. The Krom River in the study area is deemed to be of a high ecological importance and sensitivity. This is due to the importance of this larger aquatic ecosystem in providing a diversity of habitats and being important refugia for biota as well as corridors for the movement within the landscape. The wetland features within the study area are considered of moderate ecological importance and sensitivity as they are closely associated with the larger Krom River, providing habitat and ecological corridors for the movement of biota.

Based on the present ecological condition and the ecological sensitivity and importance, aquatic sensitivity and recommended buffers have been mapped to protect these ecosystems. The recommended buffer area between the aquatic features and the project components to ensure these aquatic ecosystems are not impacted by the proposed activities is 35m from the centre of these streams or along the delineated edge of the wide associated floodplain area.

As there is some flexibility relating to the exact location of the pylons, it is usually easy to mitigate the potential impact by locating them far from the freshwater features. Thus, it is usually the associated access track that potentially impacts more on the freshwater features where they need to cross freshwater features. Such crossings and disturbances of the aquatic features need to be minimised and mitigated as far as possible. Most of the potential aquatic ecosystem impacts of the proposed grid connection are likely to take place during the construction phase.

Should the development restrictions be adhered to, as recommended in the report, any grid routing and switching station placement within the EGI corridor would be acceptable. Based on the findings of this specialist assessment, there is no reason, from a freshwater perspective, why the proposed development (with the implementation of the above-mentioned mitigation measures) should not be authorized.

11.2.4 PLANT SPECIES

This compliance statement is applicable to the Mura EGI Corridor development with specific reference to the layout as provided for the assessment.

The vegetation of the site is mapped entirely as Eastern Upper Karoo, but some Upper Karoo Hardeveld and Southern Karoo Riviere vegetation types are also present. There are no threatened vegetation types present within the corridor. There are however some habitats present that are

considered sensitive but which are covered under the Combined Terrestrial Biodiversity Theme Impact Assessment Report for the project.

No plant species of conservation concern as identified by the DFFE Screening Tool were observed within the Corridor, and based on the available information for these species identified as potentially present, it is unlikely that any of these are present within the corridor.

The footprint of the Mura EGI Corridor is restricted to low sensitivity areas with no observed plant species of conservation concern present. As such, from a plant species perspective there are no reasons to oppose the Mura EGI Corridor.

11.2.5 ANIMAL SPECIES

The Mura EGI Corridor includes several areas of riparian habitat with confirmed recent Riverine Rabbit observations, indicating that this species is likely to be present at least occasionally within the affected area. The overall extent of good condition habitat however, represents less than 0.1% of the overall area of occupancy of the Riverine Rabbit and the development would in turn impact less than 1% of the habitat within the corridor, within sub-optimal areas, if all all. As such, this places the relative risk associated with the construction and operation of Mura Grid Connection on the Riverine Rabbit and associated habitat into perspective.

Although Riverine Rabbits and associated habitat have been confirmed present within the Mura EGI Corridor, the development footprint within the areas of identified suitable habitat can be reduced to a very low level if no-go areas are avoided. As a result, long-term impacts associated with the Mura grid connection infrastructure on the Riverine Rabbit are likely to be low. Consequently, the development of the Mura EGI corridor is considered acceptable with the implementation of the suggested avoidance and monitoring as indicated.

The Mura EGI Corridor includes a few rocky ridges and mountainous areas considered to represent potentially suitable habitat for the Karoo Dwarf Tortoise. As some of these are quite extensive within the corridor, it would not be possible to entirely avoid these areas. Consequently, some direct habitat loss for the Karoo Dwarf Tortoise within these areas is inevitable but has been estimated at no more than 7ha. This is insignificant when considered in context of the range of this species. Direct habitat loss is therefore not considered to represent a significant source of potential impact associated with the Mura EGI Corridor on the Karoo Dwarf Tortoise.

During operation, there is a risk that the pylons would attract crows and increase the local density of crows, thereby increasing predation levels on the Karoo Dwarf Tortoise. Given the low reproductive rate of the Karoo Dwarf Tortoise, even relatively low levels of predation would be likely to have significant long-term negative impacts on local tortoise populations. It is therefore recommended that the pylons are designed in a manner which discourages the use of the pylons by crows for nesting, and that crow nests are removed regularly from pylons within and near (1km) suitable Karoo Dwarf Tortoise habitat as mapped in this assessment.

The direct impact of the Mura EGI Corridor on the Karoo Dwarf Tortoise would be low and is not considered significant. Indirect impacts, particularly predation by crows would potentially represent a more persistent, long-term threat to the Karoo Dwarf Tortoise. However, with the implementation of the suggested mitigation and avoidance measures, it is likely that his impact can be reduced to an acceptable, low level. Consequently, the development of the Mura EGI Corridor is considered

acceptable with the implementation of the suggested avoidance and monitoring as indicated and should be allowed to proceed with regards to potential impacts on the Karoo Dwarf Tortoise.

11.2.6 AVIFAUNA

Wildskies has made the following findings with respect to avifauna:

- A total of 88 bird species were recorded on site by Wildskies pre-construction bird monitoring methods. Five of these 88 species are regionally Red Listed: Ludwig's Bustard is Endangered; Verreaux's Eagle is Vulnerable; and Karoo Korhaan, Blue Crane and Sclater's Lark are Near-threatened (Taylor et al, 2015).
- Wildskies judge four priority bird species to be at High or Medium risk (pre-mitigation) if the proposed projects proceed. Ludwig's Bustard (Endangered), Karoo Korhaan (Near-threatened), and Blue Crane (Near-threatened) are at High risk, whilst Verreaux's Eagle is at Medium risk. These species are primarily at risk of collision with the overhead lines. Electrocution of large eagles, such as Verreaux's Eagle, perched on pylons is also a risk, although can be comprehensively mitigated.

The construction of the proposed power lines and switching stations will transform some natural habitat, and will also pose a bird collision risk (in the case of the overhead lines). The impacts of the proposed project are all rated as Moderate Negative or even Low Negative significance after mitigation. Wildskies recommend that the project be authorised, provided that the recommendations of the specialist are implemented.

11.2.7 HERITAGE

The heritage specialist concludes that there are no significant concerns for the proposed powerline project. A few sites are known to occur within the corridor, but given the size of the corridor, it is expected that these will be easily avoided, as would any further sites discovered during the recommended pre-construction survey. It is notable that the powerlines would not be constructed unless some or all of the associated Mura 1 to 4 PV facilities are built. As such, landscape impacts from the powerlines would only occur if the electrical use of the landscape for PV power generation is already approved. Heritage indicators are specified in **Table 11-2**. it is the opinion of the heritage specialist that the project should be authorised in full.

Table 11-2 – Heritage indicators and responses

Indicator	Response
Uncontrolled damage to fossils should be minimised as far as possible	Significant fossils are not expected in the study area but a Chance Finds Protocol has been supplied for inclusion in the EMPr.
Direct damage to archaeological sites should be avoided as far as possible and, where some damage to significant sites is unavoidable, scientific/historical data should be rescued.	A pre-construction survey will be required once the final alignment has been chosen and authorised.
Buffers of at least 30 m should be maintained around known archaeological sites as far as possible.	This cannot be determined at this stage as no final alignment is available. It is nonetheless expected that this indicator will be easily met since sites tend to be low in density.

The powerline should cross the DR02317 road in locations approved by the visual specialists.	The crossing locations will be informed by the visual specialists work in order to minimise visual impacts to the landscape and road users.

11.2.8 PALAEONTOLOGY

It is concluded that the Mura EGI Corridor area, including the footprints of all associated infrastructure (e.g. access road network) are, in practice, of LOW Palaeosensitivity, although the potential for unrecorded fossil sites of high scientific value cannot be entirely discounted. The provisional Medium to Very High Palaeosensitivity mapped by the DFFE Screening Tool is accordingly contested here.

No recorded fossil sites of unique scientific or conservation value are likely to be directly impacted by the proposed renewable energy and electrical infrastructure developments and no further palaeontological studies or mitigation is proposed here with regard to these sites. Pending the discovery of significant new fossil finds before or during construction, no further specialist palaeontological studies, monitoring or mitigation are recommended for these renewable energy and electrical infrastructure projects. The Environmental Control Officer (ECO) responsible for the developments should be aware of the potential for fossil sites of scientific value and should monitor substantial surface clearance and excavations for fossils on an ongoing basis during the Construction Phase. Any new fossil sites revealed during the Construction Phase of the developments are best handled by the Chance Fossil Finds Protocol included in the EMPR.

11.2.9 TRAFFIC

Based on the information provided the following conclusions can be drawn:

- Road Conditions:
  - Many of the roads within the study area are gravel roads. Some of the roads are in better condition than others. There is a higher level of maintenance on the roads in the Western Cape than there is in the Northern Cape. All roads adjacent to the proposed development are expected to deteriorate due to the increased traffic volumes. Thus, the developer would have to assist local roads authorities with regular maintenance of these roads.
  - Some roads can be used by light vehicles but are not conducive to busses or delivery vehicles. The TMP needs to prescribe which roads are to be used.
  - Traverses the Molteno Pass and De Jager's Pass, are extremely treacherous, with very few barriers, steep drop-offs, very tight corners, negative banking and loose gravel. The contractor needs to assess the viability of using this road for the commuting of personnel to and from site safely.
  - The majority of the deliveries to the proposed developments will be transported via the TR 05801 via Loxton and DR 02317;
  - All vehicles delivering equipment and material to the proposed development using the Molteno Pass and De Jager's Pass, shall be limited to a gross vehicle mass not exceeding ten tonnes.
  - The expected traffic increase on the road network during the peak construction phase will lead to more significant wear and tear of the roads but will not have an undue detrimental impact on the structure of the roads if the roads are properly maintained. The developer shall contribute to maintaining the public road network affected by the development as identified by the local roads' authorities. It is proposed that the developer contribute to the maintenance of the road

network during the construction and the operational phases, commencing the year after successfully achieving Commercial Operation.
  - Additional ongoing funding from the developer towards the maintenance of the roads will have a positive impact on the local road conditions and community.
  - The public road network within the study will need to be reassessed at the time of implementation to verify the functionality of the roads, which could have changed since the initial inspection.

- Transportation Route
  - The proposed developments are accessed from well-established transportation routes between large commercial centres within South Africa.
  - Previously established transportation routes from the Commercial Centres and Container Terminal in South Africa are to be used.
  - The final route selection is subject to the limitations specified in the transport permits and the vehicles to be used by the appointed logistics company.
  - All site entrances from public roads, existing intersection and road alignments that require upgrading to accommodate the transportation requirements of equipment and material are to comply with geometric standards and approved by the relevant roads' authorities.
  - All equipment and material transported to the proposed developments on vehicles with a gross vehicle mass exceeding ten tonnes shall be on the TR05801 via Loxton.
  - All vehicles transporting equipment and material to the proposed developments via the Molteno Pass and De Jager's Pass, shall be limited to a gross vehicle mass of not exceeding ten tonnes due to the constraints imposed by the road geometry;
  - No anomalies associated with the proposed transportation routes were observed or identified that will compromise the development. However, this will have to be confirmed by the logistics contractor once appointed.

- Traffic Volumes
  - The most significant impact on traffic volumes results from the commuting of personnel, to and from the proposed developments, in the morning and the afternoon;
  - At no point during the construction or operational phases of the proposed developments does the traffic volume on the various roads exceed 50 trips per hour, which is the threshold for a detailed Traffic Impact Assessment.
  - The cumulative traffic volume generated during the peak construction phase of the Mura SEF and Grid Connection, together with the operational phase of the three Nuweveld WEF and the construction of Hoogland WEF (North), Hoogland WEF (South) and the Gamma Grid Connection, is in the order of:
    - Peak Traffic: The maximum number of vehicles on any one section of the public road network within a given hour is estimated to be in the order of 89 vph.
    - Diurnal Traffic: The maximum number of vehicles on the road network within a given hour is estimated to be in the order of 87 vph. Which equates to approximately 696 vehicles, over an eight-hour period.
  - The cumulative traffic volume generated during the operational phase of four Mura SEF, the three Nuweveld WEF, the Hoogland WEF (North), and the Hoogland WEF (South), is in the order of:

- Peak Traffic: The maximum number of vehicles on the road network within a given hour is estimated to be in the order of 29 vph;
- Diurnal Traffic: The maximum number of vehicles on the road network within a given hour is estimated to be in the order of 6 vph. Which equates to approximately 48 vehicles, over an eight-hour period.

- The minimum required level of service for gravel roads is LOS C. For the worst-case scenario, the additional traffic volume of the proposed developments results in a LOS B. Thus, the additional traffic volume does not compromise the level of service of the roads.

- Safety

- The winding roads through the De Jager's Pass and Molteno Pass, is a serious safety concern that needs to be addressed by the developer in consultation with the local roads' authority.
- The vertical alignment of the DR 02317, raises a number of serious concerns, ranging from blind rises to loss of control when travelling at high speeds.
- This is a rural area, home to many species of small fauna, including livestock and wild animals. Stray animals on/crossing the road is a common occurrence that could result in a collision.
- Excessive fine and loose material was observed along the various roads creating visibility concerns in dry weather and slippery conditions in wet weather.
- Additional vehicles on the road will be subject to these hazards, with a potential for an increase in incidents.
- The passing through homesteads that straddle the roads is a serious safety concern that needs to be included in the TMP.
- The area is prone to flash flooding, resulting in drifts being impassable. Road users need to be sensitised as to the intrinsic dangers of crossing these drifts when in flood.

11.2.10 VISUAL

The layout of the EGI powerline and switching stations has been subject to an iterative planning process, based on the various specialist findings, including the mapping of scenic resources and sensitive receptors. The currently proposed layout largely succeeds in avoiding visually sensitive areas as indicated on the visual sensitivity map in **Section 7.9**.

The cumulative visual impact of the Mura EGI and solar facilities could affect the rural quality of the area, but this would be fairly localised.

It is the opinion of the Visual Specialists that provided the recommended mitigation measures and EMPr are implemented, the project would not present a potential fatal flaw in visual terms and could be authorised.

11.2.11 SOCIAL

In term of positive impacts, the Mura Solar PV Development would be largely supportive of local and regional socio-economic development and energy supply planning imperatives. The projects would contribute to the growth and diversification of the economy as well as increased energy generation capacity. Implementation of the projects would result in construction expenditure of R2–2.9 billion per Solar Facility (R8–11.6 billion for all four). During operations, a further R36.7–52 million would be spent by each Solar Facility (R147–208 million for all four). Roughly 275 to 455 jobs of 18 to 24-

month duration would be associated with construction of each 100–240 MW Solar Facility (1100–1820 for all four, although likely closer to the 1,100 given likely economies of scale). Each facility would create 21–37 permanent jobs during operations. Positive mitigation of this impact includes the timely communication of skills profiles needed, particularly during operations, so that local skills development priorities can be expanded or adapted accordingly to enable members of the local community to benefit from positions in the solar industry. Assuming that spending on socio-economic development, local community shareholding and enterprise development is spread evenly over the 20-year project period, each facility is projected to result in an annual contribution of R6–7.4 million (R24–29.6 million for all four facilities) to these objectives collectively. As these figures are based on the minimum requirements, they represent conservative estimates.

Negative impacts would occur primarily at the local and regional scale, concentrated at the project sites as well as in communities residing on neighbouring farms and in surrounding towns. These include impacts associated with the influx of people which are not anticipated to be pronounced should the suggested mitigation be implemented. To inform the rating of impacts on tourism, the area's remote location and unique sense of place has been considered, along with the findings of the VIA and HIA outlining expected changes to the area's cultural landscape. A review of local tourism establishments suggests that negative impacts on tourism are manageable, while slight benefits from business tourism are expected to compensate, at least in part, for any reduction in demand which may be experienced by tourism operators. Impacts on surrounding landowners and communities are expected to diminish with the suggested mitigation measures, and close coordination with key stakeholders is recommended to ensure that negative impacts can be limited by effective action.

It is considered most likely that the combined positive impacts of the project would exceed its negative impacts resulting in an overall net benefit with mitigation. The project is therefore deemed acceptable in terms of socio-economic impacts and should be allowed to proceed.

11.3 RECOMMENDATIONS

The following key aspects are recommended to be included as conditions of authorisation:

- The grid alignment, access tracks and switching stations proposed within the EGI corridor must adhere to the restrictions identified by the specialists and presented within the sensitivity map in **Figure 10-1**.
- The EMPr is to be updated to include the final layout map and approved by DFFE;
- The EMPr and BAR mitigation measures must be adhered to;
- Recommendations for the grid and associated infrastructure within the corridor as provided by the relevant specialists must be implemented;
- The final EMPr must form part of all contractual documents with contractors during construction and operational phases of the project. Furthermore, a dedicated Environmental Control Officer (ECO) must be appointed to ensure compliance to all EA conditions and EMPr commitments throughout the construction phase;
- Appropriate permits in terms of the Western Cape Nature Conservation Laws Amendment Act (Act No 3 of 2000) must be obtained before commencement; and
- Where required, water use authorisation under NWA is to be obtained from the Department of Water and Sanitation prior to construction.

- Should the EA be granted, approval of the final layout map will be required from the DFFE. This will be subject to a 30 day public participation process.

The following specialist recommendations have been made in respect of the project:

- Terrestrial Biodiversity:
  - The avoidance and mitigation measures proposed from the specialist should be included in the EMPr for the Mura EGI Corridor in order to avoid, reduce and manage impacts on terrestrial biodiversity.
- Aquatic Biodiversity:
  - Specific recommendations to be included in the EA are:
    - The water for construction for the EGI Corridor should be provided from a viable water source.
    - No pylons and switching stations must be placed in high-sensitivity areas. The placement of infrastructure in areas of medium aquatic sensitivity should be limited where possible.
    - Use existing disturbed areas (e.g. access tracks) where possible. New service tracks with crossings through the high-sensitivity crossings should be kept to a minimum. A specific walk down should be conducted with the specialist to identify the most suited crossing position. Where these crossings do occur, it needs to be monitored for erosion and blockages and remediated.
    - Construction sites and laydown areas should be placed at least 35m away from the delineated aquatic features. Good housekeeping measures should be implemented at the construction sites that are set out in the EMPr and monitored by an appointed ECO for the project.
    - Invasive alien plant growth and signs of erosion should be monitored on an ongoing basis to ensure that the disturbed areas do not become infested with invasive alien plants.
  - The recommended mitigation measures proposed must be included in the EMPr.
- Plant Species:
  - The avoidance and mitigation measures proposed should be included in the EMPr for the Mura EGI Corridor in order to avoid, reduce and manage impacts on vegetation and plant species.
- Animal Species:
  - The avoidance and mitigation measures proposed should be included in the EMPr for the Mura EGI Corridor in order to avoid, reduce and manage impacts on fauna and associated habitats.
  - Avoid mapped No-Go areas in the placement of pylons, switching stations and access tracks.
  - Limit the placement of pylons and access tracks in areas mapped as being of high SEI for the Karoo Dwarf Tortoise as far as possible.
  - Where any new roads or overhead lines (and associated pylon placement) traverse areas mapped as High Riverine Rabbit habitat sensitivity, the route should be microsited by a suitably qualified ecological specialist before construction commences to ensure any potential impacts are minimised.
  - Existing tracks through the sensitive areas should be used where present.

- Clearly demarcate riparian areas near to the development footprint as No-Go areas with appropriate signage and barriers.
- The pylons located within and near (<1km) the areas of mapped Karoo Dwarf Tortoise habitat should be of a design that discourages the use of the pylons for nesting by crows.
- Construction staff should remain within the construction footprint and access routes and should not be allowed to wander into the veld.
- Should rabbits be killed by traffic, then the traffic management to and from the site should be reviewed in collaboration with the EWT Drylands Programme, to identify additional mitigation and avoidance that should be implemented to further reduce roadkill.
- No dogs should be allowed on site and precautions to ensure that there is poaching or other direct faunal disturbance on site should be implemented.
- No fauna including tortoises should be disturbed or removed from the veld.
- No holes or trenches should be left open for extended periods as tortoises may fall in and become trapped. Trenches should have soils ramps present that allow for tortoises and other fauna to escape. Holes should also be checked regularly for tortoises and other fauna that may have fallen in.
- Search and Rescue before construction clearing of areas of high-quality habitat withing the development footprint as identified and mapped during a preconstruction walk-through of the power line.

- Avifauna:
  - The mitigation measures recommended must be included in each project's EMPr.
- Heritage:
  - The mitigation measures recommended must be included in each project's EMPr as well as the Fossil Chance Finds Procedure (as supplied in the palaeontological specialist study).
- Palaeontology:
  - Implement the Chance Fossil Finds Protocol (included in the EMPr) should any fossils be found during the construction phase.
- Traffic:
  - The following recommendations are made and should be included in the conditions of the environmental authorisation:
    - All remedial work or modifications to any of the public roads shall be done in consultation with and have the approval of the local road's authority (as is standard practice, this will be finalised during and be a requirement of the municipal planning approval process).
    - The treacherous section of the gravel road, through the De Jager's Pass and Molteno Pass, is safety concern that need to be addressed by the developer in consultation with the local roads authority.
    - The route for construction vehicles from the TR 01606/7 to the TR05801 should not unduly impact the local community of Loxton and should avoid the commercial centre of Loxton.
    - The developer shall contribute to the maintenance of all roads affected by the development, during the construction and operational phases of the development.

- A TMP is required to outline specific traffic management measures across all phases of the development. The focus of the TMP will be the construction phase since this is when the traffic movements and risks are most significant. TMP be compiled once the contractor has been appointed and all the relevant details of the construction process are known.
- The TMP should consider the scope of the development and take cognisance of the existing condition of the road network at the time the project commences.
- The developer shall ensure that the contractor provides the necessary driver training to key personnel to minimise the potential of incidents on the public road network.
- The developer shall ensure that the contractor erects temporary signs warning motorists of construction vehicles on the approaches to the access road.
- The developer shall ensure that the condition of the roads impacted by construction of the development is left in a similar or better state once the construction phase is complete.
- Implement the relevant transport impact mitigations measures.

- Visual:
  - Include mitigation measures suggested in the visual impact assessment into the EMPr. This should be included in the Environmental Authorisation for the project.

11.4 EA AUTHORISATION PERIOD

Appendix 1(3)(1)(q) of the NEMA EIA Regulations 2014, as amended requires “where the proposed activity does not include operational aspects, the period for which the environmental authorisation is required, the date on which the activity will be concluded, and the post construction monitoring requirements finalised” must be included in the BA Report.

The EA is required for a period of 10 years from the date of issuance of the EA to the end of the construction period (including rehabilitation), when the proposed activities applied for are completed. This is a reasonable period as it allows Eskom to conduct its internal processes which can only begin after issuance of the EA, when the proposed route is confirmed.

11.5 FINALISATION OF THE EMPR AND LAYOUT

It is important to note that the EMPr (**Appendix H**) included in this BAR is not final and although included in this BAR, it is not submitted for approval at this stage. Subsequent to the decision-making phase, if environmental authorisation is granted for the Mura EGI Corridor, the EMPr will have to be amended to include measures as dictated by the and micro-siting (where required), including the requirements of the EA. The amended EMPr and final layout subjected to micro-siting will be submitted to the DFFE for review and approval following detailed design.

12 CONCLUSION AND WAY FORWARD

The overall objective of the BA is to provide sufficient information to enable informed decision-making by the authorities. This was undertaken through consideration of the proposed Project components, identification of the aspects and sources of potential impacts and subsequent provision of mitigation measures.

It is the opinion of WSP that the information contained in this document (read in conjunction the EMPr) is sufficient for DFFE to make an informed decision for the environmental authorisation being applied for in respect of this Project.

Mitigation measures have been developed, where applicable, for the above aspects and are presented within the EMPr. It is imperative that all impact mitigation recommendations contained in the EMPr, of which the environmental impact assessment took cognisance, are legally enforced.

Considering the findings of the respective studies, no fatal flaws were identified for the proposed Project. Should the avoidance and mitigation measures prescribed be implemented, the significance of the considered impacts for all negative aspects pertaining to the environmental aspects is expected to be acceptable. It is thus the opinion of the EAP that the Project can proceed, and that all the prescribed mitigation measures and recommendations are considered by the issuing authority.

WAY FORWARD

This Draft BAR is available for review from **06 March 2023** to **06 April 2023**. All issues and comments submitted to WSP will be incorporated in the Comments and Responses Table of the SER.

The Draft BAR will be updated with all comments and submitted as a Final BAR to the delegated competent authorities responsible for authorising this project.

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

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Appendix A

EAP CV

Appendix B

EAP DECLARATION

Appendix C

SPECIALIST DECLARATIONS

Appendix D

STAKEHOLDER ENGAGEMENT REPORT

Appendix E

MAPS

Appendix F

DFFE SCREENING TOOL REPORTS

Appendix G

SPECIALIST STUDIES

Appendix G.1

AGRICULTURAL COMPLIANCE STATEMENT

Appendix G.2

TERRESTRIAL BIODIVERSITY COMPLIANCE STATEMENT

Appendix G.3

AQUATIC BIODIVERSITY ASSESSMENT

Appendix G.4

PLANT SPECIES COMPLIANCE STATEMENT

Appendix G.5

ANIMAL SPECIES COMPLIANCE STATEMENT

Appendix G.6

AVIFAUNAL IMPACT ASSESSMENT

Appendix G.7

HERITAGE ASSESSMENT

Appendix G.8

PALAEONTOLOGICAL ASSESSMENT

Appendix G.9

TRAFFIC IMPACT ASSESSMENT

Appendix G.10

VISUAL IMPACT ASSESSMENT

Appendix G.11

SOCIAL ASSESSMENT

Appendix H

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